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ROYAL COMMISSION OF INQUIRY

INTO

CONSTRUCTION OF PUBLIC TANKS AND WELLS

OF

NEW SOUTH WALES.

REPORT, MINUTES OF EVIDENCE,

AND

APPENDICES.

Presented to Parliament by Command.

SYDNEY: CHARLES POTTER, GOVERNMENT PRINTER.

1888.

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TABLE OF CONTENTS.

	PAGE.
I.—Commission	3
II.—List of Witnesses	4
III.—Report of Commission	5
IV.—Minutes of Evidence	1
V.—List of Appendices	239
VI.—Appendices	240

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—

The Honorable George Henry Cox, M.L.C.;
Major Cooper Penrose, R.R.; and
John Chadwick Woore, Esquire, Police Magistrate, Queanbeyan,—

Greeting:—

Know ye, that We, reposing great trust and confidence in your ability, zeal, industry, discretion, and integrity, do, by these presents, authorize and appoint you or any two of you, as hereinafter mentioned, to make a diligent and full inquiry into certain allegations which have been made respecting the construction of Public Tanks and Wells in Our Colony of New South Wales: And We do by these presents give and grant to you or any two of you, at any meeting or meetings to which all of you shall have been duly summoned 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 way and means; also to visit and inspect, if considered necessary, such Tanks and Wells: And Our further will and pleasure is, that you, or any two of you, after due examination of the premises, do and shall within the space of three months after the date of this Our Commission, or sooner, if the same can reasonably be, certify to Us, in the office of Our Secretary for Public Works, under your or any two of your hands and seals, what you shall find touching the premises; and We hereby command all Government officers and all 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 Honorable George Henry Cox, aforesaid, to be President of this Our Commission, which said Commission We declare to be a Commission for all purposes of the Act 44 Victoriæ No. 1, intituled, "An Act to regulate the taking of Evidence by Commissioners under the Great Seal."

In testimony whereof, We have caused these Our Letters to be made Patent, and the Great Seal of Our said Colony of New South Wales to be hereunto affixed.

Witness our Right Trusty and Well-beloved Councillor, Charles Robert, Baron Carrington, Knight Grand Cross of Our Most Distinguished Order of Saint Michael and Saint George, Our Governor and Commander-in-Chief of Our Colony of New South Wales and its Dependencies, at Government House, Sydney, in New South Wales aforesaid, this twenty-eighth day of December, in the fifty-first year of Our Reign, and in the year of Our Lord one thousand eight hundred and eighty-seven.

(L.S.) CARRINGTON.

By His Excellency's Command,
(L.S.) HENRY PARKES.

LIST OF WITNESSES.

	PAGE.
Harry Gillist	1 to 20
William Sawers	20 to 23
James William Boultbee	23
Francis Abigail	23 to 34
James William Boultbee (recalled)	35 to 42
William Sly	42 to 46
James William Boultbee (recalled)	46 to 50
David Brown	51 to 58
John Low	58 to 71
Percy Rollo Brett	71 to 74
Charles Alfred Cheney	74 to 83
Farquahar M'Kenzie	83 to 89
George William Townsend	89 to 92
Edward Quin	92 to 101
Hugh Giffen M'Kinney	101 to 103
John Edward Kelly	103 to 108
George William Townsend (recalled)	108 to 109
George Earngey	109 to 113
James Budd	113 to 117
Mark James Curry Tully	118 to 123
Thomas Waddell	123 to 126
James Yeo	126 to 131
James Cotton	131 to 134
Peter Leslie	134 to 138
Arthur Hastings Doudney	138 to 141
William Christopher Bennett	141 to 157
Arthur Pepys Wood	157 to 180
William John Hanna	180 to 191
Alexander Adam	191 to 196
John Coleman	196 to 203
Edward George Cronin	203 to 208
Edmund Caswell Bowyer-Smijth	208 to 212
Arthur William Stilwell	212 to 230
John Henry Adams	230 to 232
John Thomas Pritchard Bassett	232
William Christopher Bennett (recalled)	232 to 234
Thomas Pollard	234
John Waugh	234 to 235
John George Carew-Gibson	235
Arthur William Stilwell (recalled)	235 to 237
William Christopher Bennett (recalled)	237 to 238
David William Gregory	238
Arthur Pepys Wood (recalled)	238

REPORT.

To His Excellency the Right Honorable CHARLES ROBERT, BARON CARRINGTON, Knight Grand Cross of the Most Distinguished Order of Saint Michael and Saint George, Governor and Commander-in-Chief of the Colony of New South Wales and its Dependencies, &c., &c., &c.

MAY IT PLEASE YOUR EXCELLENCY,—

We, Her Majesty's Commissioners, appointed by Letters Patent under the Great Seal of the Colony, dated the 28th day of December, 1887, to make a diligent and full inquiry into certain allegations which have been made respecting the construction of Public Tanks and Wells in the Colony, have the honor to submit to your Excellency the following Report:—

We have held seventy-five meetings, and examined thirty-six witnesses, minutes of whose evidence are appended hereto.

We have also inspected a number of the works and appliances at the public watering places in the Hay District, with respect to which some of the more serious allegations have been made.

In this Report we have dealt as fully as the circumstances appeared to demand with the numerous allegations submitted for our investigation, confining our attention chiefly to the more prominent and important cases affecting public interests, and avoiding unimportant and tedious details.

We have dealt with the allegations as nearly as possible in the order in which they are given in the Minute Paper by the Chief Inspector of Public Watering Places, covering the *précis* of cases submitted to us, under the following heads:—

1. Faults of judgment in the selection of sites for public tanks on stock routes.
2. Defective design and faulty construction; too steep batters in most cases without reference to the nature of the soil, and the adoption of a certain form of tank without reference to the formation of the ground.
3. Excessive cost of construction of public tanks on stock routes, and sub-letting of contracts for same.
4. Incapacity of officers of the Department of Public Works, and frauds by contractors in the construction and measurement of public tanks.
5. Defective construction of flumes and inlet pipes.
6. Carelessness in laying out drains, and excessive cost of construction.
7. Expensive forms of machinery for lifting water, necessitating greater cost of maintenance.
8. Excessive cost and faulty construction of fencing; sub-letting of a contract for fencing, and excessive cost of gates.
9. Interference with Mines caretakers and overseers by officers of the Department of Public Works.
10. "Greasing" of service tanks.
11. Faulty sites of wells.
12. Faulty construction of wells; sinking, timbering, and centering of shafts, and erection of head works—whim, service tank, and troughing—before testing for supply and quality of water.
13. Excessive cost of construction of wells, and supply and quality of water.
14. Costly hutting for caretakers.
15. Defective construction of troughing.
16. Unfortunate effects of dual control, and suggested remedies.

We

We have also ventured to touch upon subjects incidentally introduced in the course of our investigations, which, though not strictly within the authorized limits of our inquiry, are nevertheless so intimately connected with the matters submitted to us, and with the interests of the public, that we trust the brief expression of our views and suggestions with respect to them will not be considered out of place in this Report.

We have dealt with these subjects under the following heads :—

(A) Cost of maintenance of public watering places.
(B) Caretakers.
(C) Condition of stock routes.

Although the witnesses have been allowed considerable latitude in giving their evidence, and in putting in documents which in some instances are inadmissible as evidence, we have endeavoured to base our conclusions upon evidence of facts within the personal knowledge of the witnesses, carefully disregarding all hearsay and extraneous statements.

We have also been guided by our personal inspection of the works and appliances at many of the public watering places, and by our personal knowledge and experience in connection with the several matters submitted to us.

No. 1.—Faults of Judgment in the Selection of Sites for Public Tanks on Stock Routes.

The construction of public watering places was commenced by the Department of Public Works in 1869, and originally, the selection of sites for, as well as the construction and maintenance of these works was entirely in the hands of that Department; but when, some years later, the Department of Mines was charged with the control and, to a limited extent, the maintenance of public watering places, it was arranged that that Department should indicate generally the position in which a watering place was required, and that the Department of Public Works should fix the exact site, which arrangement does not seem to have been adhered to in some cases. (See Q. 9, 16, 3042, 3304, 3306, and 4406.)

Mr. Gilliat states that when he was appointed Inspector of Public Watering Places, on the 6th October, 1879, there were only about twenty such places in the Colony. (See Q. 24, 25, and 121.) It appears that it was not always possible to obtain very good sites, as the selection was restricted within the limits of stock routes, and to approximately equal distances on those routes (See Q. 2934 and 3374.)

It is alleged that the Department of Public Works has committed faults of judgment in the selection of sites for tanks. Amongst the earlier works constructed by that Department are those named respectively—*Peri*, *Ventabaupee*, *Warramutty*, and *Goomboolara*, on the Paroo stock route.

The chief objections advanced against these tanks are that they have been placed in close proximity to natural waters which, it is suggested, might have been improved and utilized as public watering places, in lieu of the tanks; therefore the tanks were not required, and that public money was unnecessarily expended in constructing them, particularly *Peri* tank. It is also stated with regard to the site of *Goomboolara* tank that the catchment is defective.

In order to form a correct opinion of the action of the Department of Public Works with regard to the selection of sites for these tanks, it is necessary to take into consideration the period of their selection—1879—and the surrounding circumstances.

The district in which these tanks are situated is subject to long periods of drought; the climate is intensely hot; and generally, the natural water supply is very precarious, and the rainfall very limited and uncertain. The pioneer Crown tenants of that part of the Colony may justly be regarded as the reclaimers of a region which, in its natural state, was not inaptly described by the early explorers as a desert unfit for the habitation of man.

The natural waters, excepting Peri Springs, near which the sites for these works were selected, were certainly not permanent; but their degree of permanence was greatly increased by earthworks constructed at the expense of the pioneer Crown tenants of the pastoral runs on which they were situated, and they were at that time of the utmost importance and value to them, and doubtless were used by them as bases of operations for the conservation of water upon, and occupation of, the adjacent waterless country.

Peri

Peri Springs are the only absolutely permanent waters in that locality yielding a large supply, and were used by the first occupants of the extensive pastoral holding on which they are situated (during whose tenure Peri tank was constructed) as a refuge for the whole of their stock during periods of protracted drought.

The improvement of these natural waters at the public expense, with the object of making public watering places of them, as suggested by Mr. Gilliat (see Q. 117), would have necessitated reservation from lease; and, at the time the sites were selected, reservation of these natural waters—especially those improved at the expense of the Crown tenants—would have been, in our opinion, an unjustifiable violation of vested rights, and a very serious obstruction to the improvement and profitable occupation of the adjacent waterless country.

With regard to the statement that the catchment at *Goonboolara* tank is defective, Mr. David Brown, of Kallara, a witness suggested by the Department of Mines, states in his evidence that if a tank was required there at all, he does not think that a better site could have been had within a reasonable distance from the road (Q. 951); that in 1875 and 1876 there was no water at all at Mungundie Lake within 4 miles of the tank (see Q. 946 and 949); that he has not seen the tank dry (Q. 960); that he leased it for about two years formerly, and had the general supervision of it for three or four years after that (Q. 961 and 962); and that it was not dry during the drought of 1884. (Q. 963.) Mr. Gilliat, also, states in his evidence in reference to the tanks in question that there is no fault that he knows of as regards catchment. (Q. 107.)

Considering these statements in connection with the evidence of Mr. Hanna (Q. 3767 to 3775), we find that the site of this tank, as regards catchment, is not open to any objection.

We also find that sound judgment, a proper regard for the improvement of the public estate by Crown tenants, and a just appreciation of private rights and enterprise, were exercised in the selection of the sites for all the tanks in question; and that proximity to natural waters must have considerably facilitated and diminished the cost of their construction.

In reference to these cases see evidence, Q. 75 to 77, 96 to 121, 682 to 743, 944 to 970, 984 to 986, 989 to 995, 1021, 1022, 1867 to 1908, 2399 to 2433, 2446 to 2459, 3689, 3690, 3767 to 3775.

Dry Lake Tank.—This tank is on the road from Wileannia to Mount Brown, and has not yet been transferred to the Department of Mines. Notwithstanding that it has been submerged by an unprecedented rainfall, which could not have been foreseen, the site is admitted to be, and undoubtedly is, a very good one under ordinary circumstances, both as regards catchment and position on the road, and was reserved from sale specially for water supply many years ago by the local Commissioner of Crown lands. The Department of Mines did not recommend the site for a public watering place, which is alleged to be unnecessary on the ground that a Mr. Smith, a publican of Dry Lake, had made sufficient provision there for watering stock. The Department of Public Works on the other hand, recognizing the importance and urgency of providing *public* watering places on that road during the "rush" to Mount Brown, constructed the tank at Dry Lake, deeming it injudicious to leave the public entirely at the mercy of the publican Smith, who had the power in seasons of drought, not only to demand excessive rates for water, but to refuse it altogether, if he thought fit.

We find that in this instance the Department of Public Works acted judiciously and in accordance with the best interests of the travelling public; and that the Department can scarcely be blamed for the tank being submerged, seeing that the lake was never known to have been flooded before. It may here be noted that this is not a parallel case to Cobham Lake, inasmuch as that lake is much more liable to be flooded, being supplied by two of the largest creeks in that part of the country, and was known to have been flooded two or three times before the tank was made there. It is also very much larger than Dry Lake, where the tank is more sheltered than that at Cobham; and consequently less liable to be damaged by wave action.

In reference to this case, see evidence, Q. 122 to 128, 580 to 582, 3302.

Old

Old Copago Tank.—This was one of the earlier tanks constructed by the Department of Public Works. It was situated on the Paroo stock route, and consisted of a dam and excavation in the channel of a creek, at its entrance into Copago Lake. The dam has long since been washed away, and the excavation silted up, necessitating the construction of another tank a little higher up the creek.

We find that great want of judgment and foresight were displayed in selecting the site for this tank, as the result has amply proved; and that the officer who selected it is responsible for a great waste of public money.

In reference to this case see evidence, Q. 239, 734, 1957 to 1959, 1962.

Seaville's Tank.—This tank is on the road from Wilcannia to the Paroo; the site is objected to on the ground that it is only 7 miles from the river Darling.

We find that the tank is within about 7 miles of the nearest point of the river, which is about that distance off the Paroo stock route; that it is properly situated on the stock route about 12 miles from Wilcannia, and that there is no reasonable objection to the site.

In reference to this case see evidence, Q. 239, 2191 to 2211, 3688.

Tarella Tank.—This tank is on the road from Wilcannia to Mount Brown, and is alleged to be unnecessary on the ground that it is situated between Koonawatta and White Cliff dams, about eight miles apart, on Bunker or Teralla Creek. These dams were constructed at the expense of the Crown tenant on whose run they are situated; and we are of opinion that the water in them, conserved by his enterprise and the expenditure of his money, is as much his property during the currency of his lease as the grass upon his run; and that no person has a right to take the one or the other without his consent; and although Mr. Quin, the present occupant of the run, has generously allowed the public to use the water in his dams, there is no guarantee that he will always do so, or that his successor will be equally obliging, or that the dams will always be equal to all demands, especially as silting up is said to be inevitable. (See Q. 1960 and 3501.)

Therefore, to protect the public from inconvenience, and possible disaster in seasons of drought, when the Crown tenant would probably require all his water, the Department of Public Works chose this site as a convenient stage on the road for a public watering place; and in doing so in this and other similar instances, prior and subsequent to this, acted upon a principle laid down in a Minute by Mr. J. P. Abbott when he was Minister for Mines, referring to J. K. Well, dated 3/7/84, the justice and expediency of which we have no reason to doubt.*

We therefore find that in this instance the Department of Public Works did not commit any fault of judgment in the selection of the site, which we believe to be the best that could have been chosen, and that proximity to water must have considerably facilitated and diminished the cost of construction.

In reference to this case see evidence, Q. 132, 133, 404 to 410, 1909 to 1920, 1931 to 1939, 2219 to 2223, 2477 to 2491, 3305, 3306, 3691, 3692, 3698, 4848.

Cobham Lake Tank.—This tank is at Cobham Lake, on the road from Wilcannia to Mount Brown. The objections made to the site are that it is in the lake; that the tank has been submerged for about three years; that when the waters of the lake subside the tank will be nearly silted up; and that the expenditure on it was useless, especially as there is sometimes water in the lake.

This lake has no outlet and is capable of containing a great depth of water; it is known to have been filled—or partially filled—at least two or three times since 1865; and the water in it is known to have lasted for about seven years; it is also known to have been dry for several years in succession.

The tank is situated on the south-eastern side of the lake far above the level of its bed, but considerably below the level to which it is capable of being filled. The last time it was filled the embankments of the tank were some four feet under water, as admitted by Mr. Hanna (see Q. 3684), who acknowledges the responsibility of having selected the site. (See Q. 3672.) The water in the lake will, in all probability, be fit for general use for two or three years without further replenishing; consequently the tank will be useless as a public watering place for about six years from the time it was submerged.

The

* See minute of Minister of Mines, dated 3/7/84 (quoted in Q. 3305, p. 189)—"I think tenders should be accepted for a well, as by this means a more permanent water supply is likely to be had, and entirely independent of the lessee."

The lake covers a large area and the wave action, as the water subsides, in our opinion, cannot fail to do considerable damage to the tank—which is in an exposed position—by washing away the embankments and partly silting it up.

We find that the tank, not being required for so long a period, in consequence of the temporary supply of water afforded by the filling of the lake—does not in itself render the site objectionable, but its liability to considerable damage by wave action every time it becomes submerged, or partly submerged, is in our opinion a serious objection, which shows want of judgment and forethought in the selection of the site; and it may be deemed advisable to abandon the tank rather than risk any further expenditure upon it.

As to the suggestions of the Mines Department for a tank 3 or 4 miles south-east of the lake (Q. 2439 and 2440) or a well a mile south of it (Q. 237), the former would be too near Murlippa tank, and would make the distances between that and Cooilly still more unequal. As to the latter, the saline nature of the country and the proximity of a very large salt lake—divided from Cobham by a sand ridge only about a mile in width—is much against the probability of obtaining suitable water in an ordinary well, though artesian water of fair quality might perhaps be obtainable by boring.

In reference to this case see evidence, Q. 149 to 154; 237; 583 to 589; 2212 to 2218; 2434 to 2444; 3296 to 3302; 3669 to 3685.

Ivanhoe Tank.—This tank is on the village reserve at Ivanhoe, on the road from Booligal to Wilcannia. The allegations against the site are that, being in the centre of the township at Ivanhoe, it is inconveniently situated for watering stock; that the drainage from the township past stables and piggeries flows into the tank; that the townspeople cannot get near it; that it has never been used for supplying the town; and that it does not hold water well, the soil being very porous.

It appears that a site for this tank was first chosen on the Ivanhoe to Balranald road, about 1 mile west of the town; and a tender was accepted for construction; but it is stated pressure was brought to bear against this site by the lessees of Kilfera run and some of the townspeople. Consequently it was abandoned; and a site was then chosen at Box Swamp, about 1 mile east of the town on Tiechurst run.

Trial holes were put down and contract for construction was let, but between the time of sinking the trial holes and the arrival of the contractor on the ground, the lessees of Tiechurst run selected—*i.e.*, conditionally purchased—the site and ordered the contractor off it, no precaution having been taken to have the land reserved from sale, which Mr. A. P. Wood frankly admits was an omission on the part of his Department. (See Q. 1844, 1845, and 1846.) The Department of Public Works was then apparently forced to adopt the alternative of placing the tank in its present position on the village reserve.

This site was approved of by Mr. Gilliat in his minute of the 18th March, 1885, quoted by Mr. A. P. Wood (see Q. 3350), and appears to have been the only one then available free from the drainage of the town. Mr. Stilwell, under whose supervision the tank was constructed, states that he consulted the residents of the locality as to the suitableness of the site, and did not hear anything against it until some time after the work had been in progress. (See Q. 1417.)

We find that although this tank is on the village reserve, it is a short distance (about a hundred yards) apart from, and not in the centre of the town as alleged, which consists of only a few buildings.

That it is somewhat inconveniently situated for watering stock on account of being so near to the buildings.

That the drainage from the buildings does not flow into the tank by the drains, though it is *possible* that it might do so by an indirect course, and from the main road through the lower silt tank during heavy rains.

That the tank is accessible to the townspeople, and though there is no evidence showing whether it has been used for supplying the town or not, it could be used for that purpose, if the inhabitants wished to avail themselves of it, and were permitted to do so.

That the soil is porous and some of the water is now lost by absorption, but the deposition of silt will, no doubt, in time, render the tank sufficiently retentive, the holding powers of the tank having very much improved already.

That

That notwithstanding that the site is somewhat objectionable, mainly on account of its proximity to the buildings, the tank is a useful work and answers the purpose for which it was intended.

That the site chosen at Box Flat is, all things considered, preferable to that on the village reserve; and the Department of Public Works is responsible for omitting to have it reserved from sale.

In reference to this case see evidence, Q. 158 to 167; 656 to 674; 393 to 400; 1119; 2640 to 2646; 3347 to 3359; 4412 to 4420.

Walla Walla Tank.—This tank is on Petrie's Creek about 25 miles north of Albury. The site is objected to on the ground that it is in close proximity to natural water and that the tank was therefore unnecessary.

We find that the site was suggested by the Stock branch of the Mines Department; that the natural water near it is not permanent, and when it fails, the inhabitants of the locality are entirely dependent on the tank; and that the tank is not an unnecessary work, and the site is not in any way objectionable.

In reference to this case see evidence, Q. 177, 178; Mr. Low's report, paragraph 9, page 58; Q. 1141, 1142; 3417 to 3432; 4332 to 4337.

Gilgai Tank.—This tank is on the road from Nymagee to Nyngan. The site is objected to on the ground that there are some gilgai holes within half a mile of it which are not included in the tenants' lease.

We find that in this case the objection is of a frivolous nature, and that the site is not open to any objection whatever.

In reference to this case see evidence, Q. 181 to 183; 2940, 2941.

Gunaramby Tank.—This tank is on the road from Ivanhoe to Balranald. The allegations with regard to the site are that it is in a swamp, in rotten copai ground; and that it would have been better if it had been situated about 300 yards away on red ground, where the catchment would have been much quicker.

We find that the tank is placed on the edge of a swamp; that it has a good catchment from the swamp and the adjacent high ground; that it is capable, with proper care and management, of conserving a large quantity of water above the berm; and that the site is in every way satisfactory.

In reference to this case see evidence, Q. 838 to 840; 2636, 2637; 3362 to 3367; 4454, 4455, 4457; 4765, 4766.

Clare Tank.—This tank is on the road from Ivanhoe to Balranald. The allegations with regard to the site are that it is on low ground, in a boggy black-soil swamp, and that the works are liable to damage from being surrounded by water when the tank is full.

We find that the tank was placed on low ground in the swamp with the object of commanding as large a catchment area as possible by tapping a neighbouring swamp; that during an exceptionally wet season the water from this swamp—added to that in which the tank is situated—caused an excessive supply, which surrounded the works and made the ground about them boggy; that this state of things was prolonged by the valve being left open, allowing the water to escape from above the berm level of the tank into the swamp; that very little damage was done to the works by the excess of water in the swamp, which could easily have been prevented by cutting off the supply from the upper swamp, and preventing the water above berm level from flowing back into the swamp by closing the valve; that the site probably is the best that could have been chosen in the locality; and that there is no reasonable objection to it.

In reference to this case see evidence, Q. 1008 to 1112; 2625 to 2635; 4421 to 4432; 4765.

Box Creek Tank, and New Tank 16 miles from Balranald.—These tanks are on the road from Ivanhoe to Balranald, at the junction of stock routes. The sites are objected to on the ground that better sites could have been obtained.

We find that the sites are in every way satisfactory.

In reference to these cases see evidence; Mr. Low's report of 17th January, 1888, pp. 60 and 61; and Q. 4459 to 4466.

Tom's Lake Tank.—This tank is on the road from Booligal to Ivanhoe. The allegations with regard to the site are that it is in a rotten, boggy swamp; that there is much better holding ground three-quarters of a mile northerly; and that the tank is quite half silted up.

We

We find that the tank is partly in a swamp, in good holding ground, and where a larger catchment area is obtained, than if it had been placed in any other position; that the troughs are on the edge of the swamp, clear of the bad ground; that there is only about one foot of silt in the tank; and that the site is satisfactory.

In reference to this case see evidence; Mr. Low's report of 7th January, 1888, p. 39; and Q. 4447 to 4451, 4453, 4770 to 4774; and diagram in Appendix.

Kerrigundi and Mulya Tanks.—These tanks are on the road from Cobar to Louth. It appears to have been impossible to obtain good sites in suitable positions on the portion of the road on which they are situated; and we have no reason to doubt that the sites chosen are the best that could be obtained within the limits of the stock-route, and with due regard to approximate equal division of distance.

According to the return of the Department of Mines for the week ending 10th January, 1888,—produced by the Department at the request of the Commission—the first-named tank contained 14 feet of water; and there is no evidence showing that it has not answered the purposes for which it was intended. *Mulya tank* is said to have contained 12 feet of water at one time; and the catchment has been increased by extending the drains so as to make it fill more readily.

We find that any faultiness in the sites of these tanks is due to circumstances beyond the control of the Department of Public Works, and not to any want of judgment in their selection.

In reference to these cases see evidence, Q. 1075 to 1081; 1645 to 1653; 1671, 1672; 2777 to 2786; 3374; 3844 to 3847; 3855 to 3861; 3973 to 3984; 4140 to 4142.

Lowdale Tank.—This tank is on the road from Corowa to Urana. The site is objected to on account of the sandy and unretentive nature of the soil, which at first resulted in loss of water by absorption; but it is admitted that the tank has been made retentive, and holds well now; and, from the weekly returns of the Department of Mines relating to public watering-places, it appears that the depth of water in this tank during nine months from the 1st January last has been from 16 to 18 feet.

We therefore find that there is now no objection to the site on the ground stated.

In reference to this case see evidence, Q. 200 and 1430.

Thirty-five Mile Tank.—This tank is on the road from Ivanhoe to Wileannia. It is alleged that the site was badly selected, and that the tank never had any water in it to the knowledge of witness G. W. Townsend. On reference to the weekly returns of the Department of Mines relating to public watering-places—produced by the Department at the request of the Commission—it appears that the depth of water in this tank during nine months from the 1st January last has been from about 16 to 19 feet.

We therefore find that the site is satisfactory.

In reference to this case see evidence, Q. 1845 to 1847; 2174; 2175; 2984.

Booroorban Tank.—This tank is on the road from Deniliquin to Hay. This is a case of alleged faulty site mentioned in the *précis* of cases submitted to us—p. 220. The objections advanced against the site are that it is in a swamp, and that it is near a waterhole which is admitted not to be permanent.

There is no evidence supporting these allegations; or showing that the tank is an unnecessary work; or that it has not fulfilled the purposes for which it was intended.

Youhl Plains Tank.—This tank is on the road from Ivanhoe to Balranald. This, also, is a case of alleged faulty site, mentioned in the *précis* of cases submitted to us—p. 219. The objections advanced against the site are that the drains have had to be taken over porous ground, and that the watershed is very small.

There is no evidence supporting these allegations; and on reference to the weekly returns of the Department of Mines relating to public watering-places, it appears that the depth of water in this tank during nine months from the 1st January last has been from about 14 to 17 feet.

In

In concluding this portion of our report, we desire to point out that there are 113 public tanks on stock-routes in the Colony, including those in course of construction. With respect to twenty-two of these, it is alleged that the Department of Public Works has committed faults of judgment in selecting the sites. It will be seen from our report on the sites of these tanks that there is one case—namely, Old Copago—of total failure and loss of public money on account of injudicious selection of site; that there is one case—namely, Cobham—which may result in total failure and loss of public money on account of injudicious selection of site; and that there is one case—namely, Ivanhoe—in which the site, and the action of the Department of Public Works with respect to it, are, to a certain extent, unsatisfactory.

It is a well-known fact—and it is within the personal knowledge of two of your Commissioners—that in the selection of sites for the conservation of water the squatters themselves have made great mistakes, resulting in loss of money and disappointment; and Mr. Tully, of the Department of Mines, who has had considerable experience as a station manager, admits that in the early days "mistakes were made all round" (See Q. 2491.) Therefore, infallibility in this respect cannot reasonably be expected from a Government department; and taking into consideration the restrictions previously mentioned,—by which the Department of Public Works was limited in selecting sites for public tanks, and the novel nature of the duty to the Department,—the result is somewhat remarkable; and cannot fail to be regarded as highly satisfactory to the public and creditable to the Department.

No. 2.—Defective Design and Faulty Construction; too steep batters in most cases without reference to the nature of the Soil, and the adoption of a certain form of Tank without reference to the formation of the ground.

A great deal of evidence was taken in reference to this comprehensive allegation, which may be resolved into the following more specific allegations.

(*a*) That in most cases the batters are too steep, and will not stand.

(*b*) That in some cases the tanks are too large.

(*c*) That in many cases advantage has not been taken of the lie of the ground to conserve water over the natural surface by a proper disposition of the embankments.

(*d*) That the steep batters have unnecessarily increased the cost of construction.

(*a*) The latest type of tank approved by the Department of Public Works and the specifications are shown in Appendices.

This type is the outcome of many years' experience of tank-construction in all parts of the Colony; and we are of opinion that it is admirably adapted to the requirements of a public watering-place on a large stock-route.

The form is square, the batters of the excavation 2 to 1, and the depth 18 feet. Assuming that experience has shown that this batter is the steepest advisable in most cases, this form of tank—putting aside one of circular plan—will conserve most water with the smallest evaporation and soakage areas; the mean depth will be greatest; the surface exposed to wind and sun will be least; and the probability of the tank holding water through a long drought will be a maximum.

In some of the earlier tanks batters of 1 to 1 and 1½ to 1 were adopted, with a view of still further reducing the areas for soakage and evaporation in relation to the cubic contents. Much fault has been found with these earlier batters, and, we think, much exaggeration indulged in as to the evil effects said to have been produced by the crumbling away of these slopes under wave-action. We inspected two of the tanks specially referred to as instances of this falling-in of the batters, viz., Ivanhoe, a new tank, and Gunaramby. We are of opinion that the damage done by wave-action at these tanks is practically insignificant, and that it will probably cease as age and exposure consolidate the sides. In the older tanks, the growth of water-plants on the batters, which are undisturbed by stock, appeared to afford an excellent protection against wave-action.

We

We find that the charge of blindly adhering to one form of tank, irrespective of varying local conditions, has not been made out.

The Commissioner for Roads points out in his evidence that when he first started these works everything was necessarily of a tentative character, and that every latitude was given to his local officers to modify the type designs and specifications. This is borne out by the evidence of his officers. Long experience has caused a reduction of the slope of the batters from 1 and 1½ to 1, to 2 to 1, and in some instances even to 3 to 1.

(*b*) As regards the statements that tanks are in many cases too large, we are of opinion that the evidence does not bear out the allegation, and that the Department of Works has, as a general rule, constructed the tanks of the cubic capacity requested by the Department of Mines. Some witnesses have said that the tanks in the Cobar district are about twice as large as required, owing to the quick and good catchments generally available there; but Mr. A. P. Wood, of the Department of Public Works, shows (in Q. 3416 and Appendix XII), that the size of many of these tanks (20,000 yards) was fixed by the Department of Mines. He also proves that the *Walla Walla* tank, the size of which is complained of by some of the Mines witnesses, was constructed of its present capacity in accordance with a minute by Mr. Bruce, Chief Inspector of Stock of the Department of Mines. (See Q. 3425 to 3431.)

(*c*) That in many cases advantage has not been taken of the lie of the ground to conserve water over the natural surface by a proper disposition of the embankments.

Although the formulated allegations of the Mines Department do not contain the above charge in so many words, yet the evidence given with regard to tanks generally—and those in the Cobar district especially—led us at first to suppose that much stupidity and ignorance had been displayed in the adaptation of the works to particular sites where natural advantages existed for conserving water over the surface of the ground.

We find, however, that such is not the case; and that the allegation has not been substantiated. We consider that considerable skill and judgment have been displayed in many instances in adapting the tanks to local circumstances, so as to catch water from different levels; on one side up to—or nearly up to—berm level; and on the other side above the natural surface—*e.g.*, *Tom's Lake*, *Mongiel* and *Gunaramby* tanks,—which we personally inspected. At *Tom's Lake* and *Gunaramby* tanks the embankments are run out to the high ground to impound the water above the natural surface, and we find from the evidence that this has been done wherever practicable.

We find, also, that the shape, depth, and ratio of batters have been left very much to the discretion of the local officers, subject to approval at headquarters, and that an admirable code of instructions was issued by the Commissioner for Roads to these officers to guide them in this particular branch of their work. (See evidence, page 148.)

At *Tom's Lake* tank, which has been the subject of much adverse comment by officers of the Mines Department, there are two catchments as already explained, feeding the tank through silt-tanks at different levels. From the neighbourhood of the upper silt-tank a large deep drain has been led for about three-fourths of a mile to a shallow creek or swamp on a slightly higher level than the main tank; this creek has been dammed by a low embankment which was constructed to throw the water down this drain to the upper silt-tank and raise the water in the main tank some feet above the natural surface. When we inspected this tank we found that the water in the upper creek had been allowed to scour a channel round the dam; the intercepting drain choked up with vegetation and silt, and a cutting made through the lower side of the drain near the tank to prevent any water going into the upper silt-tank; so that the object of this drain has been completely defeated. We have no doubt that this drain has at one time brought water down to the tank as intended from the creek, partly because the upper silt-tank was quite full of silt; and from the evidence adduced, we believe the present state of the work to be due to want of proper maintenance and care on the part of those in charge of the tank. This appears to us a notable instance of the lamentable result of the divided control of these public works.

(*d*) That the steep batters have unnecessarily increased the cost of construction.

There

There is no doubt that the steep batters have increased the cost of construction, but not, we think, to the extent supposed by some. To obtain any material reduction in the cost of excavation due to the batters alone (apart from depth and other conditions) would have involved very gentle slopes of 4 or 5 to 1; and we are of opinion that in view of the many undoubted advantages conferred by steep batters, the Department of Works have been wise in keeping them as steep as possible; and that the consideration of the permanence of the water so conserved far outweighs the slightly increased cost of first construction. Taking the increased cost of construction due to steep batters at 2d. per yard in an 18,000 yard tank the increased cost of excavation is £150; and this is but a small fraction of the total cost of such a work.

We are of opinion that the holding qualities of the tanks have not suffered to any appreciable extent owing to the steepness of the batters; and that although at first a tank with steep slopes possibly may not hold as well as one with gentle slopes, yet the published records produced by the Department of Mines of the depths of water in the public tanks during the past dry year afford no indication of any undue leakage. Some of the tanks appear to have leaked when first filled; but there is no evidence to show that any undue loss is now occurring from this cause.

It has also been alleged under the head of "faulty construction," that in some instances the embankments have not been completed to the full height,—notably at *Pulletop* and *Ralkole* tanks,—and that as these tanks conserve water over the natural surface, the embankments have been in considerable danger in consequence. It has been explained by Messrs. Hanna and Stilwell, the Works officers in charge, that the contractors in each case failed to complete their embankments, and thereby forfeited some of their retention money; and that if any danger to the embankments has arisen, it has been the fault of the caretakers in not having diverted the water from the drains into the creeks and natural by-washes, and in not having made up the embankments themselves to the proper level. It is evident that unless care is observed in cutting off the supply of water to tanks conserving much above the natural surface, the best finished embankments are liable to be washed away in exceptionally heavy rains.

We took the opportunity when visiting the tanks of sounding some of them in order to test the amount of silt deposited. At *Tom's Lake* tank—which one of the Mines Department witnesses believed to be half silted up—we found only about 10 inches of silt. In an older tank, *Til Til*, we found about 2 feet of silt. This question of the silting up of tanks—which does not appear at present to be a very pressing one—and also that of pumping outlying water over the embankments, are, we think, deserving of careful consideration by the responsible authorities, as being intimately connected with the question of the permanency of the supply of water at these public tanks.

We do not consider it necessary to touch upon all the alleged instances of faulty construction and defective design cited by the Department of Mines, as it would unduly lengthen this report. We are of opinion that the design and construction of Government tanks is excellent, that the batters are not too steep in most cases, and that it is not the case that a certain form of tank has been adopted without reference to the formation of the ground.

For evidence re "defective design and faulty construction," see Q. 190 to 211; 265 to 269; 353 to 365; 418 to 426; 458; 593 to 624; 757 to 759; 819 to 821; 960 to 967; 998 to 1000; 1026 to 1027; 1066; 1130 to 1152; 1167 to 1200; 1382 to 1385; 1394 to 1418; 1460 to 1464; 1477 to 1522; 1525; 1586 to 1596; 1644 to 1646; 1665 to 1677; 1804 to 1816; 1824 to 1827; 1831 to 1836; 1964 to 1975; 2040 to 2049; 2078 to 2082; 2097 to 2118; 2147 to 2148; 2334 to 2347; 2363 to 2367; 2460 to 2470; 2490 to 2491; 2556 to 2562; 2573 to 2585; 2637 to 2639; 2646; 2652 to 2655; 2661 to 2666; 2790 to 2795; 2831 to 2836; 2848 to 2850; 2862 to 2886; 2940 to 2950; 3075 to 3125; 3154 to 3161; 3170 to 3176; 3375 to 3396; 3415 to 3434; 3619 to 3631; 3638; 3708 to 3711; 3776 to 3799; 3822 to 3825; 3835 to 3841; 3870 to 3875; 3969 to 4002; 4024 to 4037; 4160 to 4189; 4324 to 4345; 4394 to 4400; 4447 to 4483; 4688 to 4712; 4766 to 4770; 4774.

No. 8.—

No. 3.—Excessive cost of Construction of Public Tanks on Stock Routes and Sub-letting of Contracts.

It is alleged that the Department of Public Works has given very excessive prices for the construction of public tanks on stock routes, and that these prices are very much higher than those given by squatters for the construction of their tanks. (See Q. 246 to 252; Mr. Boultbee's report, paragraphs 3 & 6, pp. 35 and 36; Q. 793 to 797; 1063 and 1064; 1387, 2073, 2109, 2494.)

The principal reasons given for the alleged excessive cost of construction are,—

(1.) That the design is unnecessarily expensive, especially in respect to steepness of batters and formation of embankments round and at a given distance from the excavations. (See Q. 263, 344, 360; Mr. Boultbee's report, paragraph 6, p. 36; Q. 1019, 1501, 1803, 1824, 1825, 1831, 1832, 1984, 2310, 2311, 2661, 2707, 2864.)

(2.) That the specifications adopted by the Department of Public Works were framed for the purpose of consuming public money and contain a great many unnecessary provisions. (See Q. 459, and Appendices V and VI.)

(3.) That unnecessary, absurd, and ridiculous precision and nicety of finish of the works has been insisted upon. (See Q. 264, 267, 454, 455, 462; Mr. Boultbee's report, paragraph 6, p. 36; Mr. Chesney's letter, sub-paragraph 1, paragraph 2, p. 76; Q. 1513, 1802, 1803, 1983, 1984.)

(4.) That delay in payment of contractors has induced them to tender at higher rates than they would have otherwise. (See Q. 264, 345; Mr. Boultbee's report, paragraph 6, p. 36; Q. 440; Mr. Mackenzie's report, paragraph 18, p. 84; Q. 1385, 1976, 2312, 2313; 2348 to 2351; 2495, 2658, 2797, 2864; 2056 to 2058.)

(5.) That contracts have in some instances been let at excessively high rates and sublet at much lower rates. (See Q. 240 to 245; 257, 446; 849 to 852; Mr. Boultbee's report, paragraph 3, p. 35; Q. 1325; 1563 to 1565; 1798 to 1801; 1818 to 1822.)

A remarkable fact in connection with the allegation as to the excessive cost of public tanks—as compared with private tanks—is, that the witnesses of the Department of Mines on this question do not seem to have had any knowledge of the prices per cubic yard actually paid by the Department of Public Works for excavating tanks, excepting from hearsay statements, which do not appear to have any foundation in fact. Mr. Gillint, for example, states that he has been unable to ascertain the cost of the public tanks, yet he says the cost is excessive, because it exceeds the prices given by squatters. (See Q. 245 and 246.)

The cost of squatters' tanks cannot reasonably be taken as a basis for the cost of public tanks, inasmuch as in each case the character of the works, the purposes for which they were intended, and the conditions under which they were constructed, are totally different. The squatters' tanks are often comparatively temporary and shallow works, intended to provide sufficient water for a limited number of stock depastured on their holdings; they are generally designed and constructed as cheaply as possible, and their cost is often considerably diminished by concessions to contractors—such as grass and water for their animals, meat and stores at moderate prices, and sometimes the use of bullocks, &c.—and by taking advantage of favourable seasons and positions, in which they are comparatively unrestricted.

On the other hand the public tanks are national works, suitably designed and constructed, much deeper as a rule than squatters' tanks, and intended to last for all time, and to provide a never-failing supply of water in all seasons for an unlimited number of usually thirsty travelling stock, and for the travelling public. Concessions to Government contractors—such as those mentioned—cannot possibly be made by a public department; but, nevertheless, their money value has to be paid to the contractors, who frequently have to cart water and forage long distances, and to pay high prices for meat and stores; and the works have sometimes to be carried out under pressing public necessity, regardless of bad seasons and other unfavourable conditions. So that if the value of the concessions referred to be added to the prices paid for squatters' tanks, the difference between the cost of them and public tanks cannot be so great as represented, and is, in our opinion, amply justified by the unquestionable superiority in every respect of the public tanks.

With

With regard to the reasons advanced for the alleged excessive cost of construction, we find—

1. That the design, especially as to steepness of batters and construction of embankments, is not unnecessarily expensive for the character of the works, and is fully justified for the attainment of the objects for which they were constructed, and which they appear, generally, to have satisfactorily fulfilled.
2. That the specifications adopted by the Department of Public Works were not, in our opinion, framed for the purpose of consuming public money, but for the purpose of binding contractors to carry out the construction of the works in such a manner as to secure to the public the full value of the money expended upon them, which they appear to have done, and that they do not, in our opinion, contain any unnecessary provisions.
3. That the works appear to have been carried out in a neat, business-like, and substantial manner, in accordance with the spirit of the specifications; and, so far as we have been able to ascertain, no unnecessary, absurd, or ridiculous precision and nicety of finish has been insisted upon.
4. That a system of progressive and prompt payment appears to have been carried out for some years for the convenience of contractors; and that since that system was adopted delay in payment has not taken place, excepting such delay as is inseparable from the necessary routine of large Government Departments, and in cases where contractors have made default in carrying out their contracts, or where disputes have arisen in reference to their claims.
5. That the allegations in respect to the letting of contracts for the excavation of tanks at excessively high rates, and the sub-letting of them at much lower rates, are based entirely upon hearsay, and do not appear to have any foundation in fact, as the sequel will show. And we would here remark that the apparent heedlessness with which this very serious allegation has been made has naturally created in our minds certain doubts and misgivings as to the correctness and *bonâ fides* of numerous other allegations made against the Department of Public Works by the Department of Mines.

Reverting to the evidence under this heading, it will be seen that Mr. Gillint states that he has been informed that certain tanks at 12-*Mile*, 35-*Mile*, and 48-*Mile*, on the Booligal road, and *Box Creek*, *Til Til*, and *Youkl Plains* tanks, on the road from Balranald to Ivanhoe, were let to Burton Brothers at contract price for 2s. 6d. per cubic yard; and relies principally upon Mr. Low, Mr. Boulthee, and Mr. Townsend to prove it. But these gentlemen have utterly failed to prove it, as will be seen on reference to their evidence. (See Q. 242, 851, 852; 1796 to 1801; 1818 to 1822.)

And Mr. Abigail, in speaking of the cost of public tanks, states:—"There can be no doubt about it—there can be no question about it—that as much as 2s. 6d. has been paid away to contractors, who have sublet the work at much smaller rates." (See Q. 446). To prove beyond the possibility of doubt the incorrectness of these statements, Mr. Bennett, Engineer-in-Chief for Roads and Bridges, has exhibited to us copies of vouchers for the tanks in question, showing that they cost from 1s. 6d. to 1s. 9d. per cubic yard; and Mr. Gregory, of the Auditor-General's Office, produced the originals—see his evidence, p. 238. (See also Q. 1837.)

In reference to the evidence under this heading generally, see Q. 240 to 269; 277; 334 to 365; 373 to 378; Mr. Boulthee's report, paragraph 3, p. 35, and paragraph 6, p. 36; Q. 440 to 463; 745 to 747; 793 to 799; 1002 to 1019; 1063, 1064; 1385 to 1428; 1500 to 1501; 1502 to 1512; 1562 to 1567; Mr. Mackenzie's report, paragraphs 7 to 10, p. 83, and 19 to 22, p. 84; Q. 1796 to 1810; 1818 to 1834; 1976 to 1984; 2073; 2109 to 2111; 2119 to 2133; 2258, 2259; 2263 to 2265; 2301 to 2359; 2494, 2495; 2658 to 2671; 2796 to 2812; 2873 to 2875; 2940 to 2974; 3108 to 3112; 3131 to 3155; 3383 to 3414; 3632 to 3636; 3663 to 3666; 3937 to 3941; 3946; 4003 to 4017; 4034 to 4037; 4390 to 4398; 4473 to 4500; 4764, 4765; 4829 to 4837.

We find that in letting contracts for the construction of public tanks it has been the practice of the Department of Public Works to invite public competition by tender, and to adopt other measures calculated to insure the construction of the works at fair and reasonable prices, with due regard for the urgency of public requirements:

That

That the cost of these works has ranged from 10½d to 1s. 9d. per cubic yard, excepting in four instances mentioned in Appendix III, in which prices exceeding 1s. 9d. per cubic yard were given for the removal of rock and hard cemented gravel met with in the excavations;

That, considering the national and substantial character of the works, the purposes for which they were intended, the unfavourable conditions under which, doubtless, many of them have been constructed, and the fact that the contractors who constructed them have not, as a rule, made large profits, but in some instances have become insolvent, the prices paid for the construction of the works have not been excessive.

No. 4.—Incapacity of Officers of the Department of Public Works and Frauds by Contractors in the Construction and Measurement of Public Tanks.

It is alleged that Mr. A. P. Wood has been terribly embarrassed by the incapacity of the officers under him, and that these officers have been repeatedly misled by contractors making up the soil round the tanks so as to make the excavations appear deeper than they really are, in some instances by 2 or 3 feet; that they have been imposed upon by contractors in measuring the work; and that in one instance cement was represented to the Road Superintendent as gravel, in consequence of which he told the contractor not to go any deeper. (Q. 2250 to 2262; 3018 to 3020.)

Mr. A. P. Wood emphatically denies the incapacity of the officers under him (see Q. 3290); and from what we have seen of these gentlemen under examination before us, and learned from the evidence in defence, we are of the opinion that it is extremely improbable that they have been misled or imposed upon by such very simple and perceptible artifices as those described, or that frauds to any appreciable extent have been perpetrated. (See Q. 3170 to 3176; 3290; 3523 to 3530; 3532; 3638 to 3646; 3915 to 3924; 4133; 4390.)

No. 5.—Defective Construction of Flumes and Inlet Pipes.

Very little evidence has been elicited in support of this allegation, and what has been given is comparatively trivial and unimportant.

We are of opinion that as a rule the flumes and inlet pipes are of good construction; and that, with ordinary attention from those in charge, will fulfil—and have fulfilled—the purpose for which they were designed. At Tom's Lake tank, which has been constructed some years, we noticed an open flume failing for want of a little ordinary care on the part of those in charge of the tank.

Great exception has been taken by some of the Mines Department Officers to the method in which the water is led into Gunarmmby tank from one side. There are two silt-tanks at opposite sides of the main excavation; the water from the upper silt-tank is led round both sides of the excavation in drains cut in the berm to the flume on the further side. It is said that this will endanger the edge of the excavation and carry it away into the tank. We fail to see why this should happen with ordinary care and attention, and the explanation offered by the Department of Works, viz., that it was done to save a second flume and apron, costing £100, appears to us reasonable and satisfactory.

At Box Creek tank we found a defective valve on the inlet shoot, which has probably been the cause of a great loss of water. The tank has had 19 feet 6 inches of water in it, which, if this non-return valve had been in repair, would have been impounded in the tank as the outside water fell. We cannot say whether this valve was out of repair before the water filled the tank; but we do know that it was out of repair at the time of our inspection, long after it might have been repaired by those in charge of the tank. (See Q. 553; 838 to 848; 1096; 1644 to 1678; 2037; 3128 to 3130; 3706 to 3707; 4039 to 4044; 4455; 4781 to 4792.)

No. 6.—Carelessness in Laying out Drains and Excessive Cost of Construction.

A good deal of evidence has been received on this subject, chiefly in regard to tanks in the Hay District. Having carefully considered the evidence and visited many of the works complained of, we are of opinion that the Department of Public Works has successfully rebutted or explained away the allegations.

We

We consider it desirable to specify some cases—three of which came under our own notice :—

Tom's Lake Tank.—Mr. Low, Inspector of Public Watering Places, in a report read before the Commission (p. 59) states :—" Drains. These are badly constructed, especially one alongside of road, which for some distance from its commencement runs water from instead of to main tank, having a direct and sudden fall into same without the water, as is usual, passing through a silt tank. Owing to no silt tank being here and the drain being much cut up by traffic and nature of ground much silt must have been carried into main tank which I feel confident is quite half silted up. This drain could easily and practically have been led to opposite end of tank when water could have run through swamp and silt tank, thus allowing silt to settle and not be carried into main tank."

These statements are further corroborated in his sworn evidence (Q. 1161.) Mr. Stilwell, the Works officer in charge, in Q. 4452, says :—" That statement is directly at variance with the facts. There is a silt tank on this side of the creek through which all the flow must pass into the tank, &c."

Having carefully examined this watering place we found the upper silt tank full of silt, showing that the drain referred to by Mr. Low as running water away from the tank must at one period have run water into it. Moreover, had Mr. Low's proposal of running the water from this intercepting drain into the swamp been adopted, the whole object of the drain would have been defeated, as it was intended to run water in above the natural surface by means of this drain on the upper side, the embankments having been run out as wings for this express purpose. At the time of our inspection the lessee was clearing out the silt tank, which Mr. Low says does not exist ; but the drain referred to had been blocked, and the water diverted into the swamp, thus defeating the object of the original design.

In the same report, referring to *Dowdigans*, or the *new tank* 16 *miles from Balranald*, which had not, by the way, been transferred to the care of the Mines Department, Mr. Low states :—" Drains.—There were 50 chains 6 ft. by 9 in. excavated here. Although there had been heavy rains shortly before my inspection, these had run no water into silt tank ; in fact they never will as both drains in some places were full of water but quite dry near the tank, thus showing they would run water from instead of to main tank." In reply to this, Mr. Stilwell, the engineer in charge, states (see Q. 4467 to 4469), that the statement is at direct variance with the facts ; that when he visited the place about November, 1887, he was unable to measure up the silt tank, as it was overflowing with water brought down by these drains ; that there was no water standing in the drains themselves ; and that the water had to be dammed back from the main tank which was not quite completed.

We examined this tank at the end of August, 1888, and found the silt tank two-thirds full of water after a long spell of dry weather. We are of opinion that Mr. Low's criticisms are not borne out by the evidence and the facts of the case.

Ivanhoe Tank.—The allegation in respect to these drains is that they have been carelessly laid out and badly graded ; that one important drain (the northern drain) leading to the upper silt tank is ineffective for a good distance at the end furthest from the silt tank ; and that another drain leading to the lower silt tank runs through the town and collects filth from stables and piggeries. The Road Superintendent in charge of the work, Mr. Stilwell, in his evidence states that after a portion of the northern drain referred to had been constructed, he found by levelling that an advantageous extension of this drain could be made by cutting through a small rise 3 feet 6 inches in height, and continuing the drain on the other side for some chains. This work he gave to the caretaker to do just before the tank was handed over ; the cutting has never been continued or finished properly ; and therefore that extension of the northern drain is still ineffective.

We see no reason to doubt that Mr. Stilwell's explanation is satisfactory as far as he is concerned. As regards the lower drain passing through the township allotments we found on inspection that this drain ran through the allotments above the stables and piggery referred to, and consequently did not carry the drainage from these places to the lower silt tank. We concur in the action taken by the authorities in closing this drain, which has been found unnecessary for the supply of water to the tank, as it cuts through many township allotments. We strongly recommend that the allotments near the tank should be resumed, and the catchment area of the tank be kept quite clear of human habitation.

From

From the ample supply of water in the tank at the time of our inspection after a long period of drought, we see no reason to doubt that the drains, with the exception referred to—which has never been completed—efficiently fulfil the purpose for which they were constructed.

Hulong Tank.—Exception is taken to the state of some drains at this tank, which are said to run water away from instead of to the tank; and it is further alleged that the Department of Public Works was obliged to lower the level of the flume to get the water to run into the tank owing to carelessness in levelling the drains. (Q. 533, 879, 1096. *Précis* pp. 185–186.)

The engineer in charge replies (see Q. 4445, 4781, 4806), that the drains were not completed by the contractor, who also left the tank excavation unfinished; and the flume set at the wrong level, that the retention money was more than enough to cover the cost of completing the work by day and contract labour; that he had the flume put right by his own men as soon as possible, and not in consequence of seeing water lying in the drains; that in order to save expense he left the completion of the drains to be done by the caretaker; and that the ineffective drains complained of could easily be put right at small expense and trouble.

We are of opinion that the Department of Public Works acted in this manner from a desire to save undue expense and hand over the work to the Department of Mines for use by the public as soon as possible; but that it was unwise to so hand over the work to another Department in an incomplete state.

Excessive Cost of Construction of Drains.—Mr. Low in his report read before the Commission (p. 59 and Q. 1166) states that the cost of the drains at Ivanhoe tank was 15s. per chain—about three times what they should have cost—and this is corroborated by Mr. Yeo. (Q. 2073.) Mr. Stilwell, the engineer who constructed the tank, admits that the price paid for these drains was excessive. It would appear from his evidence (Q. 4508 to 4516) that the drains were offered for public tender, and that he was forced to let them at an excessive price to get the work done at once; and that by so doing he was able to catch the first fall of rain, which would otherwise have been lost.

It would appear that the drains were not included in the tank contract, and that had they been included they would probably have been done much cheaper.

We consider that under the circumstances the Department of Public Works acted judiciously and in the interests of the public in paying this excessive price, rather than run the risk of losing the first opportunity of filling the tank by leaving the drains unconstructed until more moderate tenders were obtained; but that an error of judgment was committed in not including the drains in the tank contract originally.

We have had no evidence to lead us to believe that drains as a rule have been constructed at excessive prices.

For evidence re drains, see Q. 553; 667 to 670; Mr. Low's report, p. 58; Q. 1157 to 1166; 1654 to 1658; 2673 to 2687; 3000 to 3001; 3126, 3127; 3350 to 3351; 3690 to 3705, 3762; 3899; 3975 to 3984; 4418 to 4420; 4434 to 4436; 4444 to 4453; 4466 to 4467; 4501 to 4502; 4508 to 4521; 4775; 4818.

No. 7.—Expensive forms of Machinery for lifting Water, necessitating greater cost of Maintenance.

The Mines Department, some years ago, strongly urged the adoption of watering appliances at public tanks; and we are of opinion that the recommendation was a wise and proper one. Objection is, however, strongly urged to the alleged expensive nature of the water-lifting appliances adopted by the Department of Works in accordance with this recommendation. The M'Comas horse-gear lift was first tried by the Works, found wanting, and condemned, as it involved expensive timbered wells and staging, and was very difficult to put in order, if anything went wrong when the tank was full. The Mines Department strongly advocated a double whip to be worked by a horse, and sent in a sketch of proposal, which the Works Department found involved the same expensive and perishable timbering as the M'Comas horse-gear lift.

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The Works Department then determined to adopt pumps, involving little or no woodwork in the tank itself, and selected some simple and effective forms of steam and horse-gear pumps for trial. The steam pumps are placed at tanks where wood is easily obtained, and horse-gear pumps where wood is not easily obtained.

Many witnesses of the Mines Department now state that neither horse nor steam-power is required for these tanks in many instances, and that the hand-power M'Comas lifts would amply suffice in these cases. We can find, however, no evidence that the Department of Mines recommended the adoption of hand-power lifts at the time the question of watering appliances was first taken in hand; and we do not consider that hand-power lifts would have been adequately powerful for these works, taking into consideration the possible maximum demand for water, the depth of the tanks, the severity of the climate, and the uncertainty as to the physical powers of the caretakers or lessees.

We are of opinion that the Department of Public Works has acted wisely in adopting the forms of machinery now in use; that the pumps—both steam and horse-gear—are simple and effective; not easily put out of order with ordinary precautions and care, and neither unnecessarily expensive in first cost nor in maintenance, considering the conditions which they are bound to fulfil at public watering places.

For evidence *re* machinery for lifting water, see Q. 324 to 327; 553 to 557; 834 to 838; 890 to 905; 470 to 471; 701 to 760; 1096; 1201 to 1219; 1527 to 1539; 1614; 1630 to 1706; 1851 to 1855; 1985 to 1986; 2134 to 2139; 2496 to 2516; 2672; 2688 to 2704; 2813 to 2830; 2890 to 2894; 2986 to 2993; 3177 to 3201; 3208 to 3227; 3324; 3372; 3435 to 3462; 3473 to 3475; 3712 to 3716; 3862 to 3869; 4051 to 4065; 4190 to 4208; 4346 to 4352; 4523 to 4536.

No. 8.—Excessive Cost and Faulty Construction of Fencing; Sub-letting of a Contract for Fencing; and excessive Cost of Gates.

It is alleged that the cost of fencing at public watering places has been excessive as compared with the cost of squatters fencing; that in some instances the construction is faulty; that in one instance a contract for fencing was sub-let with enormous profit to the original contractor; and that the cost of gates has been excessive.

We find that the prices paid by the Department of Public Works for fencing at Public Watering Places, consisting of fencing inclosing the tanks and caretakers' paddocks, have usually ranged from £38 15s. to £100 per mile; and that in one or two instances £112 and £120 have been paid.

The extent and description of fencing appears to have been decided upon by the Department of Mines (see Appendices X and XI) under departmental arrangements (see "Public Tanks and Wells—Departmental Arrangements;" Class A, No. 7; p. 175), no distinction having been made in the description of fencing for inclosing tanks, and that for lessees or caretakers' paddocks. But the Department of Public Works, finding the description of fencing decided upon very expensive for these paddocks, substituted a No. 4 wire for the top rail, or two No. 6. wires, decided upon by the Department of Mines; and placed the posts 10 ft., instead of 8 ft. 6 in., apart.

Notwithstanding that the posts were sunk 2 ft. 6 in. in the ground (which we consider unnecessary and costly), this is a somewhat less expensive description of fencing than that decided upon by the Department of Mines, and quite as effective. And in Wilcannia district a still less expensive description of fencing has been constructed.

We find that the description of fencing decided upon, and that constructed, is not too substantial or costly for inclosing the tanks, it being absolutely necessary that these valuable national works should be very substantially protected; but that the same description of fencing, and that constructed, is unnecessarily substantial and costly for tenants' leases or caretakers' paddocks; and that the Department of Mines having, under Departmental arrangements, decided upon a very expensive description of fencing for the purpose, is responsible for the somewhat extravagant expenditure that has taken place with respect to it.

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The cost of these fences per mile cannot reasonably be compared with the cost of squatters' fences, inasmuch as they are—as a rule—immeasurably superior to squatters' fences in every respect; and the conditions under which they were constructed—as in the case of tank-sinking—were probably more favourable to squatters' contractors than Government contractors. Then the timber in some instances had to be procured under great difficulties and carted long distances—in some cases 60 miles—and the contracts were very small as compared with squatters' contracts, which also has materially increased the cost.

There is ample proof that public competition was invited for the erection of the fences—in some cases repeatedly—and that the lowest tenders were accepted.

We may fairly conclude from this and from our inspection of some of them that—as fences—they are, as a rule, worth the prices that have been paid for them.

The following statement is made by Mr. Abigail in evidence (see Q. 387 p. 24):—"At one watering place a simple piece of fencing required renewing which at the most would have cost £3. The officer reported that the fence should be removed as suggested. This had to go to the Works Office, and ultimately the cost of reporting upon the removal of the fence was some £50." (See also Q. 388.)

This statement is based entirely upon hearsay. Mr. Hanna states that the work referred to was not done, and that no expense was incurred in connection with it, and gives a full explanation which we consider perfectly satisfactory. (See Q. 3758 to 3761.)

The faulty construction complained of consists chiefly in erecting fences without straining posts, running the wire out to its full length, and straining and fastening to posts only 3 inches thick, which it is said will not stand the wiring plug being driven in; and are splitting and giving way, being unequal to the strain.

We find that this description of fencing has been erected in several instances, experimentally, to lessen the cost and to avoid splicing the wire; but it was discontinued on account of the objection raised by the Department of Mines.

We inspected some fencing of this description in the Hay district; it was in very good order, and seemed to be well and substantially constructed; and we did not observe any of the posts splitting or giving way; but we are of the opinion, nevertheless, that a fence constructed in the usual way with special straining posts is better.

With regard to sub-letting Mr. Abigail states (see Q. 477) "There was one case (Booroona tank) which cost more than £120 per mile. It was sub-let by the contractor to another man, and the former pocketed about £40 per mile." And referring to sub-letting fencing at Ivanhoe tank Mr. Yeo states (see Q. 2710):—"The first contractor must have made a profit of £60 per mile on the transaction;" and Mr. Low referring to this case (see his report, last paragraph, p. 59) puts down the profit from first contract price at "at least £33 11s. per mile."

We find that no evidence excepting hearsay has been tendered in support of these statements.

With regard to excessive cost of gates constructed by the Department of Public Works at a cost of from £10 to £15 each (see Appendix XX), we are of the opinion that these gates are not too substantial for access of stock to public watering places, and that their cost is not excessive.

It is stated that at some of the paddocks to which travelling stock are not admitted these expensive gates are provided (we observed some of them at paddocks in the Hay district), but as no reason is given for this apparently extravagant expenditure, we have no alternative but to find that the Department of Public Works is responsible for it.

In reference to the evidence under this heading generally, see Mr. Boulthee's report p. 36, paragraphs 2 and 3; and Q. 882 to 889; 473 to 487; 800 to 801; 821 to 825; 1031 to 1033; 1063; Mr. Low's report, page 58, paragraphs 2 and 3, p. 59, paragraph 13; and page 60, paragraphs 13, 17 and 18; Q. 1220 to 1261; 1437, 1541, to 1557; Mr. McKenzie's report, page 84, paragraphs 8 and 9; Q. 1707 to 1731; 1997 to 2007; 2149 to 2154; 2171; 2390; 2517 to 2521; 2589, 2590; 2705 to 2714; 2841 to 2847; 2895 to 2899; 3228 to 3238; 3476 to 3498; 3536 to 3541; 3719 to 3739; 3740 to 3761; 3876 to 3897; 4056 to 4059; 4209 to 4242; 4357 to 4365; and 4537 to 4582.

No. 9.—Interference with Mines' Caretakers and Overseers by Officers of the Department of Public Works.

It is alleged that caretakers and overseers of the Department of Mines, at public watering places, have been interfered with by officers of the Department of Public Works, and that the interference has taken place chiefly in the Hay district. (See Q. 502 to 510; Mr. Low's report, last paragraph on page 61; Q. 1289 to 1314; 2522 to 2524; 2715 to 2733; 3010 to 3014.)

We find that with the exception of the interference admitted by Mr. Coleman, which appears to have been justified (see Q. 4100 to 4107), there is no admissible evidence of direct interference with the caretakers and overseers of the Department of Mines by officers of the Department of Public Works; but that Mr. A. W. Stilwell, Road Superintendent of Hay district, Mr. A. P. Wood, Mr. W. J. Hanna, and Mr. J. Coleman have, we believe, in the execution of their duty, and in the interests of the public, indirectly interfered by reporting to the head of their Department cases of negligence and incompetence of caretakers of the Department of Mines, that have come under their notice. (See Q. 3240 to 3242; 3500 to 3510; 3523 to 3527; 3657 to 3662; 3785 to 3789; 4100 to 4107; 4584, 4593, 4594, 4624; Mr. Stilwell's letter of 9th February, 1887, p. 227.)

That such negligence and incompetence is amply proved by the evidence of Mr. Stilwell, Mr. Wood, and Mr. Adams (see Q. 4610 to 4614, Mr. Stilwell's reports, pp. 222 to 224, and Q. 4588, 3503 to 3505, 4716) and by the fact proved by the evidence of Mr. Abigail, Mr. Boulthee, and Mr. Low, that several of the caretakers were reported and suspended for neglect of duty and dismissed on account of their unfitness for their positions. (See Q. 507, 876, 877, 1290, 1312, 1313.)

As far as we were able to observe, the caretakers on the Hay and Ivanhoe and Balranald roads were capable and attentive to their duties.

No. 10.—"Greasing" of Service Tanks.

It is alleged that service tanks were "greased" with a composition of tar, tallow, and pitch (Q. 907); that 7,000 sheep were lost on the borders of a tank because they would not drink the water owing to the mixture which the Department of Public Works has been in the habit of dressing the inside of service tanks with, causing a film to arise on the water and rendering it undrinkable by stock (See Q. 452 and 2769); that the Mines Department strongly objected to this being done, and has evidence to show that it was done after it was objected to. (See Q. 510.)

We find that a mixture, composed of tar, tallow, and pitch, was in three instances applied by the Department of Public Works to the inside of service tanks, a somewhat similar mixture having been reported by Mr. M'Kinney, C.E., of the Mines Department, to have been used with success in Victoria and having been recommended by him to Mr. A. P. Wood.

That the statement that 7,000 sheep were lost on the borders of a tank because they would not drink the water owing to its being rendered undrinkable by the use of the mixture is not substantiated.

That the mixture at first produced a film upon the water but its effects appear to have been only temporary.

That the Department of Mines objected to further use of the mixture on service tanks, and its use was at once discontinued by the Department of Works in deference to the objections of the Department of Mines.

That no evidence whatever has been offered showing that the mixture was used after it was objected to. (See Q. 3254 to 3259; 3511 to 3519; 913 to 915; 2770.)

No. 11.—Faulty Sites of Wells.

J. K. Well and Menamurtie Well.—These wells are on the road from Wilcannia to Mount Brown. The objection advanced against them is that they are unnecessary, having been placed near permanent waterholes, which might have been used as public watering places. (See Q. 129 to 148; Mr. Boulthee's report, p. 36, paragraph 4; Q. 411, 412; 1921 to 1931; 2527 to 2531; 3306, 3307; 4848; 3346.) The waterholes referred to are named respectively "J. K." and "Menamurtee."

Though they are fine waterholes they certainly did not afford a permanent supply of water in their natural state; but the supply was largely increased by dams constructed at the cost of the first occupants of the runs on which they are situated.

The

The fourth, sixth, and ninth paragraphs of our report upon the sites of Peri, Yentabangee, Warramutty, and Goomboolara tanks (see pages 6 and 7), and the second and third paragraphs on the site of Tarella tank (see page 8), apply generally to these wells, rendering repetition here unnecessary.

It will be seen that the action of the Department of Public Works in these cases is covered by Mr. Abbott's minute. (See note, foot of page 8.)

Willandra Well.—This well is on the road from Balranald to Ivanhoe. The site is objected to on the grounds that the Department of Mines did not ask for a well there; that one watering-place, namely, a tank, would have been sufficient between Clare and Ivanhoe; that the Department of Public Works constructed two watering-places there, namely, a tank and the well in question; and that the well is absolutely unnecessary on such a road. (See Q. 169 to 172; 3323, 3324; extract from Mr. Gilliat's report of 13th January, 1880, upon the road from Balranald to Ivanhoe, on page 27, Mines *précis* of cases; Q. 4766.)

We find that in constructing two public watering-places between Clare tank and Ivanhoe the Department of Public Works was guided by Mr. Gilliat's recommendations for 1884, for two works (see Appendix XII); and in our opinion one public watering-place between Clare tank and Ivanhoe would not be sufficient, and that a public watering-place at this site is necessary.

Rota Well.—This well is on the road from Hillston to Cobar. The site is objected to on the ground that it is almost alongside of a permanent waterhole in Willandra Creek. (See end of Q. 521, Q. 3295 and 3296.)

We find that the site, though now objected to, was approved of by the Department of Mines, and the Department of Public Works acted in accordance with that approval (see Q. 4848); that Willandra Creek at this point does not afford a permanent supply of water; that the well is a very necessary and useful work; and that there is no reasonable objection to the site.

Normanstone Well.—This well is on the road from Gunnedah to Coonabarabran. The site is objected to on the grounds that it is not identical with that fixed by Mr. Gilliat, and that it is in basalt country. (See Q. 179, 233; latter part of Q. 521; Q. 1730 to 1743; 1756 to 1758.)

It appears from the evidence of Mr. A. P. Wood that this well is in basalt, and was sunk within a few chains of the site fixed by Mr. Gilliat; that many wells sunk through basalt have proved very good water-yielding wells; and that wells sunk in the neighbourhood have given an abundant supply of water. (See Q. 3326 to 3340.)

We find that in this instance the arrangement between the Departments with respect to sites (see Q. 9) appears to have been adhered to by the Department of Public Works; that the fact of the site being in basalt country is not sufficient to justify us in condemning it, and that there is no evidence showing that a supply of water would have been more readily obtained by sinking the well in the exact position defined by Mr. Gilliat.

No. 12—Faulty Construction of Wells—Sinking, Timbering, and Centering of Shafts and erection of Head-works (to line Service Tank and Troughing) before testing for Supply and Quality of Water.

There are about thirty wells at public watering-places, and the Department of Mines allege that many of these wells have been constructed, and great expense incurred, without a proper test being made of the supply and quality of the water.

Exception is taken to the sites of *Baloola* and *Normanstone* wells as not being in the exact sites prescribed by the Mines Department, and also that they have been sunk in basalt rock; that no water has been found; and that the whim and service tank were erected or commenced at one of these wells before any water was found.

No trial shafts were first put down in these cases, as the ground was basaltic and it was thought cheaper to sink the main shaft at once.

We are of opinion that it would have been wiser to have bored in these two cases; and that the Department of Works committed an error of judgment in not doing so, as admitted by Mr. Wood (see Q. 3549), although they appear to have had good grounds for their action, as wells in the same district through basalt are said to give a fair supply of good water.

We

We find that head-works were not put up at *Normanstone* well, as stated, and that at Baloola the contractor was stopped constructing the service tank, the whim having been put up most probably to help in the sinking of the shaft. It would appear that these wells are not yet done with, and further boring and driving operations are either in progress or contemplation, so that water may yet be obtained.

Old Gunbar, *Holy Box*, and *Dolmoreve wells* are cited as cases where the Department of Works have completed the shafts and head-works without testing the quality of water and that in each instance the money has been thrown away, owing to the water being quite unfit for stock.

In the case of *Old Gunbar Well* we find that the Department of Works received a sample of water which was good, which purported to come from the trial shaft; and that having sunk the main shaft some distance away from the trial shaft, bad water was obtained, and that the water has remained unfit for stock ever since.

We are of opinion that in this instance the Department of Works has not evinced enough care in testing the quality of water previous to erecting costly head-works and fencing.

In the case of the *Holy Box Well*, we are of opinion that the Department of Works were justified in proceeding with the erection of head-works; and that although the quality of the water is not so good as it might be, it has much improved, owing most probably to constant baling. We visited this work, and found that a large number of travelling and station stock were watering at it, and our own horses drank readily of the water. (Q. 4755 to 4760.)

Dolmoreve Well.—The water at this well is not at present fit for stock; and we find that in this instance also the Department of Works is responsible for having completed the head-works, &c., without properly testing the quality of the water. Seeing, however, that there is within a mile of this well a private well where the water is very good, and from which water is constantly being drawn, we recommend that the well should be leased, if possible, to the lessees of Til Til station, for, say, two years, with a view of its being given a thorough trial, and of testing the value of constant baling in improving the water. We have reason to believe that the manager of Til Til station would be ready to take the well over for a time.

Willandra Well is cited as an instance of faulty construction and excessive cost without any supply of water for stock having been obtained.

We find that this well has given great trouble to the Department of Works, which is still endeavouring to get the well completed and to obtain a supply of stock-water. It would appear that in sinking the main shaft the contractor failed to get the shaft to stand in soft drift at the bottom, and it had to be abandoned, and a new one sunk in close proximity, three contractors failing to complete the well. It appears that the whim, service tank, and troughing have been erected, and two shafts partly sunk, the sums paid to contractors amounting to £752, or considerably less than the first contract. As the operations in connection with this well have not yet been concluded, we are of opinion that the time has not yet arrived for criticising this work, which may, after all the difficulties that have been encountered, prove a useful public watering-place. (Q. 4819 to 4821.)

Wooloondool Well is cited as an instance of faulty construction, in that the Works Department omitted to put a floor and pipe at the bottom of the well; and that in consequence of this omission the bore at the bottom of the well became choked with silt. The Department of Works affirm that no floor or pipe is necessary, and that baling or the occasional probing of the bore is all that is required to keep the well in order. We believe a floor and pipe, as suggested—and, we understand, constructed—by the Mines Department to be unnecessary; and fail to see how it will get over the silting up of the bore, unless constant baling is kept up.

It appears to us doubtful whether wells are satisfactory as public-watering places where brackish water is known to exist, seeing the uncertainty that seems to obtain as to whether the water when struck will be fit for stock or not, and as to where the line is to be drawn between good and bad stock-water. Seeing, however, that wells are so much cheaper than tanks, and afford a more permanent supply of water, we are of opinion that both the Departments of Works and Mines have evinced a proper regard for the public purse in making every effort to put down wells as often as possible, and that the Department of Works is by no means singular in its failure to provide good stock-water in every instance.

For

For evidence *re* "faulty construction and excessive cost of wells," see Q. 172 to 176; 179; 212 to 234; 272 to 279; 514 to 523; 553; 802 to 806; 924 to 934; 1035 to 1060; 1096; 1145 to 1149; 1326 to 1343; 1441 to 1448; 1644; 1733 to 1759; 1848 to 1849; 2011 to 2014; 2178 to 2180; 2744 to 2761; 3002, 3003; 3035; 3160 to 3169; 3260 to 3276; 3310 to 3345; 3543 to 3570; 3925 to 3936; 4265 to 4293; 4615; 4649 to 4650; 4819 to 4823.

No. 13.—Excessive Cost of Construction of Wells.

It is alleged by the Department of Mines that the cost of construction of wells has been excessive.

We are of opinion that no comparison can be made between the wells constructed by the Department of Works at public watering places, and those constructed by squatters as regards the material and workmanship. We find that the total cost of some of the wells has reached a sum of £1,000, but this includes the whim, service tank, and troughing, and frequently repairs and alterations. We believe the construction of these works to have been let by open tenders, and that the Department of Works has exercised due reluctance to accept high tenders. We do not consider the class of work at these wells unnecessarily good or expensive for such important national works. Our remarks as to the disadvantages under which tanks are often constructed, tending to raise the cost of construction, apply in some degree to wells.

No. 14.—Costly Hutting for Caretakers.

The Department of Mines allege that the caretakers' huts designed by the Department of Works were too expensive, and that by undertaking the construction of these huts themselves they have effected a saving of something like 50 per cent. Having compared carefully the drawings and specifications of the huts designed by the Works Department with those constructed by the Mines Department, some of which we have inspected on the spot, we find that no comparison can fairly be instituted between the two classes of buildings. (See Appendices.) The designs of the Department of Works, which were estimated to cost about £100, provide for three rooms, with spouting, and a tank for rain water, while the constructive details are far stronger and better than those of the huts put up by the Department of Mines.

Having examined some of the huts erected by the Mines Department, we consider that they are of very inferior construction; that they will probably in their present condition, fail to withstand a strong gale of wind; and that they are scarcely fit habitations for human beings in the severe climate of the western district. In these huts only two rooms are provided; the gauge of iron and scantling of timber are of the lightest description; there are no braces to walls or roof; no painting of wood work is done; and no guttering or drinking tank is provided—even at brackish wells, such as Holy Box, where we found the caretaker carting his drinking water from Mossgiel, distant 16 miles.

We believe that it would have been a truer economy to erect the more expensive huts designed by the Department of Public Works.

For evidence *re* hutting, for caretakers, see Q. 282 to 295; 1071 to 1073; 1344 to 1354; 1574 to 1577; 1760 to 1764; 2015 and 2016; 2535 to 2537; 2602; 3277 to 3283; 3577 to 3579; 3800 to 3817; 3942 and 3943; 4294 to 4298; 4717 to 4726; and Appendices.

No. 15.—Defective Construction of Troughing.

Exception is taken by the Officers of the Mines Department to the original type of railing put round the watering troughs to prevent cattle and sheep from getting into them.

We find that this railing was at first experimental, and that the Department of Works submitted a sketch of the railing as used at some private troughing for the approval of the Department of Mines; that this form of railing was generally approved by the Inspector of Public Watering Places, but that it failed to give satisfaction to the public. We find that a superior design of troughing has been

 adopted

adopted by the Department of Works, and that a rail down the centre as proposed eventually by the Department of Mines, has also been adopted. We think the latest type of troughing and railing to be excellent. We find that the Department of Works adopted the form of railing which was the best they knew of at the time, and that the subsequent alterations are the outcome of experience. We noticed that the alterations now being carried out to existing troughing rails by the Mines Department are by no means uniform; and while those at Ivanhoe tank appear to be excellent, those at Mossgiel tank seem to us quite the reverse.

We do not find that the Department of Public Works has been to blame in this matter, which has been the subject of experiment for some years by the pastoral community.

For evidence re troughing, see Q. 427 and 428; 529 to 531; Mr. Boulthee's report, pp. 36-7; Q. 807 and 808; 916 to 923; 1355 to 1366; 1372 to 1378; 1568 to 1572; 1578 to 1580; 1765 to 1773; 2017 and 2018; 2158 to 2165; 2391; 2538 to 2540; 2763 to 2770; 2900 to 2916; 3580 to 3582; 3944 to 3946; 4114 to 4116; 4299 to 4300; and Appendices.

No. 16.—Unfortunate effects of Dual Control, and suggested Remedies.

We find that the evidence throughout discloses that the dual control exercised by the Department of Public Works and the Department of Mines over the public watering places, and the laxity in adherence to arrangements between them—doubtless framed with the best intentions, but in which the seeds of discord are sown broadcast (see p. 175)—has, as a natural consequence, for some years past, been productive of frequent unseemly differences and recriminations, and much unnecessary and irritating correspondence between the Departments, the tedious details of which we have deemed it unnecessary and unprofitable to enter into in this report.

This very objectionable state of things has no doubt for a corresponding length of time been highly prejudicial to public interests, and to the decorous and regular conduct of public business by the Departments in question. We therefore deem it incumbent upon us to suggest the adoption of the following remedies:—

(1.) That the Department of Public Works, be charged with the construction of all public watering places, whether tanks, wells, or artesian borings, and with the entire supervision, maintenance, and control of them.

(2.) That the necessity for constructing public watering places on any stock route, be in all cases reported to the Department of Public Works by the Stock Branch of the Department of Mines.

(3.) That the sites for such watering places be fixed by the Department of Public Works, dividing the distances between them as equally as the circumstances may permit.

(4.) That before entering upon the construction of such watering places a report be obtained by the Department of Public Works from the Government Geologist, or other competent authority, as to the advisability of sinking wells or boring for artesian water.

In concluding this portion of our report we desire to point out that for some time past three classes of officers have been employed in the supervision, control, and maintenance of public watering places, namely: Road Superintendents, under the Department of Public Works; Inspectors of Public Watering Places, and Overseers of Public Watering Places (who are also Inspectors of Stock), under the Department of Mines. (Q. 647 to 649.)

But in the event of the Department of Public Works being charged with the entire supervision, control, and maintenance of all public watering places in accordance with our suggestion, the services of the Inspectors and the Overseers of Public Watering Places would be unnecessary, and the duties now performed by them might conveniently (with necessary assistance) be undertaken by Road Superintendents resident in the several districts, who presumably being trained engineers, and having supervised the construction of these fine works, and the erection of all the appliances connected with them, must naturally have a better knowledge of their management, and a greater interest in them than could be expected from unprofessional officers of a foreign department.

SUBJECTS REFERRED TO AT PAGE 6.

(A.) Cost of Maintenance of Public Watering Places.

It appears that the revenue derived from public watering places, provided at great cost for construction and maintenance, is so insignificant that the maintenance of them is a burden upon the community.

The principal reason for this appears to be that in good seasons—or after heavy rain—there is usually sufficient natural water along stock routes to enable stock to travel independent of public watering places, which—irrespective of such conditions—have to be continuously maintained up to the normal standard of efficiency, notwithstanding that they may sometimes remain unused for long periods.

We are of the opinion that these works should be at least self-supporting, and that they might with perfect justice be made so, by making owners or drovers of travelling stock pay for the water along the particular stock route they wish to travel, at the time they take out their travelling permit.

The revenue from public watering places would thus be collected by officers of higher responsibility than caretakers over whom, under the present system, there does not appear to us to be any sufficient or satisfactory check.

The proposed mode of payment would not be applicable in the case of teamsters' stock, the collection of charges for which, being comparatively a minor matter, would probably have to be entrusted to the caretakers as at present, if no better arrangement could be made.

(B.) Caretakers.

Intimately connected with the question of cost of maintenance is that of caretakers, who, under present arrangements, are employed at most of the public watering places, and we think are indispensable for the protection of the works.

In some cases public watering places are leased, but lessees appear to us not to be so much under control, and in case of any default, such as negligence or incompetence, cannot be so readily and promptly dealt with as caretakers.

Leasing, moreover, appears to involve the expense of erecting several miles of fencing which, where steam water-lifting appliances are used, is unnecessary for the efficacy of the works; and even where horse-power appliances are used, less fencing would perhaps suffice for caretakers than for lessees.

For these reasons we believe caretakers to be preferable to lessees, and in the event of our suggestions as to payment for water by travelling stock being carried out, caretakers might be allowed the use of existing paddocks in part payment for their services.

(C.) Condition of Stock Routes.

We desire to direct special attention to the fact that although a very large expenditure has been incurred in constructing public watering places on the stock routes of the Colony with the object of rendering them available for the passage of stock—especially during seasons of prolonged drought—that object is partially nullified by the usually bare condition of the stock routes, owing to their not as a rule being reserved from lease, and otherwise protected.

The holders of runs over which they pass—naturally desiring an equivalent for the rental they pay—usually divest the portion of their runs embraced by the stock route of every vestige of sustenance, thereby in dry seasons rendering the passage of stock in parts of the Colony not yet traversed by railways very hazardous—if not impossible—just perhaps at a critical time when it may be necessary to remove them to save their lives; the situation being that they must either perish miserably on drought-stricken country, or face the terrors of starvation on a stock route abundantly supplied with water, but utterly devoid of any other sustenance.

This appears to us to be a matter of considerable moment, and we have ventured to introduce it into our Report in the interest of the public and in the cause of humanity.

We

We observe that reference is made to the condition of reserves and driftways for travelling stock in the Annual Report of the Stock and Brands Branch of the Department of Mines for the year 1881 (page 9).

Understanding that the Department of Mines wished to reply to the evidence of the Department of Public Works, we expressed our willingness to receive oral evidence in reply, in denial of facts spoken to by the witnesses of that Department; but although ample opportunity was afforded, no such evidence was tendered.

In conclusion we deem it but just to record our opinion that, although the construction of public watering places and the works connected with them has not been altogether faultless, the large degree of success attained in so extensive, and to some extent experimental an undertaking, is very satisfactory, and highly creditable to the Department of Public Works.

Certified at Sydney under our hands and seals, this thirteenth day of December, 1888.

(Signed) GEO. H. COX, President.
J. C. WOORE.
COOPER PENROSE, Lieut.-Col.

ERRATA.

Question 106, page 6. *Before* the words "Are these springs not known to be the most permanent water in that part of the country back from the river" *insert* the word "Chairman."

Question 1645, page 84. *For* "Mulga tank" *read* "Mulya tank."

Question 2206, page 110. *For* "3 miles" *read* "9 miles."

Question 2218, page 110. *For* "40 feet" *read* "20 feet."

Question 3115, page 146; and Questions 3391 and 3394, page 166. *For* "main depth" *read* "mean depth."

Question 4842, page 238. *Add* to note attached to question the following—"The witness subsequently produced the original vouchers."

ROYAL COMMISSION OF INQUIRY INTO CONSTRUCTION OF PUBLIC TANKS AND WELLS.

MINUTES OF EVIDENCE.

THURSDAY, 12 *JANUARY*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

Harry Gilliat called in and examined:—

H. Gilliat. 12 Jan., 1888.

1. *Chairman.*] What position do you occupy in the public service? I am Chief Inspector of Public Watering-places.

2. You are aware that various charges have been made against the Works Department—that portion of the Works Department which has the construction of tanks and wells: You are aware that certain charges have been made against them? I desire to explain at once that I can hardly regard what has been said as charges, as these papers which I have placed on the table are communicated to me by my local officers in many cases, and submitted by me to my Minister. Of course it would be necessary for me to point out that according to these statements there appears to be considerable waste of public money in the construction of these works; and in the covering paper forwarded to you the other day you will find these cases set out. The full papers from which they were drawn will be submitted to you.

3. Of course you are aware that when I speak of making charges, I do not mean that they are criminal charges; but, rather, charges of carelessness and neglect? Exactly; this is the point which the Minister desires me to clearly explain to the Commission. As a matter of fact the charges are rather against this department than against the Works Department.

4. Well, in that light we can scarcely call them charges; but have not the Roads and Bridges Department charge of the public watering-places? I should say that the Roads and Bridges Department had not charge of the public watering-places.

5. But they have charge of the construction? Yes.

6. Have you yourself any knowledge of these defects or want of skill in construction? To a very large extent I have. I used, until lately, to spend nine or ten months out of every year in the interior. Up to 1885 I visited every part of the colony, but since then the duties have so increased that I could not make the inspections so frequently.

7. *Major Penrose.*] Do you not think it would be well to get a clear definition how far the duties of each department extend?

8. *Chairman.*] Yes; there is a sort of dual control. As soon as the work of one department is completed it is handed over to the other department.

9. *Witness.*] It is handed over to the Mines Department. We can recommend any number of sites for tanks, but it remains for the Works Department to decide which shall be selected. The arrangement arrived at between the two departments will be seen from the printed papers. It was a matter of some discussion, the final decision being that the Mines Department should indicate the position in which they wished the watering-place to be put, and that the Works Department should fix the exact site; so that, if in a report I recommend a certain site, the Works Department are supposed to fix it exactly. I objected to that arrangement at the time, but was overruled. This arrangement has been in force ever since; although, I may add, a number of watering-places have been constructed by the Roads and Bridges Department without reference to the Mines Department.

10. Are you aware upon whose recommendation these were made? The matter was never referred to us, and I knew nothing about them officially until we received an intimation that they were ready to be handed over.

11. *Major Penrose.*] Within what limits would the Works Department be allowed to vary the site of a tank? There was no actual rule established. It was merely that the Mines Department should indicate generally the position of the tank. The Works Department fixed the exact site.

12. *Chairman.*] Then I understand that the general site would be fixed by the Public Watering Places branch: the Works Department to construct it within a suitable distance therefrom? Yes; in two of the cases that are brought before you, of wells, I attached so much importance that I fixed the exact sites by mile-posts; in both of these cases the position was altered.

13. To what extent? In one case to about 4 miles, and in the other to about a third of a mile.

14. *Mr. Woore.*] Are there any papers to define the arrangements and relations between these two departments? Yes; and they will be submitted to you. They will be submitted with the printed papers; and that is the reason why I was anxious not to be examined until the printed papers were laid before you, so that I could be able to refer to them while under examination.

15. *Chairman.*] I think we ought to exhaust this subject now before we touch another. We can in that way make our inquiry as symmetrical as possible. We can proceed point by point, and there will be no confusion in referring back to anything we have dealt with. You say that in the first instance the Mines Department were not consulted as to the localities in which tanks and wells were to be sunk? The arrangement was that we should recommend; but cases have occurred in which watering-places have been constructed without reference to the Mines Department.

H. O'Hist. 12 Jan., 1888.

16. *Mr. Woore.*] The arrangement has not been strictly adhered to, then? No.
17. Was it adhered to at first? For the first few years I had great difficulty in getting works constructed; but, latterly, owing to the recognition of the importance of the works, the Works Department have proceeded with greater rapidity.
18. *Chairman.*] So that the Commission may understand, is it not a fact that when the Public Watering Places Act came into force it was then arranged that no tank or well should be constructed without reference having been previously made to the Mines Department, and the work recommended by it? That arrangement came into force previous to the inception of the Public Watering Places Act. This measure should have altered the whole affair, because it gave the whole power to the Secretary for Mines—that is, the whole power of construction. As a matter of fact this Act took the whole power out of the hands of the Works Department.
19. So I gather from you that the present construction of tanks and wells by the Works Department is in contravention of the Public Watering Places Act of 1881? Yes, it is. But I may further say that soon after Mr. Abigail took office he directed that certain of the papers showing the relations between the two departments should be put before him. These were submitted to the Cabinet, and by its direction a letter was subsequently addressed to the Mines Department, directing that for the future it should undertake the construction of these works. My first action was to place before the Minister a statement of what would be necessary before we gave practical effect to the Cabinet minute, and we wrote to the Roads and Bridges to know what arrangements they had entered into for the construction of the various works recommended by the Mines Department during the last few years. They were again reminded, but we have received no reply, and my hands are tied in regard to doing anything except with further works; because I cannot get the information as to what engagements have been entered into.
20. *Mr. Woore.*] I should think the letter referred to ought to be produced.
21. *Witness.*] I will have it put in.
22. *Chairman.*] When did the construction of tanks and wells first begin under the Government—do you remember? I took charge in 1879, but to the best of my belief the earliest tanks that I heard of were the three little tanks that had been completely destroyed, which were constructed by the Surveyor-General's Department. The first constructed by the Roads and Bridges branch was, I believe, the Boonoona tank, on the Booligal to Wilcannia road, about 92 miles from Wilcannia. The 18-Mile tank on the same road was constructed before I took charge. The 35-Mile tank, the Holybox well, the Jumping Sand Hill well, the Mossgiel well, the Mount Manara well, were also constructed prior to my appointment. Then, on the road from Balranald to Ivanhoe, the Box Creek, the Youhll Plain, and the Til Til tanks. These are all that I recollect at the present time, besides those on the road between Cobar and Bourke.
23. *Mr. Woore.*] Is there not another, the 25-Mile tank? That has been completed since. There are a number of others; one at the 28-Mile, and another at Ivanhoe. Those of which I speak are prior to 1879—to October of that year. On the road between Cobar and Bourke there were several. I would like to qualify that statement, as I am not quite certain that these latter were not constructed in that very year. Of course, I am merely giving an approximate idea of the dates.
24. I asked this question because I wanted to know how these tanks were taken over, and in whose charge they were previous to your taking charge of them? There was absolutely no one—no caretaker—in charge. There were some other tanks on the Cobar to Bourke road, and the Cobar to Nyngan road. I think I am approximately correct in stating that there were not more than twenty tanks and wells for public watering-places constructed in the colony at that time. Our present list of available works is 168.
25. You were first appointed overseer of public watering-places? I was appointed inspector. I was first appointed in the year 1879.
26. *Major Penrose.*] Is that position conferred under an Act of Parliament? I was appointed by the Governor and Executive Council, and in consequence of the rapid increase of public watering-places, the Act became necessary.
27. *Chairman.*] Previous to your appointment, who took care of the tanks and wells? They were without caretakers, and the principal objection—the original element of discord—is my having been obliged to point out to my Minister in a departmental communication that no care was being taken of the tanks and wells after construction, and that some of them were useless. That was the subject of a report, which I am sorry I cannot put in evidence, because the document was destroyed in the Garden Palace fire. Prior to the appointment of caretakers, the tanks and wells were mainly in the hands of the various road superintendents.
28. *Mr. Woore.*] Were not some of these public watering-places let to squatters? I think in one case this was done. The Waiko well was so let.
29. What about the tanks on the Booligal road? I think not. I can only speak from hearsay.
30. Was it not a general practice? I cannot say. Until we introduced the system of leasing I never heard of it.
31. *Chairman.*] Then we are to understand that prior to your appointment there was absolutely no control exercised over these tanks and wells after construction? To the best of my knowledge and information, none but that of the local road superintendent. I received authority from my Minister to take delivery of these works from the different local road superintendents.
32. So that they were really under the control of the road superintendents? Yes.
33. Then after your appointment did you take steps to have caretakers appointed on all these tanks? I called attention in a number of reports, showing the condition which these works were in; and I think it was early in 1880—I cannot be quite positive about it—it was decided to appoint caretakers. It was very soon after my appointment. I also, at an early date, pointed out that the appointment of caretakers would necessitate additional outlay by the Government, and urged the importance of leasing the works. This gave rise to the steps subsequently taken.
34. We are anxious to go through the whole process, so that we may find out who are responsible.
35. *Witness.*] The Department of Works were hardly aware of the importance of these works to the travelling stock at the time, and my recommendation was made that a certain area of land should be attached to each of these tanks and wells by which the lessees would benefit, and would add to their inducements to rent them.
36. *Mr. Woore.*] You are quoting now from the report? Yes, I am quoting roughly from it; but I cannot put it in, because the papers were, as I have already said, destroyed in the Garden Palace fire.

37. Is that the substance of them? Yes; so far as I can recollect.
38. *Chairman.*] What I am trying to lead up to is to ascertain who the parties are who had these tanks in charge from the earliest time to the present. I want to find out when they took charge, so that we may know who are responsible for the work from the beginning to the end? I may state that the general substance of these reports has been frequently re-stated in reports that will be placed before you.
39. No doubt the papers, when they come before us, will give more information, but any papers that are printed are of no value to us, except they are supported by oral testimony. We must get our information viva voce, and on oath, so that every statement made in the papers must be verified on oath. I may add that any statement made in the papers is useless to us, excepting so far as it will help us to elicit information for ourselves. Now in the year 1896, some few months after your appointment, you recommended that instead of giving the tanks over to the caretakers they should be leased, and that small portions of land should be attached to them—in fact, that a sort of common should be made around those tanks and wells for the use of travelling stock? Yes. In the original recommendation the arrangement was that 200 acres should be given around the tanks as a special lease. But my duties kept me constantly in the field at that time, the office duties being then performed by the Chief Inspector of Stock. He brought before the Minister for Mines my reports from time to time, and amongst these was a recommendation that we should give over 200 acres to the lessees under special lease.
40. Were these leases to be disposed of by tender? Yes; they were originally to be invariably let by tender.
41. Was that arrangement carried out? That was given effect to, but I cannot say exactly the date. It would be in the course of a year or two afterwards, and some of the public watering-places referred to would be in these reports.
42. Then, you say that your report was acted upon some time subsequently, and that these tanks and wells—or most of them—were leased, with small portions of land attached? Oh, no; only a few of them, because we had a very great difficulty in getting satisfactory surveys from the Lands Department. In some cases of special lease asked for at a work, 200 acres were prepared; but the surveyor, not understanding the requirements of public watering-places, placed the work in the centre; the consequence was that as a leasehold the land was of very little value, because so large a slice would be taken away to admit stock.
43. What was the object of this leasehold: was not the land to be a sort of common? No; it was intended as an additional inducement to a person to come forward and lease the works. The water would enable him to keep a little stock of his own and to have a garden; but the tank was supposed to be always on a reserve.
44. *Major Pearse.*] Having the water, these leases would be useful to the caretaker in the way you state? Yes.
45. *Chairman.*] Then, you had some difficulty in having the surveys made to enable you to issue these leases? Yes; that is the better way to put it, because what I have said before might be considered a reflection on the Lands Department. I certainly had no intention of making any such statement in this connection. I think it was really a difficulty to obtain suitable surveys. We had a difficulty also, inasmuch as there was some trouble in obtaining the services of men understanding the requirements of the watering-places. The lease of the 200 acres was intended for the use and convenience of the tenant, so as to give him a small property which he could cultivate in the neighbourhood of the work.
46. And unless this survey was made on one side of the tank, so that the tank should not be in the centre of the ground, the land would be valueless to the lessee; because it would be a mere common, for the use of travelling stock? Yes.
47. Were there any other causes of delay beyond the want of appreciation, and the difficulty in having surveys made? No; but there were other causes mentioned in my earlier reports. In these I pointed out that where the tanks had been constructed there was no continuity in the line of water; one tank might be placed here, and there might not be water for a great number of miles on either side. I called attention to the necessity of having these works at regular distances, to enable travelling stock to pass from one to the other without suffering from any risk of thirst.
48. Do you think that that could be the fault of the Department? I may point out that this was the view I took in my recommendations of the object to be attained for the future.
49. Well, suppose there was no water for 50 miles. The Government would put a tank midway or 25 miles from the nearest water—that would give temporary accommodation, but they could not put a tank at 12 miles, except after a long time. Yet, after putting the other tanks through, the route was made available at once? I recommended that tanks should be put down at points which would enable us to bridge over dry places; that subsequently they should be put down at intervening points. This has since been carried out, and some routes are magnificently watered now.
50. Then, for various reasons, the system of leasing the tanks was not followed? It is in force, but was not availed of to the full extent that I hoped it would, and which I think it will be in the near future.
51. But in the meantime you had caretakers? Yes.
52. When do you take charge of the tanks and wells, and by whom are they handed over to you—by the Works Department? We usually took over the tanks and wells from the local road superintendents; but in some cases arrangements were made by which we nominally took transfers. I, for a time, visited and took the transfers myself, and placed the men in charge, who were to be directed by overseers. I believe it was about 1894 that we took charge of the first new works.
53. So that they were absolutely placed in charge of the Mines Department as soon as they were handed over by the person in charge under the Works Department? Yes.
54. And you became responsible for them? Yes; but as a matter of fact one of the questions which arose at the time was as to who should undertake repairs. The maintenance of the tanks is vested in the Mines Department, but in case of accident or break-down, or a "wash-away," or anything of that sort, it became necessary under the old arrangements to refer the matter to the Department of Works.
55. *Major Pearse.*] Then you had no constructive power? No, for there was a clause in one of the arrangements that we were not to spend more than £10 per annum for minor repairs at each tank. We looked, therefore, to the Works Department to repair any accident of a serious or disastrous character.
56. *Chairman.*] What were the duties of the caretaker? Exactly what is detailed here in these printed instructions. These are the instructions issued to the caretakers, which were prepared by me for the officers of the Department; and with them are the regulations and the Act. The pamphlet gives general instructions to inspectors, overseers, and caretakers.

57.

H. Gillist. 12 Jan., 1886.

57. In accordance with the regulations at the end of the Act? Yes; they were practically the same as those in the Act and Regulations. Of course, experience has shown us what was desirable and what was not, and we have altered the regulations; but they are fundamentally the same.
58. *Mr. Woore.*] What I understand is that, after the tanks were completed, they were handed over to the Mines Department?
59. *Chairman.*] Yes, unless some break-down occurred.
60. *Mr. Woore.*] Let us hear what this "break-down" means? It means that anything that requires the expenditure of money we are required to refer to the Works Department.
61. In case of silting up of the tank, would that be repaired by the caretaker? Yes.
62. Then, all you could do in the way of repairs was what the caretaker could do? Exactly so.
63. Beyond that, it was the duty of the Public Works Department? Yes: we were allowed the sum of £10 to be expended on each tank by our department; that was outside what the caretaker might be able to do. Substantially, these are all the instructions issued to caretakers.
64. *Chairman.*] Then, what you mentioned just now—that only substantial damages were made good by the Works Department; and that, where damages are of less cost, they are not referred back to that department—does not that show that the Works Department do not finally give up all charge of those tanks and wells, even when handed over to you; because, in any heavy breakages, you state that the matter might be referred back to them for repairs? Yes.
65. Is not that likely to be the cause of disagreement? It was the whole cause of the annoyance and friction which have arisen. When the printed papers come before you, they will show that.
66. We are not going into that now. We want to confine your remarks now to the fact that various tanks and wells were sunk in improper places. The other matter is only incidental? I think I may safely say, to the best of my belief, this was one of the fundamental causes of the disagreements between the two departments. I stated this substantially to the Minister in a draft which I gave to him, and which he took to the Cabinet meeting; but it was never seen afterwards. The document was not registered nor copied. My statement to him was this—that, when we called for certain repairs to be made, the Works Department said that the repairs were necessitated by the carelessness of the Mines officer, while we contended that it was through the works not having been properly carried out in the first instance.
67. *Mr. Woore.*] Was it optional with the Mines Department to take over these tanks or not? Were you obliged to take them over whether in good order or not? I am very glad indeed that you have asked that question. We did not desire to take works over unless in good order. On the contrary, on one occasion I refused distinctly to do so unless I received instructions from the Minister; but I was instructed to take over everything that Mr. Bennett handed to us.
68. *Chairman.*] You have no discretion in the matter? No; none whatever. I have a discretion now; because, since Mr. Abigail came into office, I raised the question with regard to certain works.
69. *Mr. Woore.*] You were obliged to take the tanks and wells over whether you approved of them or not? Yes; whether I thought they were properly carried out or not. As soon as the papers are placed before you, you can turn up all the points and the deductions to be derived from them.
70. When these tanks were completed, was the construction of them approved of by any person, either in the Mines or Works Departments, before they were handed over to you? In many cases they were not approved of by us; but I assume that they were approved of by the duly authorised officer of the Works Department.
71. Do you know who he is? Mr. A. P. Wood and the local officer, I believe, dealt with the contractor. I am very much afraid that until the case is properly before you, with all the papers, it will be difficult for me to make myself clear to the Commission. In many cases years have elapsed since the matters referred to in the papers were dealt with.
72. *Chairman.*] We met here on Tuesday, and had the *precis* of the papers handed to us. We then determined to examine witnesses first on the faults of judgment in the selection of sites for tanks and wells; second, on defective design and faulty construction; third, on expensive forms of machinery; fourth, on faulty construction and excessive cost of fencing; fifth, interference with contractors; sixth, subletting of contracts; seventh, faulty construction of wells, sinking and centreing of shafts, erection of head-works, service tanks and troughing before testing supply and quality of water; eighth, excessive cost of construction; ninth, cost of hutting for caretakers; and tenth, defective construction of troughing? Well, I will deal with the first point, and I can state that some of these tanks have been under water since 1885.
73. Well, we will not go into that now. I merely wished to point out to you how we want to carry out this inquiry. We want to exhaust one subject before we go into the next.

[*A discussion ensued, with the result that it was arranged the Commissioners should not read the papers for the present, but go on with the points given in the précis.*]

74. *Chairman.*] Then all tanks were placed in the hands of caretakers? When I say that all were placed under the charge of caretakers, there may be one or two tanks where (being close to natural water) we did not think it necessary to employ men. We did not think that we were warranted in going to the expense of engaging caretakers for them.
75. What tanks were these? Peri Sand Hill, Yentabangee, Warramurtie; and, I think, Goomboolara.
76. These were the tanks that you declined to put caretakers on? We really found that no stock would come there to water, and on that account we did not think that the expense was warranted.
77. *Mr. Woore.*] You thought that, being close to natural water, the tanks would not be required? Yes; that the tanks would not be used, owing to the presence close by of natural water.
78. *Chairman.*] The number of tanks became so numerous, and the expense so large, that you considered it desirable to have legislation on the subject? Yes.
79. And you recommended that such should be done? Yes. I recommended it, but not in writing. It was more in the nature of a conversation with the Minister.
80. Well, we will put it in that way. There was a large expense incurred, and in view of the great importance and necessity of legislation you advised certain changes, which were made in the Act of 1884? Yes, that is a very fair way of stating it.
81. Now, did this Act lessen the difficulties that you were labouring under with regard to the unfortunate disagreements between the two departments? Oh, no; I don't think so in the least. I do not think that as the Act has been administered it would be likely to reduce departmental friction. The Act legalised the construction of public watering-places, and enabled their being placed under caretakers; but as

administered,

administered, the Act did not in any way reduce the friction between the two departments—not in the least. H. Gillet.
82. Are you in a position to point out how the Act could be remedied in this direction? Well, the fifth clause of the Act provides that the construction should be vested in the Minister who administered it, and there is another clause providing that the works should be leased by the Mines Department. 12 Jan., 1898.
83. Then the Act was not carried out in its integrity, although the fifth clause said that the Minister for Mines shall have the construction and maintenance of the tanks? No.
84. And notwithstanding that this provision is in the Act of 1894, the law has not been carried out? No; it has not been carried out.
85. Can you give any reason why the Act was not carried out in its integrity? I can give no reason for it. I have pointed out from time to time to the Minister how urgent and desirable it was that the whole of the construction and maintenance of these tanks and wells should be placed under the control of one department.
86. What is the Minister's opinion on the subject? Well, he is the first Minister who has taken a very strong view of the matter. The other Ministers were very much pressed with other business, and have allowed this matter to stand.
87. *Major Pearce.*] I may point out to you what the Act says: "It shall be lawful" to make a change? According to my reading of the Act, I should say the Minister has the power at any time to take over the construction of the tanks.
88. *Chairman.*] Are you aware why the Minister of your department does not carry out the law in its integrity? Can you tell us why he does not take on himself the powers and duties conferred on him by this Act? That I cannot say; I have no evidence to show. I really do not think there is any reason to show why it has not been done.
89. But there is a Cabinet minute on the subject? Yes; it was written about September or October last.
90. Can you put it in evidence? I will do so at the next meeting.
91. *Mr. Moore.*] What is the substance of this Cabinet minute? That the construction of public watering-places and the maintenance shall in future rest with the Department of Mines.
92. But if there is an Act giving that power already to the Minister for Mines, is this minute needed? No; I don't think there is any necessity for it.
93. *Chairman.*] Can you tell us why that minute has not been acted on? Well, when the minute directing the construction of watering-places should be taken over by the Minister for Mines was received, the period of retrenchment came in. We asked the Works Department to make arrangements to enable us to carry out the construction. Before I could go on I had to ascertain how far the Works Department had gone with letting contracts. I therefore submitted to the Minister, that in accordance with the instructions from the Cabinet, it was necessary we should be informed to what extent the Works Department had made engagements with contractors for works, and also the names of those works. To that letter we have received no reply. I could do nothing further with regard to these works, and could not put down in the estimates for this year the sum of money which I thought would be necessary to carry them out until such information was supplied.
94. And having no money you could not go on with the works? Certainly not; because the money voted hitherto was for the Works Department, and it was impossible for me to make any provision or prepare estimates for the carrying out of the work, until we received the information as to how the other department stood with regard to contracts. We have been waiting for that reply ever since, and have not yet received it. We thought that an amicable arrangement could be made for the transfer of the vote, as was done with regard to the vote for hutting. When the Works Department submitted the tenders they had accepted, or had arranged to accept, they were sent on to us; but the average cost was thought too high. The vote was transferred to us, and we have since carried out these works.
95. *Major Pearce.*] We have got clearly now the position of affairs.
96. *Chairman.*] You tell us that the papers show that Peri Springs tank has been constructed within 500 yards of permanent springs, one of which gave 7,000 gallons per day. If this is proved, it is clear that the tank was constructed near permanent water? Upon this I can give you personal evidence, because I have inspected it several times.
97. Is it a fact that this tank was constructed within 500 yards of permanent water? I will not say that it is within 500 yards, but the spring is within the tenant's lease. As one method of recouping money that had been unnecessarily expended on the tank, I had a survey made to include the springs within the tenant's lease at the Peri Springs tank. A person said that if he were allowed to develop the Peri Springs himself he would make the Paroo run into the Darling. This tank has certainly been sunk within half a mile of permanent springs. One of these springs was opened by Mr. Hogarth, the manager of the Mouba Pastoral Company, whose letter on the subject is attached to these papers.
98. *Major Pearce.*] Who asked that the tank should be made at that spot? From recollection I cannot now say.
99. You do not remember at whose instance this tank was sunk? No; it certainly was not sunk through any action taken by the Mines Department, as the papers will show.
100. *Mr. Moore.*] Where are those springs situated—are they not in the lake? They are on the edge of the lake.
101. Are they not right in it, or, at all events, right on the margin of the lake? Yes; on the margin. The lake itself is about 5 miles by 18, and when full lasts about three years with drinkable water. After that the water becomes brackish and finally salt. When completely full, the water in the lake will last five or six years.
102. *Chairman.*] It it filled now? Yes; it has been filled by an overflow.
103. *Mr. Moore.*] Have you ever known the supply of water for stock to fail in the Peri Springs during the driest season that you have known? I have been through the country during the severest drought that the colony has known, and there was then plenty of water there.
104. If the supply of water had failed in the spring, were there other springs that could have been opened, and would have given a further supply? Certainly; Mr. Hogarth's letter says that by an expenditure of £300 he could have supplied sufficient water there to water every hoof that came down the Paroo.
105. Are these springs on the travelling stock reserve, or are they on private property? If they are not available for travelling stock, it would necessitate a tank being put down, and there may be some reason

why

H. Gilliat. 13 Jan., 1888.

why the Works Department put the tank there in this case? I am going to explain still further. In wet seasons the Paroo, by overflowing the country, forces teamsters and the travelling stock to go close to the shores of the lake. The tank has been put on the wet weather road, and in close proximity to the springs. This diagram shows the edge of the Peri Lake, and the tank on the east side of it; while here is the road in which the stock has to travel in time of flood. The tank, instead of being put on the dry weather road, and where it might have done some good, was put there 3 miles further back upon the wet-weather road, where there is always a supply of water. In this case, the route goes along the clay-pan and sand ridges, along the shores of the lake, and regains the main road further on.

106. Are these springs not known to be the most permanent water in that part of the country back from the river? I should say so unquestionably. I think they are the most permanent water on the Paroo, or even in the whole of this part of New South Wales, with the exception, perhaps, of certain springs on the other side of the Paroo between Yantabulla and the Paroo. They are the same line of springs, but on the Bourke to Hungerford road.

107. *Major Penrose.*] Are there any other faults with regard to the size of these tanks—is there any fault as regards catchment? No fault that I know of as regards catchment. Of course, there are places on this line where tanks would have been useful. My original report is against these particular ones. The Peri Springs tank was bottomed on cement, which is very difficult to take out.

108. *Mr. Moore.*] This tank was constructed after you took charge? Yes, after I was appointed inspector; but I think the selection of the site was made about the time of my appointment. I am not sure that I was not consulted myself about this tank.

109. You do not know at whose instance the site was selected? I know this by looking through the papers—that it was selected by the Works Department at the instance of two Sydney stock firms, who asked that water might be supplied *en route* between Hungerford and Wilcannia. I see by the papers the sites of both tanks were selected by Mr. Cambridge, who was the Works Department local road superintendent at Wilcannia.

110. *Chairman.*] This is a very important matter? Yes; and it will be shown fully in the papers.

111. Then the site of this Peri tank was selected by Mr. Cambridge of the Roads Department? Yes.

112. *Mr. Moore.*] I suppose you have his report on it? The Peri Springs tank papers give the whole history of the case. They show that letters were received calling for a tank at this place.

113. This man was quite a stranger in the district at the time? I believe he was.

114. Will you please read the report made by Mr. Cambridge on the matter? Yes.

Report by Mr. Road Superintendent Henry Cambridge.

Tanks, Paroo Road.

Sir, Hay, 30 June, 1879.

In accordance with your instructions, I visited the Paroo respecting proposed tanks on that road. I found that the following would be about the stages from Wilcannia to—

1. Copago dam, 27 miles—dam and tank here already made by Department.
2. Mumba dam, 50 miles—nothing required here.
3. Peri Sand-hills, 70 miles—tank required here.
4. Nipper's Creek, 83 miles, or Yantabangee Lake, 89 miles—good sites for tank at either.
5. Warramartee, 105 miles—tank.
6. Goombalara, 131 miles—tank.

I think the £6,000 available will make four tanks, at £1,300 each. They need not be very large—say, 12,000 cubic yards each. I should recommend that tanks be put down at Peri Sand-hills, Nipper's Creek, or Yantabangee Lake, Warramartie, and Goombalara. At this last place the Paroo channel becomes defined, and water is found in the water-holes. The places recommended are all cane-grass swamps, and have good drainage area. The sites recommended have been suggested by some of the oldest residents in the district, to whom I am indebted for a great deal of information respecting the road and sites suitable for tanks. I should have mentioned that we already have a tank and dam at Copago. At Mumba there's a good billabong, which is very seldom dry, and has at present a good supply of water; so that the tanks I suggest will cover the portion of the track at present unwatered. My visit was very hurried, and consequently I had not such a good opportunity of thoroughly examining the country as I could have wished, especially as it rained the whole of the time I was away from Wilcannia; but I think that very little more can be said of these sites I propose than that they are suitable.

I should not think of recommending any tanks with pumping gear for this portion of the district, but similar ones to those that are being put down between Hay and Booligal. I am, &c.,

The Commissioner for Roads. HENRY CAMBRIDGE.

I should suggest that these tanks be let as soon as possible, to enable contractors to take advantage of grass and water. This will save at least 20 per cent.

With respect to Major Penrose's question just now as to whether there were other objections, it appears to me, in the first place, that it was radically wrong to put a tank there on account of its close proximity to water which is much more permanent than the tank. There is also the fact that no trial shafts were sunk to ascertain the nature of the soil in which they were going to put those tanks down. Then Mr. Cambridge writes:—

Peri Tank.—On the 22nd January I received the enclosed letter from the contractor, advising me that he had got on to a hard sandstone in the drinking tank, and asking for extra remuneration on that account. I wrote him in reply herewith, and on my visit found matters as described by the contractor. I found powder was being used to blast out the stone. I brought a sample with me, which I send by post. I think some slight allowance might be made. Will you kindly inform me if the stone being in the tank, and not having shown in any of the trial shafts, will nullify the contract? I have never had such a case before, and shall be glad to know for future guidance. The main tank and also the silt tank were completed. A good deal of gritty material came out of the main tank. The banks round the tank were well consolidated and were well trimmed. I laid out a series of drains, shown on accompanying plan. They follow the water-courses, which at this tank are fairly plain and are well graded—in fact, the fall throughout is about 1 in 200 to 1 in 100. I laid out about 113 chains of drains, which will be quite sufficient here. The water at this tank will be good, as it all runs off sand hills and hard ground. I find a great deal of salt in all the ground about; but I do not think this will injure the water.

There are a good many clay-pans. These places are hollows that have been coated with clay from water lying in them. These will all be drained into the main drains.

———

Reduce the size of the tank. Arrange it so that the cattle will stand on the stone as far as possible when drinking. I find that it is objected to that they beg in these tanks.—W. C. B.

One would think Mr. Cambridge's common sense would guide him here. Of course the man must be paid extra; but I cannot conceive how Mr. Cambridge laid out a tank in a place where there was the slightest possibility of meeting rock. I hope such a thing will not occur again. If the printed specification was complied with, it could not. Will the tank be water-tight?—W. C. B.

I do not wish to put this in evidence; but I may remind the members of the Commission that in dealing with this gentleman's report a considerable amount of latitude must be allowed, because he was subsequently

subsequently convicted of a serious crime. He was convicted of embezzlement, and was confined in gaol for a number of years. I believe the embezzlements took place in connection with supplies to these very contractors. Cambridge stated that tanks would be put down after consultation with a certain number of the oldest residents of the district. I wrote to Mr. Hogarth, the manager of the station on which this tank was placed, and told him the whole story. My letter is as follows:— H. Gilliat. 13 Jan., 1868.

My dear Mr. Hogarth, Ivanhoe, 18 January, 1868.

I wish to obtain an opinion from an independent observer with regard to the value of the Peri Sand-hill, the Yentabangee and Warramurtie Government tanks, on the Paroo, and whether they are or are not so close to other sources of water as to interfere with their being leased.

Any remarks you may have to make upon them will be more carefully attended.

As I am preparing a paper on these works, I shall be glad if you will let me hear from you as early as possible.

I am sorry to say that the tracing you lent me, with the other papers connected with the wells of the Colony, were destroyed in the fire at the Garden Palace.

I expect to be on the Paroo in four or five months' time, when I hope to have the pleasure of meeting you.

W. Hogarth, Esq., Manager, Momba Pastoral Company HARRY GILLIAT.

The following is Mr. Hogarth's reply:—

My dear Mr. Gilliat, Momba, 27 January, 1868.

Yours of the 18th to hand, re tanks in this district.

Peri Sand-hill tank I don't think you will ever be able to let, simply because it is within a quarter of a mile of the Peri Springs, therefore I think putting the tank down in the present site a great waste of public money. Had the Government and station owners (M. P. Co.) combined and spent say £300 on the Springs, they would have watered all the stock that ever came down the Paroo, and all station stock that the country would carry.

Yentabangee is almost similarly situated, being within about 3 miles of the Tongo waterhole, which is almost permanent on the one side, and Olpoloko waterhole on the other side, also about 3 miles distant from tank. In my opinion this tank should have been put down at the Olpoloko waterhole, as it would have divided the distance between the Peri Springs and the Tongo waterhole, making about 10 miles from the former and 6 or 6½ from the latter.

Warramurtie tank I don't know anything about, as I have never seen it. I note the tracing, &c., I sent you, got burnt. Should it be of any further use to you, I could get you another, and also showing another well where I was fortunate in getting good stock water at 148 feet. The supply is not great, but I believe by going down 5 or 6 feet there will be an abundant supply. Hoping to see you in the course of a few months,

I am, &c.,

Mr. Gilliat, Inspector of Tanks and Wells. W. HOGARTH.

113. *Mr. Moore.*] Well, we will go on to the next tank—Yentabangee—where is that situated? Yentabangee is the next tank to the Peri Springs. It is not so serious a case as the Peri Springs case, except that it is close to water, which would give a large supply at a less cost had the natural features been utilised.

116. Have you thought of the possibility of floods washing away dams? I know that some of the dams on the Paroo have been washed away, but far above Yentabangee and Olepoloko; but all danger could be avoided by increasing the earthworks, and allowing flood waters to go off by the natural by-washes. I am speaking now of what could be done at either of those places.

117. What is the next tank? The next tank is No. 118—Warramurtie. This is within half-a-mile of a waterhole that lasted during the whole drought. The point we raise is a twofold one: If the tank is excavated within reasonable distance of permanent water, it is absolutely impossible to lease it. The question is, then, whether it is not more desirable to improve permanent water where it exists, than to make new tanks and wells. The point I am raising is this: that the tank has been put down near a permanent waterhole. So permanent is it that I have never known this place to be dry, even during the last drought; and Mr. David Brown, of Kallara, on whose run this place is situated, can give you testimony to this effect.

118. *Major Pearson.*] Is this another tank recommended by Mr. Cambridge? Yes.

119. Did the Works Department know at this time that the tanks were going to be leased? I cannot say that.

120. Because your objection on that ground to leasing to squatters would fall through? I should say it was extremely likely that they did not know that the tanks were to be leased; but it is a point on which I cannot say whether they were informed or not.

121. *Mr. Moore.*] Were there any reports since the reports received from Mr. Cambridge? Mr. Cambridge's reports came in June, 1879. I was only appointed on the 6th of October of the same year, so that it would have been some months before my appointment. Consequently, these tanks were recommended before the Works officer knew anything about me, or about the proposal to lease the tanks.

122. So that no idea of leasing could have been brought forward? No. The Dry Lake tank has never been transferred to us, because it was under water the whole time.

123. In regard to this Dry Lake tank, you say there was no necessity for it? I was sent up at the time of the water famine at Milparinka. Sir John Robertson was Colonial Secretary at the time, and I had to report upon a scheme of water supply for this road. I made a full report, and it will be placed in evidence here. My recommendation concerning this place was that a tank was unnecessary. A man named Smith had put down two tanks and a well, and had made provision for the watering of travelling stock which I considered sufficient, and I called attention to that fact.

124. You thought a Government tank there unnecessary? Yes; and I drew attention to the fact that as Smith had gone to considerable expense to put down water, we should not enter into competition with him; and that so long as his charges were reasonable I did not think we should interfere. I considered it a legitimate enterprise and expenditure of private capital, and I believed we should not put a tank there. I also made a series of recommendations as to where in my opinion water should be provided, and as the watering of this road is one of the most serious errors that have been committed from our point of view, I should like to be examined upon it. The Works Department in this instance put a tank where we recommended there should not be one.

125. Was there not a public-house there? Yes; a very respectably-kept place, indeed.

126. *Major Pearson.*] If this Mr. Smith placed a tank and well there, and made them profitable, surely the Department were justified, in case they wanted to construct a tank there, in thinking that they could do the same? Quite justified, if they thought the tank necessary; but I thought that under the circumstances it was not necessary, because this man Smith had made arrangements to water stock, and did, as a matter of fact, water stock all through.

127. When you were there did you foresee that the place was likely to be flooded? No; and I did not object to the general site at all. I merely thought that a watering-place at that point was entirely unnecessary in view of the local provision that had been made. I recommended also that the whole of the lake should be reserved as a water reserve in case it might ever be required for that purpose.

H. Gillies. 12 Jan., 1888.

128. *Mr. Woore.*] Was it not already a water reserve? I was informed there were frequent applications made for it. The reserve was in danger of being alienated. Applications were being made for it as a conditional purchase.
120. *Chairman.*] You know something about Meenamurtie? This is another case in which a well was constructed in the vicinity of permanent water. This well had been sunk within half a mile of permanent water on the Bunker Creek.
130. *Mr. Woore.*] When was that well sunk? Within the last year or two. I submitted a scheme for this road between Wilcannia and Wampah waterhole. I thought a work at this place was unnecessary, on account of the Meenamurtie waterhole.
131. Is there a well on the water reserve? I cannot say, but we objected to a well going down there on account of its being close to a permanent waterhole.
132. *Major Pearce.*] When did you object? As soon as we heard of it. Instead of adhering to our scheme they put a tank down at Dry Lake and a well at Meenamurtie, in contravention of our report. The Tarella tank is in close proximity to two dams yielding water. These belong to Mr. Quin. There was one on each side. I pointed out in 1883 that there was no necessity along the Bunker Creek for additional water.
133. *Mr. Woore.*] But you could not fairly take away the water that the lessees had conserved and use it for travelling stock? Mr. Quin told me that it was unnecessary, and that he never prevented the travelling stock from being watered at his place. The next work on that road to which we have to take exception is No. 75. There is a waterhole there—the J. K. waterhole; and I recommended that it should be dammed and fenced, and a small horse-pump put there. If this had been done it would have given us an ample supply to meet the necessities of the road. However, that was not acted upon, and they have sunk a well there, but have not got water.
134. What depth is this well? I have no information about it.
135. It is used? I presume so. This has been going on for two or three years or more. At least that period has elapsed since the work was commenced.
136. *Major Pearce.*] Have you written a report, saying that you wanted water in a certain place, and never afterwards heard anything about it from the Works Department? I will not say that they have not treated us with sufficient courtesy; but they have not complied with what we might say was departmental etiquette; and where they have departed from our recommendations they have not informed us, and gave no indication of desiring to do so.
137. Did you ever suggest that the officers engaged in the construction department should go around with your officers? Not exactly in the selection of sites, but for a short time an officer of the Works Department travelled with me while we were taking delivery from the Works Department.
138. But never in the selection of sites? No.
139. *Mr. Woore.*] Still these recommendations from your Department for the supply of water were simply ignored by the Works Department? Yes; and in those that they carried out they expended a great deal more money on the roads than was necessary.
140. And your recommendations as to sites? They were not adhered to; not closely. As a case in point: they put a tank in Dry Lake, where there was no necessity for one, and at Meenamurtie, where a well was not only unnecessary, but where we reported against it. Again, they put a well at considerable cost at the J. K. waterhole, where we considered all that was necessary was that the existing dam should be slightly added to.
141. And the well is useless in consequence? Well, we know nothing about it, because it has not been transferred, on account of the Works Department having failed to find water.
142. Is there now no other water there? There is a permanent waterhole; but if there was danger that that water might give out I would at once make provision to have that waterhole made effective. Since I have been Chief Inspector I have found it necessary on several occasions to take action of that kind.
143. *Major Pearce.*] Then the only watering-place on that road was taken over by you? Had it been open to me to decide, I should have recommended that we should not take over Meenamurtie, because I do not think there is the least chance of its being leased. However, it is near a public-house, and drovers may use it occasionally.
144. *Mr. Woore.*] Are you aware that a large expenditure on a dam has been made at the Meenamurtie waterhole? Yes; and it was an expensive one. As long as the water is made on the travelling stock reserve I think the public have a right to water their stock there; but I suppose that is a question which will have to be fought out.
145. If the public have no right to water at this place, where the water is conserved by a squatter, then the Works Department would be justified in constructing a tank—would they not? Well, I look for precedents to those countries where water conservation is dealt with as a national question, and where the water is retained as the property of the Crown. The water in every creek, stream, and river and lake is held as the property of the Crown, and the Crown has the right to adjudicate in respect to it without reference to private interests or private rights as opposed to public needs. At the time I was in that country I stayed at Meenamurtie and went very carefully over it with the manager of the place. I consulted him on the subject, and he said that there was ample water for travelling stock if they were confined to a certain point of entrance. My recommendations dealt with that point, as will be seen in my report. The view I took was that there was available local permanent water that had been used for years by everybody that passed that way.
146. But they might have been using it only on sufferance? Then they could have continued to use it on sufferance.
147. But might they have been prosecuted at any time? I think not. Well, that, I will admit, is a most important point; but there was ample water there for everybody that required it.
148. And this well was sunk close to a waterhole, where the public had a legal right to get water? That is my opinion.
149. Are there any other watering-places on this road? Yes; I called attention to Cobham Lake, No. 77. I recommended no watering-places there, to the best of my recollection. I thought that a well back from the lake would have been better. We know the lake was frequently filled and to a large extent; but having no outlet, it became salt in time. The Works Department constructed a tank so far within the boundaries of the lake that it has been under water ever since January, 1885.

H. Gilliat. 12 Jan., 1888.

150. *Major Penrose.*] That might be a perfectly good tank in dry weather? Yes; but fancy the state the tank will be in when the water dries up! It will be very nearly silted up. You have yet to examine these tanks with high banks all round them.

151. But do you not think that this would be a perfectly good tank in dry weather? Yes; I think it would, provided it had not been under water for three years.

152. *Mr. Woore.*] When you recommended the well, was there no other probability of getting good water there? I had made a careful inquiry at Milparinka from a number of persons, and I learned that there was no prospect of doing it.

153. Were any other wells sunk there? Yes; I was informed other wells had been sunk about the country, and good water obtained.

154. Were you aware when you recommended this that there is a large salt lake close by? Yes, I was perfectly aware of it; but the Cobham Lake is just as salt as that when it stands for a few years.

155. *Major Penrose.*] When will you be able to take this place over? I can hardly say; but if you will permit me I will read Mr. Abbott's minute on the subject:—

The Minister for Mines with reference to an Extract from the *Sydney Morning Herald*.

Department of Mines, Sydney.

In an article published in the *Sydney Morning Herald* on the 10th instant I find the following:—"Tanks and wells have been repeatedly constructed where they were not wanted, and where no local authority would ever have placed them. For example, on Menamurtee station a Government well has been sunk within a mile or two of permanent waterholes, both on the stock road. A Government tank has been constructed on Tarella station, close to the Coonawatta dam, on the stock route. This dam has been used by travellers and drovers for a long time; and although a station work, it is available for the general public, there being abundance of water. A Government tank has been made on the Paroo Road, close to the Peri springs—a natural reservoir on the stock reserve, sufficient for all the stock that can ever travel that way. Now for a case of another kind. On Mount Manara an expensive well has been sunk, securing abundance of water good for stock. This well has been abandoned, and no one is looking after it. It is said that some years ago one of the slabs with which the well is lined got loose; the bucket stuck, and could not be brought up. No attempt was made to put it right, and there it remains. As the well is sunk in hard rock, there is not the least risk of its giving way, and it is believed that it could be put in working order for a few pounds; but no official has any instructions to deal with it, and though the public suffer by the want, nothing is done. This is certainly a burlesque on centralization and officialdom."

It is alleged that a Government tank has been sunk within 1 mile of two permanent waterholes, on a stock road on Menamurtee station. I shall be glad if Mr. Gilliat will inform me whether this allegation—first, is true; second, if true, why was the tank so constructed?

10 May, 1884.

J. P. ABBOTT.

Mr. H. Gilliatt, Inspector of Public Tanks and Wells, in reply to the memo. of the Minister for Mines.

The Peri Springs and Public Tank.

20 May, 1884.

In reply to the minute of the Hon. the Secretary for Mines, T. and W. 542, with reference to the statement in the *Sydney Morning Herald* of the 10th instant, that a public tank has been made close to the Peri Springs, I have to say it is correct.

Early in 1881 I was directed by the Secretary for Mines to take delivery and report upon the tanks on the Paroo, between Wilcannia and Hungerford. My report was submitted in April of that year, and pointed out that it was improbable that tenants would ever be obtained for the Peri, the Nipper's Creek, or the Warramurtie, on account of their neighbourhood to good water supply.

The Peri Springs are within 500 yards of the Peri tank, and are practically inexhaustible.

The Nipper's Creek tank has the Olepoloko waterhole 5 miles on one side, and the Tongo waterhole 3 miles on the other side.

The Warramurtie tank is about half-a-mile distant from the Warramurtie waterhole, one of the finest in the Lower Paroo.

The attention of the Department has on various occasions been directed to these works. I may add that it is only within the past ten months that the Department of Mines has been admitted to have any voice in the selection of sites for works, and that I am not aware of any instance in which it has been consulted with regard to their construction.

HARRY GILLIAT.

156. Were the faults of judgment in the selection of sites a general thing? No; I do not say that. There are numerous other cases referred to in the papers; but those I have given you are the principal ones.

157. I presume they have traversed all these statements? Yes; and traversed this very report on the subject. They referred to Mr. Woore again about it. The following is the reply of Mr. Bennett on the subject, and I think it should be put in evidence along with the other papers. I am now merely stating my view of the case. All these papers afford information, although they traverse our opinions on the subject. The following is the letter:—

Minute by the Commissioner and Engineer for Roads and Bridges.

Roads, Sydney, 8 August 1884.

In compliance with instructions to report on the strictures contained in a paragraph by letter from in the *Herald* of 10th May, on the operations of this Department in the dry country, I think it necessary to deal with the paragraph in its entirety.

It begins by pointing out the desirability of a Local Government Act. As I have long advocated such a course, I append two paragraphs from reports of mine, dated 31st March, 1865, and 9th February, 1871, respectively.

It is generally represented that the Department is opposed to such a measure. The extracts appended show, on the contrary, that I have always advocated it, but from reasons different to those generally put forward, as I cannot admit that the works would be better done, as throughout the Colony where municipalities do exist it will almost without exception be found that the best roads and bridges therein have been made under this Department either prior or subsequent to the formation of the municipality.

As to not giving consideration to the wishes of those on the spot, Mr. Cambridge reports that the sites were recommended by the oldest residents, and Mr. Quin's letter of approval was an evidence that Mr. Wood gave satisfaction.

The first specific accusation in the paragraphs is with reference to the Peri tank. The Minister for Mines asks that the Minister for Works will ascertain who is responsible for this gross waste of public money, and the cost or amount so wasted.

The amount is £1,500. The tanks in this Paroo route were demanded in very strong terms by the local press, by a petition forwarded and urged on by the then Member for the district, Mr. Colin Simpson, and by letter from Mr. W. Brown, of Wilcannia. Mr. Cambridge, Road Superintendent at Hay, was directed to report.

I attach copy of his report with parts underlined; but, not satisfied with Mr. Cambridge's examination, as he was then new to the locality, and liable to be misled by interested persons, I requested that the opinion of the gentleman whom I considered, and had a right to be, the best and most disinterested authority—Mr. Woore, the then Commissioner for Crown Lands—should be obtained, and asked Mr. Cambridge to confer with him. His letter is attached.

The waterholes referred to by Mr. Gilliat either have been made since, or it was considered that they were private property, and not available for public purposes, as Mr. Brown distinctly states there was not a drop of water on the line in dry seasons, and that great losses of travelling stock had been sustained. I am not sufficiently informed on this point, but will endeavour to ascertain.

It is no doubt extremely easy to find fault, now that the country is known and of easy access, water conserved, and communication facilitated.

H. Gilliat.

12 Jan., 1885.

When the inquiry as to works was being made, the course of post was at least six weeks, and there was no railway nearer than Junee.

It should not be forgotten that tenders were invited for the construction of these works in *Gazette* and local papers for some weeks. No one during that time objected, and excessive pressure was put on the Department to get the work executed during the season when it was alone possible.

If there has been a gross waste of public money, which, notwithstanding Mr. Gilliat's assertions, I doubt very much, I alone am responsible, if it is considered I could have done more and laid the Department open to accusations of delay and accountable for loss of stock.

Mr. Wood had nothing whatever to do with these Paroo works; but that the springs were not overlooked is evident from the sketch plans sent by Mr. Cambridge.

I have not had time to get detailed information about the relative positions of other works and respecting adjacent waters; but Mr. Woore's approval applies to all on this line.

I need not further dwell on accusations made after seven years, when the whole circumstances of the case have changed; but, in the interests of the future, I think that Mr. Gilliat's recommendation as to further expenditure on these works should be considered in the light of Mr. Higman's recommendation of 20th November, 1878, as to the probability of this route being superseded when rail opens to Bourke. I will therefore not proceed with the alterations and additions suggested by Mr. Gilliat until further instructed—at most the Copago tank or well there, which I believe would be most advisable; and, as instructed at the Peri, Mr. Hanna reports that the slopes are easy and the ground firm, and stock can be watered with safety and despatch, thus avoiding expense which the erecting of pumping-gear would involve.

As regards Mount Brown road and Mr. Abbott's memo. on Mr. Gilliat's paper, requesting that searching inquiry be made into the matter, I append Mr. Wood's paper.

There were a number of communications from the district urging on the construction of some sort of water supply about the commencement of 1881, and at the urgent and pressing request of those interested, Mr. Wood was despatched to let such works and take such steps as seemed to him necessary for the permanent opening of a route to a large goldfield which was then pronounced to have been proved. Mr. Wood's mission gave great satisfaction at the time, and I might say an unparalleled letter was written by Mr. Quin, M.P., expressing approval of the action taken.

The Under Secretary for Public Works. W. C. BENNETT.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

158. *Mr. Woore.*] I want to ask you about Ivanhoe tank? Yes; that is one which I ought to have brought up this morning. It is a case that shows very clearly, in my opinion, the evils which a divided control between the two Departments has brought about. I am not sure whether the Ivanhoe tank papers are amongst the papers yet before you or not. Still I can give you a general account of it, reserving the point that the evidence I am giving is merely from recollection; and, as I am on my oath, I want to be particularly careful.

159. *Chairman.*] Can you remember at whose instance this tank was sunk? The general question of the construction of the Ivanhoe tank was at my instance—on my absolute insistence that it was necessary the work should be done. It is situated at a central point between the Lachlan and the Darling—that is, on the road from Hay to Booligal, and at the junction of the Paddington and Balranald roads. The abandoned Waiko well had been sunk about half a mile or three quarters from it.

160. By whom? By the Works Department. It was done some years previously—(I cannot give the date; perhaps Mr. Woore could give it);—probably about 1874 or 1875, or perhaps before that time. I found that this Waiko well had been leased to the Kennedy's, of Tichurst. It was in drift, and there was always a danger of such a bottom caving in. I had a careful examination of this well made, and I obtained information from all the neighbouring stations about it.

161. What was the depth? I think it was about 120 feet.

162. *Major Penrose.*] What do you call drift? I mean very fine sand. It is suspended in the water, it is so light. By the least disturbance it floats, but it will again settle on the bottom. Shafts in drifts frequently form cavities behind the slabbing, and then the whole thing collapses. After carefully considering the question, we found no proof that absolutely pure water had been discovered at any of the wells on the neighbouring stations. The water at all was more or less brackish. I therefore recommended, on account of the probable increase of population at a central point like Ivanhoe, that a tank should be made at a site which would necessitate the resumption of a portion of purchased land. Mr. Williamson, who was the owner, offered to exchange this for other land in the neighbourhood. Being a field officer at the time, and not in charge of the branch, there was a good deal of delay; but at length the Works Department was urged to construct the tank. Instead of carrying out my recommendation with respect to the site, another was selected. This was upon Tichurst Run, and the excavation was commenced.

163. *Chairman.*] How far was this distant from the township? As to that, I can only speak from hearsay; but I believe it was about a mile or a little more from the township. After having commenced this tank (being at the time in May) I received information that the tank was being excavated on a conditional purchase or an improvement purchase. From subsequent information I obtained, it appeared that the officers of the Works Department then removed the site of the tank, and had sunk it directly in the township.

164. *Major Penrose.*] Why did they move it? Because it was on private ground. Of course we understood that they had to pay compensation to the contractor for shifting him from the place where he had commenced. It was simply a piece of carelessness in not obtaining a knowledge of where they had a right to put the tank down.

165. *Chairman.*] This is the way it is put in the memorandum:—"The Waiko or Ivanhoe well fallen in through neglect prior to 1879. Tank required for use of township and townspeople; and after much correspondence, the Works Department consented to construct it. A site was recommended by Mr. Gilliat, but not adopted. Another site chosen for tank upon Waiko private property. Tank site was altered to present position in main street of Ivanhoe. Compensation paid to contractor for moving. Tank sunk in sand-drift. Papers relating to prices paid for fencing and drains, also to charges of drains and fencing in this case"? I have no personal knowledge myself that compensation has been paid to the contractor, but I understand that it was paid. Everything else is quite correct.

166. And this tank was first sunk in the sand? Oh, no; bottomed on sand-drift.

167. What is the meaning of the sentence, "sunk in the sand-drift"? I do not know that. It was probably reported on as leaky—that is, having sand-pipes in the sides or bottom, and after filling, the water sank away. The defective selection of site was caused by not putting down trial shafts.

168. There are also questions in regard to fencing, but we do not intend to touch them? That is an entirely distinct matter. Of course the present objection ——

169. *Mr. Woore.*] Which is No. 10? No. 10 is the Willandra well. The *précis* states, in regard to that well: "The construction of this well not asked for by the Mines Department. Site selected by Works Department.

Department. When nearly completed, a supply-tank, troughs, and whim erected, it was found that a portion of the headworks were upon Kilfera private property. Chief Inspector recommended one tank between Clare and Ivanhoe. Works Department constructed the tank and the well. He also pointed out that from experience gained in district, wells were not suitable. Construction so defective that although only 102 feet deep, the cost has exceeded £1,050." H. Gillies. 13 Jan., 1899.

170. How did it happen that the well was being sunk on private property? The papers will show that.

171. You have no personal knowledge? None; except that all the papers came through me. I dealt with the matter fully, and here are my minutes on the subject. They first commenced sinking a shaft on the edge of a reserve. After they got the headworks erected, they found that the service-tank and the troughing were encroaching upon an improvement purchase.

172. *Chairman.*] This states that the sites that were fixed by the Mines Department were not adhered to in the Willandra case? As a matter of fact they were not. In reference to the Clare tank, I wrote a report in 1882 or 1883 as to the want of watering places on this road. I thought one would be sufficient (as it was not a first-class road) between Clare and Ivanhoe. Instead of this the Works Department put down a well and a tank where one would have been quite sufficient. My whole experience in this district showed me that wells were undesirable, because when sunk the water was found to be very salty. This is also shown in the papers. Without consulting the Mines Department, or in any way referring to my report on the matter, they proceeded and put down this tank, No. 58, No. 57 being Willandra well. The water in this is absolutely salt. The well is between 98 and 102ft. deep. I considered it absolutely unnecessary upon such a road. The case is a very long one, and the papers will be given in *extenso*. In regard to the Holy Box well, I find a statement in these papers which shows that evidence as to salty condition was submitted, and that it was quite unfit for the travelling public; but it is not shown that the well is salty just now. Another question comes in, in No. 18—Mount Manara. It appears that this well was sunk on the shoulder of a hill, the tank being some 5 miles away.

173. Are you aware of the circumstances in connection with this well at Mount Manara? This is not one of the very salt wells, but of insufficient supply. It was constructed about the same date as Waiko.

174. Before the Mines Department had anything to do with it, I suppose? Yes; but still these reports show that we reported against it. We showed that the supply was so small that it was practically useless for a road supply. We recommended the construction of a tank, which has since been carried out; and the well has been abandoned.

175. The chief charge here is that the whim and tank were constructed without testing the value of the water? It was generally the case. Mount Manara well is not a good one, and No. 10, Willandra well, shows it more completely. There was no proper test of the quality of the water in this case.

176. Now, in regard to Roto well—this too has been constructed, I believe, in the vicinity of permanent water? In a recent case against the lessee, the Bench declined to find against him, on the ground that the well had been constructed near permanent water. They forgot that he was proceeded against for a breach of contract, and a breach of the Regulations under the Act.

177. Have you dealt with the Walla tank? This is one of those minor cases which are of lesser importance. It was constructed on a road where it was used by a few selectors. I reported in 1883 that it was absolutely unnecessary at the time; still the Works Department constructed it.

178. This is what the *précis* says on the subject:—"Walla Walla tank. Papers indicate that this tank is in close proximity to large swamp, although this site was reported upon adversely by the Chief Inspector, Public Watering Places. Even if required at its present site, the rainfall is sufficiently great to have rendered a very much smaller tank sufficient"? The statement there is substantially correct. I reported against it altogether.

179. What about the Ballools and Normanstone well? This is a case where three wells were recommended, and in each I defined on a tracing the exact points. I was very short-handed at the time, and sent the original papers to the Works Department with the tracings. I have not since been able to recover the tracings. The Works Department sank two wells at points that do not correspond with those fixed in my report. The Normanstone well is one of those I have referred to in the papers, in which I give general deductions. The headworks were put down before testing for the supply and quality of the water. The whim and a skeleton of service tank remained there for years, but the money spent on them was thrown away. The work has since been abandoned. The Willandra well is another case.

180. What about the tanks on the road between Bourke and Wanaaring? It is said that these tanks have been sunk in close proximity to artesian bores, without reference to this Department.

181. *Mr. Moore.*] With regard to these tanks and wells being put near permanent water, are they not still useful for the purpose of watering travelling stock? Well, speaking generally, I should say that they are not useful. The Peri Springs tank is not useful, generally speaking; it is not often used. We have a number of cases to be submitted to you to confirm this. The Gilgai tank was leased to a tenant for £60 per year. The gilgai holes are within half a mile of it, but are not included in the tenant's lease, and the poor fellow who has leased the tank has been absolutely left out in the cold.

182. But these gilgai holes dry up? Always in dry seasons; but this is not a dry season.

183. But you say the tank is not used at all? Not in good seasons. Roto well is another case. I think this well has not collected anything at all since it was leased. It was rented by Mr. Evan Evans, of Roto, who is said to have taken it because he wanted to control the well himself.

184. Take the Peri Springs, which are the most permanent water in that part of the country, and can you say that the supply of water in these springs is sufficient for all demands upon them in all seasons? I cannot give evidence that this is the case; but Mr. Hogarth, the manager of the station on which the springs are situated, will distinctly state that they are; and my own impression, so far as my knowledge goes, is that they are quite sufficient. In all seasons, so far as my experience goes, there has been quite sufficient water there.

185. You were not there in 1865? No, I was not.

186. *Chairman.*] We now want to settle the matter of the selection of sites? I think a great want of judgment has been shown in placing the tanks and selecting the sites at places that are too low. I should prefer intercepting the water before it reaches the lower ground, and get it into the tank before reaching the swamp.

187. *Mr. Moore.*] For what reason? For various reasons. If you can get the tanks on the side of a slope, with the same amount of excavation, you can conserve a great deal more water.

188. *Major Penrose.*] What are the contents of these tanks? From 12,000 to 18,000 cubic yards; and I think there are two or three of about 20,000 cubic yards.

189.

H. Gilliat. 12 Jan., 1886.

189. Then the catchment area is very small? Not necessarily. In some cases it is very large. One thing I am of opinion should be specially watched: Instead of putting tanks down where the drains run over black soil they should be put down where the drains collect from red soil or clay pans. The clay pans are always firm, whether covered by water or not. I do not think that sufficient care has been exercised in the selection of these sites. In most cases the tanks have been put down in the flats. I should prefer putting them at a little above, on the fall of the ridge, so as to intercept the water before it gets to the flooded lands. Wherever practicable the tanks should be so situated as to drain from red land.
190. *Chairman.*] The next thing to consider is "the defective design and faulty construction, with but little concern of the formation of ground or selection of catchment area so as to avoid collection of silt; of too steep batters in most cases, and apparently the adoption of a certain form of tank without reference to formation of ground or nature of soil; the defective construction of flumes and erection of inlet pipes, with carelessness in laying out drains and excessive cost in construction." Now, this is what we want you to show, and unless you are an expert, you can only speak as a practical man. I assume that you do not say that Mr. Bennett is not a man competent to undertake the theoretical part of his duties. No hard and fast rule for construction could be made to apply to all localities. I have seen a great many tanks in my time, and I know that some localities will stand a very much steeper batter than others? You have made my answer for me. The character of the soil in various parts must be taken into account; some will allow almost perpendicular sides;—for instance, the Peri tank was in cement; and practically might at a certain depth have been put down with vertical sides.
191. One in 1 would be quite ample in such a place for embankments? Yes, wherever the embankments could be so placed as to protect the tanks from prevailing winds it would be a great advantage. This was one of the points that I took, and I believe that unnecessary expense has been gone to on the embankments. I think a hard and fast rule in the construction of tanks is certainly objectionable.
192. Have you ever known an instance where the batter has not been sufficient to retain the bank and it has slipped under? I am sorry to say that this is the case in nearly every instance.
193. And has the attention of the Works Department been drawn by you to this subject? I believe so. I have called their attention lately to it, and I think we have often done so before. I can refer you to the papers, which will be placed before you, dealing with those works in the Walgett district—Boro, and Bung Hill tanks—and in each the trouble with the batters is shown. The batters on several other tanks caved in and fell into the tank.
194. Do you know of your own knowledge that a large portion of these tanks have slipped in;—are you aware that a large number of these steep embankments have fallen in on account of the want of batter? Yes.
195. *Major Penrose.*] But does it do much harm? Yes, it reduces the depth of water and increases the evaporation.
196. *Mr. Woore.*] Are any of these tanks made so that the water can be pumped over the embankments? They are now usually made that way.
197. But I think you stated there was an opening in the embankments? Yes, to allow the flood water to get in.
198. Is the opening right down through? Yes. The only advantage of putting down the four-sided tank is protection from wind, and to enable the water to be pumped above surface level. As a matter of fact, it is not a practice that has been generally followed. In any case, it has always been my desire to pump the tanks full during good seasons; and I did it quite recently in one case—in that of the Kulkine tank.
199. *Chairman.*] Are you aware that it is very desirable to put down steep sides in these excavations? Yes, wherever the nature of the soil will admit of it. I am quite well aware of the desirability of confining the water to the smallest possible surface, and having as steep batters as the soil will admit of.
200. It is for that reason, probably, that the Works Department have had these works carried out in that way. Have you ever known tanks sunk where the soil has been so porous as to allow the water to run out? Well, no; I have not. The only tank which I know of, and which I can recollect now, is the Lowesdale tank; but it was handed over to us in good order some time ago. It was sunk in a sandy, porous bottom. No; we have not, as a rule found a great many leaky tanks. The Ford's Bridge tank is also a leaky tank. We have not had Lowesdale tank long enough yet in our hands to show whether it is a leaky tank or not. I was down in the district with the local superintendent, and saw it with him; and I heard that he carried out certain repairs. When I saw this tank it had not a drop of water in it.
201. *Mr. Woore.*] Is it not usual for tanks to leak at first? Certainly not. I have known one tank that did leak at first to be made afterwards to retain water; but when I speak of leaky tanks, I refer to the exceptional leakage; I was not referring to ordinary leakage.
202. *Chairman.*] Sometimes a tank may leak, without any fault of selection of site, after the trial shafts have got to a good bottom? Yes; you may find sand pipes.
203. And no fault must be found, because every precaution has been taken, and trial shafts have got on to retentive soil? Oh, no.
204. *Major Penrose.*] This is one of the hazards of engineering? I would never dream of constructing a tank without at first putting down trial shafts.
205. Has it been the practice of the Works Department to do this? I cannot say.
206. Or did they go and sink a tank without making any examination of the ground? I have not the slightest idea what they did. We are not able to give any evidence of that sort, because we are not in a position to know what they have really done.
207. If there was any case in which the Works Department did adhere to the ordinary batter—the 1½ in 1—and got into hard ground, they might have had a steeper batter than that? In the Peri Springs sandhills they clearly got into cement after they got a little way down. The batter might have been very much steeper there; but they should not have constructed a tank at all. As a rule, the batters have been made too steep.
208. *Chairman.*] Of course, you are aware that the Government have specifications for all these works, and that these specifications are insisted on, and have to be adhered to strictly? Yes.
209. Now, in the case of a squatter getting a tank made, he would occasionally visit the tank himself, and modify the conditions and specifications in case the tank-sinker had got on to rock. In that case he would not insist on having a batter? Yes.
210. I suppose that that is not the rule with the Government? Well, I do not know what the rule really is. I should not like to state objections unless I am asked about particular cases. My reply is general

that

that the fault was not having sufficiently close supervision. In the Peri Springs case, when they reached cement the batters should have been changed.

211. *Major Penrose.*] What do you mean by "cement"? It is not the proper term to use, as it is not cement in the ordinary sense, but a hard indurated clay.

212. *Chairman.*] It is a kind of clay with a mixture of coarse gravel, and is excessively difficult to work. In some instances it has been blown up with powder, but it is really harder than rock. Sometimes the men who get into this kind of stuff could not earn rations upon it. Now, we will go into the matter of wells. Do you know any fault in the construction of wells? We know of serious faults that have occurred in the construction of a number of wells that are alluded to in these papers. The Willandra well presents some of the faults.

213. Then there is the Wooloondool well. You state that "this well has been bored from the bottom of shaft; neither pipe nor floor placed in well; bore liable to, and is constantly, choked from silt; constant baling, even when water is not required, necessitating great wear and tear and useless labour, insisted on by Works Department as necessary to keep bore from silting; bore choked on many occasions, and has caused much needless labour and correspondence; the Works Department endeavouring to show that it is the fault of the Mines' caretaker or lessee"? A floor to well and pipe in bore would not be very expensive, and would prevent choking from silt, and allow the well to be worked much more cheaply than now.

214. *Mr. Moore.*] Is it a usual thing to put a pipe and floor in wells; and if so, why was it neglected in this case? I believe it is the general practice. I should always do so.

215. Do you know why it was not done in this case? No, I do not. They have not given us their reasons. The papers show that our request has been refused by the Works Department, and we are requested to bale the well constantly. This necessitates the labour of man and horse unnecessarily. We propose to relieve the Department of Works of all repairs in future.

216. That is the action to be taken in the future? Yes.

217. A number of wells having been proved to be unfit for drinking purposes, was machinery erected? Yes; we have had such cases as these. I am only venturing as an opinion, from what I have seen of their method of construction, that they leased the contract for the sinking of wells and at the same time the construction of the head works—the whim, service tank, and so forth. The objection I take to this proceeding is that these costly head-works and main shaft should not be erected before a trial shaft had been put down to test the quantity and quality of the water. One of the cases I have referred to was the Willandra well. I question very much, although it has cost an enormous sum of money, whether it will not be necessary to put a new work down there. If the construction was transferred to the Mines Department I should not put a well there at all, because I am quite certain I could never get any but salt water. Then, again, there is the Holy Box well, from which I do not think 3s. has ever been taken for the sale of water.

218. *Major Penrose.*] Is it a usual practice to make trial borings? It ought to be. It is done in the colonies I have heard of; but I do not say a bore is absolutely necessary. If not a bore, a trial shaft should of course be put down, as is done on a goldfield.

219. *Mr. Moore.*] Has the watering of stock been tried at Old Gunbar? Yes; when I inspected it on the date of completion with the officer of the Works Department, I telegraphed down: "*Re* Old Gunbar well. Have accepted transfer, subject to Minister's approval, but require analysis of water. Report to follow." That analysis was made, and the following is what was said by Mr. Watt, the Government Analyst:—

REPORT respecting sample of water received from the Honorable the Minister for Mines. Sample received 21st March, 1885.
Old Gunbar Well, near Carathool.

	25th March, 1885.
Total solids, grains per gallon	382·00
Soluble solids	836·20
Insoluble solids	68·00
Volatile at red heat	87·80
	382·00
Chlorine	313·25
Saline ammonia, parts per 100,000	0.020
Organic ammonia	Not determined.

This water has been found to contain a very large quantity of organic impurity, derived partly from animal and partly from vegetable origin. This alone is quite sufficient to condemn it for domestic use.

There is also an excessive amount of saline matter, consisting chiefly of common salt, carbonate, and sulphate of lime. The water may be used for cattle if no other is to be obtained in the neighbourhood, but it should never be used for domestic purposes without first being boiled or properly filtered. However, no amount of boiling or filteration will remove the extraordinary quantity of soluble matter present. Distillation would be the only method of properly purifying such a water, and as I am not acquainted with the history of the water and its surroundings I am unable to indicate the sources of pollution.

The Honorable the Minister for Mines.

CHAS. WATT,
Government Analyst.

Upon this report reaching me (17/4/85), I wrote as follows:—

THE report of the Government Analyst upon the water of the Old Gunbar well cannot be regarded as satisfactory, but I would point out that the organic impurities, especially those derived from animal origin, in water from a well shaft recently sunk 100 feet deep, lead to a suspicion that the water may not have been taken from the source intended. I would recommend that a gallon jar be packed and forwarded to Mr. Keighran, with a request that he should draw the water himself and forward for analysis.

On the 23rd April, 1885, I also wrote in reference to a newspaper extract, which stated that there was not an animal in Riverina that would drink the water from this well unless actually starving from thirst:

WATER was sent down from this well, and condemned by the Government Analyst; but as there appeared some reason to suspect that the sample procured was not a pure one from the well, a fresh sample has been sent for. In any case, I have no hesitation in saying that in its present state horses will not drink it, and I am doubtful if sheep or cattle will. I have withheld making a recommendation to the Works Department upon the subject until the analysis of the water could accompany the paper.

This

H. Gilliat. This was followed by a second analysis by Mr. Watt, who writes :—

Government Laboratory, 12 May, 1885.

12 Jan., 1888. MEMO.—The sample of water was found to contain 1,094·4 grains of solid matter per gallon. The water is quite unfit for use. The remarks made in the report dated 25 March apply to this sample even more strongly than to the previous one.

It is possible that the organic matter may arise, at any rate, in part from the well not having been thoroughly cleaned out after the workmen left it. Nevertheless, the saline matter alone condemns the water.

CHAS. WATT,
Government Analyst.

The Under Secretary for Mines.

220. *Major Pearson.*] That was certainly a very extraordinary thing to find? Yes; and, as you will see, a second analysis showed that the water was worse than ever. Mr. Keighran, who obtained the water on the 4th May, 1885, wrote :—

Sir,

Referring to instructions contained in No. 83-613 Tanks, of the 15th ultimo, I do myself the honor of informing you that I visited Old Gunbar well, and drew a jar of water from the well, which I am forwarding you by rail to-morrow per Messrs. Wright, Heaton, & Co.

I have, &c.,
JOHN KEIGHRAN,
Inspector of Stock.

The Chief Inspector of Stock.

A copy of these papers, with a report of the analysis, was forwarded to the Works Department before the fencing of the special lease was proceeded with.

221. *Chairman.*] Then it has been fenced? Yes; but we submitted that they should delay it. I recommended then that the papers might be forwarded to the Engineer-in-Chief for Roads and Bridges. The object of doing this was that we might ascertain whether measures could not be taken to improve the quality by boring.

222. *Mr. Weare.*] Has this water been used by stock? No; no stock ever drank it.

223. Well, where did the stock water while travelling along that road? They went to the next well, or wherever else they could get water.

224. And this has gone on for two years? Yes; and a caretaker kept to protect all these expensive works, which would have been otherwise destroyed.

225. *Chairman.*] You have come to the conclusion that the Department of Works went to unnecessary expense in making the head works until the quality of the water had been proved; and the water has now been proved to be so bad that it is utterly undrinkable? Yes.

226. But the caretaker has been placed there at much expense? Yes; because, if we had left the place unprotected, these works would have been destroyed. The Works Department were always urging us to bale the well in the hopes of improving the quality of the water. We have kept this man baling for some years; but I have maintained that this baling arrangement is an absurd one. My request was for the Works to bore until we got drinkable water, or else abandon the well altogether.

227. *Major Pearson.*] Have you ever known the quality of the water to be improved by baling? Personally, I never have. I have heard it said that water is improved by baling, but I never had an instance of it coming under my own personal knowledge, and I do not think that a very salt-water well would improve. There is another case about which you will probably be asking me questions. I refer to the Holy Box well. A very remarkable change in the water took place; but, in my opinion, this was simply owing to overground drainage.

228. *Chairman.*] You came to the conclusion it was a mistake to erect all these head works until the quantity and quality of water was ascertained by boring? Unquestionably.

229. This well is now stated to be useless,—is that so? Utterly useless; and it will have to be abandoned.

230. We now come to the Holy Box well. You state that the well has cost over £1,000. Also, in the *précis*, "that this well was sunk, and small supply of fresh water tapped, followed by a great flow of salt water, which when twice analysed was declared unfit for use. Evidence as to saltness was submitted. Well was abandoned, and tank commenced. Works Office stopped work at tank when about 3 feet deep, declaring well-water good. Well again handed to Mines, and constant baling insisted on to improve quality of water. This done without result. Depth of well and price referred to, 94 feet deep, cost over £1,000. Mines has to bear cost of maintenance, and employ caretaker to bale and protect head works. There is no prospect of losing salt wells. Caretaker has carted drinking water 17 miles. Whim, service tank, and troughs erected before quality of water proved suitable. Iron in troughs destroyed by action of salt. Well almost useless for stock; quite unfit for travelling public?" I would like to mention what I have done at this well. I have seen as much as 40 or 50 pounds of crystals of salt under the troughs and around the service tanks. Of course, it is not a pure salt. There is sulphate of lime and sulphate of magnesia in it. When the troughs were filled with water you would find a quantity of crystalised salt after evaporation in the stock troughs.

231. You also came to the conclusion that this well should not have been sunk without previous testing? Yes. The papers in this case are very voluminous; and many gentlemen in the district wrote to me protesting against this well. The Works Department then commenced a tank, and subsequently abandoned it. This is the present position of affairs.

232. We now come to the Mount Manara well. I suppose that in all these works the same contractor apparently contracts to sink and supply the well with all the head works? That I am not in a position to say.

233. Well, it looks like it; because if the well is sunk, and it proves a failure, this expensive work goes on notwithstanding? I do not know about that as a well which has never been completed. I have seen the contractors sinking and timbering main shafts before discovering any water at all. The case I refer to is that of Normanstone, on the road from Gunnedah to Coonabaraban. I visited the well on two occasions, and found that the contractor was down about 80 feet in basalt without water, and putting up the same time the whim and service-tank. The average capacity of Mount Manara was about 3,000 gallons a day. They tried to increase it by driving, but unsuccessfully.

234. *Mr. Weare.*] The supply was never considered very large, but the quality of the water was good? The Government, by advertising, guaranteed that a certain supply of water would be forthcoming: but the water obtained here was not sufficient for the requirements of this road.

[The Commission adjourned.]

FRIDAY,

FRIDAY, 13 *JANUARY*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

Harry Gilliat called in and further examined:—

H. Gilliat. 13 Jan., 1888.

233. *Chairman.*] You mentioned that in one instance tanks had been sunk on the sites of dry lakes and were now under water;—do you refer to Dry Lake and Cobham Lake? I know that both are under water now. I have not been there since they have been submerged, but I have reports from my officers on the subject, showing that they are still under water.

236. At whose instance were these sites selected? As I stated yesterday, in making my recommendations for water along the road from Wilcannia to Milparinka, there was water supply provided by this man Smith, at the Dry Lake, which was amply sufficient for the time. Mr. Smith is a very respectable man, who had a licensed public-house there. He had sunk one or two tanks and a well for the use of travelling stock. As stated yesterday, he having gone to this expense, I thought it was very undesirable for the Government to interfere and put a tank there.

237. Did not you give your support to the sinking of tanks at Dry Lake and at Cobham? My report, which will be submitted to you, distinctly states that I objected to the construction of a watering-place at the Dry Lake, and that I recommended a well to be sunk about a mile south from Cobham Lake.

238. Then you did not support sites selected for the construction of tanks at Dry Lake and Cobham Lake? Most certainly not.

239. There are also tanks at Neaville's and Copago;—were not these also chosen by the Works Department, and also supported by the Mines Department, or by officers of yours? My report on this subject will also be submitted to you. It will show that I selected a site, to the best of my recollection, about 4 miles northerly from Neaville's. I passed over the road at the time when the cane grass had been cut from the site of the tank. I rode down to look at it, and found that no further work had been done. I wrote an urgent minute, asking that the tank should be stopped at Neaville's, and that a site 4 miles further on, which I had previously recommended, should be taken. With this minute you will have a letter from Mr. Hogarth, showing that the site which I selected was a much better one. The old Copago tank was constructed long before I entered the service. It was a dam and excavation at the entrance to the Copago Lake, and I always anticipated the first heavy flood that came down would sweep it into the Copago Lake and cover the excavation. I then recommended that as the Copago Lake became salt in time that a new watering-place should be made on higher ground. The old tank was made before I entered the service, and the new tank I had had nothing to do with further than recommending its construction at some suitable spot in the neighbourhood.

240. A memorandum has been handed to us, showing the cost of the various tanks sunk under the Works Department, and I see that the prices run from 10½d. up to 1s. 9d. Now, I believe the assertion has been made that tanks have cost up to 2s. 6d. per cubic yard? Of that I have no knowledge. It is a matter about which I have never spoken to contractors. The statement was made to me, recently, by Mr. Townsend, Civil Engineer, who stated that he was camped upon the Booligal to Wilcannia road at the time Burton Brothers received their contracts in that district at 2s. 6d. per cubic yard, and immediately afterwards sublet to Ford Brothers at 1s. 3d. He volunteered that statement to me, and said that he would give evidence, if desired, before the Commission.

241. What tank was that price given for? I am not quite certain; but you will find it in the papers. Mr. George Williamson, of Ivanhoe, has recently stated the same. Of this I am informed by letter from one of my inspectors, which is as follows:—

Department of Mines, Public Watering Places,
Ivanhoe, 12th November, 1887.

Sir,

I have the honor to report that Mr. G. Williamson, Ivanhoe, informs me that a contract for excavating 12-Mile

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reports from Mr.
of excavation. In
and Mr. Townsend
linister for Mines,
each of the public
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could

Ford, tank makers in this district, at 1s. 3d. per yard, who performed contract and made money

I have, &c.
JO
Inspector Pu

The Chief Inspector, Public Watering Places, Sydney.

242. That is the 12-Mile tank you are referring to? I think so. I have been i
tanks at 12-mile, 33-mile, and 48-mile on the Booligal road; and Box Creek, Til Til
tanks, on the road from Balranald to Ivanhoe, were let to Burton Brothers at contr
per yard. I may add that my other officers are prepared to make more positive s
matter. Mr. Inspector Low can give you direct information on the subject, and s
Boultbee.

243. *Mr. Woore.*] But in what manner do you intend to substantiate those statemen
attached to the Mines Department will give you evidence upon them. I am speaki
which have been sent to me, and from what I have heard from Townsend and others,
give evidence here.

244. *Chairman.*] You are head of the Public Watering Places Branch of the Min
therefore we wish to get all the evidence in connection with these charges? The
statements that have been made by our officers, which can, I have no reason to d
them when they are called on.

245. We want such information as you can give us on the matters stated in the *prec*
these reports are departmental reports, made to me by my field officers, and of
obliged to place them by departmental rule before the Minister of Mines. I have
Inspector Low, in one or two cases in connection with this very matter—*i.e.*, the cost
one case he reports to me that the contracts were let at 2s. 6d. per cubic yard;
informs me personally that he was on the ground when the contract was let. The
six months ago, called upon me for a report. This report embraced the cost of
watering-places in the Colony, the revenue from each of them, and the cost of the

H. Gilliat. 13 Jan., 1888.

could only prepare the latter clauses, and pointed out to him that the replies to the first questions must be obtained from the Works Department. We have asked the Works Department repeatedly for this information, but have not yet received it.

246. Now, why do you consider that the cost of tanks is excessive;—is it because they exceed the prices given by private individuals? Certainly; because, to a large extent, they exceed the prices given by the squatters. From my experience, I am confident that I could obtain the performance of the work at much less cost.

247. *Mr. Woore.*] And could you have done it at less cost at the time when the tanks were sunk? The present is an exceptionally good season; but even at any time I think it could be done more cheaply. The prices given for work during the last two good seasons have been very high in many cases.

248. *Chairman.*] Were the rates excessive when these contracts were let? [No answer.]

249. *Mr. Woore.*] Perhaps they were let in the middle of the drought? I am confident that the work could have been done at much lower cost at any time.

250. Do you know of any tanks that have been sunk by private individuals at very much reduced rates? Yes; I know many tanks that have been sunk at less rates.

251. At that time? To the best of my belief, at that time.

252. Can you remember any instance of tanks in the same locality constructed at the same time at a less price? I can hardly commit myself to such a statement as that, because I do not think I could give personal evidence with regard to it. I am judging by the rates I have ascertained in travelling through the Colony, as to the average prices—and I may say that I was travelling during the greater part of the drought; and at all times the amounts given by private individuals for sinking tanks were much less than the amounts given by the Government.

253. It is most important that we should see these contracts, so that we may know what the contractors bound themselves to do.

254. *Chairman.*] The forms of tender are included in the papers submitted by the Works Department.

255. *Mr. Woore.*] Are you aware whether these contracts are let by public tender or otherwise? I always understood they were let by tender.

256. Then it seems rather odd that the Government should pay so much more than private individuals;—how do you account for that? You will find amongst the papers submitted to you (with the field officers reports to me) that if it is known that material is to be purchased by the Government, it will cost from 25 to 30 per cent. more than if it was purchased by private individuals.

257. For what reason? Well, I believe for this reason—that Government contracts have been let at much higher rates than they should have been.

258. Are you aware that in most instances the Government tanks are sunk very much deeper than tanks put down by private persons? Usually; but I believe the largest of ours do not exceed 18 feet deep.

259. Are you aware that the prices increase as the depth increases? Certainly.

260. And these tanks are deeper than private ones? We have some tanks that are deeper than private tanks; our larger tanks (those of 18,000 cubic yards) are certainly deeper than the average. They range up to 18 feet, while private tanks range in depth from 12 to 15 feet.

261. Then that alone should account to a certain extent for the increased prices which the Government have had to pay? I do not think so. I do not think it would account for the large price to any great extent, and it certainly would not account for some of the prices that have been paid.

262. You are also aware that the cost of excavation is increased by tanks having steep sides, or steep batters, rather than sloping batters? Well, that raises the question of construction, which I would point out can only ——

263. I am only now speaking as to the cost;—would the steep batter not cost more than a sloping one? Unquestionably it would, unless it were constructed on improved principles. The practice is to leave a roadway along the batters, so that the drays could be taken out by this roadway. Unless this is done it adds very much to the expense; but in a tank, as I consider it should be constructed, I would leave in all cases a permanent roadway going out. Then the batter and the bank can be dressed down and the soil removed by drays.

264. *Chairman.*] Would you like to make any comments on the remarks that I made with regard to contracts let by the Works Department? I think the points you have mentioned very fairly indicate the errors that have been made in letting contracts. There is a good deal of unnecessary work and finish about the tanks. I think that the same amount of water might be conserved at a very much less cost. There is unnecessary work in the dressing and general construction, and I believe that suitable works for storage of water at public watering-places can be constructed at very much reduced prices. I believe that more prompt payment to the contractor and closer supervision, so that the contractor will have no claim for any mistake or error, will enable these works to be constructed probably as much as 25 per cent. less than at the present time.

265. Have you gone into the question with regard to the relative merits and cost of construction of tanks with steep batters and very considerable sloping batters—the cost of construction as against the loss of water caused by having a larger surface exposed to evaporation? Exactly, and my firm conviction is that the steep batter, when obtainable, in certain characters of soil is preferable to the sloping batter. The steep batter is preferable for any watering-places where stock are not allowed to enter, because it is always necessary that these watering-places should be used to a greater or less extent for domestic purposes. They are intended not only for travelling stock, but for the use of carriers, teamsters, and travellers. My general opinion is that the tanks can be constructed to the same depth and in the same soil, and at much more moderate prices than the Government have paid.

266. You have based your information on this matter, on the contracts that have been taken from the Government, and, as alleged, sub-let to other contractors at very much reduced rates? Yes, in many instances; and from the fact that in other works I have by careful measurement convinced myself of the high prices given.

267. *Major Penrose.*] Then you complain of the form of specification? I am not acquainted with the form of specification adopted by the Works Department; but I know what their works are when completed; and I know there is very much about those completed works that is entirely unnecessary. I take the ground that to accept a standard form of tank to be put down in all places, is wrong. I think a tank should be constructed in accordance with the nature of the ground in which it is sunk.

268. And are all specifications for tanks of the same character and nature? Yes, as a rule, as you will be able to see for yourself.

269.

269. *Chairman.*] The specifications seem very full and very stringent? I understand they are.
270. *Major Penrose.*] There is another question—that of fencing—in respect of which there is a large amount of correspondence.
271. *Chairman.*] We will come to that directly.
272. *Major Penrose.*] About the excavation of wells—what was the cost per foot? In regard to wells, I may say we are not aware what the cost is per foot. We know in some cases the total sum; but I am prepared to put down wells from 150 to 180 feet deep, substantially the same as those put down by the Works Department, for from £450 to £750. You will see that the cost of some wells reaches to £1,100 and £1,200.
273. *Chairman.*] Yes; for yesterday we read of a case of a well 90 feet deep which cost over £1,000? We have numbers of cases of the same kind. One well, I think, has cost £1,400, and is under 200 feet in depth. I may add, in explanation, that, with respect to obtaining tenders, when the vote for building cottages was handed over to us I found great difficulty indeed in obtaining tenders at anything like suitable prices. Many of the contractors refused to reduce the prices that they had been asking under the Works Department, and I gave instructions to the local officers to entertain none of those high prices at all, with the result that after a few months I was able to let the contracts at reduced rates.
274. *Major Penrose.*] What is your estimate based on? It includes everything.
275. What would you have done in a case of urgency? Well, I question whether any such case has arisen. In the midst of severe droughts very few stock travel, and it would be undesirable to commence the construction of a tank at such a time. There are very few instances, if any, in which an emergency of that kind has occurred.
276. You cannot conceive of a pressure being put on? Oh, yes, I can; but not in such cases as these. It would be in some case of a remote mining township; but for ordinary watering-places and the ordinary requirements of travelling stock, I think it would be unnecessary. Mining townships often spring up very rapidly. A large population collects, and there is always a danger of suffering from want of water. Then, if the Government desire to supply the water to that township, it becomes an entirely different question, and one which has very little resemblance to the supply of water at public watering-places.
277. *Chairman.*] The same remark which applies to the excessive cost of wells applies also to the excessive cost of tanks. Yes; I think the tanks, too, can be constructed at very much reduced rates.
278. We have here remarks about faulty construction of wells and timbering of shafts before testing the supply and quality of the water? Yes; we went into that yesterday. I believe a rule should be absolutely and universally carried out that bores or trial shafts should always be made in order to test the supply and quality of the water.
279. You mean that a trial shaft or bore should be put down before constructing the head works? Yes; but even if they put down the shaft before timbering and centreing, it would reduce the expense very much. I have here reports from my field-officers, showing the faulty construction of drains, and also the high cost per chain of fencing. Contracts have been taken from the Government at 4s. 6d., and immediately sublet at 3s. 6d. This is a fair price for the class of drains that are used. They are 6 feet by 9 inches in depth. I put these reports in, as I cannot verify them from personal knowledge.
280. Now, with regard to fencing? The same thing applies here. These papers, handed in by my field-officers, show the facts. The officers themselves will be before you for examination, if necessary.
281. *Major Penrose.*] But you can give no personal evidence on this matter? No, except to indicate that certain works, which are noted in the paper, have been constructed. For the last three years my departmental duties have kept me at headquarters, and I have been unable to make a personal inspection.
282. *Chairman.*] Now, we have heard of the cost of hutting. I have some documents here in connection with this matter, and the estimate of the Mines Department for a two-roomed cottage was £100. This was in 1883? I never heard of that before. I expect that that was when Mr. Bruce was attending to the departmental business. We have refused tenders of £60, and since then we have got them done for about £40. We refused many of the first tenders received.
283. Did the contractors find all material? Yes, all material. These papers show our case exactly. At Cobar we have completed sixteen cottages at £50 each. The Works Department approved tenders for the same buildings at £82 6s. At Corowa we have completed three cottages at £40 7s. The price approved by the Works Department was £68. At Silverton we have completed five cottages at £50. These are all of iron. Another was completed for £47 10s.; while the tender received by the Works Department was £60 10s. Others were completed for £44; and at Forbes we built some for £30 11s. 2d.
284. *Major Penrose.*] Did you really get this done for £30? Yes; we merely insisted on the Government getting the work done at the same rates as were paid by private persons.
285. *Chairman.*] Information has been furnished to us alleging that where the Mines Department purported to have a cottage at Deniliquin built for £44 3s. 6d., the materials alone have cost £50? I have no hesitation in saying that that information is untrue.
286. Of course these cottages consisted only of two rooms? Yes.
287. *Major Penrose.*] Can you produce the accounts? Yes; and the specifications and the vouchers, in all cases. I shall be very glad if you direct that they shall be called for.
288. I see in one case at Forbes that a hut has been built for £26 1s. 6d.? The explanation is this: This man guaranteed to put up a hut, the cost of which was £21 1s. 6d. This was irrespective of iron for roofing, which cost £4 10s., bringing the total cost up to the amount stated.
289. Do you line the roofing of the cottages? No; we let the caretakers do that for themselves. We merely put up an ordinary bush hut. You rarely see lining, except in the head stations. The occupants themselves often put bark or boughs over the roof.
290. *Chairman.*] It has been said somewhere that some of these huts have been very badly placed. Is it a fact that some of the huts are now submerged by water? Certainly not; not to my knowledge. The strictest instructions have been given to the inspectors, and in nearly every case the site has been selected by the inspector. We have never had a report that a hut was submerged, nor even that a hut had water near it.
291. We have had it in one of these papers received here from the Works Department that one of the huts which were built by you is now up to the eaves in water? I would like to see the case, because I will then be in a position to get a report from the caretaker. If it has occurred, it has been most carefully kept back from me.
292. *Major Penrose.*] You say that the hutting work has been passed over from the Works Department

H. Gillist. 18 Jan., 1898.

to the Mines? The papers, which will be submitted to you, show the whole history of the case. Briefly, it was this: Tenders received by the Works Department were sent to the Mines after they had been approved of. We disapproved of the cost, and pointed out that the work could be done for one-half the money. The Ministers for Mines and Works agreed that if this were the case the works should be transferred to us. We have been constructing huts ever since for something like one-half the price approved by the Works Department. Our average now for thirty-three to thirty-six huts is about £46 10s. The huts I refer to are two-roomed huts.

293. Why were the plans for huts sent to you for approval, if it had not been done in the case of the tanks? I cannot account for it. It was certainly a most unusual thing. My answer to the question is, that I am not aware why they were sent; but the papers in the case will show all the action.

294. *Mr. Weore.*] Was it not in consequence of your making a statement that the huts could be put up for less money than the Works Department were paying? No; that statement was only made after we received the papers.

295. *Major Penrose.*] It seems a very curious thing that this should be done in one case and not in another. Arguing from the case of the huts, the same economy might be practised in all other cases? Yes, in all other cases. I may add that upon the question of fencing we have distinctly guaranteed to the Minister for Mines that fencing throughout the Colony can be done for an average of £45 to £50 per mile.

296. *Chairman.*] I notice in the *précis*, in Dry Lake it is stated that a hut built at a slight elevation over the tank was submerged to the eaves? Well, that was Smith's house, built by a private individual. We have nothing whatever to do with that.

297. From the statement made in the papers it would appear that several of these huts had been erected by the Mines Department? Well, that is not so. This particular hut of Smith's was put up by a private person.

298. When you took over the tanks and wells and placed your caretakers in them, were they then solely under the charge of the Mines Department? I consider that they should be, except when we were asking for repairs to be made, which were inevitable under the vicious system of double control. The caretakers in that case are told to lend every assistance to the man making repairs.

299. When you or your officers think that repairs should be made, and that the caretaker is not capable of making them, you send a letter to the Works Department requesting their assistance? I at once place the matter before the Minister for Mines and give him my opinion, recommending that the Works Department may be requested to carry these repairs out. If the matter is approved of, a letter is sent to the Works Department, asking that the repairs should be made; but I hold that until the Minister for Mines approves of the proposed repairs the Works Department have no right whatever to interfere.

300. As a matter of fact, you have already stated that all repairs involving a sum of more than £10 would be referred to the Works Department? As a matter of fact, we have referred almost everything to them.

301. Why do you do that;—why do you refer all these trifling matters? Well, we have to refer everything to them which the caretaker is unable to do. In the case of a break-down or a smash, it is usually so referred; but in some cases of urgency we have had repairs effected ourselves, without reference to the Works Department.

302. *Major Penrose.*] Have the Works Department officers continued to inspect the works? [No answer.]

303. *Chairman.*] I am coming to that. Do you apply to the Works Department to carry out any necessary repairs that might be required;—what made you apply to them if you thought that you had the works under your own charge? We have tried to adhere to the original arrangement that was proposed. I certainly think it was an error to have done so, and I frequently moved to have the whole thing taken over by the Mines Department under the Public Watering Places Act.

304. For instance, suppose the simple matter of a pump getting out of gear, owing to the want of new leathers, would you apply to the Works Department to put that right? Certainly not.

305. Are you aware that it has been done? No, not to the best of my belief. At the Rounsona tank something radically wrong with the pump was reported. Mr. Boultbee made a very full inquiry, a report of which appears in the papers. We never intentionally referred a small matter of repair that could be attended to by the caretaker, to the Works Department.

306. Is it a fact that many men are placed in charge of tanks and wells who are utterly incompetent to take charge of them? Not many men—I should say certainly not. As a rule our caretakers are fairly good average men. I might point out that these appointments do not rest entirely with the head of the Department, but have been made at times by Ministers over the heads of their officers. Immediately a caretaker is found to be, or is reported to be, unfit or incompetent to discharge his duties, he is subjected to a strict inquiry, and if the report proves true he is dismissed.

307. Are you aware that on one occasion the pump at One-tree tank was stated to be out of repair by the caretaker, owing to disconnection of the piston-rod between the piston and the plunger, and that application was made to the Works Department to put it right? I am not quite certain about this case. I should certainly like to make inquiries about it. I may state that this man Kelly was not appointed by me at all, but was put on by the late Minister for Mines, Mr. Fletcher.

308. Is it the duty of the officers of the Roads Department to send reports if they see anything wrong with regard to tanks, to headquarters? I should think that we might be notified about it if they see anything wrong.

309. Then you think it is right, for instance, for a road superintendent, or a roads officer, in the event of anything being wrong, to interfere? No, not to interfere. I think a road superintendent should communicate with the local Mines officers, and avoid all unnecessary correspondence. A simple memorandum to the local Mines officer would often cure the whole thing.

310. Do you know who Mr. Stilwell is? Yes; he is a road superintendent at Hay, I think.

311. He made a complaint in July last that breaches in the bank at Pulletop tank had never been repaired; that the silt tank had been neglected; and that the troughing was not clean. This was reported to the Commissioner for Roads, and hence we can understand how the friction arose? This case is not the case of a caretaker. The whole of it is very fully dealt with in these papers. Pulletop was leased to a very unsuitable man, who commenced by giving a great deal of trouble to the Mines officers by violating the conditions of his lease. At the very time those letters were being written, arrangements were being carried out for the cancelling of this man's lease, and removing him from his position. This has since been

been done, and immediately a man was sent up to put the tank in good order. Mr. Boultbee inspected and made a careful report of what occurred. H. Gillies. 13 Jan., 1888.

312. We have here a letter dated 1st July, 1887, referring to the Hulong tank. It is addressed to the Commissioner for Roads, and is as follows:—

Sir,

On the 24th ultimo, I found 17 feet of water in this tank, and the appurtenances in fair order; but the caretaker and his family were residing in the pump weathershed, and keeping up a fire under the boiler for domestic purposes. The defects in the construction of the weathershed—R. Duncan, contractor—had not been rectified, the framing being imperfect, and some of the iron used, 26 instead of 24 gauge. The contractor has been notified by me of this.

I have, &c.,
A. W. STILWELL.

Upon this Mr. Wood wrote:—

I think it might be advisable to refer this to the Mines. I could not have credited such practices being allowed, were the report not signed by one of our own officers.—A. P. W., 4/7/87.

I have never heard of it, and I do not think the papers were ever referred to the Mines Department. There are plenty more papers in connection with Hulong and Mr. Stilwell.

313. *Major Penrose.*] Does this friction of which you speak (and which purports to exist between the various officers)—is it confined to the head office in Sydney, or does it extend to the officers in the country districts? I think the greater part of the friction arises in the district of which Mr. Stilwell has charge.

314. *Mr. Moore.*] What district is that? The district of Hay. In the other districts the officers get on pretty well together. The trouble arises chiefly in this one district.

315. *Chairman.*] Are you aware that Mr. Hanna, the road superintendent, has frequently complained to Mr. Crommelin, overseer of Public Watering Places, that the Wilson reservoir had been neglected by the caretaker, and subsequently found that his remarks with regard to the want of repairs had not been attended to? I have no special recollection of this particular case.

316. Well, now, do you think Mr. Hanna had any right in his public capacity to write, drawing attention to this neglect? No doubt he had a right to draw attention to it; but I think that the management of these public watering places, having been transferred to the Mines Department, should be left with that Department. I think Mr. Hanna, as a zealous officer, might fairly have called attention to any neglect that came under his observation. That is the way I think I should act myself.

317. But was Mr. Hanna justified first in making these complaints, and then, finding that they were not attended to, in communicating in an official manner with the head of his Department in Sydney? [No answer.]

318. I think the answer is one which we ought to have. Was Mr. Hanna justified in making these complaints; and then, finding that the matter was not being attended to, was he right in communicating, in his public capacity, with the head of his Department in Sydney? I think that Mr. Hanna had no right as an officer of the Works Department in interfering at all; but I think that he would have been quite justified if he noticed any neglect to call attention to it—to call the attention of the local officer to it, who was in charge of the works at that place. Then if he found that the matter was not being attended to, as an extremely zealous officer, I do not know that he would not be justified in reporting it to Sydney, in order that attention might be called to it there. If an officer of mine neglected his duty, I cannot find it out unless it is reported to me in some such way; and I think that the officer of another Department would be justified in reporting it to me; but to hinge a complaint against a whole Department on such a ground is not fair.

319. In the abstract of reports on tanks and wells in the Hay district, I notice the following having reference to the Til Til tank:—

Report of 21st January, 1885: That Mine's caretaker was without a horse to work the M'Cosme lift, and without oil for bearings; that the public worked the pump with their own horses, when requiring water, and it had thus sustained considerable damage. Report of 3rd April, 1886: Found caretaker absent on leave—only a lad in charge; sheep and cattle had been admitted inside tank enclosure to water at silt tank, and the embankment was thus being damaged; fence rails were missing, apparently used for fuel by travellers. Report of 1st May, 1886: As to pump (Holman, horse-power) being reported by caretaker as out of order and quite ineffective; that there was no defect, except that bucket leathers required renewal, and this should have been done by caretaker instead of requiring mechanic to be sent for from Hay—100 miles; also that much negligence was evinced in keeping drains and fence in repair, and that sheep have been allowed inside tank fence, damaging the embankment. McLeod, Mines' overseer, reported, in reply to this, that caretaker had been told by travelling mechanic never to open the pump for repairs, and that the sheep had been removed from tank enclosure as soon as observed. Report of 6th August, 1886: That statement of caretaker, as to repairs of pump, was incorrect; had not been directed not to touch it by mechanic; did not know how to overhaul the pump: and that there was no other defect than as to leathers being worn; that Mr. Nicholson reports that sheep had remained inside fence by caretaker's admission for some days until they were too weak to walk out.

—? You will find that we will have rebutting evidence on all these points as soon as the papers are placed before you.

320. Then we have the following statements in reference to the Lignum Hut well and the Mossgiel tank:—

Report of 22nd October, 1886: Connecting-rod of pump broken; pump does not receive due attention from caretaker; has having a ladder put in well, so that the caretaker should have no excuse as to want of access to pump. Report of 8th November, 1887: Breakage of plunger-rod. Report of 8th December, 1887: Breakage of windmill connections; it is evident that there is much want of attention on part of caretaker, &c.

Then in regard to Mossgiel we have—

Report of 30th July, 1887: Embankment batters scoured by rainflow; negligence in keeping in repair; horse has been admitted inside fence and on the embankment, destroying the vegetation, which it is so desirable to protect; that caretaker had taken up the dwarf fence from troughing, leaving the post-holes open; had evidently been so for a long time; were full of rain water, impairing stability of trough sleepers; the fence was being used to construct a rail laid on the posts as bearers along the middle of the trough.

Now I would like to have a little more information from you in reference to this friction between the two Departments. How do you propose to remedy or remove this friction? Of course it has been proved in various letters and papers that considerable friction does exist between the Works and the Mines Departments;—how do you propose to remedy this very undesirable friction? I have submitted recommendations to the Minister for Mines on this subject. My recommendation was that the whole construction and maintenance and administration of the Public Watering Places Act should be transferred to one Department. I would have one Department responsible for the whole work. Under present circumstances the responsibility is divided, and both Departments decline to assume it. 321.

H. Gilliat. 13 Jan., 1898.

321. *Major Penrose.*] But duality of control still has a good effect where the officers of one Department happen to be inefficient? I do not want to be understood in that way. I was asked whether Mr. Hanna had any right in his public capacity to make a report concerning the neglect of an officer of another Department. I said that a very zealous officer might have been justified in calling attention to the neglect of an officer of another Department.

322. You said that in this far-away district one officer is a check upon another? I might certainly have conveyed that impression. But Mr. Hanna might merely have said that there was an inefficient officer there. But this is picking out a trivial case. I have no doubt but that the caretaker and inspectors will deny a good deal that is contained in these papers. That is why I can say nothing about them just now. We simply have to deal with these matters from the reports which come in from the officers who are in charge.

323. *Chairman.*] Now, these papers come from Mr. Stilwell, who is, I understand, the road superintendent at Hay. Then, in these various reports which have been read from Mr. Stilwell, do you think he exceeded his duty in bringing those matters before his chief? I am not aware what his instructions are. He is, of course, a subordinate officer, acting under instructions from the Engineer-in-Chief and Commissioner for Roads and Bridges. I think it very undesirable that Mr. Stilwell should make such reports; but if it is admitted that there is dual control I do not see how he can avoid making reports to his own Department. Whether it is desirable that it should be so, is another matter. That is for the Commission themselves to say.

324. *Major Penrose.*] What are the expensive forms of machinery that you object to? I think the use of steam-pumps necessitates the employment of skilled workmen, and increases the cost of maintenance. I am quite certain that, in view of the allegations of the Works Department as to the character of the caretakers employed, we get the best men available, so that the simplest forms of machinery may be used.

325. Are there many steam-pumps? I should say that to the best of my recollection there are between thirty and forty. I strongly objected to them for public watering places. They may be very desirable and useful at or near a township, and occasionally some of our watering places are in the immediate neighbourhood of townships. At other places I would recommend the very simplest sort of appliances.

326. *Chairman.*] Your objection to the steam-pump is that it necessitates the employment of more expensive labour as caretakers? Yes; and it raises the average cost of the work.

327. *Mr. Moore.*] What would you substitute for them—windmills? No; I would not.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

William Sawers called in and examined:—

W. Sawers. 13 Jan., 1898.

328. *Chairman.*] Where do you reside, Mr. Sawers? I am living down in the country at present: but for many years I have been a resident of the Western Division of this Colony. I have lived for some time west of the Barwon or Darling River.

329. You formerly represented the electorate of Bourke in the Legislative Assembly? Yes.

330. Are you aware that a Commission has been appointed to take into consideration the difficulties that exist in working this particular branch of the Public Works Department having reference to tanks and wells, and also to consider the difficulties and differences that have arisen between the two Departments—the Works and Mines;—you know that some difficulties have arisen? I was aware of the difficulties you refer to, and have noticed through the press that a Royal Commission had been appointed on the subject.

331. Will you kindly state what has been your experience in connection with the district you have represented in procuring the initiation of tanks and wells. Be good enough to state how this matter worked, and the difficulties you experienced in getting your applications for necessary works replied to and dealt with? I may mention that, as representative of the Bourke district, I had occasion to apply for the construction of several tanks during the time that I held that position. The usual procedure was to apply by letter to the Minister for Mines, stating the necessity for these works, and putting forward the reasons why such tanks should be excavated. That letter would be simply acknowledged, and I would have to follow the matter up by several interviews with the Minister, and also with the officer-in-charge (Mr. Gilliat), with whom I would have various conversations on the subject. Mr. Gilliat would submit a report to the Minister for Mines; and, as I have said, I would also make representations myself to the Minister during the course of an interview. In every case I believe there has been attached to my applications a satisfactory report from Mr. Gilliat in favour of my contention that the work should be done. In every case the Minister approved of the tanks being excavated and constructed; and, in my innocence, I thought that that had ended the matter. But I afterwards found that the papers had to be sent on to the Department of Works. Anxious to serve my constituents, I followed the matter up to the Works Department, and was in the habit of reviewing the matter with the Minister on various occasions. I also interviewed the Commissioner and the Engineer-in-Chief for Roads and Bridges (Mr. Bennett), who has charge of this Department. I represented to him that the construction of the works for which I had applied had been sanctioned and authorised by the Minister for Mines and should be carried out. Mr. Bennett, in effect, said that he must wait and act upon the report of his own officers, and that he had nothing whatever to do with the Mines Department. His contention was that he had to rely upon his own officers, to whom he referred the matter. I believe Mr. Bennett received favourable reports from his own officers in each case, and when I pressed him to carry out the works he said that he had no money for the purpose. I desire to point out to this Commission the absurdity of a Member of Parliament having to carry his application to one Department, and having received the sanction of the Minister of that Department to the work, having afterwards to go and get the approval carried through another Department. And I would like, further, to point out the absurdity of one Minister sanctioning work—not only one Minister, but two Ministers in this case—and afterwards in the Cabinet so cutting down his Estimates that the work could not possibly be performed, because there was no money to pay for it. In my opinion, the construction and management of the tanks of the Colony should be placed altogether in the hands of one Department; but as to the Department to which it should be given, I express no opinion.

332. Have you found, from your own personal experience, that it is more satisfactory, and that less friction would take place than otherwise, if this dual control by Departments were abolished? I cannot say from actual

actual personal knowledge. From the fact that my residence has not been in the immediate neighbourhood of tanks, I have it only from hearsay.

333. *Major Pearson.*] Might I ask if the witness considers that the tanks that have been so constructed were constructed in an economical manner; the witness may have seen some of the tanks? I have represented a large portion of the Colony; but my own station is on a watered portion, and I have not much knowledge on the subject.

334. You have nothing to say as regards construction or cost of works? Well, I am not in a position to give a reliable opinion on the matter. I have sunk many tanks myself, but of course private tanks are different from the Government tanks. There is no similarity whatever between the tanks constructed by private individuals and those constructed by the Government. The Government tanks that I have seen have a larger earth excavation, and embankments are invariably made round the tank, which I have never done at all.

335. *Mr. Moore.*] Were these Government tanks which you have seen more expensively constructed than private ones? Yes; but the excavation is quite the same. The only difference is, that the earth is built around the tank with the object of holding the greater quantity of water.

336. *Chairman.*] Necessarily, then, the Government tanks are the more expensive? Yes.

337. *Mr. Moore.*] Are not the Government tanks generally deeper than other tanks, and have they not steeper sides? I cannot say. I can, of course, give you particulars regarding the batters that I have made myself, and what their expense has been. My firm conviction is that, had I the batters steeper I would have had to pay very much more money. I have excavated in tanks, I suppose, about 200,000 cubic yards. In various tanks (with one exception) the slope of the batter was 3 in 1. I have in every case excavated with bullocks, with ploughs and scoops, and have dressed the sides afterwards. The average price which I have paid for such work as this is 1s. per cubic yard, and I am convinced that I could not have got this work done at the price had I the batter 2 in 1.

338. What was the depth of these tanks that you refer to? The average depth was, I think, from 15, but nothing over 16½ feet. I may state that the greater part of the trouble and difficulty I have had was in the last 2 or 3 feet of the excavation. The contractors would sink down to 15 feet at a trifle less than they would be willing to receive for taking out 18 feet. I think I may amend my evidence by saying that the average depth of these tanks was about 16 feet. The contractors have very great objections to go beyond 14 feet. In one instance or two I believe they have gone down to 18 feet, or, rather, I wished them to go down to that depth; but in spite of all persuasion I was unable to get them to go down that far. The bullocks cannot possibly draw the stuff up at that depth. The time I refer to was in a fair season.

339. Supposing you made your tanks 18 feet deep, would you not have had to pay a considerable sum more than you paid for the tanks sunk to 15 feet? Yes; I would probably have had to pay 1s. 8d. per cubic yard instead of 1s.

340. *Chairman.*] And if you had steeper banks what would be the result? I could not get the work done with ploughs and scoops. In going down the extra 2 feet I would have had to pay a-third or a-half more for the excavation below 15 feet.

341. *Mr. Moore.*] Then you say that tanks cannot be sunk to that depth with scoops? I cannot say that it could not be done, but I have had always the greatest difficulty in getting the contractors to go beyond 15 feet.

342. *Chairman.*] Can you give us the reason why the Government have had to pay very much more for their tanks than private individuals;—Is it for this reason or any other that has come to your knowledge? The reason I have mentioned is probably one of them.

343. Are you aware of any other reasons that would necessitate the Government paying more for their tanks than other persons? I am not positively aware of other reasons; but I believe it is because the Government are needlessly particular. The Government require that their tanks should be mathematically correct.

344. *Mr. Moore.*] Where a professional man is employed to pass the tanks, would he not be bound to see that they were properly made, and to insist upon their being carried out in the strict spirit of the contract? In the case of a squatter, if a man has worked well, and has not made money out of the work, the squatter is apt to take the whole of the circumstances into account. Of course a tank not well finished would not do an inspector so much credit as one nicely finished. Another most important consideration in the matter of expense is the distance that the contractor has to deposit the earth from the edge of the tank.

345. *Chairman.*] Is there any other reason that ever came to your knowledge. Does not a squatter pay cash down on completion of the tank, after measuring it up, while the Government go through a good deal of red-tapeism before the money can be paid. The accounts must first go to the Department, then to the Auditor-General, and then to the Treasury before the money can be paid? I have heard very serious complaints on that point.

346. *Mr. Moore.*] Now what is the usual distance that squatters in your experience have had the earth which has been taken out of the tank removed from the edge of the tank? I cannot say from memory.

347. In the case of Government tanks it is, I believe, about 30 feet. In your own case how far do you remove the earth? Speaking from memory, I should say we put the earth away from the bank from 12 to 13 feet. I may point out that there has been serious trouble with the contractors in order to get them to put the earth far away, even in our locality. If we always insisted on moving the earth twice the distance I have named I would not like to say what we would have had to pay for the tank.

348. There is another matter you do not always insist upon having—this earth put up in a bank with uniform sides? No.

349. That would entail a greater expense, would it not? Certainly; considerably more expense. I have no knowledge of what the expense would be to do that. We simply ask that the earth should be shovelled out beyond a certain point.

350. *Chairman.*] All the squatters care for is that the earth taken out does not go back again? Yes.

351. *Mr. Moore.*] This bank that you say is erected around the Government tanks is made with the object of conserving more water by pumping over the bank from outside when there is surplus water? That is the object, I believe.

352. From your observation of the Government tanks, do you believe that they are made in an unnecessarily expensive way for public works. Further than that there is a good deal of neatness and finish;—

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W. Scott. 19 Jan., 1886.

do you think that the tanks are made in an extravagant way? I do; I think that they are made in some cases extravagantly.
353. Will you explain? Where there is an excellent catchment—a hard ridge like the roof of a house—I think in any season almost sufficient water would come into an ordinary tank without having these additional expensive embankments built all round. Of course, I refer now to a case where there is good catchment area.
354. Of course, you will admit this—the greater the depth of water, and the more water the tank contains, the more permanent and valuable it is likely to become to the public? Yes; I quite admit that.
355. Then, suppose you conserve 25 feet of water instead of 15 feet, is it not all the better? I admit that it is; but I think that it would be better still, where there is a good catchment area, to make two tanks instead of one.
356. Then you think the quantity of water conserved is unnecessarily large? I do, where the catchment is good.
357. But the catchment is no good without rain? What I mean is, that an inch of rain falling into a tank from a good catchment will put plenty of water into it; but in some parts of the country two inches of rain will not make so much water as one inch will elsewhere—that is, where the soil is porous.
358. But you will admit that as a rule the general design of these tanks, and utilising the earth that comes out of them, is an economical way of constructing these public watering places? I think it is business-like and substantial, but expensive. I think a hard and fast rule as to the size of the tanks must be absurd, so much depends upon local circumstances and the quantity of water required from these tanks.
359. Is it not more economical to utilise the earth taken out of the tank, by building it around the tank, to conserve more water than by not using it in any way at all? In answer to that I would say that it may be so in some cases, but circumstances must determine in each.
360. But, generally speaking, is it not a more economical system? Only where the catchment area is not good. My opinion is founded upon a proof that additionally heavy expenditure is caused by these embankments.
361. Are you sure that it is not by the steepness of the batter? No; not by steepness of batter. Steep batters are unnecessary where the catchment is good, and the money expended upon one tank would probably have excavated two;—but on the simple merits of whether, *per se*, a tank with embankments round it is not better than one differently situated, there can be no question.
362. *Major Penrose.*] Will not a tank of this kind hold just double the amount of water by putting up embankments, especially where there is a caretaker in charge? Certainly, there can be no question about that; and especially where the expenditure is of no moment. The same caretaker might be looking after two tanks, provided they were not more than 8 miles apart.
363. *Mr. Woore.*] You admit, then, that these tanks with banks around them are better than squatters' tanks;—do you admit that? Certainly, in some cases; just as I admit that a new fence is better than an old one.
364. Then, if that is so, why do not the squatters make their tanks in this way;—is it because the engineering skill is not available? No; because it would not pay us to do so.
365. *Major Penrose.*] But your tanks have not to fulfil the same conditions as Government tanks? Though the conditions are entirely different, we would find it much better to make two tanks for the same money.
366. *Mr. Woore.*] Now, if you wanted to augment your water supply at a certain place, and had six months' supply at that place in a waterhole, and the banks were not suitable to a very much increased depth of water, would you think it better to sink a tank near that place, if you had good catching ground, than to make banks around this waterhole, which would be liable to be washed away by a flood;—would you bank the whole all round, or would you prefer, if you had a good place for a tank, to make a tank apart altogether from the creek? It would entirely depend upon the features of the case.
367. The reason I ask this question is because we have evidence here as to the making of tanks near natural waterholes? As a practical squatter I should be guided entirely by the circumstances.
368. But I have given you the circumstances? If the waterhole was not a permanent one, I should think it would be a waste of money to bank it; and my experience brings me to the belief that in the far western flat country of New South Wales tanks are much more satisfactory than anything in the way of dams.
369. They are not so liable to wash away? That opinion which I have given you only refers to the western country.
370. Do you know the Paroo? No, but I can speak of those creeks—the Narran River, the Bokhara, the Birie, and the Culgoa Creeks—on which dams have been a very doubtful success indeed. Unless you have a first-class place for a dam it is no good.
371. *Chairman.*] In Riverina they are the commonest things you can have? I regard this hitherto dry back country as the most permanently-watered country we have now. I know the country on the Bokhara, and the dams in that creek. They are expensive dams; but I now regard our back-country (previously dry owing to the want of tanks) as the most permanently-watered country we have got. But the circumstances of each case must guide a practical man.
372. *Mr. Woore.*] Have you had any experience of springs? No, not much.
373. Is it within your knowledge that to try and do anything with springs—that is, to try and open them up—sometimes results in a decreased water-supply instead of an increased supply? Yes, I have heard of that being the case out in the Irrara district—in the country west of the Warrego. The opening up of springs is not always followed by an increased supply of water; indeed it is sometimes the reverse. In speaking of the prices we have given for tanks, I may say that the country where we have sunk, and where we gave 1s. per cubic yard, was very good sinking. There was no difficulty in ploughing off a layer of soil with a plough and bullocks, and then scooping off the soil.
374. Is there no provision in contracts for hard ground or cement? No; we always sink a shaft.
375. *Major Penrose.*] Has there been water near where the contractor was working? Yes, there was water not very far away.
376. *Mr. Woore.*] But if, owing to unforeseen circumstances, a contractor had taken a contract to make a tank, and the price had proved to be too low, is it usual with squatters to make any concessions? It would be usual with nine squatters out of ten—that is, if they wanted the work finished.

377. Are you aware that it is not usual for the Government to make any concession of that kind? I was going to point out that I have seen Government tanks which it was impossible to complete beyond a depth of 7 or 8 feet. The contractors worked at it, and left it. Around Byrock I should not be surprised if a man had to pay from 2s. 6d. to 3s. 6d. for the excavation of such soil. W. Sawers. 13 Jan., 1898.
378. And have you known contractors on some of those Government works not to make even wages? Yes; they could not make wages on that kind of stuff. I found it necessary in many cases to make tanks oblong instead of square. I have one 180 yards long and 40 wide, or something of that kind. We took the stuff out the way that was shortest. An oblong tank is much easier to construct than a square one.

James William Boulthee called in and examined:—

370. *Chairman.*] What is your position in the Public Service? I am an inspector of public watering places. J. W. Boulthee. 13 Jan., 1898.
380. Are you aware of the objects of this Commission? Yes, I am.
381. You are aware that there has been—to use the mildest term—considerable friction between the Departments of Mines and Works with regard to the construction and maintenance of tanks and wells? Yes; there has been a considerable amount of—I would not like to call it friction.
382. I use this term as being the least disagreeable? Well, I think there has been what it is safe to call friction between the two Departments.
383. To what cause do you attribute this feeling? To a certain extent, the feeling has been engendered by the tone of the minutes adopted by the Works Department. The tone of their correspondence with us is not calculated to engender good feeling between the officers of the two Departments. Besides this, I think it is attributable to the system of dual control—to having two sets of officers over the same work. The feeling is only the natural consequence of this.
384. *Mr. Moore.*] I suppose it was this dual control that caused this correspondence? Just so. [*Witness then read a document entitled, "Abstract of Reports on Tanks and Wells in Hay District," signed A. W. Stilwell, 20/8/97, a copy of which will be found in Appendix.*]
385. *Witness.*] As to the complaints as to the caretakers, we employ the best men we can obtain; and when a complaint was made against the caretakers, each case was investigated, and the man dismissed if he was found guilty.

[The Commission adjourned.]

THURSDAY, 10 JANUARY, 1898.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

Francis Abigail called in and examined:—

386. *Chairman.*] You are a member of the Legislative Assembly, and Secretary for Mines? Yes. F. Abigail. 19 Jan., 1898.
387. In the inquiry we are now making, we are going through the charges *seriatim*, so far as we can, in order that in our summary of evidence we shall have all these matters in regular order, which will be more conducive to the end that we have in view. It will save trouble if we go through the same system with you, asking you at the end your opinion with regard to the friction that has arisen between the two Departments, its probable cause, and any suggestions which you may wish to make with a view to a remedy? Perhaps you will permit me to start by describing the circumstances which led me to take up this matter. That will explain very fully the position I have taken up, because I look upon this inquiry and the appointment of this Commission as the result of my action. I will state what I have to say as briefly as possible. When I took charge of the Department of Mines I immediately became aware of the fact that great loss of time and public inconvenience arose from the division between two Departments of the work in connection with the construction and maintenance of tanks and wells. What I had learned in this way led me to inquire from the officers of my Department the causes of this loss of time, and I then ascertained that some portion of the work was done by the Mines Department, but that the constructive part of it was under the charge of the officers of the Department of Public Works. About that time also a large number of complaints came in to me, as Minister for Mines, about the faulty manner in which the works were carried out. Complaints were made as to the bad selection of sites, and in some cases I was told that tanks were constructed where there was no necessity for them. I was so impressed by all these circumstances that I made a representation to the Cabinet by minute on the 21st of March last. The following is the minute:—

Minute by the Secretary for Mines.

Department of Mines, 21st March, 1897.

THE administration of the Public Watering Places Act, 44 Vic. No. 10, which gives statutory authority for the construction, control, and maintenance of works for storing or providing water, adjacent to any public road, is charged to the Department of Mines.

The administrative arrangements of 1890, which are still in force, also allot to that Department the charge of works for the storage of water in the pastoral districts. In addition to the control, maintenance, and leasing, the surveys of watering places and the construction of huts have more recently been undertaken, and it is now found necessary to assume the charge of fencing, and provision has been asked for that purpose on this year's Estimates.

The construction and repairs still remain with the Department of Public Works; but this division of authority is accompanied by drawbacks such as much unnecessary correspondence, great loss of time, and a resulting want of economy, which, it is thought, will be obviated if the service is placed under one Department.

The Secretary for Public Works will perhaps agree with me that, under the circumstances, it might be desirable, in the public interest, that the whole of the business connected with these works, including construction and repairs, be handed over to this Department.

FRANCIS ABIGAIL.

That minute went in due course to the Cabinet, and they virtually decided to carry out the suggestions I had made. About that time, also, I was informed by Mr. Quin, who was at one time a Member of the Legislative

F. Abigail. 19 Jan., 1883.

Legislative Assembly, of circumstances which strengthened me in the conviction that, in connection with the construction of public watering places, there was a great deal of abuse and defects which required alteration. At one watering place a simple piece of fencing required renewing, which at the most would have cost £3. The officer reported that the fence should be removed as suggested. This had to go to the Works Office, and ultimately the cost of reporting upon the removal of the fence was some £50. I considered, as a business man, that any arrangement of that kind, which resulted as it did, was simply a waste of public money, and on that account I urged the matter on the Cabinet so that the thing should be stopped. At that time there was upon the Estimates a sum of £30,000 for the construction of new works. The Roads Department immediately called for a lot of tenders for works for tanks and wells in various parts of the Colony, which absorbed the whole of this money. This was done, as I believe, for the purpose of preventing the Mines Department from having the spending of the money.

388. *Mr. Moore.*] In reference to this expenditure on the repairing of the fence, might I ask how it was incurred—was it incurred on the repairs which were necessary? I believe some officers of the Works Department had to make very long journeys, travelling some hundreds of miles to report on the matter. That is the way, I understand, the expenditure was incurred. The officer had to make two or three journeys backwards and forwards to see that the work was done.

389. *Chairman.*] Is it not a fact that the Public Works Department have now road superintendents in all parts of the Colony? I believe that is so.

390. And do you know the reason why the services of these men were not obtained for this thing? I have the impression that most of these men have not the necessary knowledge; and my authority for that statement is the opinions of men possessing large station experiences—such men as Mr. Quin, Mr. Russell Barton, Mr. Cheaney, and a number of others. These gentlemen have made to me very strong reports in reference to the selection of sites and the manner generally in which the work was carried out.

391. *Major Pearce.*] Were those tenders that you have mentioned called for by the Works Department before the proclamation of the Cabinet minute? I think they were called for about that time; if not, immediately afterwards. It was immediately prior to the issuing of the minute.

392. Because they would hardly have done it after the minute was issued? [No answer].

393. *Chairman.*] I made one or two notes as to what you have mentioned to the Commission. Has not the selection of sites been made by some of your own officers? These papers will prove the contrary; and in proof of what I say I will just turn to one—a most extraordinary one—that giving the history of the Ivanhoe tank. I can speak with authority on this matter, because during my western trip some months ago I inspected the tank and saw the absurdity of it. The site was selected in direct opposition to the wishes of the Department of Mines. It is the 10th case in these papers.

394. Yes; it is alluded to in the *précis* as follows:—

Ivanhoe Tank.—The Waiho (or Ivanhoe) well fallen in through neglect prior to 1879. Tank required for use of township and travelling stock, and, after much correspondence, the Works consented to construct it. A site was recommended by Mr. Gilliat, but not adopted—another site chosen for tank upon Waiho private property. Tank site was altered to present position in main street of Ivanhoe. Compensation paid to contractor for moving. Tank sunk in bad holding ground. Papers relating to prices paid for fencing and drains, also to character of drains and fencing in this case.

——? Well, now, the site of this Ivanhoe tank is in the centre of the town. As a matter of fact, I have now under consideration a proposal to open a new stock route at the back of the township, because stock will not travel through it. The site selected for the tank is such that the townspeople cannot get near it. I saw it was silted up and leaky; and altogether in the district it is looked upon as a huge joke that a tank should be constructed in that locality.

395. Can you give us any reasons for the alteration in the selection of the site from that originally chosen? I cannot tell; except that the Works officers saw a difficulty, and our officers found it necessary to go in the opposite direction.

396. Might it not have been the case that upon putting down a trial shaft the site chosen was found to be ineligible? I think a close scrutiny of the papers will show that that was not the case. It was clearly pointed out to the Works Department before they undertook the work. It was merely a difference of opinion between the officers of two Departments, and the result shows that the officers of the Mines Department were sounder in their judgments than the officers of the Works Department.

397. But this tank was supposed to supply the town as well as travelling stock? Yes.

398. And it is found to be useful for one purpose, but not for the other? Well, the site recommended by Mr. Gilliat would have been very much more suitable for both purposes. It would have been very much cheaper and very much better.

399. But this tank is necessary to supply water to the town? Well, it has never been used for that purpose.

400. I suppose that in the present season it is not required? During my trip no deputation waited on me, as was done in other places, to ask that the tank water should be allowed to be used by the townspeople.

401. Then, as a matter of fact, the selection of sites which was supposed to have been made by the Mines Department, has not always been carried out, and you think to the detriment of the public? There can be no doubt of that. Now I will read, if you please, a portion of report received from Mr. Inspector Low upon this very tank. It is dated 12th December, 1857:—

The drains here have evidently been constructed with no respect as to what a drain is for. One drain, for a good half mile, running water from tank. Another is brought along road to Mongial, and cut up very badly by both stock and teams. The water from this drain overflows silt tank, which is very small, and partly upon main road, and runs into Elliott's tank on opposite side of road, which water Elliott afterwards sells to the public. Another long drain runs through township allotments which have been sold, and is now being blocked up. JOHN LOW.

402. *Mr. Moore.*] Was that work done by the Works Department or by the Mines? Well, I cannot tell you now. I have also in another report, referring to the fencing of the same tank, a statement which shows that a tender was let for this fencing at from £110 to £120 per mile. It was sublet to Elliott, and afterwards to a man named Anderson, whose price for doing the work was £82 per mile; showing that the first contractor, without doing anything at all, had cleared a profit of £33 11s. per mile. When these facts came under my notice I came to the conclusion that it was about time I did something to put a stop to the practice.

403. *Chairman.*] Have any of these sites selected for tanks besides that of Ivanhoe come under your notice? Yes; Mr. Quin pointed out to me that the dam at Tarella tank had been constructed on his run, and quite close to good permanent water, in direct opposition to his recommendations and to the

recommendations

recommendations of the Department. The tank had been under the charge of a keeper for some years without bringing in the slightest revenue to the State.
404. I have it here, "Tarella and Meenamurtie"? Yes; these are the places.
405. *Mr. Moore.*] Was this place close to which the tank had been erected permanent natural water, or was it made by the lessee? Partly natural, and partly made by Mr. Quin; but in my opinion the Government had a perfect right to use the place without any charge.
406. *Chairman.*] In what way? By Mr. Quin's offer in writing to that effect.
407. *Mr. Moore.*] Are you aware of a minute, written by Mr. Farnell when he was Minister for Lands (I cannot tell you the year), stating that the foreshores of all waters artificially conserved by lessees of runs would be protected, and that a number of the lessees took advantage of this inducement, and made some very expensive works for the conservation of water? I am not aware of that. All I know is that if Mr. Farnell did so, he had not the authority of law in his favour.
408. But he did actually issue this minute, and I, myself, acted upon it? Well, I am not aware of it; but even if what you say occurred, it could have no reference to the Tarella tank, because Mr. Quin freely offered the use of it to the Government.
409. I merely point this out to you that you may see that it would not have been fair for the Government to take these waters, artificially conserved by lessees, away from them? The papers show no reason for the non-acceptance of Mr. Quin's offer; but they do show that the work was proceeded with in spite of his protest against this wrongful expenditure of money.
410. *Chairman.*] The Tarella tank and Meenamurtie well minutes are referred to in these papers? I would like to say in reference to this matter that Mr. Quin lately came to me and spoke to me about it again. I at once called for a return of the cost of maintaining these two wells, and also the revenue that had been derived from them since they had been constructed. Mr. Quin, on this occasion, reiterated all that he had previously said to me, and I showed him a minute from Mr. Bennett, the Commissioner for Roads, who stated that the work had been carried out at Mr. Quin's request. On this Mr. Quin immediately wrote me a letter, denying the statement in the most indignant terms, and protesting against being placed in such a false position. He concluded by again denying in the most emphatic way the statement that had been made by Mr. Bennett.
411. Are there any other cases besides this that you are personally aware of? There was the Meenamurtie well, which is also in close proximity to waterholes. This well is only a very short distance away, and although a man has been put in charge of it, it has never been used, and has not brought in any revenue. In fact, at the present moment I am thinking of having the well battened down, and the man removed from it.
412. Do you know how many years this well has been sunk? It has been sunk now for a good many years, but I cannot state exactly. It was not during a wet season, but I believe it was during Mr. Quin's term in Parliament, six or seven years ago. Had the well been opened in a good position it would undoubtedly have been used.
413. Have there been any other cases brought before you in which faulty judgment has been displayed? No; three are the most prominent ones that have been brought under my notice.
414. We have evidence rather fully from Mr. Gilliat on this matter. He had remarks to make upon them all; but it is only in regard to special ones that we require your evidence? Certainly.
415. *Mr. Moore.*] Did you see in all cases the sites of those tanks that were chosen by the Works Department? No; not in all cases, but I saw some of them. In some cases that were referred to the Works the Mines recommendations were approved of.
416. In some cases I understand you to say the recommendations of the Mines Department with regard to sites were approved of and adopted by the Works Department? Yes; and I have not heard of any of these being afterwards complained of as unsuitable, because in selecting the sites they had the experience of the stock inspectors, as well as their own, in connection with these public watering-places.
417. Do you know anything about the tanks on the Nyngan to Cobar Road? No; I do not know by whom the sites of these tanks were selected.
418. *Chairman.*] Now, in regard to defective design and construction, and excessive cost? In connection with these matters, of course, I can only state to you that which I have learned myself. I cannot, of course, give you anything like professional testimony or information gained by practical knowledge. I can only say this, that during my Western trip, which occupied close on a month, travelling in the country for close on 600 miles, it was subject of complaint by nearly everyone that I met with that had any knowledge on the subject, that these designs were faulty.
419. In what way? It was said by nearly everyone that the sides of the tank were too steep—that the batter was too steep. I believe that in most cases it was 1 in 1.
420. *Mr. Moore.*] How does this affect the tanks? Well, I will merely say what I was informed. The batter is made so steep that when the cattle are driven on to the ground they go straight into the water and down go the sides of your tanks.
421. Is there no troughing at the tanks? Not always; in many cases there is not.
422. But is there not a place made specially for the cattle to water at? There is still a part of the tank they can get at, and the result is what I have stated to you. Steep sides are very nice to look at if you can keep them in that position and keep out the cattle.
423. Is there not a fence round the banks to protect them? There are cases where this has been done, and others where it has not been done. Where you have a mob of cattle you cannot confine them except by a strong fence, and this does not exist in many places.
424. *Chairman.*] Is it a reasonable supposition that when the tanks were constructed with steep sides it was not intended to water cattle at all in the tanks, but to pump the water into troughs? I think that is very probable indeed.
425. Consequently, stock getting into tanks shows no defect of design in constructing the tanks? Well, I take it that there is still a want of knowledge; and in support of what I say in this respect, I point to the fact that no squatter constructs on his run tanks with the same steep sides.
426. Mr. Sawers has already given us valuable information to the effect that pumping the water into troughs would be too expensive for squatters? Well, I think there is a lot of expensive machinery on many of these tanks for which there is no necessity. I think this is a question to be dealt with by skilled inspectors, who would have more practical knowledge of this particular subject than I could possibly have.

F. Abigail. 10 Jan., 1896.

427. *Mr. Weore.*] With regard to troughing, has faultiness of design come to your knowledge? Our Department is now altering all the troughing. The alteration was pointed out to the Works Department times without number, and it was shown that the first construction was so unsuitable that cattle could not drink at the troughs; and we are now proceeding to alter the thing by taking down the top rail.
428. But you are speaking now generally? Yes; I am referring to a general rule, and the Department of Works has since admitted that the alterations which we have carried out are wise and good ones.
429. *Chairman.*] Are you aware that one of the reasons for the construction of these steep batters was for the purpose of lessening evaporation; because you must allow that the greater the surface of water exposed to the sun the greater will be the evaporation, and that in a long batter there is a greater amount of water exposed to the surface than in a steep batter. It is for that reason apparently these steep batters were designed by the Department of Works. In two places, the fact of these steep batters being adopted was for this reason: Tanks necessarily cost considerably more than they would otherwise have done if there had been a very long slope, because, in constructing a steep batter, it is impossible to get bullocks to draw ploughs up the sides. The next reason for the apparent excessive cost is that so far as we have learned yet the Government tanks are much deeper on an average than the squatters tanks. This adds, as you must know, very materially to the cost of the works? I do not think the reasons stated by you can be sound. If they were sound the squatters would adopt the Government system of tank-making, because they are more intimately concerned than the Government can be in the storage and saving of water.
430. But if the squatter could make a tank for 1s. per cubic yard of excavation, would he not rather prefer to make two tanks for that price than to make one which would cost him 2s. per cubic yard? My opinion is that the squatter would construct his tanks in the deepest and most effective manner, having all the knowledge which men gain by living out in that part of the country.
431. Then there would be some apparent antagonism between cheapness and effectiveness. The Government would, perhaps, adopt this plan, not thinking it necessary to save a few pounds; but the squatter, wishing to get as much water as he could, and as cheaply as he could—would it not be reasonable to suppose that he would prefer to have two tanks at 1s. per cubic yard than one tank at 2s.? Well, all I can say is, that gentlemen with professional knowledge outside the Department of Public Works, say no. Mr. Cheeney is an engineer as well as a squatter, and you will find in the papers valuable information from him on the subject. It is generally admitted that his conclusions are correct, and his judgment sound on the question.
432. But I am now speaking presumably from the squatters' point of view. The Government make tanks, say, every 10 miles, but the squatter wants his tanks nearer than that. In consequence of having to make more tanks he cannot afford to pay so much as the Government, who have one over every 10 miles? But the Government do not have one every 10 miles.
433. But that only bears out the argument which I am adducing. A squatter having to make more tanks than the Government cannot afford to go to the expense that the Government (whose tanks are further apart) can afford to undergo? That may be so.
434. *Mr. Moore.*] Are not the demands made on the Government tanks much larger than the demands made on the tanks of the squatters? Well, the revenue obtainable from them does not show that. There are a number of these places which return no revenue whatever. I called for a return recently on the subject, and was simply astounded at the fact that men are being paid £3 per week to take care of places which are not used at all, and which bring in no revenue whatever.
435. Does that occur in a great many instances? In several—in numbers of instances. I think I shall be able to supply the Commission with a copy of that return. I shall have it prepared and sent down.
436. No doubt some of these tanks seem unnecessary, especially in good seasons; but a caretaker has to be appointed there, so that in time of severe drought the tank which is now considered unnecessary, and which is not used at all by the public, may prove of good service. It is not in good seasons at all, of course, that tanks are required. People can do without them altogether then? Certainly, and I have no doubt that some of these tanks were constructed in some of the seasons when they were wanted by the public; but what I have said shows that they were either put in the wrong place ——
437. *Chairman.*] Can you enumerate one or two cases where this occurred, so that the other side may have an opportunity of replying to them? I would rather that this information was given directly by one of the officers, who can speak with authority, and give the whole of the surrounding circumstances, which I cannot do.
438. With regard to excessive cost, there is one other matter I should like to ask you about ——
439. *Witness.*] In speaking about the last question, I would like to refer to the Jumping Sand-hill well case, the report of which showed that the tank need not have been made, as there was good water a mile away. I have a list of cases here with respect to Low, but he will be here himself. This report is written by an officer, and comes with authority; but at the same time it would be much better to have it from the officer himself.
440. Now, one other matter. As a rule, when a squatter has a tank excavated he of course gives every facility to the contractors to carry out the work, and advances money to pay wages; so that when the tank is finished he goes there, measures it, and pays the money at once. I believe this is not the case with regard to the Government. In the first place only 50 per cent. of the whole amount to be paid for construction is given, and inspectors are sent up to see that the work is being carried out properly, and sometimes several months' delay occurs before the contractor is paid. Necessarily, therefore, the contractor has to ask a higher price from the Government, because it means that no one can take a Government contract unless he has a considerable sum of ready money available to pay off his workmen. Do you not think that this delay that occurs between the inspection and the survey, and the final passing of the work and final payment, therefore necessitates larger prices being asked? I think there can be no doubt that the delay which takes place in paying the contractors by the Works Department has led to excessive prices being charged, and I gave instructions seven or eight months ago that the contractors were to be promptly paid. I believe that it is for this reason the Mines Department have been able to obtain the erection of huts and other works at very much reduced prices.
441. *Major Pearce.*] Might not the excessive cost be due in some instances to the works having to be constructed in very bad seasons—in seasons when there is a great drought, scarcity of provisions, scarcity of grass and water, and under great pressure from outside—a great want for the works having been pointed out, and a tank having to be constructed whether the Department wished it or not? That would no doubt be

be the case in some of these works; but it could not affect the cost per cubic yard. For instance, if a squatter were to carry out an excavation of a similar character in the same district at 9d. to 1s. per cubic yard, there would be no reason whatever for the Government allowing their works to cost them 1s. 9d.
442. But suppose the conditions were not the same? Well, there would still be a great disparity in the cost.
443. But the Government tank might be much further from water than the squatter's tank? Yes.
444. And the facilities given by the squatters? I think in most cases the Government give better and greater facilities to the contractors than the squatters.
445. *Chairman.*] There is yet one other matter? I would like to say now in reference to the cost of excavation that seven months ago I made a request to the Department of Public Works through the Minister that I should be supplied with a return, showing the cost of excavations. I have received no reply, and have addressed some ten or twelve other communications to the Department, every time being put off with one excuse or another; and this led me to the conclusion that the Works Department did not desire to furnish me with this information, as it might prove too much. I at once wrote to Mr. Sutherland (you will see in the papers some very strong minutes on the subject), but up to the present moment we have not received the information that we asked for.
446. We have here a list, but it is not a complete one, in which we find that the cost of excavation has varied from 10½d. to 1s. 0d. per cubic yard. In the evidence given by Mr. Gilliat, the Chief Inspector of Public Watering Places, he stated he heard as a fact that as much had been given as 2s. 6d. per cubic yard for this work? There can be no doubt about it. There can be no question about it, that as much as 2s. 6d. has been paid away to contractors, who have sublet the work at much smaller rates.
447. Well, the Commission have made a minute that the cost of the other tanks should be sent in to us, so that we may know each case thoroughly. There is another matter in connection with this. In some cases where the population was rapidly growing, such as Broken Hill and Silverton, great pressure is brought to bear on the Government that roadside wells and tanks should be constructed at any cost? But no such representations have been made to the Government with regard to Broken Hill; and, as a matter of fact, before the Government knew anything whatever about the accumulation of a great population there, the Works Department had authorised the construction of a tank near the town. This tank I saw when I was up there, and it is only since my visit that communications were sent to me urging greater speed.
448. *Mr. Moore.*] I think the place about which Mr. Gilliat gave evidence was not Broken Hill but Milparinka? Yes; Milparinka and out that way were referred to in Parliament on one or two occasions, and I gave a promise that the works would be proceeded with, with all the speed that we could command. These works cannot apply to the question, because they are only just recently started.
449. Still it is possible that similar costs may have been incurred in years past, where the requirements of the population were urgent and where the Government were compelled to carry out the works at any cost? No doubt. I think that that was the case with regard to the Paroo Road tanks.
450. *Chairman.*] The facts stated would necessitate an apparent excessive cost of Government tanks over those constructed by private individuals; but is it the duty of the Government to construct expensive tanks where there is no certainty of getting water and no public necessity, and is that a proper action of Government officers who are paid to select proper sites and to carry out the works with all the skill and professional knowledge that they can command? I think not. I may be strange in my conclusions; but, as a business man, I would not care to have an officer with me who would not make an endeavour to do his duty properly.
451. The public will agree with you there; but, in the case of loss of life occurring, the Government would have to do almost anything, and to incur almost any expense, rather than that lives should be lost? Certainly, if it were to supply the population I should not consider the expense at all, or if life could be saved; but in most cases there is no population to be supplied, and that is what I complain of.
452. *Mr. Moore.*] But then as to stock. I know one man who lost 12,000 sheep through there being no drinkable water in Copago Lake? And I know a case where a man lost 7,000 sheep on the borders of a tank, because the sheep would not drink the water. It was owing to this mixture which the Works Department have been in the habit of dressing the inside of service tanks with, causing a film to arise on the water, and rendering it undrinkable by stock.
453. But the making of tanks was a new thing at that time; and if the work had been in charge of any other Department inexperienced in such matters, it would have been liable to make the same mistakes? There is no doubt about it; but, then, the Works Department ought to admit that they have made a mistake, and not stick to the contention that they have done the correct thing. When their mistakes have been pointed out to them, the usual thing for the Works Department to do was to return offensive replies. Mr. Abbott, when he was Minister for Mines, received the same replies that I have received; and these papers will show that I considered their replies so offensive that I appealed to the Minister for Works.
454. *Chairman.*] There is one other matter still in connection with the charge of excessive rates of payment to contractors for Government tanks. It is this, that where a squatter is quite content to have earth excavated at a certain distance from the tank, the Government insist by very strict regulations and specifications that the earth must be placed a certain number of yards from the excavation, and they also insist that the banks shall be nicely trimmed, merely making them look well, but doing no real good? There is no doubt that that is so: and if you go to expense in having the banks nicely trimmed, it may be very agreeable to the eye, but it will be of no practical benefit. This is one of the things which involve unnecessary expense.
455. *Major Pearson.*] Then you think that the embankments round the tanks are of no practical utility? No, there is no practical benefit in making the tank as level as a billiard table, because it cannot remain so if the tank is to be used.
456. *Mr. Moore.*] The Government employ professional men to look after these matters, to plan these tanks, and to see that they are constructed in accordance with the plans? I suppose that is so; but I think in many cases if they got a good bushman he would do the work very much better than a professional officer.
457. That is your opinion; but is it likely if an engineer were employed that the work would be completed in any but a proper and workmanlike manner? They might be completed in the manner in which he would consider proper and workmanlike; but it would not follow that the work would be done properly.

F. Abigail. 19 Jan., 1888.

438. A private owner would, perhaps, be content at having the work done less nicely? Perhaps it would be just as well. I do not say anything about that, or if I did I might say something that would not be very flattering to the Works Department. I do not believe that at the present time the works in connection with tanks and wells are carried out well or neatly or cheaply, and that is the cause of the country calling out so loudly for a Local Government Bill.
439. *Chairman.*] What do you think about the specifications adopted by the Works Department? I can see that they were framed for the purpose of consuming public money, and contain a great many unnecessary provisions.
440. *Mr. Woore.*] But specifications of any kind are necessarily precise? Exactly.
441. And, of course, the Government would be more particular in carrying the works out through their officers (who are responsible for their proper completion) than would be a private individual? The officers are responsible for carrying out the works strictly in accordance with the spirit of these specifications? Yes, of course; a business man would have his specifications exact, but he would not overload them with a number of provisions which are entirely unnecessary.
442. *Chairman.*] Now, no squatter ever dreams of cutting down stumps, but he would take care that no trees were left standing in the vicinity of the tank, because the boughs might keep falling in? I see here that one of these specifications states that the bottom of the tank shall be perfectly level. Now, that alone is really an absurd thing. It is ridiculous to so construct a tank as to put a spirit level on it.
443. *Mr. Woore.*] But it is the spirit and not the letter of these specifications that it is intended should be carried out by the contractors? No; the terms of the specifications have to be carried out exactly. Your Chairman here has had practical experience of this question, and if he goes through these specifications carefully he will simply laugh at many of the conditions, and would never think of spending his own money in having them carried out.
444. The tendency of your argument is in favour of non-professional men being employed to carry out these works? I did not say that. I said men ——
445. You said good bushmen would do as well as professional men? Yes; because a good bushman would have practical knowledge of what was necessary for the work. An engineer sent from Sydney without having any practical knowledge of the country, and the necessities of the works to be constructed, has not the local knowledge which is necessary.
446. Then, is your argument not in favour of having a non-professional man to take charge—to plan and to carry out these works? I would have good men, whether they possessed professional training or not. In connection with our Department we have inspectors who have had years of service on large stations, and who have acquired a knowledge of stock, and how best they may be encouraged to drink. They know what form the work should take, the kind of fences to be erected, and troughing to be supplied. We have a number of men of that kind; and men having this practical knowledge are better than engineers who have not the same experience. Not that I would select men off the streets of Sydney and send them up there; but we have practical men who are able to construct the works better and cheaper than the Works Department have done them.
447. *Chairman.*] The next matter on our list is that dealing with expensive forms of machinery. We would like to have your opinion on this? In many cases the Works Department have put on engines, necessitating the employment of engineers. Our officers have repeatedly reported to me that this expensive machinery is not required, and that the work might be done by a very much simpler process.
448. In many instances, we understand, steam-pumps have been erected? Yes; here is what is said about this:

Polygonum Hut Well.—No better site for a tank could be desired than this, which, in my opinion, would have been much more suitable for traffic. The mode of lifting the water here, which is by a windmill, condemns itself, as the windmill is continually getting out of repair and breaking. Sufficient water for requirements could easily be drawn by a single whip, the cost of which would not exceed £5. The water here is unfit for use, and is, consequently, unfit for travellers.

449. *Mr. Woore.*] Is it not the case in some instances that it is not possible to obtain water fit for human use from wells used for stock? No doubt; but it opens up the question whether it is a wise thing to open up expensive wells until you have acquired the knowledge by boring whether you can get fair water or not.
450. *Chairman.*] We are still on this question of the excessive cost of machinery and the greater cost of maintenance. Of course we are aware that a caretaker who could merely take care of a common pump or whim would not be competent to take care of a steam pump? Certainly not.
451. You think that these steam pumps are necessary at some places and that at other places they are not necessary? I do; and we are compelled to keep an engineer in charge of machinery at these places where there is no water whatever. A more simple form of machinery which would require the services of a man at 7s. a day, would be quite sufficient; but at the present time we would have to pay an engineer at the rate of £4 per week.
452. *Major Pourose.*] I suppose you can specify instances of this, given by your own officers? Yes; but I should prefer that it should come from the officers themselves, as they can speak with greater authority.
453. *Chairman.*] The next point of inquiry is as to the excessive cost of fencing? In reference to the fencing, the excessive cost will be found to be in this way: A very expensive style of fence was adopted, and one which I conceived to be altogether unnecessary. During my trip in the west I actually came across some fencing paid for by the Government at the rate of something like £100 a mile.
454. *Mr. Woore.*] Was not that fence put around the tank to protect it? Yes; but there are very extensive fences, sometimes including land, to the extent of 400 or 500 acres.
455. It is not around the tanks, then? No; the fence is around the caretaker's paddock. We have evidence that men working in the district have offered to put it up for from £40 to £45 per mile.
456. Then these fences around the caretaker's paddocks are put up in just the same manner as fences around the tank? They must be.
457. Are these fences wire fences? No; I understand that a good many of them must be of sawn timber. The gates erected at many of these places were something like those which might be seen at the entrances to some gentlemen's residences in Sydney. I asked where those gates led to—in my simplicity and ignorance thinking that they led to some palatial residence near at hand—and was told to my astonishment that they were the entrance to the caretaker's paddock. There was one case (Boonoona tank) which cost more than £120 per mile. It was sublet by the contractor to another man, and the former pocketed about £40 per mile.

mile. The cost of each gate was about £15; when any form of the simple fence that I had seen in my 600 miles journey round the country would have done just as well.
478. *Chairman.*] Will you describe the fence—how many wires had it? It was of sawn timber.
479. *Mr. Moore.*] You mean sawn rails and posts? Yes.
480. Were they painted? Yes; the gates were splendidly painted. They had a beautiful white paint coating, and I supposed I was reasonably correct in imagining that the gates led up to some gentleman's residence.
481. *Major Pearson.*] Then it was the gates that you referred to as being made of sawn timber? No; it was the fences. At the Ivanhoe tank there was a six-wire fence of a description which was new to the inspector, and it cost £35 per mile.
482. *Chairman.*] Are you aware of any instance in which straining posts were dispensed with at the instance of one of your own officers? No; I am not aware of that.
483. *Major Pearson.*] The specifications are very clear with regard to straining posts.
484. *Chairman.*] I have a memorandum here to the effect that in one instance straining posts were dispensed with by one of the officers of the Mines Department? Has that been confirmed by Mr. Gilliat?
485. No; I do not think that Mr. Gilliat knew anything about it. I suppose you do not complain that the fence around the tank is unnecessarily strong? No; but I think it unnecessarily good.
486. Of course you are aware that a mob of 1,000 cattle, almost dying with thirst, require a very strong fence to restrain them, else they would break it down? The trouble is that the fence is expensive without being strong. I am quite sure that if a mob of cattle ran up against most of these fences they would have to give way. I have a list here which I will read:—

Forty-eight mile Tank.—Fencing not yet completed; this of split bolar, none of it being carted more than 3 miles. Contractor would not tell price, but told me it was between £80 and £100 per mile.

Mount Mmassey Tank.—Fencing in good order; not yet transferred. This has lately been erected by Works Department at £120 per mile. Is of pine, half split, and the balance round young pine, with no straining posts. The round pine will last only a few years.

Beaucaire Tank.—Fencing in fair order; not yet transferred; lately erected by Works Department at £120 per mile. Gates in good order; lately erected by Works Department at £15 per gate; not yet transferred.

Thirty-five mile Tank.—Fencing in good order; not yet transferred. This has been erected at £95 per mile; none of the timber was carted over 4 miles.

487. I think we have gone sufficiently into that unless you want to supplement your evidence in some way? No; I have nothing further.
488. Then we will go into the next; but first of all I would like to read to you a report from Mr. W. J. Hanna, on the Wilson reservoir. He writes from Moorindie on the 13th June, 1887:—

Mount *Wilson Reservoir.*—On last inspection the caretaker was absent, and very little work appeared to have been done since my last visit. Mr. Crommelin informed me the pump is now in working order. I would again suggest that the caretaker be instructed to keep the various parts clean, and to lubricate more frequently. The ruts in the embankment could be filled up by shovelling up the material washed down instead of breaking in the sides, which tends to weaken the embankment. This evil of rutting can be reduced to a minimum by drawing off the top water at one or both ends of embankment, as recommended in previous report. If small drains were cut round excavation and kept in proper order the storm water would be collected, and would run into the creek instead of flowing down the excavation slopes and causing deep ruts. It should also be part of the caretaker's duty to remove the sand from the bed of the creek, especially near the weir, as opportunity offers. This report has been unavoidably delayed.

W. J. HANNA,
Road Superintendent.

The Engineer-in-Chief for Roads, Sydney.

——? I may say, with reference to Mr. Hanna, that he is a very efficient and careful officer, and I should be happy to give great attention to any report coming from him, although he is an officer in another Department.
489. Now, when these works are completed and handed over to the Mines Department, what right has Mr. Hanna, or anybody else, to report on them or to interfere? I think he was encouraged to do so by his chief.
490. But is it recognised at all that the Roads officers have the right to report on works that have passed out of their hands? Well, I should resent any interference by any officer of the Works Department of anything that happened to be under my control. I should resent it as a very improper interference.
491. But suppose an officer of the Works Department saw works that had cost the country large sums of money going to destruction, would he not be right in reporting that fact to the head of his Department? Yes; I should say so under these extraordinary circumstances. If that had been done the officer would deserve to be commended for it; but what you say does not contain the case as it occurred.
492. Well, it seems clear that Mr. Hanna reported on the want of Mr. Crommelin's attention, and the next time he visited the reservoir he found that the caretaker had not attended to the instructions, and that Mr. Crommelin did not compel him to do so; and he not only found fault with the caretaker, but with Mr. Crommelin as well, both persons being officers of the Mines Department? Was the document which you have read sent to the Mines Department? I ask that question because I have dismissed several caretakers for neglect of duty.
493. The document is endorsed—"I think a copy might be sent to the Mines Department." If a copy had been sent the matter would have been at once inquired into; and if the statement therein contained was found to be correct, then the caretaker would be dismissed.
494. And Crommelin would have got a reprimand? Certainly.
495. But do you think that Mr. Hanna stepped out of his way in reporting this matter to his Department? In a case of this kind, I would not think that Mr. Hanna would be guilty of doing such a thing.
496. We have some documents here which I would like to read to you. They relate to the One-tree tank:—

Sir, Stock Office, Hay, 5th June, 1887.

I have the honor to inform you that Caretaker Kelly, at the One-tree tank, has reported that the plunging-rod belonging to the pump has become disconnected. I have reported the matter to the assistant-engineer, Mr. Stilwell.

I have, &c.,
JOHN A. KEIGHRAN,
Overseer of P.W.

The Chief Inspector of Public Watering Places, Sydney.

This is a matter which should have been attended to by the caretaker, and this appeal to this Department is scarcely consistent with the claims made by the Mines as to the maintenance of these works being in their hands. I would point out that this system of routine causes unnecessary delay—in this case three weeks—and to deal with a matter which should be attended to at once by the caretaker.—A. P. W., 24-6-87.

Telegram

F. Abigail.
19 Jan., 1888.

Telegram from Sydney to A. W. Stilwell, Roads Office, Hay

Keighran reports piston-rod, One-tree pump, disconnected. Presume it has been attended to?

A. P. WOOD,
Assistant-Engineer.

The Commissioner and Engineer for Roads.

One-tree Tank.

Sir, Roads Office, Hay, 26th June, 1887.

Mr. Wood's telegram attached. I visited One-tree tank on the 24th instant, and found that the piston-rod had become disconnected with the plunger-rod, owing to the key which fastens the two together having fallen out. This I attribute to negligence on the part of the caretaker. I repaired it, and the pump is now in working-order. This might have been remedied by the caretaker himself.

I have, &c.,
A. W. Stilwell, A.E. W. B. NICHOLSON.

This is another proof of the absurd nature of many of the complaints forwarded to us by the Mines. Long correspondence, and an official set in motion to rectify carelessness that could have been dealt with by the most stupid of labouring men.

Sir, Roads Office, Hay, 2nd July, 1887.

As instructed by you, I visited the One-tree tank on the 24th June, and found that the piston rod had become disconnected with the plunger-rod, owing to the key which fastens the two together having fallen out. This I attribute to negligence on the part of the caretaker. I repaired it in five minutes, and left the pump in working-order. This repair might have been effected by caretaker, who, when I asked him the reason, replied that he did not know anything about the pump, but reported the break-down, and was waiting till some one was sent to repair it. To do this five minutes' work I had to ride 50 miles over country almost impassable. This man is evidently unfit for the post of caretaker, as he has no knowledge of any portion of his work.

I am, &c.,
A. W. Stilwell, A.E. W. B. NICHOLSON.

An unnecessary journey of 50 miles across flooded country, equal to 150 miles in a dry season, has been caused by the carelessness and incompetence of this caretaker of the Mines Department.—A.W.S., 1/7/87.

——? Well, I should want that confirmed before I believed it.

497. This man says that he rode 50 miles in order to attend to what might easily have been put right in five minutes? Well, I have a case in which Mr. Stilwell countermanded the instructions of the officers of our Department, and caused a great amount of public inconvenience.

498. *Major Pearson.*] Was he within his rights in doing that? No; certainly not.

499. Who moved Mr. Stilwell to do this? It is necessary to explain that there has been a continual desire for the last five years to discredit the officers of the Mines Department in connection with this work. Four or five years ago Mr. Abbott (who was then Minister for Mines) wrote a strong minute, expressing disapprobation at the terms used by some of the officers of the Works Department in writing to the Mines' officers in connection with these works; so that this friction and irritation has existed for a long time, and I insisted upon having the whole of the work, or I said I would have none of it. You will find that all these statements are couched in the most offensive terms.

500. *Chairman.*] Now, this is the gist of our inquiry. It is as to the nature of the present interference of the officers of one Department with those of another. Here, a caretaker applied to the Inspector of Public Watering Places, who, instead of attending to it, refers it to the Works Department in Sydney, and that Department was obliged to compel its officer to ride 50 miles to do five minutes' work. Now this of itself (as anyone can see) must have led to a good deal of friction. Here is a trifling complaint by a man who should have been sent about his business there and then; who waits for three whole weeks, allowing the public to suffer for want of water, until he has communicated with his superior, and his superior communicated with the Works Department, who have to communicate with their officer up country. Now, it is easy to understand what annoyance this must give to a public officer, who must necessarily feel very angry that, through the stupidity of one man, he should be made to ride 50 miles: and hence the friction between these two Departments? You will understand at the same time that we are not allowed to do anything, no matter how small the cost might be. We are not allowed to do anything by way of alteration or repair, although the Act gives the Mines the power of alteration, and even of construction. We could not do anything before the matter was brought before the Cabinet.

501. Mr. Gilliat stated in evidence that it was not the privilege of the Department to spend more than £10 on any necessary repairs? Yes, that is as a matter of course; but we had not the right to do it. We had not ministerial or executive authority to spend a shilling until I obtained from the Cabinet the minute giving us the power.

502. *Major Pearson.*] I suppose you had no vote to work on? No; the statement which has just been read is a bare statement from the Works' officers, and it will be necessary to have a reply from the Mines' officers on this particular case before you will be able to see the exact facts. One is an *ex parte* statement, and may be very good until you get the other. Mr. Gilliat is more conversant with individual cases than I could possibly be; and he will be able to deal with this at once. I have two cases here of Mr. Stilwell interfering with our officers at Pulletop and Hulong.

503. *Chairman.*] We should like to hear about them? The first is dated from Hay, on the 6th December, 1886, and is in these terms:—

Sir,

On visiting this tank on 3rd instant, the water was 2 feet above level of bore—20 feet depth in the tank. John O'Neil is lessee. He has been in possession six weeks, and was in charge when I visited. The embankment was in very bad repair, and no effort had been made by lessee to remedy it. Water had been allowed to accumulate on top (which is dished), and break over at two corners, carrying down some 30 cubic yards of earth. The batters throughout were also corrugated by neglected rain-scour. The wires of enclosing fence were very slack, and should be attended to.

The service tank was not full, and the lessee appeared to know little about the care or working of the steam-pump. I got it to work, and he said he would employ a man to take charge of it. It worked satisfactorily, but the boiler needed cleaning. The troughing was in good repair; it also needed cleaning.

I have, &c.,
The Commissioner and Engineer for Roads. A. W. STILWELL.

Make copy to send Mines; re-submit on Mr. Wood's return.—W.C.B., 8.12.86. The Mines should certainly be informed and requested to insist on lessees keeping works in proper order.—A.P.W., 10.12.86. (Mr. Overseer Elworthy for report.) If these statements are correct, Mr. Elworthy will please say why reports of neglect at wateringplaces in his district should be so frequently received through another Department before being reported on by him.—HARRY GILLIAT, B.C., 20.12.86. Mr. Overseer Elworthy.

These statements by Mr. Stilwell are very annoying. I visit these tanks regularly, and report you fully after each inspection. The last time I reported on this tank was when I handed it over to O'Neil in October. At two ends of the embankment the earth was washing away, and I gave O'Neil instructions to mend this up, and have sent him iron to make the V shaped gutter at corners. When passing the tank subsequently I noticed my instructions had not been carried out, mainly owing to Mr. Stilwell, who, the lessee said, had countermanded my orders, and told O'Neil not to touch the embankments without instructions from him. Why does Mr. Stilwell do this? I have personally complained of this interference to Mr. Boulton,

Boultbee, who can tell Mr. Gilliat all about it, and I am sending Mr. Boultbee copies of several letters on the subject. I also refer you to my letter of 10th instant, wherein I complained about Mr. Stilwell. I will write O'Neil, and insist on the work being carried out at once; and if not done by the time I pay my next periodical visit of inspection in January, I will report to you. I opposed O'Neil's tender for this tank, but he got it after all.—W. J. ELWORTHY, 22/12/86. F. Abigail. 19 Jan., 1888.

The next is dated from Whitton, 21st December, 1886:—

Sir,

Referring to my instructions to visit the Hulong tank, I have now the honor to inform you that I did so, and found that Mr. Road Superintendent Stilwell—after Mr. Overseer Elworthy had instructed the caretaker to coal-tar the boiler, &c., in accordance with your circular, 3rd September last—had issued fresh orders to the caretaker to paint it red, and to apply to Mr. Elworthy for paint. Mr. Elworthy instructed to prepare the newly-dished top of the embankment for the reception of a shoot for carrying off the storm water, and material for which Mr. Elworthy was applying. These instructions were also countermanded, and a length of india-rubber hose 2½ inches in diameter was supplied by Mr. Stilwell to carry off all the storm water from the four embankments. I need hardly say how totally inadequate this is, and must at the same time protest against such a useless waste of money, and such a childish innovation, that in the eyes of the travelling public so reflects upon the Public Watering Places officer. I wish to bring this immediately and urgently before you, as I understand Mr. Stilwell is about supplying other tanks in his district with the same. A short of less than one foot across is perfectly useless and is required at each angle. Actual experience, both at Hulong and Pulletop, has proved the folly of the 2½ in. hose, and caretakers have now definite instructions to proceed with shoots so soon as material arrives.

The interference on the part of Mr. Stilwell and his assistant, in regard to the control of public watering places transferred to us, is highly objectionable. The overseers do not appear to have the interest in their work they should have while dictated to and snubbed by an officer who has no control over them. The caretakers cannot understand what appears to them a divided and antagonistic authority (antagonistic, however, only on the part of the Works' officer), and between the two the public watering places suffer.

After the transfer of public watering places to us in good order, I would urge that the responsibility of the Works officers should cease. We have capable men as overseers, who, if they understood it to be their duty, could see all repairs executed, and, I think, with less expense; and thus avoid a correspondence and interference that, I venture to think, is hardly creditable to Mr. Stilwell and his endless and groundless complaints.

It is only from Mr. Stilwell's districts that these endless, frivolous charges come.

The accompanying copies of letters are, I think, a substantiation of my remarks.

I have, &c.,

JAMES W. BOULTBEE,
Inspector of Public Watering Places.

The Chief Inspector of Public Watering Places.

Now, you will observe there that Mr. Stilwell complains of the work not having been done; but he does not say anything about the countermanding of the orders given by the Mines officers and the non-fulfilment of repairs, which is the result of his own action and not of our officers.

504. It might be advisable if I read over *seriatim* to you the complaints that were made by Mr. Stilwell? I have another one here.

505. This is the series of reports sent in by Stilwell himself, and some of the officers under him. It goes to show, apparently, that the caretakers over these works are careless, and that several incidents such as that where the key fell out and the plunger-rod became disconnected, have happened. This matter was read over to Mr. Gilliat, but he stopped me in reading in order to make some reply. This would appear to show good reasons why the Works Department were continually interfering with the Mines. Take the report with reference to Til Til tank, for instance. It is as follows:—

Til Til Tank.—Report of 21st January, 1885 (85-118): That caretaker was without a horse to work the McConnan lift, and without oil for bearings; that the public worked the pumps with own horses when requiring water, and it had thus sustained considerable damage.

Report of 3rd April, 1885 (85-579): Found caretaker absent on leave—only a lad in charge; sheep and cattle had been admitted inside tank enclosure to water at silt tank, and the embankment was thus being damaged; fence rails were missing, apparently used for fuel by travellers.

Report of 1st May, 1886 (86-643) as to pumps, Holman horse-power, being reported by caretaker as out of repair and quite ineffective: That there was no defect, except that bucket-leathers required renewal, and this could have been done by caretaker instead of requiring mechanic to be sent from Hay—100 miles; also, that much negligence was evinced in keeping drains and fence in repair, and that sheep had been allowed inside tank fence, damaging the embankment: Mr. M'Leod, Mines' Overseer, reported, in reply to this, that caretaker had been told by travelling mechanic never to open the pump for repairs, and that the sheep had been removed from tank enclosure soon as observed.

Report of 6th August, 1886 (86-1,165): That statement of caretaker as to repair of pump was incorrect; had not been directed not to touch it by mechanic, but that mechanic had found that caretaker did not know how to overhaul the pump, and that there was no other defect than as to leathers being worn; that Mr. Nicholson reports that sheep had remained inside fence by caretaker's admission for some days until they were too weak to walk out.

——I have a letter here from the lessee on the subject, and he states that whatever blame there is in the matter lies with Mr. Stilwell himself.

506. There is no reply from Mr. Stilwell to that? It is dated on the 9th, and is headed, "As to alleged interference with Mines' overseer at Pulletop tank." The letter is as follows:—

Sir,

Hay, 9 February, 1887.

Referring to the attached papers, it is to be observed that Mr. Elworthy does not state that I countermanded his orders to the tenant, but that the tenant, O'Neil, informed him so. An obvious preliminary on Mr. Elworthy's part would have been to ascertain whether such were the facts. For your information I may state that it is about the reverse of the facts; but as this was not elicited by Mr. Elworthy, it may perhaps be neglected as irrelevant, and now apparently the points to be considered are that this man's unsupported statement is taken by his overseer (as he intended it should be) as an excuse for gross neglect, for some time possible of a most obvious and urgent duty; and then his hand is unwittingly played further to by Mr. Elworthy's report, and Mr. Gilliat's consequent minute being based upon it.

It would really appear that up to the present Mr. O'Neil has been master of the situation. I do not see how any responsibility regarding it rests with this Department.

In fact, the matter should be one, as Mr. Gilliat somewhat elaborates in his minute—so obviously and solely between the Mines officers and their tenant—that unless it had been forced upon me I should have had some delicacy or reluctance in dealing with it.

I can, however, heartily concur in what Mr. Gilliat says respecting the interference of officers with the men under another Department—the more especially as this has been at times somewhat realised for me by actions of his overseers at works still under my jurisdiction; but I confess that I have failed to draw from it the somewhat anomalous conclusion that it is impossible an officer can successfully accomplish his work if his orders are countermanded by an officer of another Department, possessed of no authority to interfere.

On the contrary, I have found little difficulty in maintaining my authority, and little harm has resulted, and I have taken it all in good part as evincing only mistaken zeal on the part of his officers.

I have, &c.,

A. W. STILWELL.

The Commissioner and Engineer for Roads.

507. The object of reading this letter of Mr. Stilwell's is to bring out such incidents as show where the Roads officers were justified in making charges against the men who were placed in charge of valuable public works? There can be no doubt that at times improper men are appointed to the position of

F. Abigail. 19 Jan., 1898.

of caretakers. This is proved by the fact that I have dismissed, during the last few months, several of them who were reported to me for neglect of duty. In every case where the neglect was proved I have never hesitated to dismiss the man.

508. *Major Penrose.*] Of course, caretakers might prove inefficient, no matter what Department appointed them? Yes. Here are the instructions to the caretakers. *(See Appendix).*

509. That appears to cover the whole thing? No doubt.

510. Perhaps the Works officers have had similar instructions? But there are times when under the most strict regulations men will be guilty of disobedience; and as soon as it is shown that there has been disobedience they are punished. The tone of Mr. Bulwell's communication would lead to the inference that we not only appointed incompetent men, but that we countenanced their incompetency by keeping them in their positions. That is what I regard as a ridiculous conclusion. Now, the greasing of the tanks is a matter to which we objected most strongly; but we have evidence to show that it was done after we objected to it.

511. What about the subletting of contracts? I have heard of contracts that have been sublet so often that the public have had to pay to the tune of £30 to £35 per mile more for fencing than they should; and the same with regard to excavation.

512. *Chairman.*] We should like to get a contractor to give evidence about this matter. It may be that a contractor, having a large sum of money on hand, will go in and take Government contracts where men of small means are shut out. The consequence of that would be that these men would get a very large margin of profit by subletting the contracts to other men possessing less capital? That may be the case; but do not the facts in connection with the caretakers' cottages destroy a conclusion of that kind? While the cottages were under the control of the Works Department, the average cost of their erection was £85.

513. Unless we can get something specific, the matter is hardly worth going into? I know cases where the first contractors for fencing have lagged from £35 to £50 per mile.

514. Now, with regard to the faulty construction of wells and the expense of constructing headworks before the water was tested—that would involve a large expenditure of public money, and apparently in a very improper manner? In reference to the faulty construction of wells, I think I had better begin by referring to the Wooloondool well:—"This well has been bored from bottom of shaft without any pipe or flooring being placed in the well. The bore is liable to, and is constantly choked from, silt—constant baling, even when water is not required, necessitating great wear and tear and useless labour, insisted on by Works Department as necessary to keep bore from silting. Bore choked on many occasions, and has caused much delay and useless correspondence. The Works Department endeavoured to show that it was the fault of the Mines caretaker or lessee." Now, here is a very case in point. Here is a certain work insisted on by the Works Department, showing that they were interfering with the management of the works by the Mines Department. We shall show that they insisted upon much needless work which was entirely unnecessary. Then there is the case of the Dry Lake well, the circumstances of which are similar to those of Wooloondool well, in which all the requests for repairs and alterations were referred to the Commissioner for Roads. We come next to the Willaundra well, the construction of which was not asked for by the Mines Department, the site having been selected by the Works officials. When the well was nearly completed and the supply troughs and whim erected, it was found that a portion of the headworks was upon private property. The Chief Inspector of Public Watering Places recommended one watering place between Clare and Ivanhoe; but the Works Department constructed both a tank and a well, although Mr. Gilliat pointed out that, from experience he had gained in the district, wells were not suitable. The construction of the well was so defective that, although it only went 102 feet, the cost exceeded £1,000. Then for the resumed land where the headworks were erected they had to pay £30 compensation, being £7 10s. per acre for 4 acres, to the owner.

515. Was there no reason given for that? The papers show that there was no reason whatever, but that they had ample room for the troughing without encroaching on this land.

516. Why did they go in, then, on what was private property? I cannot say; but I should think it was their duty to acquire information whether the land was private property or not before they trenched upon it. As you all know, you can, under the most difficult circumstances, put down a well from 100 to 170 feet deep at a cost of about £700, and that is a very good figure; but here there was no need for a well at all. There was only need for a tank, but we get both a tank and a well at excessive cost. It is noticeable, also, that this was done in direct opposition to the report of the Mines officers.

517. Here is another matter about which we want your opinion—the erection of headworks before a water supply is found at all? My view of that is this—and I will carry it out while I have the privilege of presiding over the Mines Department—that where a well is necessary to water stock, and as soon as a suitable site is selected, I shall insist on boring being carried on or a trial shaft being sunk, to test whether we can get fairly good water or not before the expenditure of any public money is incurred by the erection of those costly headworks.

518. Has that system of which you speak not been already carried out by the Works Department? Evidently not; otherwise we should not have had a number of wells where the water is of such a character that stock will not use it.

519. *Major Penrose.*] Is boring for artesian water carried out by your Department? Yes; and very successfully carried out by our Department of late.

520. *Chairman.*] In many cases these headworks are let all in the one contract with the excavation? Yes.

521. Consequently, the contractor takes care to put the headworks down, and then gets paid for them whether he gets a supply of water or not? Yes; here is another case I refer to—the Holy Fox well—which was sunk, and a small supply of fresh water tapped, followed by a great flow of salt water that, when twice analysed, was declared to be unfit for use. Evidence as to saltness was submitted, and the well abandoned and the tank commenced. When the work at the tank had proceeded to about 3 feet, the Works officer suspended operations, declaring that the water in the well was good. The well was again handed over to the Mines Department, and constant baling was insisted upon to improve the quality of the water, which was done without result. The Mines has had to bear the cost of maintenance, and employ a caretaker to bale and protect the headworks. There is no prospect of leasing salt wells, and the caretaker has had to cart water 17 miles. The whim, service tank and trough were all erected before the quality

of

of the water was found to be suitable; and the iron in the troughs was destroyed by the action of the salt. The well is now useless for travelling stock and the public. Then, here is another case—that of the Mount Manara well—which was sunk on the shoulder of a hill. The supply of water was too limited, and the depth too great to be of use. The Works Department erected whim, tanks, and troughs before testing supply. Endeavours were made to increase the supply by driving, but without success, and the well was abandoned, and a tank sunk 4 miles away. Then there is the Old Gunbar well, which, when completed and transferred to this Department, was proved by analysis too salt for any purpose. Although the Works Department admit that this water is too salt, yet they endeavour to show that it is fit for use, and urge that constant baling will improve the quality. This constant baling was carried on for two years without any improvement. The Works Department then consented to bore a well, but this has apparently been abandoned. The Mines Department have had in the meantime to employ a caretaker to bale and protect the headworks. The well was completed, supply tanks, whim, and trough completed, although Works Department were requested to defer the latter work till the water was proved. No stock was ever watered there, and the well is useless as a public watering place. A small tank has been recommended to be constructed in the vicinity. Then there is the case of the Dolmoreve well, which is an instance of what is considered stock water by the Department of Works. At the time of the transfer the local officer called attention to the quality of the water, and advised that a tank be made. Constant baling was again urged by the Works Department to improve the quality, but without success. The possibility of leasing this well is small, and the caretaker has had to take his horse 4 miles to fresh water. A case of breakage of wire-rope is submitted as an instance of the action of saline matter in water. I would like to add that this is a case where we several times sent the water to the Government Analyst; and, in the face of the fact that he reported it was unfit for cattle, or for any stock whatever, the Works Department went on and completed the well in the same way that they would have done had the water been good. Then there is the Balcoola and Normanstone well, which have been for a long period in course of construction. The usual head-works in this case were erected before the supply of water was assured. There appears to be a reasonable doubt that the sites recommended by the Chief Inspector were not adhered to by the Department. Normanstone well has since been reported as having been abandoned. The Roto well is another which deserves mention. This well has been sunk almost alongside a permanent waterhole in the Willandra Creek. The lessee of the well was prosecuted by the local overseer for a breach of the regulations under the Public Watering Places Act.

F. Abigail. 19 Jan., 1888.

522. With what result? The case was dismissed.

523. Are you aware that wells are ordinarily sunk as adjuncts to what is called permanent water, because sometimes the so-called permanent water gives out? Yes, I am aware of that; but the quality of what is coming should be tested before you put down expensive wells. Of course I should want evidence to show that it was necessary to have a well close to a tank for the purposes which you have enumerated, before I would feel justified in going into an expenditure which might prove unnecessary.

524. The next question is, excessive cost in the construction of these wells? I think I have very fully elaborated that part of the question.

525. Well, can you give us some information about the huts? I can only give you the fact that we are now having the huts constructed at an average of £42 15s. each. We have now in course of construction thirty-four of these cottages. The average price paid by the Works Department was £85. They paid from £114 to £46; but the average was what I state.

526. Is the same accommodation given in both? I think so; but the work is meted out on the principle that I have before referred to—of not having everything so particular and nice. Ornament is altogether unnecessary under the circumstances.

527. But the accommodation is not more limited? I do not think so. The papers will show it, so that it is not necessary to go into it.

528. *Major Pearson.*] Perhaps the Mines Department will furnish the drawings by which these huts are made? Certainly: the papers are now being prepared for Parliament. The Assembly carried a resolution during last session that all these papers should be placed upon the table of the House, and we will supply you with plans and everything else.

529. *Chairman.*] The next question is the defective construction of troughing? Well, the defectiveness is proved beyond all doubt, because we are altering all the troughs; and the Works Department have agreed in the wisdom of the change.

530. What is the chief difference? They were altogether defective, and the top rail was so fixed that it was impossible for the cattle to get at the water. We are now taking the top rail off.

531. *Major Pearson.*] Is it difficult to arrange to meet the requirements of all classes of stock? I think not. Our plan is working very well. One general rule will apply.

532. *Chairman.*] Now, I want to ask you about the remedy. There are one or two matters noted down here in this discussion that has taken place.* In the Public Watering Places Act, the fifth clause of that measure provides that it shall be lawful for the Minister for Mines to take over the construction of these places. Now, this Act was passed in 1884, authorizing the Mines Department to do all these things;—has that provision in the law ever been carried out? No.

533. Why? Because there was always a very strong opposition offered to it on the part of the Works Department. We have not had a Minister for Works who would consent to hand the matter over to the Mines Department, until I brought it (as I said) before the Cabinet myself; and I told the Cabinet simply this, that they would have to make the change, and if they did not, I would take a step of a most extraordinary character. I felt the matter to be of such urgent public importance, that I would have given up my position in the Government rather than allow things go on as I found them going on.

534. *Mr. Weare.*] Has your Department the whole of the construction under its charge now? Well, very nearly. Occasionally we have some interference; but on this year's Estimates we, and not the Works Department, have placed sums down for the construction of tanks, dams, and wells. I have insisted on that step being taken.

535. *Chairman.*] Now here is an important matter. In handing over this Department from the Works to the Mines, does it not necessitate a new set of officers to carry on the construction of tanks and wells? No; our Inspectors of Public Watering Places, and Mr. Gilliat are, I think, admirably suited to carry out the work in an economical and satisfactory manner. 536.

* Reference is here made to evidence of Harry Gilliat, Esq.

F. Abigail. 10 Jan., 1896

536. I think you have already stated that you do not think it necessary to have specially trained men to carry out these works—that you prefer good, practical, sensible men, possessing a good knowledge of the country? Certainly. Here is a man appointed at £6 per week to tar the tanks, when we could get a man to do it equally well for 45s.; and he would be very well paid.
537. We find now that the Works Department have to draw out specifications and plans of those works which they construct, necessarily employing their own skilled officers to do it;—I understand from you that you deem it unnecessary in your Department to take their place? The officers we have there are in every way capable of carrying out these works without any of the skilled officers from the Works Department.
538. Then it would not actually increase the expenditure on the part of the Government to hand over these works from the Works to the Mines? On the contrary, I believe it would be a great public saving; and I do not make that statement without thought, or from any personal or interested feeling. It is a matter which has given me very grave concern for the last nine months, and what I have done is the result of very careful consideration.
539. In saving money, do you mean that you would save money in the construction of these works or in the salaries of officers? I mean a saving of money in the cost of construction; a benefit to the public in doing away with unnecessary delay; and altogether putting an end to that friction—that unseemly friction—which has been going on between the officers of the two Departments.
540. Then, from your experience you think it is impossible to carry on this dual control with any satisfaction? I think it is just absolutely impossible. In fact, I would not be a party to anything whatever of the kind; and, in connection with this work, I have found, as in some other things, the same division of labour bring about the same result. When I took charge of the Mines Department, I found the same public inconvenience in consequence of the division of labour in connection with the minor roads. I had a conference with the Minister for Lands on the subject, and allowed him to take the whole of these over, with the result that there is much saving of time and public convenience. I look upon the matter as a man having a large business experience, and it seems to me thoroughly ridiculous to divide the work in the way it has been done here. No man who was spending his own money would do it.
541. *Major Penrose.*] I suppose these officers of yours have some engineering qualifications? Yes; I think sufficient engineering qualifications for the work.
542. *Chairman.*] You are aware that lately, at some considerable expense to the Government, a Commission on Water Conservation was appointed—that it took a very considerable amount of evidence, and brought up a report which, if carried out, would necessitate a large expenditure of public money? Yes; that is so. The Mines Department is the Department in which the officers of the Commission are now engaged; and when I was appointed to the position I now occupy, I found that the Commission had spent from £12,000 to £13,000. I found, also, that it had collected very valuable information; and they applied to me for a renewal or further extension of time. I thought, however, that they had gone far enough, and, with the concurrence of the Cabinet, I refused the extension asked for. The officers of that Commission are now under my control, and we are now carrying out some experimental works at Lake Ursna, towards one of the first steps of a large scheme of irrigation.
543. The carrying out of a scheme of irrigation is one of the recommendations of this Commission? Yes; one of its first features.
544. Would your officers be competent to carry out such a very elaborate and costly scheme of irrigation, presuming that this water conservation business is entirely taken over from the Works Department? Yes; we have a man there now (Mr. McKinney, the engineer in charge of the Lake Ursna works), who is admitted to be one of the most capable men in the Colonies. He has had a large experience in water conservation works in India; and all authorities agree in stating that he is a man capable of carrying to a satisfactory issue any works of this kind, no matter what their magnitude may be. He is the engineer under Mr. Gilliat.
545. So that in carrying out the recommendations of this Water Conservation Commission, entailing many thousands of pounds expenditure, you think you have officers in your Department competent to deal with these expensive and elaborate works? I am thoroughly satisfied of it; and I may say that Mr. McKinney's reports to the Water Conservation Commission have been commented on in Victoria in the highest terms.
546. *Mr. Weore.*] Is Mr. Gilliat a professional man? He has had experience of the water question in California, and has had eight or nine years' experience in connection with the same matter in the Colonies.
547. But he is not a trained man? No; he is not a trained man.
548. *Chairman.*] Would you be at all surprised to find that Mr. Bennett, now at the head of this Water Conservation Branch, would feel very much disappointed and perhaps hurt at finding that the system which he had advocated and encouraged for years was to be taken out of his hands because a little friction had taken place between the subordinate officers of two Departments? That question is put in such a manner that I scarcely know how to reply to it. I do not think, where public convenience is in question and the public interest is at stake, that any individuals should be considered. The works should be carried out in the manner which would best serve the people's interest and obtain for them the best return for the money they have expended. I think it is very likely that Mr. Bennett or any other man would feel very much hurt at the work being taken out of his hands under the circumstances.
549. Especially when he has brought it to fruition? There is a great deal to do yet before it comes to fruition; and when it comes to that I do not think that Mr. Bennett will be amongst the living.
550. Do the Government not contemplate any immediate large expenditure in accordance with the report of the Water Conservation Commission? The state of the matter is this: The Government have not yet decided which Department is to be charged with the work of water conservation. This is a matter which cannot be taken up till Parliament is invited to deal with this question, and it is impossible for me to say at this stage what will be the decision of the Cabinet. Certainly the question will not be dealt with in any large measure during the present session of Parliament. We have at present sufficient measures to occupy our time.
551. *Major Penrose.*] This question, I presume, is largely mixed up with that of Local Government? Yes; and the passage of a Local Government Bill will settle the question altogether; although, of course, the central Government will have to retain the supreme control.

[The Commission adjourned until the afternoon, when the sitting was resumed].

James

James William Boultbee called in and further examined :—

552. *Chairman.*] We are trying, Mr. Boultbee, to make our evidence as symmetrical as possible; and to do that we intend to adhere as strictly as we can to the items you have given here, which we will go into *seriatim*. The first question to consider is the faulty judgment alleged to have been shown in the selection of sites for tanks and wells. I notice that your Department has issued the following circular to your officers :— J. W. Boultbee. 19 Jan., 1888.

(88-408)

Department of Mines, Public Watering Places Branch,
Sydney, 1st December, 1887.

Sir,

In compliance with a direction of the Hon. the Minister for Mines, you will be good enough to furnish me, as soon as possible, with replies to the following questions. It is to be understood that the information afforded shall be based on your own experience or observation :—

1. At the public tanks, whether it is preferable that stock should have admission to the excavation, or be supplied from troughing? State reasons for your preference.
2. What are the general rates paid per cubic yard for excavation by private persons and by the Government.
3. What are the general rates for sinking wells per lineal foot paid by private persons and by the Government.
4. What are the relative cost of headworks paid by private persons and by the Government.
5. Are the costly appliances at the Government tanks more effective than simpler methods of raising water? State which are the most liable to get out of repair and present greater difficulties in restoring them to order.
6. Are there any substantial reasons why the Government works should not be constructed at the same relative prices as those given for works undertaken by private enterprise? If so, state them.
7. State the most serious errors in construction you have noticed of public tanks and wells.

I have, &c.,
HARRY GILLIAT,
Chief Inspector of Public Watering Places.

Of course you are aware that although these documents are very instructive and give us very useful information, still we can only be guided by what your sworn evidence. We will take the documents for what they are worth, and merely ask questions upon them? I have written a rather lengthy report myself on the subject and I would like to hand it in.

553. I think you had better read it? I will.

Public Watering Places, Mines Department,
Sir, 1st January, 1888.

Referring to your letter of the 1st inst., I now have the honor to reply to it, dealing with each question raised in the order indicated.

From actual experience, I am strongly in favour of water being supplied to stock at tanks from troughing, in preference to allowing them to water from the excavations or open drinking tanks; and the following reasons for it will, I think, uphold my views :—The water in a tank, if supplied to stock by troughs, can be used to the last drop—if from open tanks, it cannot. Stock can water with greater comfort and ease, there is little or no waste, and weak sheep cannot get bogged. No water is carried out in the fleeces. There is no pollution of the water from droppings or drainings from long-woolled sheep, and the water is always good and pure and available for human beings. At the open tank the slopes get trodden in, dung and urine is carried into the water, and the tanks in time get putrid with silted sediment so that nothing, as experience has shown, can drink when the water is stirred up. There is the cost of cleaning out the open drinking tank, a nasty and expensive job; and, in addition, the cost of an open drinking tank is, I think, greater than that of service tank and troughing. The service of water by troughing is far more economical in every way, since water supplied by this means will last fully one-third as long again as compared with open tanks. This is a question that has had some prominence of late years among the large Western squatters, and the more advanced have adopted it with success.

So far as I have been able to ascertain, the rates paid by Government for tank-work have been largely in excess of those paid by private individuals. I lived for twelve years in the dry country beyond the Darling, and I have no remembrance of a case, not even in the early days, where more than 1s. per cubic yard was paid for tank-work. This rate I have myself paid during the dry seasons of 1882, 1883, 1884, and where the contractors had to cart their water 6 and 9 miles respectively. The general rate, however, was 9d. to 10d. per cubic yard; and I have ascertained that this rate is the general one throughout the Colony. In cases where plant and cattle were found, from 4d. to 6d. was deemed a fair rate, and one at which contractors could make money. The price at which Mr. Kennedy offered to construct a dam at the J. K. Waterhole for the Works Department, viz., 6d. per yard, and which appears in the papers, gives independent testimony on what was evidently considered a fair price.* I have no absolutely reliable information as to prices paid for tank-work by the Government; but I think I can safely say it has ranged from 1s. 1d. to 2s. per cubic yard. E. Ford, lately a Government contractor, excavated over 30,000 yards for 2s. at Tarella at 10d., and 1s. for dam-work. Well-sinking in the same district was paid for at the following rates :—Trial shafts, 2s. 6d. per foot to 100 feet, 4s. 6d. to 200 feet. Main shafts in alluvial, 15s. to 20s. per foot of 100 feet, 25s. per foot to 200 feet, 30s. per foot to 300 feet, which price included timbering, centering, and fixing runners, and is exclusive of the cost of sawn timber, which was delivered on the station for 42s. per 100 feet. Where contractors found their own timber, i.e., pine or mulga, the price was 5s. per foot in excess of that quoted; and anywhere where alluvial sinking exists these prices, so far as I have been able to ascertain, are not exceeded by private individuals. £5 10s. per foot has been paid by Government for well-sinking, and this has in cases, I think, been exceeded.

The cost of headworks, as paid by the Government, exceeds fully 50 per cent. the price paid by private persons. For whims I paid—

	£	s.	d.
Getting timber and erection	30	0	0
Sawn timber, tar, &c.	10	0	0
Mountings (best and heaviest)	12	0	0
Carriage, &c.	10	0	0
Total cost	£62	0	0

This included poppet legs, &c. The whims erected by the Government are elaborately finished, all materials used in most cases being sawn red gum, even to king posts, and, so far as I can ascertain, at a cost of from £120 to £150. The whims erected for the sum I quote will compare very favourably in point of workmanship, design, and durability with the best of those erected for the Government, the design of which is open to serious objections. £200 was, if I remember rightly, the cost of a 20,000 gallon wood and iron service tank erected by me, including 300 feet of troughing, the timber for which was landed on the station at a cost of 42s. per 100 feet from Echuca. This sum is rarely or ever exceeded, since a cheaper form of tank is in general use. £250 has been in nearly every instance paid for service tanks by the Government, and this does not include troughing, which has cost from 14s. to 18s. per foot, while that erected by private persons costs from 4s. 6d. to 6s. per foot, according to design.

The appliances used for raising water, notably the steam pump, are no doubt effective; but its cost and elaborate adjuncts do not compensate for any advantage gained. They necessitate far greater care and cost in maintenance, and skilled and reliable persons, at high wages, have to be employed as caretakers; and erected as they are without shelter sheds, exposed to all weathers, have been most difficult to keep in order, and have been the subject of considerable correspondence between the Departments. They appear also to have been erected at places where least required, and horse-power supplied where the traffic is apparently greater. Except at tanks which are used for both stock and town supply, I think steam pumps entirely unnecessary. Failing simpler appliances, the horse-power pump, if properly erected, can do all that is required; and at other places, where the traffic is small, the hand M'Conas' or Floods' lift is ample; one man, single-handed, can lift sufficient water daily for 7,000 sheep. This is within my own experience. The steam pumps are far more liable to get out of order—the multiplicity of parts, their exposure to all weathers, wear and tear, all conduce to it—and the ordinary caretaker is not equal

* So papers re J. K. Well

J. W. Boulthee. 19 Jan., 1888.

equal to the repairs, although, by instructions, we are endeavouring to replace them as opportunity offers by men who can undertake repairs of all kinds. It is, however, desirable that simpler appliances of a less elaborate and costly nature should be used, and which an average caretaker can repair without reference being made to the constructing Department, which has so frequently led to frivolous and unpleasant minutes from that Department re "neglect of Mines caretakers."

It is a well-known fact, and one much commented upon in the country districts, that rates paid for Government tank-work are largely in excess of those paid by private persons; and this is, I think, mainly due to the delays that ensue in making payments. Small men, or contractors without money, are consequently unable to tender. Could they do so, the works would not be left in the hands of a few men who have followed up work of this kind, and who, by charging a higher rate, can afford to wait for payment. Mr. Quin told me of a case of a man who owed his merchant £60, and although the Government owed him £800 on a contract, he was sold up and ruined. In addition, too much polish is required to the work, the batters pick-dressed, and the floor of excavation as level as a table. The extreme steepness of the batter, viz., 1½ and 1 to 1, precludes the use of the scoop and bullocks (the most economical way devised as yet). The tank has consequently to be finished, and, in fact, mostly excavated by shovels and drays, necessitating extra men and extra cost. Drays and horses cannot climb the batters; roadways are consequently necessary, and the labour and power cannot be used to the best advantage. The embankments are invariably placed all round the tank, and unless used for conserving water over the excavation, are a very considerable item in the increase of cost. In their present state, they are practically useless. The nicety of the work enforced serves no practical end, and largely increases cost.

The fencing at all the Government tanks is far heavier than is required, and the cost of it, so far as I can ascertain, out of all proportion, and the disparity between station and Government rates very marked. The style of fencing latterly adopted by the Works Department is as follows:—Posts, 9 x 3, 9 feet apart, 2 feet 6 inches in ground, every twelfth post a straining post, and wired with Nos. 4, 6, and 8 gauge. This is all unnecessarily heavy. What suits for a station horse paddock or a police paddock should suit for a Government tank. Posts 6 inches or 8 inches x 4 inches, 22 inches in ground, and 12 feet apart, every twentieth post a strainer, and wired solely with No. 8 Rylands, Whitecross brands, are ample for all requirements, and will cost from £35 to £48 per mile, according to carriage and proximity of timber; and the average rate throughout the Colony should come well within £50 per mile. No station pays more than this for the fences I have described, while, so far as I can ascertain, the Government rate varies from £58 to £120 per mile, and then the contracts are sub-let. In addition, a concession has lately been made in the Ivanhoe district, by which the contractors have been allowed to disregard straining posts. The wire is run out and fastened to the post where it ends (this no practical man would ever dream of), and within a few days of the transfer from the contractors to the Works Department the Mines caretaker is reported for having the wires all slack. The charring of pine posts helps to increase the cost, while it draws the resin—the wood's best preservative—from it. The heavy wires, Nos. 4 and 6, are objectionable, since a caretaker single-handed cannot re-strain them properly, and from the extra weight required add cost per mile.

In regard to the gates provided at the Government tanks, I think they are far too elaborate and expensive for the requirements. The general run of them are single gates, 12 feet swing, some well made, others badly. A pair of 6 feet gates, lighter in construction, would be far more serviceable, and cost one-third the price paid. I understand as much as £30 has been paid for a gate. At some of the paddocks, and to which travelling stock are *not* admitted, a 12 feet gate and two 12 feet slip-panels are provided, and are quite unnecessary; and at other places (in Albury district) a large expensive 12 feet gate is erected to admit to the tank enclosure into which nothing is allowed except the caretaker's horse to work the pump. A wicket gate appears to me to be all that is required in a case of this sort.

In regard to the last paragraph of your letter, there are many instances of injudicious selections of sites, faulty work, a disregard of the requirements of travelling stock, especially in the matter of the railing at the troughing; a disregard of the rainfall in a district in determining the size of the tank required; in sinking wells in districts where the salt water is invariably met with, and where excellent and ample catchment area exists for tanks; in placing drains where they run from the tank and where they can be but of small use; the adoption of a standard form of tank, irrespective of the ground formation, with 1½ and 1 to 1 batters in ground that will not stand; and of the inconvenient way in which the water is admitted to the troughing, and without due reference to the requirements of the road or the probability of tenants being found. In corroboration of which, reference may perhaps be made to the following, and which are within my personal knowledge:—Cobham Lake tank: In the bed of Cobham Lake, now under water for two years. J.K. well: Close proximity to an almost permanent waterhole. Tarvin tank: Almost midway between two large dams that are on reserves and open to the public; neither of these dams have to my knowledge been dry since 1875. Meenamurtie well: Close proximity to permanent waterhole in 1875 before the dam was made; this waterhole was not dry. Dry Lake tank: In bed of Dry Lake; now under water two years. Ivanhoe tank is directly in the centre of township, upon measured portion of V.R., and is most inconveniently situated for bringing stock to it. Willandra well: This well is salt, and has cost £1,087, although only 102 feet deep; there is a good catch for a tank close to, but owing to defective work a new well has been commenced, I understand; the experience of the whole district has been that wells are invariably salt. The Delmerevo and the Holy Rox wells are the same, and this Department has to maintain them at great expense, since it was urged by the Works Department that constant baling would improve the quality; at the latter place a tank was commenced and abandoned by the Works, since they insisted the water was suitable for travelling stock. At both the Lignum Hut and Jumping Sand-hill wells the water is not good, while good catchments are close to for tanks. At the Old Gunbar the case is the same, only that the water is perfectly undrinkable by either man or beast; yet it is urged that improvement might ensue with constant baling. The expense of maintenance is the same as at a fresh water public watering place, and there is no possibility of leasing a public watering place of this description. All the wells enumerated are sunk in country that shows, from wells sunk by private enterprise, that brackish water alone is obtainable. The requirements of the travelling public have not met with due consideration in considering the suitability of the water, and from having to maintain caretakers at them. Some odium is attached to this Department. Reference may be made to the construction of the Woolcoomtool, Dry Lake and Crow's-nest wells. These are sunk and slabbed to a certain depth, and a bore to increase the supply has been sunk from the bottom. No flooring slabs, however, have been put in the well, and no pipes in the bore holes. This is, and has been, a source of trouble. The bore-holes choke and silt in, and the supply gets checked, and it becomes necessary to probe the hole to release the supply. It is urged imperatively by the Works Department that constant baling, whether water is required or not, is necessary to keep the hole clear. This is imposed upon the Mines Department, and I am sure that no practical person would attempt to defend the absence of floor or pipe. There is a consequent waste of water, wear and tear of gear and ropes, with no practical advantage, and the matter has been the source of numerous reports from overseer and lessee, and has been referred to the Works Department for action, with the result that when the bore gets choked it is attributed to the negligence of the Mines caretaker.

In the matter of drains, I have reported that at Tom's Lake, Hulong, and Ivanhoe the levels are in some cases imperfect, and water expected to run up hill. At Mount Elliott a long drain is brought straight down a hill, and is practically useless. In many cases the wheel traffic crosses them. They are consequently very much cut, silted, and damaged. If it was absolutely necessary that the drains should cross the track, provision should I think have been made, either by logging or pitching. Ivanhoe, Pullatop, Hermitage, Muriel, Tom's Lake, are cases in which this defect is very apparent.

The railing at the troughs at Government tanks has also been the subject of several memorandums by me. It is in nearly all cases too high to allow large stock to water with ease, and did not prevent sheep from getting into trough. Alterations were made by this Department, which were commented upon by the Works Department, but that Department has, in the Cobar district, now adopted the form of railing as altered by us. The complaints made to me personally in reference to this defect have been frequent, and I am sure the Department has lost hundreds of pounds from it alone. At the Howell's dam, in the Albury district, there is an example of great waste of money. The dam (a very fine one) is constructed across the creek, and on the one side abuts on to a rocky spur; on the other is a fine wide open flat—an ample and a fine natural by-wash. This (for a reason I cannot explain) was disregarded, and a cutting taken right through the spur to form a by-wash. This by-wash is cut through the solid rock to a depth of about 15 feet, and is about 70 yards long, &c. The reason for this it is hard to understand, seeing the natural by-wash already made. At the Muriel tank and dam it became necessary, upon the adoption of pumping gear, to erect a horse-walk, and this was done on the upper or inside of the dam, at a time when the water was over the excavation. The distance from edge of excavation to edge of dam necessitated the formation of the horse-walk partly in the tank. Load after load of loamy spoil that melted like sugar, to the extent of I believe something like 3,000 yards, was tipped into the tank. This is now much filled with silt, &c., from this source. The necessity for placing the horse-walk in its present position, and in which it has settled considerably, I never could understand, nor could I understand any practical man allowing the same to be done.

The

The size of the tanks in the Albury district, and in fact through the whole of the southern portion of the Colony, are, I think, larger than required in many cases. The embankments surround the tank, and no provision is made for filling over the excavation. Had this been done, a much smaller excavation would have sufficed. Tanks are, in cases, most admirably suited for this, and steam pumps erected; but no effort has been made to utilise them by pumping within the embankments—The Hulong tank, where the tank is on the edge of a large swamp; the Ledknappa and others. The same form of tank has in most of the later tanks been adopted, with batters 1½ and 1 to 1, irrespective of the soil. The Gunaramby tank is an instance of this. The soil is what is known as copai ground, very friable and loose, and the batters are caved in excessively. On one side the face is now about 3 feet high, and here one silt tank discharges by means of drains following right round the tank into the lower flume. The ground has been badly cut, and has been protected by the caretaker to a certain extent by a pitching of copai stones.

J. W. Boultbee. 19 Jan., 1888.

In some cases the troughing does not run at right angles to the supply tank, the valve from which is in cases 2 feet 6 inches from the troughs; the consequence is that when the water is turned on it misses the troughs. This has to be remedied by the caretaker. At Goonery the valve is exactly opposite the centre rail of troughs, and when the water was turned on it scattered all over the place. A best pipe should I think deliver from supply tank to the trough, since the noisy and rapid flow of the water alarms and disturbs wild stock, and a long length of troughing becomes practically useless. Sufficient room has not in some cases been left for stock on one side of the troughing, as at Gunbar, Ivanhoe, Roto, &c., and the access to the Ivanhoe tank is down the main street. The placing of tanks near good waterholes and the salt wells are very much against the chance of obtaining tenants for these works. In some cases two works are placed on a line of road where one would have sufficed—Clare to Ivanhoe. Wells have been sunk, timbered, centred, &c., and whim, service tank, and troughing erected, before the supply or quality of the water was decided sufficient or suitable; notably at Willandra, Old Gunbar, Holy Box, and Dulmaroo. No practical man or squatter would do this before he had tested the ground either by trial shafts or bores.

I have, &c.,
JAMES W. BOULTBEE,
Inspector of Public Watering Places.

554. *Chairman.*] Then these elaborate embankments are of no use? No, there are not many cases of that sort; but there are cases where the embankments are all made after the same form—that is, open inlets are used.
555. *Mr. Woore.*] Are they not made in that way, so that the water supply may be increased, if required? That may be; but it has not been done. My argument is, that if smaller tanks had been constructed, and the embankment utilised for conserving water, smaller excavations, and consequently less expense, would have sufficed.
556. *Chairman.*] But they would hold a lesser quantity of water? They would hold a greater quantity of water than they do now.
557. The first matter is between open watering and troughs. You are, of course, aware that the matter is very much after all a matter of pounds, shillings, and pence. Open watering is infinitely cheaper than pumping and troughing, and the question then arises which is the better plan—the cheap one, or the conserving all this water and keeping it intact from the contamination of animals, which always makes their droppings in the tanks. Then there is the corresponding costs of keeping a caretaker at these tanks, and pumping the water from them for the watering of animals;—I would like to ask you this question from the Government point of view (where money is not so much an object), and from the squatters' point of view (from which money is an object)? Well, speaking from the view of an ex-station manager, I most certainly would never allow stock into the tanks. In the first place, away up in that dry country, a tank will last fully a third as long and more by keeping the stock out. Then, as regards the cost of supplying the tank with a caretaker and troughing, I may point out that boundary-riders on a station do the work. You save the money on the whole, and you do not lose any sheep through bogging, and the wool is not perished; so that altogether, I think, there is no comparison between the two methods. If sheep are allowed into a tank they will carry out a very large amount of water with them. A boundary-rider ought to be able to look after his paddock and attend to the watering of 7,000 sheep in a day. With the McComas' pump, which is an endless chain, a man can lift water 20 feet. He can also water 7,000 sheep in the day. I never myself had to do it at that depth, but I have seen it done at Meenamurtie. It was a perpendicular lift of 20 feet. They had a well sunk on the edge of the berm, and lifted it. The great object in keeping water pure in the Government tanks is that it may be kept available for human beings as well as stock; but that, of course, does not apply so much to squatters. Another plan that was adopted on some stations was to fence in three sides of the tank, and have moveable hurdles on the fourth. The approach to the tank would be along one slope.
558. *Mr. Woore.*] But that does not get over the fouling of the tanks? No; but it prevents the waste of water. I admit that it does not keep the water entirely pure.
559. *Chairman.*] You mentioned about the J. K. well. The cost of that well has been very considerable;—we would like more information on that point? I referred to the J. K. well. It was placed in close proximity to a fine waterhole. Mr. R. H. Kennedy, of Wonominta, offered to construct a dam there, and to do it for 6d. per yard. He offered to construct a dam on the J. K. waterhole.
560. Are you aware that it is scarcely possible to have permanent water by means of tanks and dams; and, that being admitted, do you not think it desirable to have an adjacent well on which you can rely in a case of drought? Then the question comes in, that we have to maintain them. They do not return a penny, although they are a very big expense to us.
561. In what way are they a big expense? We have to employ a caretaker, there being no possibility of leasing them.
562. But the caretaker looks after the tank and dam, and the well does not want him? I understand now what you mean.
563. But you see that complaint has been made that wells have been sunk in close proximity to tanks, and you can see that no water is permanent, strictly speaking. The tanks are always liable to dry up; and is it, therefore, not desirable to have wells, even in close proximity to tanks, which will always give you water? If it can be done under these conditions I should think it would be an advantage; but the expense would be double, and it would be a very long drought that would dry up these tanks. I do not think the J.K. waterhole will ever dry up.
564. But I am speaking generally. In some instances the Works Department have thought it desirable to have tanks and wells in close proximity to one another? [No answer.]
565. *Major Penrose.*] I do not fancy that they were very close together; but where one was asked for in a gap they put down two? That was the case in the Ivanhoe, and also in the Willandra and Gunaramby, where two public watering places were constructed when one was asked for.
566. *Chairman.*] To carry out what I wish to ask you,—are you not aware that squatters, to provide against contingencies, have sometimes thought it desirable to sink wells, perhaps immediately adjoining the tanks,

J. W. Boulthee. 19 Jan., 1889.

tanks, so that in case a tank fails they can pump the water from the well into the tank, and in that way carry themselves over a long drought? I cannot call to mind where that has been done. I have known a tank at one end of a paddock and a well at the other, so that in case of stock travelling to a tank, the grass around the tank would be all eaten when the water was exhausted. Then the sheep and stock go to the other end of the paddock, where the well is, and eat the grass down there.

567. Do you not think it a wise precaution on the part of the Government, knowing the terrible droughts we are subject to, to put down a well in the same neighbourhood as a tank, so that one caretaker can look after both: and then, in the event of a tank going dry, it would be a very desirable thing to have the well? I can hardly say that, because the tanks now constructed are so large that they can well stand any drought, and there is not the double expense. Practically, they are as permanent as a well. I guarantee that some of the Government tanks will last for three or four years without rain.

568. I do not think you quite understood my question about the J.K. waterhole. You said that a Mr. Kennedy proposed to construct it at 6d. per yard? Yes; he was to find all plant and do the whole of the work at 6d. per yard.

569. What did the work actually cost? I really cannot say what the cost was in this case.

570. *Major Penrose.*] Did Kennedy get the work? No; I don't think so. A dam was never made, but a well was put down close to there.

571. *Chairman.*] What are these service tanks made of? The bulk of them are of wood, lined with galvanised iron, and the balance buckle-plate iron.

572. In your experience, which are the most effective and desirable? There can be no question as to which are the best. Buckle-plate iron is the best, but a cheaper form of tank was used by the squatters, and seemed to last very well.

573. You must remember that the position of the squatter and that of the Government is not quite the same. A squatter is a man planted upon the ground for the time being; but the Government have to make their works much more durable, and do make them so. You think it is desirable in this hot climate to have really good service tanks instead of wooden affairs? Certainly I do; but squatters improvements are, as a rule, permanent.

574. So that you do not find fault with the expense that the Government have gone to in having these more expensive service tanks? I never ascertained exactly what their cost was; but there is no doubt that they are very much more durable and better than the wooden ones.

575. *Major Penrose.*] These buckle-plate tanks would last for years? For very many years, if they are taken care of.

576. In fifty years time the cost of the buckle-plate service tanks will be less than the wooden ones? I should think so, if they last so long. I do not say that it would be so at a place where there is salt in the water. I do not think that in such cases they should be used. If so, the iron should be galvanised, as the salt water would eat the plain iron through.

577. *Chairman.*] Now, with regard to Cobham Lake and Dry Lake, you spoke about the injudicious action of the Government in making tanks in these two places. Are you aware that the sites of these tanks were approved of by the officers of your Department? No; I never heard that they were, and I do not think that they were so approved. It was before my time; but I have seen Mr. Gilliat's report on the Mount Brown road.

578. It is asserted that Mr. Gilliat himself approved of these two sites? Mr. Gilliat has submitted his report to show that he did not do so. He left out Dry Lake altogether in his report on the Mount Brown road as a public watering place. He specially mentioned Dry Lake as having been supplied with water by a publican, and he said that so long as the publican supplied the water at reasonable rates to the public he thought further expense by the Government was unnecessary.

579. Of course you are aware that the publican had the privilege of denying the water to anyone who might offend him, and he could charge what he thought proper. Therefore, it was undesirable that a private individual should have the control of a place of this kind and be able to make very heavy charges for the watering of travelling stock? The plan that Mr. Gilliat laid down might have been easily carried out without reference to the publican, Smith, at all, and the public would not be literally forced to go to Smith for water.

580. As a matter of fact, Dry Lake is merely a depression in the ground; and, therefore, was not a tank justified in this place? Yes; it is simply a depression between sand-hills, fed by two considerable creeks.

581. Then the fact of sinking a tank in this depression in Dry Lake was not a faulty one? As an actual site for a tank there is no question about its being a good one; but as a public watering place it would have been better had it been further away from the lake.

582. *Mr. Weore.*] But presuming that the lake had not been filled—I know it twenty-five years ago, and there was no water in it then, and it had apparently been dry for many years? Still I think if Mr. Gilliat's plan of watering the road had been brought about the necessity of sinking a tank there would have been avoided.

583. Would the same apply to Cobham Lake? Yes, more so; because this lake was only dry once.

584. But there is evidence that it had been dry for twenty-four years? That was before my time.

585. *Chairman.*] Then you think that the Works Department were to blame for selecting these sites? I do think so; because they must have known that at some time there was bound to be plenty of water there for long periods. A tank at a place where there was no water at all would be far more useful. About 8 miles from Cobham's there is a good place for a tank—Slight's Camp. Besides, the probability of leasing a tank ought to be taken into account.

586. At a time like the present I suppose it is absurd to keep a caretaker looking after these places? Yes; when under water.

587. *Mr. Weore.*] There is no doubt about it that Cobham Lake, although one of the finest lakes in the back country, is liable to be dry for many years together? I never knew it dry, although I heard it was dry for a short time in 1875.

588. It was dry in 1863, and is liable to be dry for a number of years at a time. The filling of this lake depends upon two creeks running at one time; if one creek only runs it may merely put a little water into the lake. Now, is it not a reasonable thing to put a tank there to catch and conserve what little water that may run into the lake when it is empty, instead of allowing it to spread over the whole surface of

of the lake bed, where it would soon evaporate and soak away? The porous bed of a lake is never a good catching surface, and there is generally a substratum of drift. Mr. Gillist's recommendation dealt fully with this lake. J. W. Boultbee. 19 Jan., 1898.

589. *Chairman.*] For the reasons that you have stated, you think that there is no blame attaching to the Works Department for putting a watering place there? I certainly think they are to blame.

590. You made some remarks about Meenamurtie;—can you give us any further information about that? Meenamurtie well is put down in close proximity to a permanent waterhole. This hole was not dry in 1875 before the dam was made.

591. *Mr. Woore.*] This was not a travelling stock route then? No; although considerable numbers of travelling stock used this road.

592. *Chairman.*] You seem to be under the impression that the Works Department had caused unnecessary expense in putting a well down where there was an abundance of fine water;—did you ever know that this water failed? Never; and I know it for over twelve years. It had then and still has the reputation of being the most permanent water in the back country. Since the dam was placed there I do not think the hole can ever dry. In 1884, when the drought broke up, there was an abundance of water there.

593. Now, about Hovell's dam—you do not know why the water was sent through the rocky ridge? I heard that an error had been made in taking levels. Overseer Mackay, I think, refers to it.

594. However, it struck you that an unnecessary expense had been gone to in making a by-wash through this rocky ridge? Yes.

595. You do not think that there was any danger of erosion? No, I do not think so; because there was a wide flat on the other side for the water to flow over.

596. *Major Penrose.*] Has water ever flowed through the by-wash? Yes; in flood seasons I think the water would run through the by-wash before it would run over the flats; but no water has been through it yet.

597. *Chairman.*] Is it not possible that the rock taken from the by-wash might have been utilised in protecting the embankments abutting on the flat? I do not think so, because the amount of stuff taken out of the excavation in front was really much in excess of what was required. The spoil from the by-wash has not been used at all. I would like to refer to Overseer Mackay's report. It says, respecting Hovell's tank and dam:—"This watering-place is on a by-road. It was constructed, in the first instance, on the petition of the local selectors, who used to suffer greatly for want of water every year. A great deal of unnecessary expense was incurred in cutting the by-wash, owing to the levels being incorrectly taken in the first instance."

598. *Mr. Woore.*] Where is this place—Hovell's dam? It is on the road from Wallbundry to Howlong.

599. About Meenamurtie waterhole being permanent, do you mean permanent in its natural state, or that it was permanent after Mr. Middleton built the stone dam? Well, my experience only goes back to the time the dam was built. The dam was washed away; but there was abundance of water there after that.

600. Then, when you speak of the waterhole being permanent, you mean that it was permanent after the dam was put up? Yes, within my experience; and before, by report.

601. *Chairman.*] The next matter is the Muriel tank, in which you say the tank was interfered with by a horse-walk having been made; and to give sufficient space, they encroached upon and filled up a portion of the tank. This would appear to be a most extraordinary proceeding, and I should like to know more about it? [*The witness proceeded to show by diagram the extent of the excavation, the position of the drinking-tank for stock, and of the horse-walk.*]

602. *Mr. Woore.*] Was there any reason why the horse-walk should not have been put on the other side of the bank? I should have put it on the other side myself.

603. Is there any reason why it should not have been put there? None that I know of.

604. *Major Penrose.*] I see in the correspondence here that Muriel tank was nearly filled up? That is possibly an exaggeration. There is a great amount of spoil in the tank, and the overseer of the district puts it down at from 1,000 to 2,000 yards; but mine is merely an approximate statement. The bottom of embankment is, so near as I remember, about 30 feet from edge of tank.

605. *Mr. Woore.*] So that you think it was a waste of public money to throw this stuff into the tank, besides damaging the tank itself? Quite so.

606. But did it damage the tank? At the time it was being done the stock were getting bogged in it, and the lessee wrote to the overseer of the tank (Mr. Cotton), in order to try and get it stopped.

607. *Chairman.*] If this pump was attached for the purpose of raising water there, how comes it that the stock were allowed there at all? The horse-walk was being erected to supply water to the trough. The overseer will be able to give a far better explanation of it than I can, since he saw it at the time it was being made.

608. *Mr. Woore.*] Has the partial filling up of this tank had such a serious effect as to reduce the water-supply to such an extent that it was not sufficient? I hardly think so. There is still plenty of water there for all the stock passing.

609. *Major Penrose.*] You state that the batter of most of these tanks is from 1½ and 1 to 1? 1½ and 1 to 1.

610. How do you know that;—by measurement? No; by the eye. I never put the clinometer on them.

611. Are you aware that all the specifications given to us show that the batters have to be excavated at a batter of 2 to 1? I never saw any of these specifications at all. Of course that statement of mine that they were 1½ and 1 to 1 is only based on the judgment of my eye.

[The Commission adjourned.]

FRIDAY,

FRIDAY, 20 *JANUARY*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E., | J. C. WOORE, Esq.

James William Boultbee called in and further examined:—

J. W. Boultbee. 20 Jan., 1888.

612. *Witness.*] I was asked yesterday whether the silt put in the Muriel tank by making the horse-walk would impair the efficiency of the tank. I wish now to qualify my statement by stating that I think that when the tank gets low it will impair its efficiency. It will certainly reduce its holding capacity to some extent, although perhaps it does not impair the tank at the present time, while full and overflowing. Another matter that I would like to refer to is the probable ulterior use of the embankments that are put round the tanks. When the Works Department handed these works over to us I do not think that they had any ulterior idea in utilizing these embankments round the tanks for the storage of water, because no provision is made for pumping or anything else. The water is in some cases over the excavation, and when it gets lower you will not have the full benefit of the size of the excavation in consequence of its silting up.

613. *Major Penrose.*] What do you think the embankments are for? I cannot say at all. In their present state there is no attempt made to use them.

614. *Mr. Woore.*] Is it not reasonable to suppose that they were constructed with the idea that they would be used if required? Yes, that is a reasonable supposition; but the engines have not been fixed in any way for that purpose.

615. *Chairman.*] All the engines that are now used are for pumping water away from the tank and not for putting it into the tank? Yes.

616. *Mr. Woore.*] Have any of these tanks gone dry to your knowledge? Not to my knowledge; and I do not think it likely that they ever will.

617. That being the case, does it not clearly prove that the sites have been well selected with regard to catchment area? Some of them have.

618. And that the supply is sufficient without utilising the embankment? Yes; but then my argument is that the smaller tanks, utilised as pump-up tanks, would have done as well, if not better.

619. *Chairman.*] Is it not a fact that these embankments, as placed round the tanks, have helped to prevent evaporation? There is no doubt about that.

620. You are aware, then, that one of the objects of these embankments is to prevent evaporation by the wind? Yes; it is one of the results.

621. Do you know any instance where tanks have been sunk previous to the last wet season, and did not get water? The Mulya tank, near Louth, was a long time in getting full, and I do not think it is full now.

622. Is that tank on the north side of the river? No; it is on the south side, near the township of Louth.

623. I would like to get a definite answer in regard to this question;—I have heard indirectly that sites of tanks have been badly chosen, and that even during this last wet season some of the tanks have not been full? I have no personal knowledge of that matter.

624. You can understand that if that had been the case it would be positive proof that the site chosen was a bad one? Yes.

625. *Major Penrose.*] How many tanks have you in your district? Somewhere about seventy-five. I think there are about thirty-five in the Narrandera part of the district, and forty-one in the Cobar part of the district. I can furnish the information exactly if it is required.

626. *Chairman.*] Now, I would like to know exactly what your duties are? I am Inspector of Public Watering Places, and as such I have to visit and inspect those tanks, and see that the work is all kept in proper and good order. I have to lay out the work for the caretaker, and in case any improvement is necessary I furnish a plan of it, and an estimate as required. I have also to examine the books and certify that they are correct. I have to inspect the books kept by the caretaker, and see that the amounts received for watering stock are acknowledged. I have to examine everything at the tank as fully as possible. The work then has to be laid out for the caretaker, and when I return I have to see that the work so laid out has been properly done. I have also to make special reports on any requisitions that may be made for new tanks, and furnish whatever evidence I can get as to the probable cost thereof, and whether the work is required in the district.*

627. Have you anything to do with the selection of sites? No; I merely recommend a site which I believe to be a good one. The actual selection of the site rests with the Works Department.

628. What are the plans that you refer to? If any alterations are required at the tank, I have to make a plan of the alterations in order to show what has to be done. I have also to supply, sometimes, explanatory plans.

629. *Mr. Woore.*] Who are these plans sent to—are they sent to the Works Department? No; they are sent to the Chief Inspector of Public Watering Places.

630. Have you had any special training in the matter of drawing up plans and specifications? No; only my own knowledge of the work, which I gained on a station. I am not an engineer.

631. Now, all these particular works having been handed over to the Mines Department, are you aware whether there are sufficient trained men in the Department to carry on the works that are now done by the Roads Branch? With regard to the construction of tanks, I do say that our officers are quite capable. I hardly think that it requires a trained engineer to lay out a tank, or to put it down. A practical knowledge gained on a station comes in there.

632. *Major Penrose.*] Can you make a contour survey? I believe I can. I understand the theory of it.

633. *Chairman.*] Do you understand levelling? Yes; a station manager has to understand that.

634. Now, in the face of such large works as those recommended in the final report of the Water Conservation Commission being taken in hand by the Mines Department, are you aware whether there is a sufficient staff of men in that office competent to undertake these expensive works? I have not the slightest doubt about it. I think our men are quite capable of doing it. We have an engineer there—Mr. M'Kinney—who is second to none in the Colony. I believe that Mr. M'Kinney has made the question of the conservation of water the study of his lifetime.

635.

* For duties, see Regulations attached to the Act

635. What are his special duties now? His duties are the duties of an engineer in connection with this water conservation scheme.
636. Has he anything to do with watering places? Not so far as I know, except that should Mr. Gilliat require information on any special matter Mr. M'Kinney would possibly be referred to.
637. *Major Penrose.*] What check is kept on the moneys taken by the caretakers? They are obliged to keep a receipt book, a cash book, and a journal. Beyond this there is little or no check on their accounts.
638. I suppose there is a check in this way: A caretaker waters 9,000 sheep, and he might return the number as 7,000 or even 6,000? Of course, there will be discrepancies. If, in a dry time, a mob of sheep travelling a long length of road misses a tank here and there, we ask the caretaker for an explanation.
639. Otherwise there is no check on him? No; and it would be quite impossible.
640. *Mr. Moore.*] I think each drover ought to be called upon to sign a receipt-book? Well, something like that is done. The caretaker signs the receipt and hands it to the drover, so there is always the counterfoil for us to look at.
641. So that the drover's signature does not appear at all? No.
642. Well, I think it ought to appear? The counterfoil or butt of the check is kept, and although it is not signed by the drover the corresponding entry is made in the butt.
643. *Major Penrose.*] Perhaps this is a little outside the scope of our inquiry.
644. *Chairman.*] It might be the legitimate subject of an inquiry if the public were being plundered. If we can suggest a remedy we ought to do it. Do you not think it would be desirable that the drover should sign the book, certifying the number of stock that he had watered;—would that not be a very considerable check on the caretaker? I can hardly see why it would be a greater check than to have the caretaker receipt the book. It would not be a very simple matter to get the drovers to do it, because many of them are intractable fellows, and sometimes they even object to receive receipts. These receipts, of course, show the amount that the caretaker has received.
645. But what does the drover care about that;—have you full control over these caretakers? We have full control. If in any case we have ground for suspicion, a report is at once sent to the Chief Inspector, the caretaker is suspended, and another man is put in his place.
646. *Major Penrose.*] On an average, how many times per year do you visit the tanks in your district? I cannot give an answer to that, as it is only since last July that additional inspectors were appointed, and the districts apportioned. Before that, I was the only inspector—travelled all over the Colony—and I had no chance at all to pay regular visits. The inspectors of stock act as overseers of these caretakers, and are supposed to visit and report on the tanks regularly every two months.
647. *Mr. Moore.*] Then there are three classes of overseers over these tanks—the inspectors of watering places, the inspectors of stock, and the road superintendents? There are only three inspectors of watering places in the whole Colony, and they have to exert a general supervision. Originally there were only three overseers; but they were dispensed with, and the duties thrown on the inspectors for stock.
648. *Chairman.*] You say there are three inspectors of public watering places? Yes;—Mr. Low, Mr. Mackenzie, and myself.
649. And how many stock inspectors act as overseers? About twenty-three or twenty-four. They get no salary for the work. It is a duty which they have to perform.
650. Is there a caretaker at each tank and well? Yes; but there are some open dams in my district where one caretaker is in charge of four places. I refer to Hurley's, Old Junee, Wallacetown, and Illabo.
651. What are the wages received by these caretakers? Where they have a horse to keep they get 8s. per day; and where steam pumps are used they get only 7s. 6d. a day, and in some cases only 6s. 6d. The lessees where the tanks are leased have to keep a caretaker, who resides there.
652. Now, will you state the duties of these caretakers? The duties are very carefully laid down in the regulations with the Act, and also the duties of overseers and inspectors. Our instructions to the caretakers are very full.
653. Has it come to your knowledge that any tank excavated has not been filled during this wet season? I do not know of any, except Mulya tank, by report.
654. Then where is the alleged mistake made with regard to the selection of sites? I think we went into that yesterday. I refer you to Cobham, Meenamurtee, and Tarella.
655. *Mr. Moore.*] But these, you say, are bad sites, in regard to being too near to permanent water. What we want now is about their being in wrong places as regards catchment? [No answer.]
656. *Major Penrose.*] Do you consider that the Ivanhoe tank is on a badly selected site? I think it is most inconveniently situated. It is right in the middle of the township, excavated on what are village reserves and allotments, and stock have to go down the middle of the main street to get to it.
657. *Mr. Moore.*] But there is not much of a main street there? Well, they have to go between the houses to get to the water. Ivanhoe is now a big place.
658. *Major Penrose.*] But, from an engineer's point of view, the site selected for catchment was a fair one? Yes; the catchment was a very fair one.
659. *Mr. Moore.*] Were you there when the tank was first constructed and laid out? No.
660. Then you cannot say what Ivanhoe was then? No; I did not see the tank till it was nearly finished.
661. Even then, how many houses were there? All the houses that are there now, with the exception of the stock office.
662. *Major Penrose.*] You say in your report that the townspeople are dependent on a tank of Mr. Williamson's? Yes.
663. *Mr. Moore.*] You spoke of this tank being in the main street;—do you know whether the township had been surveyed before the houses were built? I fancy the township had been surveyed, but I can ascertain directly.
664. *Major Penrose.*] A tank has around it a square mile of land, I believe? The land is not all around it. The reserve is not square.
665. What constitutes the tenant's lease, then? The tenant's lease is a long narrow strip, following the road, in this case.
666. *Mr. Moore.*] Is it not better to have this portion of land, which is to be leased to the caretaker, situated in that way than to have it all around the tank? Just so. It is always the endeavour to get the tank as near one corner as possible. When the tank is in the middle of the tenant's lease, the stock go in there and destroy all the feed, unless the troughing is fenced off.

J. W. Boultbee. 20 Jan., 1888.

667. *Major Penrose.*] Now, can the whole of this 640 acres be utilised for catchment? Oh no; the catchment is the bad part of it, and the drainage comes through the town in several places in to the tank. One drain runs right past Cobb & Co.'s stables and then past a piggery, thence into the tank. Other drains run through allotments that were sold the other day.
668. *Mr. Weore.*] Is there no other water accessible? None, except from private tanks. Mr. Elliot and Mr. Williamson supplied the people.
669. Then this tank is almost a cesspool for the town? It is not so bad as that; but it is certainly not a nice thing to have these drains coming into it.
670. If this tank is on lower land than the buildings, of course all the village drainage runs into it? Certainly, besides the drain crosses the road in two places, and all the traffic goes over them.
671. *Chairman.*] Do you know of your own knowledge that there was a better site than that recommended? The site recommended by Mr. Gillist on purchased land of Mr. Williamson's was much better. It could have been exchanged for other land.
672. Would that be on the stock route? Yes; on the Balranald road. It is about half-a-mile from the town.
673. *Mr. Weore.*] On Government land? No, on private land; but Williamson offered to exchange.
674. Was this site chosen by the Works Department while there was an available site on Crown Lands? Yes; that I know to be true. The site was moved and a place chosen where it would be close to the township. They then found that the land was selected.
675. *Chairman.*] Now with regard to defective design and too steep batter. We cannot give an answer at the present time to your question whether the earlier specifications were the same as the present ones. I think, in the paper you read yesterday, you went fully into the matter of defective design, and that paper will of course be printed with your evidence? [No answer.]
676. *Mr. Weore.*] You say "that tanks are of defective design and faulty construction; and but little concern is taken of the formation of the ground or of the selection of catchment area so as to avoid collection of silt." You state also "that too steep batters were adopted in most cases, and that sites were adopted without reference to formation or nature of soil"; also, that "the construction of flumes and inlet pipes has been defective; that carelessness has been manifest in the laying out of drains, the cost of which is excessive"? Tanks have invariably been placed on the lower portion of the catchment instead of on a sidling, so that there would be a good fall to the tanks by gravitation.
677. But the lower the tank is situated the better the chance of carrying overhead fluming over the embankments if required, and the better the chance of filling the tank? In some cases you can do without overhead fluming. You can intercept the water on a higher level, and bring it down to fill the tanks to the top of the embankment. I have seen one good example of this, which is on a station of Mr. Evans' at Babinda.
678. Of course, in a wet season it does not matter where the tank is placed so long as there is a fairly good catchment, but the object is to catch water in dry seasons, and therefore it is only reasonable to suppose that these tanks were placed on the lower ground in order that, however little water fell, some of it would go into the tank? But you might be able to get a place giving ample catchment area at a higher level.
679. *Chairman.*] Then the chief fault you find in laying out these tanks is the fact that you cannot get water to run over the embankment unless it is built on the side of a ridge with fluming running down a gradual slope? Quite so; in some cases the tanks will hold water a little over the excavation, but the embankments will not fill up.
680. The length of fluming would depend upon the levels of the ground? Yes; and the distance from the silt tank to the main tank.
681. But the water from the silt tank could only fill up round the side of the embankment? It would fill a main tank to its own level.

William Sly called in and examined:—

W. Sly. 20 Jan., 1888.

682. *Mr. Weore.*] Where do you reside? In Toowoomba, Queensland.
683. You are a grazier? Yes?
684. You formerly owned Ardoc Station? I own it now.
685. Where is it situated? On the Booloo River, in Queensland.
686. How long have you owned that station? I have owned it for about ten years.
687. Do you know the road down by the Paroo to the Darling? Yes.
688. How long have you known it? Ever since it has been opened—twenty-seven or twenty-eight years.
689. Is that the main stock route from the south-west part of Queensland to Melbourne? Yes, it is.
690. How many years has it been used as a stock route? Well, I travelled it with stock twenty-two years ago.
691. Stock were travelled also from the neighbouring stations? Yes.
692. What kind of stock—cattle or sheep? Principally cattle.
693. I believe there is a great difference in the number of cattle travelling now and twenty-two years ago? I suppose there is 2,400 per cent. more—no comparison.
694. What is the greatest number of cattle that you have known to travel by that route within a given time? The greatest number that I know of was about 78,000, which travelled there last year, made up from three books where stock was reported.
695. Within how many months? Within nine months.
696. Do any sheep go down? Not from my part. They may go from some places further down near the Border.
697. What quantity of water would each beast drink at each watering place after making a fair stage? Each beast would drink from 8 to 10 gallons.
698. I am speaking now of a dry season? Well, they would drink 10 gallons after doing an ordinary day's journey, if they had to depend on tanks.
699. Are the cattle now confined to this stock route? Yes.
700. Were they not formerly confined to it? No, they could go anywhere formerly; but now the route is fenced in.

W. Sly. 20 Jan., 1888.

701. Do you know Warramurtee waterhole—the last waterhole on the Paroo? Yes.
702. Is that a permanent waterhole? No.
703. Not even with the dam on it? There is a dam on it, but the water is not permanent.
704. Do you think that that waterhole would be sufficient to supply travelling stock without water being conserved there? No; I do not.
705. Then, an additional supply cannot be unnecessary at that place? No; I think not.
706. You know the Warramurtee tank; it is situated near the waterhole? Yes.
707. Is the water in the tank with that in the waterhole sufficient for the stock that travel down there? No; it is not sufficient in a drought.
708. And it is in a time of drought that it is most wanted? Yes.
709. And that being the case, are you prepared to say that the Warramurtee tank is an unnecessary public work, and that public money has been thrown away by making a tank there? No; I do not think it was unnecessary. On the contrary, I think it is very necessary. If three times the amount of money had been spent there in water conservation it would have been very necessary.
710. Another place on that road is the Yentabangee tank? Yes.
711. Do you consider that an unnecessary public work? No; I do not.
712. Does that tank supply the demands of travelling stock in all seasons? No; it does not supply the demands of travelling stock—nothing near it.
713. *Major Pearson.*] Then it sometimes runs dry? Yes.
714. *Mr. Weare.*] Is there no natural water there at the Yentabangee tank? Yes; a spring.
715. Would that spring have been sufficient to supply all demands of travelling stock? No; it was a weak spring.
716. But the springs are the only permanent water there? Yes.
717. There are waterholes as well—are they not permanent? No; and the lake is a mere shallow depression in the ground. It is a mere swamp, not a lake.
718. The next case is the tank at the Peri Sand-hills;—do you know it? Yes.
719. Do you know the Peri Springs? Yes.
720. Are the springs the most permanent supply in that part of the district? Yes; the springs are the most permanent water that I know of away back from the river.
721. Do you think that if the waters of these springs were opened up there would be sufficient water to supply the demand of travelling stock during drought? I do not think so.
722. The springs would not give the quantity of water required? No; they would fail at any time when a sudden demand was made on them.
723. Have these springs, to your knowledge, been opened up in any way? I cannot say.
724. Do you know if the Peri tank is situated near the springs? Yes.
725. Do you consider that tank an unnecessary public work? No; it is very necessary, but not large enough.
726. Well, from this I gather that your opinion is that the water of this tank and these springs combined is not sufficient for travelling stock in dry seasons? No.
727. Have you ever known either of the other tanks that I have mentioned to be dry? Yes.
728. In what year? In 1885.
729. Were they all dry then? Yes.
730. That being the case, was not the traffic in travelling stock suspended? Yes, we had to stop sending stock from the south-west part of Queensland, in consequence of these tanks being dry.
731. What remedy would you suggest for the state of things you describe? I would suggest that the stock routes should be better supplied with water. I would recommend more tanks and deeper tanks. The tanks should be made deeper if the ground would allow of it.
732. Then, are the distances between these tanks too great? Yes; too great by half. There ought to be a tank between Peri Springs and Yentabangee, and between that and Warramurtee.
733. Do you know Copago tank? Yes; I know that one.
734. Do you know anything about the tank that is made there? There was, first of all, a dam at Copago, near where the creek enters into it. This dam was washed away, and was then replaced further up the channel.
735. How far? About a quarter of a mile from where the dam was.
736. In dry seasons was the tank supply sufficient to water all the travelling stock? No.
737. It was not large enough? No.
738. What do you think of the first three sites mentioned? I think they were all placed in an excellent catchment area.
739. Do you think that the Peri tank is well situated with regard to the stock route? I do think so.
740. Is the stock route the best that could be chosen? Yes; It was the road chosen by the stock-owners at a time when they could go where they liked.
741. *Major Pearson.*] Do you think that the Peri Springs could be improved in any way by the addition of large service tanks and troughing? I do not think so.
742. *Mr. Weare.*] The springs are situated in the lake—are they not? Yes; but the springs out there won't stand much meddling.
743. You do not think that they would be benefitted by being opened up? No, I do not. More stock travel in twelve months now than were in the whole district originally.
744. *Chairman.*] Have you any experience in tank excavations? Yes.
745. To what depth have you had these excavations made? Usually from 10 to 15 feet. We would put them down to 25 feet if it could be done.
746. How much more have you to pay for these deep tanks than the shallower ones? About 30 per cent. That is after you go to a certain depth.
747. *Major Pearson.*] Do you mean when you get beyond 15 feet? Yes.
748. *Mr. Weare.*] Can you get as deep as 25 feet with ploughs and scoops? Yes, you can; but you must make the tank in a different shape altogether from the way Government tanks are made. They must be longer than the others.
749. Why a long tank;—how does that lessen the expense? You can make them both ways; but by making them long you can take out the earth lengthways, and not sideways.

W. Sly. 20 Jan., 1868.

750. That would increase the expense? Yes.
751. Then the earth that you would take out of these deep and oblong tanks—where do you deposit it? There is some ground that will not allow you to use the earth. You have to be guided by the construction of the ground. Coming down from Adelaide I noticed tanks over half-a-mile long excavated by ploughs and scoops.
752. But for the expense attached to it, would it not be much better to have steeper batters, so as to have less exposure of surface to wind and sun, causing less evaporation? Yes; we do not give as much batter as the Government do.
753. You mean that you give a great deal more? No; not as much as the Government.
754. *Major Penrose.*] Do you mean that you have steeper sides still than the Government? [No answer.]
755. *Chairman.*] What batter do you allow? If it is good ground we allow 1 in 3.
756. *Major Penrose.*] You mean 1 down to 3 long? Yes; but this is a new thing altogether. Formerly we used to allow stock to go into the tanks; but now the arrangement is to pump the water out.
757. *Chairman.*] It has been complained that the Government tanks are faulty in construction, because the batters are too steep. You appear to think that they are not steep enough? Yes; I have not seen any of them but what a man could ride in and give his horse a drink, and stock will go in wherever a horse will go. If this were done a less portion of the surface would be exposed to atmospheric influence and to the wind, which causes a great deal more evaporation than the sun.
758. Then would it not be desirable to surround these tanks with earth excavations, so as to protect them from the influence of wind and sun? Yes; but you have to keep it a good distance away. I do not think that the earth does protect the water from the sun.
759. *Mr. Woore.*] It must afford a certain amount of shelter. High embankments round a tank must surely protect the water from the wind? It is barely discernible, I think. There is great danger in floodtime of the floods washing the earth back again.
760. Do you allow stock to water in your tanks? Not generally.
761. You pump the water into troughs? Yes.
762. What lifting apparatus have you? A common Californian pump.
763. Worked by hand? Yes.
764. And what troughing do you use? Iron troughing.
765. You mean troughing made specially of galvanized iron? No; made of sheet iron.
766. *Major Penrose.*] Do you think that steam-pumps on Government tanks involve unnecessary expenditure of public money? Well, in employing steam-pumps you have to depend upon one man. You must have an engineer if you have a steam-pump; whereas if you have a windmill almost anyone can work it or repair it.
767. *Mr. Woore.*] But the demands made upon the water of a Government tank are much greater than those made upon a squatter's tank? Of course there is a great difference between a squatter's tank and a road tank. The stock go to a squatter's tank in small numbers, but to the other tanks the stock come all together, in hundreds or thousands.
768. Then there is no comparison of the works required? None at all.
769. So you think it quite possible that a steam pump may be required on some tanks? Yes; because the quantity of water required in Government tanks is much greater than that which is required in tanks on a run.
770. *Chairman.*] It has also been complained that the Public Works Department have sunk wells in close proximity to tanks and waterholes. Do you think that this was a useless expenditure? No.
771. *Mr. Woore.*] Do you know the J.K. waterhole, and the well that has been sunk there? Yes.
772. Would you say that that was unnecessary? No, I would not say that it was unnecessary. I have often sunk wells close to waterholes.
773. Because in the event of the tank running dry you have a supply in the well as a stand-by? Yes; it is said that wells when sunk drain the water off from the tanks—that is the usual complaint of those who do complain about it.
774. But you do not think where tanks or waterholes are not permanent it is a useless expenditure in sinking wells? No; I do not think it is either useless or unnecessary.
775. And it is no unusual thing for the squatters to do it? Not at all unusual. The water on my run is all conserved water. There is no permanent natural water on it.
776. With regard to the J.K. waterhole, do you think that the expenditure was unnecessary? No.
777. The J.K. waterhole is not a permanent waterhole—is it? No.
778. *Chairman.*] You mentioned just now that you make a very steep batter if the soil is suitable; consequently you think a hard and fast rule for the construction of tanks is not desirable? No; I do not think that it would be desirable.
779. *Mr. Woore.*] Do you make your batter according to the ground? Yes.
780. Have you ever utilised the earth from the tanks to increase their depth by building a bank all round? Yes.
781. Then how did you fill the tank,—by pumping or conveying the water by flumes? By flumes from a higher level.
782. How do you fill them? I fill mine by flood-gates put in the flume through the bank.
783. But that will fill the tank only up to the level of the berm? Yes.
784. You never utilise the earthwork above that? No, we have not arrived at that yet.
785. Then why do you use the flood-gate,—what value is attached to that? It keeps the bank right. It is no good putting earth around a dam unless you can keep the water which is inside it.
786. But that would fill as well without a flood-gate as with it? Yes; but the water would run away again.
787. If the water rises to a higher level than the berm by the use of a flood-gate, you save an extra 2 or 3 feet of water? Yes.
788. *Chairman.*] Then you have never pumped the water into these tanks? No, I have never done that; and I never knew it to be done except on Fisher's station on the Balonne.
789. In your travels, have you ever seen a want of care and attention on the part of the caretakers who have charge of tanks and wells? No, I do not think I ever noticed anything that way.

W. Sly. 20 Jan., 1888.

790. Have you ever known any of these tank caretakers to be in any way neglectful of their duties? No; and as a rule I think the caretakers are good servants. It is an unhappy position, you know, that of a caretaker.
791. Have you ever had any experience of the difficulty of dealing with the officers of two Departments. You are aware, of course, that the construction of tanks in this Colony is under the charge of the Works Department, and that when the tanks are constructed they are handed over to the Mines? No; I have never had anything to do with the Public Departments of New South Wales. All my difficulties are in Queensland.
792. Have you ever observed any unnecessary expenditure on these works—where the Government have gone to needless expense on tanks and wells—or in the construction of fences? No.
793. Do you know as a fact that the Government pay more per cubic yard for the excavations of tanks than the squatters do? Yes, generally.
794. Why? Because a squatter generally looks after his own work, and he knows the value of it.
795. But then these works are all done by tender, and everyone is open to contract for them under the Government as well as under the squatters. If it pays a man to do work for one it ought to pay him to do work for the other? The general idea is that men are better paid by the Government, and a man will work for me 20 per cent. less than for the Government. The reason is that the Government always accept tenders, and by a combination the tank-sinkers take care that they get a higher rate than they will attempt to ask from a squatter. They never tried that on with me. Months ago I was giving 10d. a yard for tank sinking, but the Government of Queensland, for exactly the same class of country, were giving 1s. 2d. per cubic yard.
796. *Major Pearson.*] Were the conditions just the same? Yes.
797. The same depth of tank? Yes.
798. *Chairman.*] Other reasons still have been advanced. Do you know that while the squatter measures the tank and pays off his men at once, there is considerable delay with the Government before they will pay over the money to the men? Yes, I have known delays.
799. Do you not think that this has a good deal to do with it? I do not think it enters into consideration very much when the work is taken.
800. Has it come to your knowledge that the caretakers' paddocks which are given them to keep their horses—that the cost of fencing in these paddocks is much in excess of what is paid by squatters for the same class of work? I do not know what the Government have paid, but it cannot be much more than £20 per paddock at the most.
801. Would you be surprised to find that these fences cost on an average some £95 per mile? Yes, I should be very much surprised to hear it.
802. *Major Pearson.*] Have you ever watered stock at Moongiel or Holy Box wells? No, I have never done it, but I have had stock watered there.
803. Lately? No, not for the last five or six years.
804. It is a salt well? Well, I think it is brackish, or has acquired a mineral taste.
805. But it is perfectly good for stock, as far as you know? Perfectly good.
806. *Mr. Weare.*] Have you ever heard any complaints about the water at Holy Box Well? No.
807. *Chairman.*] Have you found a difficulty in watering stock at this place by reason of the faulty construction of the fence guards? Yes, the fences are generally too high, especially up Bourke and Cobar way. Owing to the stock trampling on the ground the ground wears away and the guard rails become too high. The guard rails are first put up to prevent the stock getting through, but the soil gets torn away, and then the fences become too high, and the cattle standing on ground which was six or nine inches higher originally, cannot reach over.
808. *Major Pearson.*] But that is merely a question of making up the ground, is it not? Yes.
809. Have you ever had reason to find fault with anything else in regard to these tanks and wells; or have you heard any complaints with regard to their construction and management? Yes; the drovers have repeatedly complained.
810. What was the nature of their complaints? The caretakers are in the habit of keeping dogs which disturb the stock, and cattle that have never seen dogs before are very much terrified at the sight of them. Travelling cattle, when once they are frightened, cannot be got back to the water again, and in dry hot weather this is a very serious matter.
811. *Chairman.*] Any other complaints? No.
812. Have your drovers never had to tackle to and water their stock in consequence of the absence of the caretaker? I have never heard of it, but as a rule a drover would water his own stock if he was any good.
813. *Major Pearson.*] And in that case he would not pay anything? No.
814. I suppose if there were no caretaker there, there would be nobody to take the money? What I meant was that if the drover was any good he would naturally go and assist in getting the stock watered.
815. Have you ever known tanks going dry on other stock routes? Yes; on the road to Moongiel, which was closed to travelling stock for several months.
816. Was that in the same year? Yes; in 1885. The road across to Moongiel has been stopped several times owing to the tanks failing. We take all our stock along the routes I have mentioned. I do not believe that I have taken 500 head out of Queensland in any other way.
817. Do you know any other tanks that have gone dry on other routes? Yes; on the Cobar road.
818. In your large experience do you know of any unnecessary tank or well;—of any well that could have been dispensed with? No; I do not know of one.
819. Has your attention ever been drawn to the fact that tanks have been sunk in improper places, and bad sites chosen? Of course there are people who will fault anything. Of my own knowledge I do not know of any.
820. They are all required? Yes; and as a rule, we reckon that tank-work in New South Wales is very superior to tank work in Queensland.
821. *Mr. Weare.*] You mean the Government tank work? Yes; that is what I mean. All the people who work on New South Wales tanks says that the works are very superior; they are more thought of than those of Queensland, and better sites. The only thing is the fences—£95 per mile for fencing simply astonishes me. My fences cost only £40 per mile.

W. Sly. 20 Jan., 188

822. But then you have only four wires? We have six wires; we have sheep on one side and cattle on the other.
823. *Major Penrose.*] You have not a top rail with these fences? Oh, no. That is a piece of extravagance which we cannot afford in our part of the country.
824. *Chairman.*] Have you ever noticed any expensive fencing around these caretakers' paddocks? No.
825. And in fact you have seen no reason why the fences round these paddocks should cost more than those around ordinary squatters' paddocks? No.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

James William Boultbee called in and further examined:—

[*The witness handed in a plan of the township of Ivanhoe, showing the position of the Ivanhoe tank, drains, &c., and also that the survey of village reserve was made before tank was commenced.*]

J. W. Boultbee. 20 Jan., 1888.

826. *Chairman.*] This plan shows that it is exceedingly undesirable to have a watering-place, as is this? Yes.
827. Where cattle would have to pass through the only street with houses on either side to get to the tank? Yes.
828. A suggestion was made to the Department to alter the approach for travelling stock? Yes.
829. But that would necessitate the altering of the caretaker's fences? Yes.
830. And the only question would be the cutting off of the water from the caretaker's paddock? Yes; there is a series of papers here which show that, and the action of the inspector of the district (Mr. Low).
831. *Mr. Moore.*] Was this the only available Crown Land? The only Crown Land available that I know of, though I believe another site could have been obtained.
832. Some ground will slip no matter what the grade is? I think if the batters were less steep they would not slip in that way.
833. *Chairman.*] This is black soil, is it not? Yes, copai ground. The water has washed a ledge higher thanthat table, straight down.
834. *Major Penrose.*] The action of the water would be merely to reduce the slope in the batter to what the soil would stand at? Yes; but all the stuff going into the tank reduces the capacity of it.
835. It gives way at the top? The top surface gives in. In ground of this nature it is utterly impossible to allow the stock access to the excavation. If anything went wrong, and stock were allowed across to the tank, they would certainly perish, the ground is so excessively boggy.
836. *Chairman.*] We presume the stock are not allowed to go into the tank? Certainly not.
837. What you deprecate is that there should be any hard and fast rule for the construction of tanks—that the slope in friable soil should not be so steep as in solider ground? Yes; that is what I mean—that the specifications should be varied with the kind of soil in which the tanks are put down.
838. Now in regard to this tank (Gunaramby), was there not another locality where it could have been put down? Yes; about 800 yards away, where there was a fine run of water in red soil. The tank is placed on the edge of a black soil swamp. This place is about 20 miles from Ivanhoe—between Clare and Ivanhoe.
839. Do you not think it was because there was a swamp there—was not that the reason why the ground was chosen? The place did not seem to have ever had any water in it. Swamps are not always the best catchments.
840. Do you know at whose suggestion this site was selected? I think it was selected at the suggestion of some officer of the Works Department. I believe that Mr. Gillist recommended one tank between Clare and Ivanhoe, and two were made—this being one of them. [*Witness then explained by diagram the position of the tank and the manner in which the water was led into tank from upper silt tank.*]
841. What was the object in carrying the water all round the tank? I have not the least idea.
842. What was the meaning of the silt tank being placed in the lower position? I suppose there was a good catchment from the swamp. The catchment that I spoke of was a low ridge on the other or higher side, and beyond which was the formation of a watercourse. It certainly is a very curious form of tank. There is a drawing attached to the papers recommending that an open box flume should be made towards the tank from the upper silt tank, and that the drains round the excavation should be closed.
843. *Mr. Moore.*] Why were these drains cut around the tank? I have no idea.
844. *Major Penrose.*] Did not the Works Department in the papers, give any explanation of their reasons for carrying the drains between the excavation and the embankment? I do not know.
845. *Chairman.*] Is there any other information with regard to the flumes? The flumes that I saw along the Bourke and Cobar road are really very defective; they are all too small. I have referred to them in the papers. I do not think that as a rule there is any facing put to the flume. In making the mouth of a flume on a station, we put a narrow cutting in the ground, and a sheet of galvanised iron is let into it, disturbing the ground as little as possible. Wings are put on either side, and this literally gives the water no chance of getting in behind or underneath. The putting in of a flume to a tank requires very great attention indeed.
846. I know it is a very difficult matter to deal with; the ground washes away so in that country. The chief difficulty is when the tank is first constructed. There is generally some fall, and this carries a large amount of soil into the tank. If the silt tank is full, it catches the silt, and the water flows out and runs into the main tank. Unless this is carefully done it causes a big gutter to form, and this is all washed into the tank. Then to avoid this a flume is put in, so that the water will not gutter the channel? The great danger is that the water gets behind the flume, and if it does it simply bursts it out. At another place that I would like to mention on the Bourke to Cobar road, the construction of the fluming is to a four-sided embankment. The silt tank is some distance away, and the fluming only starts within the embankment, and all the rush of water from between the silt tank into the end of the fluming has to pass through two embankments where there is no protection. The consequence is that the loose soil of the embankments gives way.

847. In fact the sides of the embankments should be secured? Yes; with logs.
848. Is it impossible in most cases to get stone to floor the flume to these tanks. It is exceedingly difficult for the wood and soil to amalgamate together? Stone should be obtained wherever it can be had. If the thing is properly stopped and rammed and the iron is put in as I describe without disturbing the ground, I think it will stand, and would be preferable to stone.
849. The next thing we have to enquire about is the excessive cost of construction. We want you to give us a few instances which have come within your knowledge in regard to what you conceive to be excessive cost of these works? Of my own personal knowledge I can say nothing whatever of the prices paid by the Works Department. All I know is that I have heard of a number of cases where excessive prices have been paid.
850. Unless it can be borne out in the papers I do not see how we can receive that evidence? What I know of my own knowledge is very small indeed.
851. Well, give us what you have heard on the subject and your own information, too? I have heard that the 12-mile tank was let to Burton Brothers at 2s. 6d. per cubic yard, and sublet to Ford Brothers at 1s. 3d. per cubic yard. Then again I have heard that statement qualified, and that only 1s. 9d. was given. The fact that 1s. 9d. only was given came to my knowledge a few days ago.
852. Are there any other tanks that you have heard of where the same prices were given? I cannot say just now. In the report that I handed in I made mention of the fact that I had no absolute personal knowledge on the subject. Mr. Low is the man who will be able to give you valuable information on the question.
853. Can you account for this excessive price—how do you account for it that when prices were let by tender they were so large? I gave the reasons in my report. I submitted very few statements to Mr. Gilliat as regards price. The only one I reported was, I think, the cost of the fence at the Ivanhoe tank.
854. The next matter is about machinery. It is stated here that it is of a very expensive character, entailing unnecessary expense in having skilled caretakers to look after the tanks? I believe that a simpler form of appliance would better meet the purposes required. The ordinary caretaker is not able, if anything goes wrong, to make repairs which require some knowledge of mechanical engineering. We endeavour to get the best men as caretakers to take charge of these works, and we are doing it by degrees. We are replacing some of the caretakers by more competent men. We have definite instructions on that matter from the Chief Inspector, and we are carrying them out as fast as we can.
855. Are you aware that some of these caretakers cannot manipulate the simplest form of pumps? I have had no such complaints made to me, and if I had I should have remembered it.
856. Are a large number of these tanks supplied with steam-power pumps? Yes.
857. Are these often out of repair? No; very seldom.
858. When they are out of repair whose duty is it to repair them? It is the duty of the travelling mechanic of the Works Department. Of course, what I say only refers to my own districts, and my districts are Condobolin and Narrandera.
859. How many square miles are there under your control—how many miles are your districts in length and width? I go from Albury to Cobar, and from Deniliquin to Wagga.
860. Now, with regard to the alleged incapacity of these caretakers. Here we have in the papers submitted by the Works Department, a letter sent to the Chief Inspector of Watering Places by Mr. Keighran, who says, under date June 8, 1887, with reference to the One-tree tank:—"I have the honor to inform you that caretaker Kelly, of the One-tree tank, has reported that the plunging-rod belonging to the pump has become disconnected. I have reported the matter to the Assistant Engineer, Mr. Stilwell." Then Mr. Stilwell was telegraphed to by the officials in Sydney, and he sends an officer some 50 miles to remedy this small defect. This is his report on the subject:—

[*Report of W. B. Nicholson, dated Hay, 2nd July, 1887, as printed at p. 30, read.*]

Now, here is a statement made by an officer of the Works Department of the utter incompetence of the caretaker. It would seem from this that he is not a man of much intelligence, seeing that he does not understand how to look after a common pump. This entails a great amount of correspondence and trouble? I have no knowledge of this case at all. I think Mr. Gilliat has sent a paper to you about this very case.
861. Mr. Gilliat was examined in reference to the same matter, but I wanted to allow you to know of the complaints made of the incompetence of this man. Now, in the event of such a case occurring within your own knowledge, what would you have done? Were I satisfied that the caretaker was unable to repair the pump (or that the key had been lost), I should have suspended him, because this is really a thing which a man ought to be able to do.
862. You would have taken it upon yourself to suspend such an incompetent man? I certainly should, if I were satisfied of his neglect.
863. Now, we have other evidence here with respect to other caretakers who had been found drinking at a public-house some distance from their tanks, and when the drovers came up there was no water for their stock, and the slip-rails were burned to make a fire? I have never had any experience of such a case; but had I had such a case, I should have taken it upon myself to dismiss the caretaker at once. This is one of the things that we are most particular about. Any caretaker getting drunk is dismissed at once. We get the very best class of men we can, and we employ none without the best testimonials.
864. It is also on record here that reports have been sent in by the road superintendents, who found fault with the caretakers for absolute neglect of duty;—do you conceive it to be the duty of road superintendents to make such reports? I do not see that any disadvantage can arise through their doing so to their own Department—no disadvantage or detriment. I can see no objection to a road superintendent sending down a report if he sees any case of glaring neglect. I think it is only right that a man who sees a case of glaring neglect should call the attention of the Department in charge and have the matter attended to. I know that if I saw anything wrong I should call attention to it, or perhaps write to that officer of the branch of the service having charge of the work, so that the matter might be remedied.
865. But the action of this man belonging to the Roads Department led to what has been called friction between the two Departments? Yes; but I do not want to impute anything wrong to the Works' officers, who, in some cases, have not been quite justified in their reports.
866. We have a large number of allegations here regarding the carelessness, negligence, and absence from work of caretakers. This is all done by the roads superintendents. If the road superintendents are to look

J. W. Boulthee. 20 Jan., 1898.

look after these caretakers, then the question arises what is the good of having overseers and inspectors? I think the overseers have done their duty well.

867. If these allegations are correct then they have certainly not done their duty? Well, unless a particular case is mentioned I cannot say.

868. Well, perhaps there is a case here that you might like to say something about. Take the case of the One-tree tank. Is that in your district?—Here is what is said about it:—

One-tree Tank.—Report of 25th November, 1885 (85-1863): Fence wires around tank slack; caretaker might easily have remedied this but appeared to think it no part of his duty; found him at the inn instead of being in charge of the tank. Report of 25th November, 1886; Caretaker said he was quite ignorant of, and appeared to be equally indifferent, as to the working or the keeping in repair of the pumps; the plunger gland had been fractured through carelessness in screwing it down, but he said he knew nothing about it; the pump, consequently disabled, service tank not half full, and the troughing contained only some liquid mud; the pump was in addition in a most dirty and neglected state, the bearings being almost dry; sent out the following day and put pump in repair. Mr. Nicholson's report, of 2nd July, 1887 (87-519); in consequence of Mines reporting pump disabled, he was sent out to inspect; that nothing was amiss, except that the piston-rod had become disconnected, owing to pin falling out; put it right in five minutes, and pump then worked well; caretaker's incompetence had occasioned an unnecessary journey of 80 miles in wet weather."

——? I cannot remember anything about this particular case; it was never referred to me; but I reported on a former case.

869. We want to know whether the inspectors, who were appointed to look after these places, or the roads superintendents, whose duty it is not to look after them, should find out these mistakes; we want to know why the roads superintendents do the work for which the others were appointed? I would like to have all the papers before me before replying to that question. The dates are grouped up so that I do not quite understand them. In one of these cases the caretaker made a statutory declaration, which is included in these papers, that a certain report was not correct.

870. *Mr. Moore.*] Is this the tank where the caretaker was found living in the engine-shed; and, if so, is he still a caretaker? No, he resigned.

871. Immediately after that? Yes; immediately after.

872. Was no attempt made to dismiss him? No, he had some words with Mr. Nicholson; and in the declaration referred to he states that Mr. Nicholson threatened to punch his head. The bulk of the complaints that come into our Department come from Mr. Stilwell's district.

873. *Chairman.*] That may be because Mr. Stilwell is a very careful officer, and is trying to preserve the property of the Government, in which he takes an interest? Well, I think the Mines officers are just as anxious to do that as Mr. Stilwell.

874. Is the Pulletop tank in your district? Yes.

875. This is what is said about it:—

Pulletop tank.—Report of 6th December, 1886 (86-1,601): Embankment in bad repair generally and damaged by scour at two corners, some 30 cubic yards of earth being displaced, wires in surrounding fence very slack, service tank not full, and the lessee in charge appeared to know little about care or working of the steam pump. Memo. of 9th February, 1887 (87-119): In reply to statement by Mines' overseer that I had forbidden their lessee to repair embankment in accordance with his instructions, and also to minute of Mr. Gilhat's complaining of interference with officers of his Department—that the lessee's statement was not true, made to screen his gross negligence in performing a most urgent work, and apparently accepted by the Mines officer as a sufficient excuse for him, and also for throwing the onus on this Department. Report of 7th March, 1887 (87-199): Embankment still remains unrepaired, fence wires slack, troughing foul, drains neglected.

——? [No answer.]

876. Do you know anything about the caretaker at Pulletop? This man was the lessee and caretaker; and I must say that he was not a desirable person to have in that position.

877. You had no control over him? Oh, yes, we had; and he has lost his lease since.

878. Is Hulong in your district? Yes.

879. I find that this is what is said about Hulong:—

Hulong Tank.—Report of 13th September, 1886 (86-1,285): When there, on 8th instant, found caretaker at his camp reading his newspaper, although his drains were much in need of attention.

Report of 9th November, 1886 (86-1,223 & 1,511). The drains, for want of attention during rainfall, had allowed a considerable quantity of water to escape into the swamp.

Report of 9th December, 1886 (86-1,616). The drains require much more attention during wet weather than the old man stationed here as caretaker gives them; the wires in fence around tank were slack.

Report of 7th March, 1887 (87-201). The tank batter had been damaged, by caretaker discharging water from the horn down it.

Report of 1st July, 1887 (87-530). Caretaker and family residing in pump weather-shed; use boiler fire for domestic purposes.

A. W. STILWELL, 29/8/87.

——? That matter about reading the newspaper was referred to me. I called on the caretaker for an explanation, and he told me he had been reading the *Government Gazette* during the dinner hour, and it was at this time that Mr. Stilwell saw him. He is an old man, who has paid great attention to the tank; and if we had not had him there, we would not have had the same amount of water in the tank that it contains now.

880. Was your attention drawn to the fact that the steam-boiler was being used for domestic purposes? I do not think that that can be a fact. I never heard of it. I believe that the caretaker had camped over near where the tank was erected. He might have been in the shed in wet weather; and, if so, he would have been justified in going in there.

881. But the using of the boiler for domestic purposes—what about that? I hardly think that that was done. I never saw it. I notice that the other road superintendents do not seem to be able to find the same number of faults in the management as Mr. Stilwell does.

882. Are you aware of any excessive prices having been given for fencing? Not from personal knowledge. I had it reported to me, by Mr. Yeo, that £112 per mile had been paid for fencing at Ivanhoe tank, and that the contract had been sublet three times.

883. *Major Pearson.*] What was the matter with the fence at Ivanhoe? This is where there are no straining-posts at the end for the straining of the wires. Whichever post the wire ends at, it is strained there.

884. Were there no struts put up? Not that I saw.

885. Do you know any other instance where straining-posts have been dispensed with? Yes; I think they have been dispensed with at Boonoona, and around the One-tree tank. The wire there is strained the full length of the fence round the tank. J. W. Boulther. 20 Jan., 1888.
886. What is the distance? About 160 yards; I cannot be sure as to the exact length of it.
887. Do you think that that is excessive? Yes; I think from 80 to 90 yards is a very good strain.
888. Has the fence suffered in consequence of the absence of straining-posts? I think it has. However, I have not seen it since.
889. *Chairman.*] Are you aware of any instances where straining-posts were dispensed with by the action of the Mines Department? No.
890. *Major Penrose.*] I should like to know on what facts Mr. Boulther bases his conclusion that steam pumps were unnecessary as a rule? I think that, as a rule, there is not sufficient work for steam pumps, and that horse-power can do everything at a much lesser cost. On some roads I do not think that horse-power is necessary, and that a man can do the work. Along the Cobar road, where there is a considerable amount of traffic, steam pumps are erected, and on the Booligal road, where the traffic is apparently heavier, there are horse-pumps. The railway to Bourke has stopped the traffic immensely. At all events, I cannot help thinking that the simpler you have these appliances the better.
891. *Chairman.*] If you have a steam pump you must have a man of more than ordinary intelligence to work it? Yes.
892. *Major Penrose.*] Have you made any calculations as to the relative cost of pumping water by steam pumps and horse-pumps? I have made no actual estimate; but I think the horse-pump is the cheaper. It would be a very nice calculation.
893. *Mr. Moore.*] Is it not expensive to keep horses? Yes, and when the places were not fenced in it was very hard on the caretakers to feed their horses during the last drought.
894. They would have to buy forage? Yes.
895. *Chairman.*] Then the steam pumps would be preferable under these circumstances? I hardly think so.
896. Then who has to bear the cost of forage in dry times? The caretakers have to do it. They have to take the good times with the bad; and as they are now provided with a paddock in most cases they are independent of forage.
897. They provide horses on their own account? Yes; and they get from 8s. 6d. per day; and formerly, where they had no paddock, it was 10s. per day.
898. And do these men who have to work without horses get the same amount of land? Yes; but they are only allowed to put one horse into it. The paddock is kept with good grass in it in order that someone may be induced to lease it.
899. The average price paid to a caretaker is 8s. 6d. a day—to a man who keeps his own horses? Yes.
900. And how much is paid to the man who works the steam pumps? 7s. 6d.
901. So that the man who works the steam pumps gets less than the man who works with a horse? [No answer.]
902. *Major Penrose.*] And this results in a saving to the Government of £18 a year? [No answer.]
903. Who finds the firewood? The Government supplies it; but where the wood is plentiful the caretaker supplies his own.
904. Then, in that case, the steam pump would be the cheaper? Yes.
905. Do you know what is the cost of these steam pumps? No, I do not. I think the cost would now be about £75; but they were higher some time ago—I think about £125. For myself, I believe that the hand-pump would be cheaper than either, and a man would be well able to keep it going. Of course he would not be able to do this on some of the larger stock routes and town tanks, such as those at Cobar, Nymagee, Nyngan, and other places.
906. *Chairman.*] You think that the Government have been put to useless expense in putting down large tanks where the traffic was small? Yes; the size being in excess of requirements.
907. Now, with regard to the "greasing" of these service tanks, it has been said that the composition with which these service tanks are "smeared" contaminates the purity of the water? Yes; it was a composition of tar and tallow and pitch, the result of which was that a greasy scum formed on the top of the water. A drover named M'Donald, who was fined for removing the rails at Boonoona, told me that this scum had as much to do with his cattle not drinking as the height of the rails. We simply use boiled tar and pitch, and let it harden before the water is allowed to go in. The tallow had the effect of keeping the pitch moist.
908. Did you ever try a composition of tar and lime? No; I hardly think a composition is necessary on these troughs. They are galvanized iron, and there is no action of the water on them.
909. You think this coating was quite unnecessary, then, on galvanized iron tanks? Yes; but not in the places where troughs are attached to wells that have salty water, which would even corrode galvanized iron.
910. Then you have never tried a composition of tar and lime? No.
911. It lasts almost for ever? I have heard of tar and cement being put on the inside of stone tanks, and it is a very good dressing for them.
912. I can understand the objection to grease and tallow; they are exceedingly objectionable to animals? [No answer.]
913. *Major Penrose.*] Was this objected to by the Mines Department? Yes.
914. And was it pointed out that the stock would not drink the water? It was.
915. And was that matter attended to? Yes.
916. *Chairman.*] We have heard that considerable complaints have been made with regard to the faulty construction of wells, and also in the construction of troughing and appliances;—can you give us any information in respect to these matters? With regard to troughing, I brought the matter before the Chief Inspector, and he has dealt with it himself. It is in the troughing that there has been so much inconvenience.
917. In what way? There is a dwarf rail on one side, and a high fence on the other, and the troughing comes in between. Sheep drink under the rail, and cattle have to drink over it. In some instances this rail is so far from the ground that the cattle cannot possibly drink over it.

J. W. Boultbee. 30 Jan., 1895.

918. Was this at the same height when originally built, or was it caused by the wearing away of the ground? No; it was originally the same height.
919. Are you sure that the stock did not wear away the ground by trampling on it? No; only in a very few cases. Latterly we put a rail down the centre of the troughs. This high rail acted as a sort of block to the cattle. Bush cattle do not like to approach a fence, and do not understand it.
920. Did you not find wild cattle jump over a fence which sheep can get under? No, it is a good height. Before these alterations of ours had been made there was a great deal of dissatisfaction.
921. Have the Works Department made any objection to this? No; and they are now adopting the system of making rails along the centre of the troughs, instead of the high fences hitherto adopted. Several gentlemen in the country spoke to me about this. Mr. Miller, a very large drover, spoke to me very strongly about it, and told me that he had come down from Bourke and had used only one Government tank. Mr. Allison also mentioned to me, at the Hermitage tank, that if his sheep would not drink he would order the rails to be chopped down.
922. We had it this morning that it was not so much the fault of the Department as that the ground had been washed away? In some cases that would be true, but in many it would not be. The caretakers have in every case had our instructions to make up the ground where required.
923. *Major Penrose.*] Where do the Mines Department get the money to make these alterations? The caretakers make the alterations in their spare time. For the expenditure on bolts, screws, and other things that are necessary, authority has been given by the Minister for Mines. In one case the alterations were effected by some men who were building cottages in the Corowa district, and if I think aright the alterations were made for about £3.
924. *Chairman.*] Have you any knowledge of the construction of wells in your district? Yes; in my district there are only two fair wells—Berrigan and Murray Hut. Oh, yes; there are more.
925. Do these contain good water? Yes; Berrigan and Murray Hut contains very fair water; but the old Gunbar well is very bad, the water being utterly undrinkable either by man or beast.
926. Have you any well in your district where, by constant use, the water has become drinkable? No.
927. Are there any abortive wells sunk in your district and abandoned? None; except the old Gunbar well, which is quite useless.
928. Were all the headworks put up in that well before the water was touched? I cannot say when the water was touched, but the headworks were put up before the quality of the water was tested and deemed suitable.
929. And you think that if the water had been tested it is unlikely that the headworks would have been constructed? Yes; when Mr. Gilliat took them over he did so subject to the approval of the Minister for Mines, and said that he would require an analysis of the water.
930. That well is still useless for stock-drinking purposes? Quite useless. I do not think that a hoof of stock has ever been watered there.
931. Was a caretaker put there? Yes.
932. What for? To protect the headworks and to bale the well, as the Public Works Department urged that constant baling would improve the quality of the water. The baling has been kept up, but it has not improved the quality of the water in the least.
933. Are you aware that constant baling has improved the wells in Riverina? No; I am not aware that the water in any Riverina wells has been improved by baling; but I have heard that it has done so in some slight way in wells along the Darling.
934. *Mr. Woore.*] Baling cannot alter the character of the water when it contains minerals? The idea is that constant baling would wash the salt out. A great deal of the water, besides being salt, is evidently charged with magnesia. Those witnesses who come after me will be able to give more information on the subject. I have knowledge of other works like this, owing to my having travelled at different times through the Colony. I made a special report on the Dolmoreve and Holy Box wells.
935. *Chairman.*] Is there anything wrong with the troughing arrangements or with the construction of troughing? I think the objection made by us only refers to the rails.
936. Can you give us any information about butting? I know what some of the huts erected in my district by the Mines Department have cost.
937. *Mr. Woore.*] Do you know what has been the cause of the disagreement between the officers of the Departments? Well, I think it is due chiefly to misapprehension. I think the friction exists only in one district—that it is confined to a certain extent to the district of which Mr. Stilwell has charge. It is only from his district that complaints have come largely. Every repair required passes from us to the Works Department; and in a great many cases these repairs that the Mines Department have deemed necessary have been referred by Mr. Gilliat to the Commissioner for Roads, and by him treated as complaints.
938. *Chairman.*] Of course, you can understand that if the officers in the Roads Department are put to considerable trouble and annoyance, and heavy duties imposed upon them through the apparent carelessness of caretakers, they naturally feel angry and are apt to use strong language? Yes; it would be justified if these things can be borne out. Nobody sympathises with these gentlemen more than I do. I know if I saw a man neglect his duty and I reported it, and no notice was taken of it, I would be annoyed very much.
939. Particularly if the work you saw going to destruction was the work of your own hands? Decidedly. Mr. Stilwell I have never met, but by those officers whom I have met I have been treated with the greatest courtesy, and I have always treated them in the same way. There is no personal friction whatever between us.

[The Commission adjourned.]

THURSDAY,

THURSDAY, 2 *FEBRUARY*, 1898.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.
MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

David Brown called in and examined:—

940. *Chairman.*] You are a joint lessee of Kallara station? Yes. D. Brown.
941. Are you aware that a Commission has been appointed for the purpose of inquiring fully into what has been called the strained relations between the Department of Works and the Department of Mines? I was not aware at all of the reasons for the appointment of the Commission. 2 Feb., 1898.
942. You are not aware that we were appointed to inquire into the matters I have mentioned, and also into the allegations that have been made by officers of the Mines Department as to tanks constructed by the Works Department, and entrusted to the Mines? I have heard something about a dispute between the two Departments, but as to the nature of it I have no knowledge.
943. Then I might briefly state to you the heads under which we propose to examine the witnesses. They are—

1. Faults of judgment in the selection of sites for tanks.
2. Of defective design and faulty construction, with but little concern to take advantage of formation of ground or selection of catchment area, so as to avoid collection of silt; of too steep batters in most cases, and apparently the adoption of a certain form of tank, without reference to formation of ground or nature of soil; the defective construction of flumes and erection of inlet pipes, with carelessness in laying out drains, and excessive cost in construction.
3. Expensive forms of machinery for lifting water, necessitating greater cost of maintenance.
4. Faulty construction and excessive cost of fencing.
5. Interference with caretakers and overseers; greasing of service-tanks.
6. Sub-letting of contracts.
7. Faulty construction of wells, sinking, timbering, and centering of shafts; erection of headworks, whim, service tanks, and troughing before testing for supply and quality of water.
8. Excessive cost of construction.
9. Costly hutting for caretakers.
10. Defective construction of troughing.

And finally, the evidence throughout confirming the unfortunate effects of a divided control, under which each Department denies responsibility? [No answer.]
944. The principal matter which we will dwell on to obtain information from Mr. Brown is as to the faulty selection of sites, which means that if the soil is not good for holding water, it was useless to make a tank in that place. We want first to ascertain if the sites are faulty as to the selection, and we will then inquire who was responsible. Now, what are the tanks which you are more immediately connected with, and which have come under your observation? There are two Government tanks on our run; they are both situated on the course of the Paroo River. One of them—Goomboolara tank—is about 7 miles from the northern boundary; the other is 24 miles further down the river. They are both on the flow of the Paroo. The name of the other is the Warramurtee tank. The first was sunk by a man named Doyle.
945. Have the sites of these tanks not been well chosen? I think not. I think the site of the Goomboolara tank is particularly badly chosen. The reason why I make this statement is that within 4 miles of Goomboolara tank there is a lake which contains water nearly always, and is seldom dry. When the lake is dry the tank is also dry, because the lake is filled by the flow of the Paroo River, and it requires the Paroo also to flow to fill the tank.
946. *Major Penrose.*] What lake is this? The lake known as Mungundie.
947. What run is that on? It is the Goorimpa, which is a back station of Kallara.
948. *Mr. Woore.*] How far is it from the Paroo? It is on the Paroo, or, rather, just off of it. There is a cutting running down. It is a natural lake, and it has only been dry on one or two occasions during the last ten years.
949. Is there a cutting made into this? Yes; the cutting was made in 1877, and improved somewhat since then. In 1875 and in 1876 there was no water there at all.
950. *Chairman.*] Would not a fall of rain fill the tank irrespective of the flowing of the river? A very heavy fall of rain might fill the tank. There is a dam above this, and the principal watershed is above the dam. The effect of the dam is to send the water towards the lake rather than towards the tank, so that in most cases the lake should begin to fill before the tank. Of course the filling of the tank by rain would depend upon whether the rain was heavy or not. It is just possible that a moderate rain might fill the tank without sufficient falling to fill the lake.
951. Could a better site have been found in that locality? No; I do not think a better site could have been found; that is to say if a tank were required there at all. I do not think that a better site could have been had within a reasonable distance from the road.
952. Would it have been more satisfactory to have made a well there rather than a tank? I think not.
953. Is well water obtainable there at all times? I have tried to get well water in several places along the run of the Paroo and have invariably found that there was a very considerable quantity of salt water within a few feet of the surface; I mean from 7 to 14 feet of the surface. The expense of sinking wells increases very much, if you have a large quantity of salt water to deal with near the surface. My own opinion is that to get really fresh water it is necessary to sink or bore from 700 to 1,400 feet.
954. I do not know if you have yet gathered the force of the question which I desire to ask. I want to know whether, when the water in a tank is precarious, and it is necessary to have a stock route supplied with water, do you think it is desirable to have anything beyond tanks to depend on in severe droughts? Do you want to go back to the time when these tanks were put down—that is, do you refer to the present or to the past?
955. I mean that where the rainfall is precarious, would it not, in your opinion, be desirable to have permanent water alongside the tanks? Are you referring to the Goomboolara tanks or is your question a general one?

J. W. Boulthee. 20 Jan., 1888.

918. Was this at the same height when originally built, or was it caused by the wearing away of the ground? No; it was originally the same height.
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D. Brown. 2 Feb., 1888.

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955. I mean that where the rainfall is precarious, would it not, in your opinion, be desirable to have permanent water alongside the tanks? Are you referring to the Goomboolara tanks or is your question a general one?

956.

D. Brown. 2 Feb., 1888.

956. I refer to tanks in general? Clearly, if water is necessary at all no expense should be spared in providing it by sinking wells to any depth. Of course, I mean if the catchment area for tanks is not sufficient to render tank water practically permanent.
957. Was there any water in the lake when this tank was sunk? Probably there was, but I cannot say from memory. When the contract was let there probably was water there.
958. *Mr. Moore.*] In what year was the tank sunk? In 1880 or 1881.
959. But there have been considerable droughts since then? Yes, the drought came on in 1883. From memory I believe I can say that the lake had water in it at the time, because the tank was sunk in April, 1880; and in March, 1881, there was a very big rain that filled the lake.
960. *Major Penrose.*] Have you ever seen this tank dry? I have seen it useless, but not dry. I have seen it useless for stock.
961. Was this tank much used? I leased it for about two years formerly, and have had the general supervision of it for three or four years after that. During that time I had the right to collect all dues, but I was only able to collect the sum of (I think) £4 10s., because in nearly every case when travelling sheep passed up or down the river there was a sufficient supply of water on some part of the route, which prevented the necessity of drovers using this particular tank.
962. *Chairman.*] Then under these circumstances you think that the expenditure on the tank was a useless one? I am not quite prepared to say that.
963. Were not these leased tanks dry during the drought of 1884? No, not dry. The drought was in 1883 and in 1884.
964. *Mr. Moore.*] When the tank was useless for watering stock was there plenty of water available in the lake? Generally there was; the tank was not required as a watering place when the lake was dry. I remember it having been dry for two or three months, and during that time no travelling stock came down that road. Our stock was dying in thousands, and other stock could not possibly travel.
965. Do you not think it was possible to make this tank—I do not know what the size of it is—but do you not think it possible to have made the tank very much more permanent than the lake? I think not, except on one condition—that three small rains might fall and fill the tank while being insufficient to fill the lake; and I think that in the lake there is very much less absorption than there is in the tank. In other cases that I know of the evaporation is not nearly as great as the absorption. The whole of the ground along the Paroo is of such a nature that tanks should never be put down more than 9 feet. I myself have put down tanks 12 and 13 feet deep in similar ground, and in one case I returned the clay to the bottom of the tank to cover the porous stratum, which contains salt, and which was opened up at that depth.
966. At the time this tank was made by the Government, was it then generally known that it was not advisable to go down more than 9 feet in the Paroo River country? Some people might not agree with me in what I say. It is an exceedingly difficult matter, even with trial shafts, to tell whether the ground will hold water or not. I know of one tank 12 feet in depth with a bank around it, arranged in such a manner that the capacity of the tank is about 60,000 yards. That tank seemed to me to be better capable of holding water than any other I saw on the course of the Paroo.
967. How deep was it? Over 12 feet, and 19 feet when filled to top of embankment. I found, however, that I was wrong, and that this tank, which looked the best of any that I had seen, turned out to be the very worst along the river.
968. Putting out of the question altogether the facilities for getting a supply of water at this particular spot near the lake, do you think the position of the place is a good one as the site of a public watering place for travelling stock? I think not. I do not think it was a good position for a large expenditure of money. If water could be got at a reasonable cost, and maintained and distributed, it might be good enough; but, under the circumstances, and from what I know since the tank was made and the revenue which it has brought in, I think that it was not a good place. My own opinion is that no public watering place was required there at all.
969. Why? Principally on account of the lake being there.
970. But the lake is liable to be dry for years? That is not my experience.
971. *Chairman.*] Are you aware of the enormous evaporation in that climate? What do you call enormous evaporation?
972. Something very abnormal as compared with the evaporation in the coast districts? How has the evaporation been tested?
973. Government have had various registers kept from year to year, and proved the existence of what I call enormous evaporation? Could you give me any idea of how much that is?
974. Well, I understand a certain amount of water is put into a vessel, which is placed under the surface of the ground, to prevent the sun from acting on the sides of the apparatus; and this, measured carefully by scales and measurement, shows that there has taken place what I call enormous evaporation. I have been given to understand that water will evaporate at the rate of 1 inch per day? That is 30 inches per month?
975. Yes, but not all the year round? It is an exceedingly difficult matter to prove. I am aware of what are said to be facts in connection with evaporation, but I am of opinion that they are not all facts. I kept one of Mr. Russell's evaporators myself at his own request, and after using it for a time, I suggested to Mr. Russell that a better evaporator should be obtained before any definite result was made known.
976. Well, you are aware that a great amount of evaporation goes on during the hot summer months in that country? I have heard of it.
977. You state that you have kept a register? Yes, I have. The register was one of Mr. Russell's small evaporators, and by the results obtained from it one might have imagined that the evaporation was considerably over a foot per month; but from practical observation I am satisfied that evaporation (apart from absorption) is not nearly so great as that. If the evaporation pure and simple could be estimated, my own opinion is that it would not be more than 2 feet 6 inches per year in deep water.
978. You stated just now that you did not think any tank along the Paroo could be sunk more than 9 feet? No.
979. Now take a three years' drought—and they are not unusual—this would mean between evaporation and absorption the escape of 12 feet of water, leaving scarcely any water at all for the stock. You do not think that it would all go in evaporation? No; twice as much would disappear by absorption; and in many cases much more.

980.

980. Then, if that is the case, what is the use of sinking a tank at all. There is no good in a tank unless it can be relied on in a drought? If absolutely permanent water was absolutely necessary, I should say certainly not. D. Brown. 2 Feb., 1883.

981. Of course, you know that a squatter would conserve water on his own run even if it only remained twelve months, because it would give him an opportunity of supplying his stock for that period. But that is not the way the Government should act. The Government have to supply travelling stock routes with water, and none of these smaller tanks put down by squatters would be of any value; so that the cases are not quite the same? Quite true.

982. So that one of these tanks of 0 feet, which you would sink on your own run, would be of no use to the Government? Excuse me, but I think that the Commission ought to go back to the time the tanks were sunk and ask my opinion as to the desirability in having sunk tanks in preference to wells, at the time wells were put down. If you did so, my answer to this would be that at that time so little was known as to the possibility of getting fresh water under salt water, that the majority of people would very much have preferred a tank to a well. All over that Paroo country salt water exists. Its presence was known; but it was not known that possibly at greater depths fresh water might be got by boring. These depths are not yet ascertained. I have put some bores down 800 feet, and the supply of water at such a depth was not sufficient for a Government watering place.

983. *Mr. Moore.*] Well, then, perhaps you may think that the Public Works Department in sinking tanks there did only what was reasonable under the circumstances? So far as the question is between tanks and wells, they acted rightly at that time.

984. *Major Penrose.*] Are you aware under what conditions these tanks were constructed. Were they urgently demanded by the people in that district? I think not. The Goomboolara tank was made about the same time as the Warramurtee.

985. *Mr. Moore.*] But do you not know that considerable pressure was brought to bear on the Government to have these tanks made? I am not quite certain about that.

986. Do you not remember that there was considerable agitation for the construction of tanks on the Paroo river? Yes; but not in respect to these two places, Warramurtee and Goomboolara.

987. Then where are the tanks which the Government were pressed to construct? They were lower down the river. I think Copago was one of them. I was never concerned in any such agitation myself.

988. *Chairman.*] Are there any other tanks that you know of, the sites of which were badly chosen? I only know that the tanks on the Cobar road,—the Kerrigundi and the Matthews's Flat tanks; and, I believe, the first tank out of Louth, were badly placed.

989. Have you anything to say about Warramurtee? Only this, that if a tank were required there at all the site selected was certainly the best one. But here again I think that the Warramurtee waterhole was quite sufficient for all public requirements.

990. How far is that distant from the tank? Quite close to the tank. My reason for making this statement is this, that since the tank has been constructed it has been required only once for the use of travelling stock. And only once has there been any water in the tank when there was none in the waterhole.

991. *Mr. Moore.*] Is it not a fact that this road has been closed for months owing to the want of water? No, not to my knowledge, except in the droughts of 1883 and 1884; and I think it was closed then, not so much because there was an absolute absence of water as that there was no grass for the travelling stock. There was then a greater want of grass than water. There have been, of course, exceptional cases, where stock have got through owing to the presence of this tank when they would not have got through otherwise.

992. Then in that case if the natural supply dried up, is this tank sufficient to take the stock over a severe drought; and is it not possible that if it were sunk deeper there would be a better supply of water? There never have been any travelling stock on that road that were not supplied with water. No stock have ever applied for water there and failed to get it. I do not say that some stock have not been prevented from going, but during my occupation of this lease no travelling stock have applied for water and failed to get it.

993. Have the tanks never been empty? I do not say that. The tanks may not have been empty, but they were so near it as to be useless for travelling stock.

994. What I want to get at is this,—is it not absolutely necessary to have permanent water on a stock route, because it is during great droughts that water is required? Quite so.

995. Permanent water is not supplied on that route in these tanks? No; and cannot be supplied anywhere after a three years' drought that Mr. Cox spoke of.

996. Then the only way to supply permanent water is by these expensive deep borings? That is the only way.

997. And little was known about boring when these tanks were constructed? I believe I was one of the few individuals who tried boring at that time.

998. *Chairman.*] Now, as to the faulty designs. Besides these two tanks, are there any others that came under your observation that you have any cause to find fault with? Well, I will take the question of batters. In most of that country the batter given to Government tanks is too steep, because the soil is not sufficiently retentive for the case of poor holding ground. Very much depends upon whether you allow the stock to go into the tank or not. If you do not allow stock to go into the tank it does not very much matter whether the batter is one in three or one in six. Where the soil is not sufficiently retentive I think it advisable that the stock should be allowed to go into the main tank, and in that case the batter must be an easy one. I can give you an instance of that, if you like.

999. I have come to the conclusion that all stock at Government tanks ought to be watered by troughs? In that case I should not put down tanks at all in bad holding ground. I should take other means of watering stock, because unless stock watered on the slopes the tanks would never get puddled. The ground along the Paroo would scarcely hold. The water there has a tremendous amount of clay in suspension. That clay settles perpendicularly. I think it desirable in most cases that the tank should be open, so that sheep on a shallow batter might be allowed to puddle the soil, which without their puddling, is not sufficiently retentive.

1000. *Major Penrose.*] Do you consider that a batter of one in two is too steep as a general rule where the stock are watered at troughs? That entirely depends upon the soil. If it is good retentive clay, a perpendicular bank would stand, and will hold water, on condition that you log it. I have on the Paroo

D. Brown. 2 Feb., 1888.

a logged tank with perpendicular sides, and you can pour into that tank a considerable amount of water, and the longer you pour the longer you will have to pour, because the tank will never fill. The sides of the tank are so porous that the water goes away as fast as you can put it in. If you make a shallow slope the clay in suspension in the water falls on the side and tends to fill up the porous sides and bottom.

1001. Now with regard to the cost of construction, have you many tanks on your own run? I began in 1878 to make tanks on the Paroo.

1002. And what was the highest price that you gave per cubic yard? Before I went up there the lowest price at which excavation was done was 1s. 6d. per cubic yard. The highest price that I have ever paid is 1s. 2d.

1003. Is that the highest price that any of your neighbours have paid? As I have said, previous to my going up there, the lowest price was 1s. 6d. per cubic yard, contractors finding everything.

1004. Yes; but I want to know what is the highest price? Well, that depends upon the work.

1005. But what is the highest price that you have known to have been given by private individuals in that locality? Well, I have known as much as 1s. 8d. to be given for excavation; but the tank was a small one, and probably had steeper sides. The highest price, and the usual price given up there before my time, was 1s. 6d. per cubic yard.

1006. Now, why was this high price given;—what caused it? You mean this excessive price of 1s. 6d?

1007. You say it is excessive? The people up there did not consider it excessive at that time.

1008. The size of a tank makes no serious difference in the cost of construction? Oh! but it must.

1009. In what way? Because if you have a moderate-sized tank with a steep slope you must take out much of the stuff by dray work, and dray work is less economical than scoop work. Then all the bank cannot be used as a roadway, necessitating greater haulage of earth. These things make a difference, and the chief difference lies in the application of dray work rather than scoops.

1010. And this is caused by the steep batter? Yes; but cost depends much upon the soil. You may get a soil in which you cannot work scoops at all, or at great disadvantage.

1011. What was the highest price that you have known the Government to give for their tanks? I can answer that only from hearsay—only from report.

1012. Do you know what these tanks—the Warramurtoe and the Goomboolara—cost per cubic yard? No, I do not.

1013. *Chairman.*] Are you not aware that when a squatter's tank is finished he measures up the work and pays the money at once? Certainly.

1014. Are you aware that this is not the rule in the Government Departments? I have heard that there has been some delay.

1015. And if there has been a considerable delay, you can understand why the contractor would allow a margin for having his money so long outstanding? Yes; I can well understand that. The squatters make progress payments.

1016. Government do also, according to their contracts. Are there not circumstances where the Government find it necessary to sink a tank and have to give excessive prices, owing to the distance of the contractor's camp from the nearest water? Certainly; there may be.

1017. A squatter will scarcely go to the expense of making a tank 20 miles from water, but Government may be compelled to do so, which would enormously increase the cost of the work? I should say that to put a tank 20 miles from water would be to nearly double the cost of the tank.

1018. *Major Penrose.*] What price per cubic yard were you paying for excavation at the time these tanks were made? From 10d. to 1s. per cubic yard.

1019. And what depth were these tanks of yours? From 9 to 12 feet 6 inches. In the construction of a tank it makes an immense amount of difference where you put the stuff. If you carry the stuff a long distance from the batter, it may make a difference of 2d. or 3d. in the price of the tank. A high embankment, and other things, also make a vast amount of difference.

1020. *Chairman.*] Is there any lifting machinery at these two tanks with which you are acquainted? No.

1021. *Mr. Moore.*] With regard to these two tanks on the Paroo, which you have referred to, would it not cost a great deal more to make them at some considerable distance from water instead of at their present positions? I do not know any better position that they could be in. They are right on the road.

1022. And but for this water beside them they would have cost a great deal more money? Yes: and they were constructed each close to a public-house. Everything else being equal that was the place to put them at the time.

1023. Do you know of your own knowledge that there was a great amount of absorption from these tanks? Yes, I know that from my own knowledge.

1024. *Chairman.*] Are you not aware that in very dry weather sheep will go and drink in these tanks and swim about in them, carrying away an immense amount of water? Yes, they will do that.

1025. *Mr. Moore.*] Therefore, when mobs of sheep enter the water they will carry away large quantities of it in their fleeces? [No answer.]

1026. This system, which you think suitable in your own case and in the case of other squatters, of having open tanks, so that sheep can go into the water, could not be applied to public watering places, for the reason that sheep would carry out a large quantity of water in their wool, besides fouling the tank? I would answer the question in this way: If you must have tanks for public watering places, the proper way is to treat them in very much the same way as people of local experience manage their tanks—make sloping batters, and allow the stock, if necessary, to puddle the ground until it is sufficiently puddled. Then close the tank, and save as much water as possible.

1027. Of course, this has all been learned by experience, and could not have been known at the time the tanks were sunk? In all these tanks there has been a considerable amount of clay sediment; that is owing to the fact already stated,—that the Paroo water contains a large amount of clay in suspension, which, when the batters are steep, is more apt to settle on the small bottom of the tank, at the foot of the batters. I suppose that in each of these tanks there is about 3 or 4 feet of silt. This silting up must continue to occur, although more slowly, as the tank widens upwards; and I think that the loss at the bottom can be more than gained at the top by an arrangement to apply an engine and centrifugal pump to give more water at the top than is lost at the bottom; that is, in heavy rainfalls.

1028. *Major Penrose.*] Is there any machinery at these tanks? No; but no machinery, except such as I have stated, would be of use for this purpose. I do not think there is any machinery at any Government tanks that could fill the tanks above the gravitation level in reasonable time.

1029.

D. Brown. 2 Feb., 1888.

1029. *Chairman.*] You have just mentioned something about the stock not having watered at the main tank but at a smaller one;—how was that filled? From the main tank by a pipe. The two tanks are always kept at the same level.
1030. *Major Pearce.*] Then you think that the machinery at the Government tanks is not powerful enough? That depends entirely on what the machinery is required for. The ordinary machine is not powerful enough to pump into the tank the large quantity of water which is required to fill the tank above gravitation level, but quite powerful enough to supply water to stock outside.
1031. *Chairman.*] Are you aware that the Government have now given most of the tanks over in charge of caretakers, and that these caretakers have paddocks fenced in for their horses which they employ in lifting the water? There are also very strong fences put around the watering place to prevent stock breaking into the main tanks. None of these fences have come under my notice as having been badly constructed or constructed at an excessive cost. The two tanks on the Paroo are fenced with as good a fence as can be had in that part of the country where the timber is very small. At them there is no paddock fenced in for the caretaker; the only fence is that which is put around the tank itself.
1032. Are you aware that the cost of these fences erected by Government was very much in excess of the cost of similar fences put up by private individuals? I do not know what the cost is, but the length of fencing is so very small that I should say the cost should not amount to very much in any case.
1033. Being a small contract people would ask rather more for it than for a large one? Yes.
1034. Have you ever found that the superintendents of roads who looked after these tanks had made complaints of the caretakers? No; but while I was lessee of these tanks I used to have letters from the overseer or stock inspector, who drew my attention to anything that required to be done. So far as I was concerned there was never any undue interference.
1035. Have any wells been constructed on the Paroo by the Government in later years? No; but I know that wells have been put down at Mossgiel and Holy Box.
1036. What is your impression generally with regard to these wells,—were they properly put down? Some of them were; the Jumping Sand-hill well certainly was; and there is a Government well some seven or eight miles out from Mossgiel. I think they call it the Polygonum well; it was also properly put down. This is a capitally-made well, and was certainly very much required. The water, unfortunately, was very bad. In reference to the Holy Box well, I was there when a trial-shaft was put down in the first instance under the supervision of a man named Higman, or some name like that. This trial-shaft was supposed to have struck really good fresh water. Between the time when the trial-shaft was finished and the time when the main shaft was undertaken, I was at the well, and I saw the water at the bottom of the shaft. There was only a small quantity of water in it, and I was exceedingly anxious to know whether it was good or not, because at that time I was sinking a number of wells myself at the Mossgiel station, of which I was manager. I let down a billy or a tin and brought up some of the water to try it. Although the water was said to be very good in the trial-shaft, this water which was at the bottom of the shaft, seemed to me to be only good stock water. The supply was evidently very small, as there was only 6 inches at the bottom of the trial-shaft.
1037. *Mr. Moore.*] What was the depth then? I should say about 100 feet. It might have been anything to 110 feet. My impression at the time was that the trial-shaft had given a very unreliable result. The quantity appeared to be small, and the quality, so far as I could judge, good enough for sheep to live on; but not good enough to take on a first trial. I should have been inclined to have had another trial. From my knowledge of that country more than one trial-shaft is always necessary if you do not get a good result at the first; because only a few yards away from one shaft you may get a different result in another. My impression at the time was that this water was not good enough. I understood that the well was proceeded with and finished, but I have never had an opportunity of testing the water or the supply afterwards.
1038. Do you know anything about the matter by common report? I have had bad reports of it, and judging by these reports the water seems to be very much what I expected it would be by the tests that I made at the time that I took the sample from the trial-shaft.
1039. *Major Pearce.*] Have you any experience as to baling out wells to improve the quality of the water? Oh, yes. Do you mean continual baling? Under certain circumstances continual baling may improve the quality of the water. I can give you one or two instances in that neighbourhood.
1040. Then it is within your experience in that neighbourhood that continual baling has improved the quality of the water? Yes; water has improved when a well was in use; but I do not know that I am justified in stating it was continued baling that did it. Indeed, I am not sure that the effect was owing to the baling. In two instances water had improved after a good deal of baling; but I have reason for thinking that the effect was due to another cause. The position of the well was covered with a large amount of flood-water, and that flood-water in going down the shaft had some effect in throwing back the salt which causes the well to be salty. That is my opinion. The very effect that I speak of was apparently produced at the Mossgiel (south) well.
1041. *Mr. Moore.*] The water there was improved by baling? Well; that is the question. It was improved.
1042. *Major Pearce.*] Then the improvement that you speak of would not be a permanent one? Possibly it might. In this south well at Mossgiel the improvement was permanent. Previous to 1870, the south well at Mossgiel gave a full supply of water, but it was of very poor quality, and was all but useless to the stock. The well was covered with water by the overflow from the Willandra during the 1870 floods, and for a considerable time after the flood-water had receded the well-water was distinctly improved in quality, and has remained useful for stock ever since. I believe that it is also possible, by constant baling of a well, to exhaust the salt in the salt-bearing stratum which makes the water salt.
1043. *Chairman.*] Are you aware of the cost of this Holy Box well? I am not.
1044. What was the sinking? It was easy, and so far as the shaft was concerned, I could have had a similar well put down for 8s. or 10s. per foot. It depends on the depth.
1045. I am told the depth was 94 feet? I could have got it sunk and timbered for £1 per foot, and perhaps for less than that. The trial shaft should not have cost more than 10s. per foot. In this instance, timber would have cost a large sum in consequence of the great scarcity of wood in that neighbourhood.
1046. Do you think, even taking that into consideration, the well should have cost £12 per foot? No, I think it is an excessive price, unless the specifications were absurdly heavy and strong.

1047.

D. Brown. 2 Feb., 1898.

1047. Do you think it was wise to have erected a whim and trough, and so forth, before it was proved that the water was sufficiently good to be useful for stock? No, I think it was exceedingly unwise.
1048. Are you aware that the iron troughs have been destroyed by the action of the salt? I believe it quite possible, but I am not aware of it. If the iron troughs have been destroyed, from the salt water in that well, it must have been very much worse than the water in the Government Mossgiel well, which is too bad for travelling stock to use, although station sheep do so.
1049. *Major Penrose.*] Do you know whether this well is now in use or not? No, but I have heard drovers complain during the last few years that they could not get water there. I have heard that drovers have had to get water from the private tanks.
1050. *Mr. Woore.*] Have you been there since the well was completed? No, but I will say this, that if the water is more salty than the water in the Mossgiel well, machinery should not have been put down there.
1051. *Major Penrose.*] But here I find that in 1883 good water was obtained there? Well, I will give some information about that matter. With these salty wells, it is quite possible that in the shaft there may be some stratum which bears a small quantity of fresh water. That fresh water will float on the top of the salt water, and if you let down a bottle into the well, the bottle will fill from the thin layer of fresh water on the top, and consequently the water will appear to be very much better than it really is. And it is possible this may account for the fact that the first water struck in the trial-shaft, which, according to my judgment, was a very small quantity, was better than the water ultimately obtained in the main shaft.
1052. *Chairman.*] Have you ever known an instance where wells have been sunk and all the head gear supplied before the water was found? If a trial-shaft is sunk, the plan is to erect a whim to expedite the work of sinking the main shaft, the supposition being that the trial-shaft has proved the water to be sufficiently good in quality and sufficient in quantity for all the purposes desired.
1053. The whim would, of course, be put up by the contractors at the cost of the Government to carry on the contractor's work more expeditiously and cheaply? Exactly; as part of the contract.
1054. But have you ever known an instance where a well has been sunk and all the head gear erected without water having been found at all? He would be a very foolish man who would do such a thing in a country like that. No one who knew what he was about would do such a thing in that country, because of the great doubt as to the finding of water good enough.
1055. Now, it is a somewhat expensive system—that of trial-shafts—as compared with boring? A trial-shaft is better in my opinion where you only require to go down 90 or 100 feet; and for that depth is probably nearly as cheap as boring when no timber is required; because it can be done from 5s. to 7s. 6d. per foot. You see that the expense of bringing boring machines on the ground is very considerable.
1056. This is certainly a very material question, bearing as it does on the relative expense of the two methods. On the other hand, from your knowledge of the country you know you have to go a considerable depth before you can obtain water? Then boring is infinitely the cheapest plan.
1057. Are you aware that the Government have paid very much higher prices for sinking wells than private individuals? Their specifications are different from private specifications; and, therefore, I know that they must have given higher prices.
1058. Just tell us the reason why? Well, I think that their prices ought to be somewhat higher, because in most cases, particularly in the Mossgiel district, the timber they use (if I am not mistaken) is red gum, while private wells are put down with the local pine timber, which is lighter to carry, more easily worked, and sufficiently durable for all practical purposes.
1059. Is there any other reason? Well, the pine timber is brought from 30 to 40 miles distant, while the red gum timber has to be conveyed from Echuca, on the Murray river, a distance of 300 to 500 miles.
1060. But pine timber would not be good enough to use in a public work? I think it would; pine is practically everlasting underground.
1061. Do you know anything about the erection of huts for caretakers? No; nothing at all.
1062. *Major Penrose.*] Do you think there has been a waste of public money to any great extent on these watering places? Do you mean with regard to construction, supervision, or maintenance?
1063. Principally with regard to construction, but I would put it under all three heads? It has always been my impression that, considering the difference in quality, the prices which the Government have paid are excessive; and, if I may say so, not for this work alone, but for other public works—fencing, for instance.
1064. *Chairman.*] You have already given some reasons—do you think these are sufficient to warrant the high prices paid? I think there is one reason which has not been given, but which is still very important. I know that contractors tendering for Government work put their prices on a distinctly higher scale than for private work; and, as in that far-out country, the contractors who are able to undertake such a work are few, they know that they have a good thing in their own hands; and I have very little doubt they have sense enough to arrange that whichever man gets the contract gets a very good thing.
1065. *Mr. Woore.*] Is some sort of a "ring" formed between them? No doubt; there may be. There are only a few men who can take this work, and they may keep matters in their own hands.
1066. *Chairman.*] Now, I am going to ask you a general question. You have already learned from what I have stated that there is a good deal of friction between the two Departments—the Mines and the Works—and that charges and counter-charges have been made against the officers of both Departments. For instance, a superintendent of roads, under whom the tanks are during construction, reports what he believes to be a great want of care on the part of the caretakers. He finds fault, sends down reports to his chief that works constructed by the country at great cost, are being destroyed by want of care. The caretakers, on the other hand (who are appointed by the Mines Department), resent this interference; and hence friction arises. Now, do you not think it is very desirable that the whole maintenance of wells and their construction should remain in the hands of one Department? Will you tell me, does maintenance include repairs?
1067. As far as we know, maintenance should include minor and trifling repairs? There could be no objection to one Department constructing the works if, on their completion, the works were wholly handed over to another Department. But if, while the works were under the control of one Department in the matter of supervision, the matter of maintenance is handed over to another Department, there must be friction. It seems to me clear that all three—construction, supervision, and maintenance—

should

should be under one Department: or if that is too much for one Department, then that one should have the construction, while the other should have everything else—supervision and maintenance—handed over to it. D. Brown. 2 Feb., 1888.

1069. Now, do you not think that this also would lead to friction. The parties taking over these works might say that they were badly constructed, and insist that they were put to extra expense in keeping them;—would not that occur? Well, I am not sure that that would be altogether a disadvantage, because it might be so, and the parties constructing might not care to acknowledge an error of construction.

1070. Do you not think that it would lead to a further expenditure of public money? I am looking at it from the point of public utility. If it made it too cumbrous for one Department to have the construction with the supervision and maintenance, then the construction could be given to one Department and the supervision and maintenance to another.

1070. At the present time small repairs to the extent of £10 may be entered into by the Mines, but if any more serious repairs are required they have to go back again to the Works Department. The consequence is, that one finds fault with the work of the other and reports unfavourably of the repairs? That is an absurd system, undoubtedly.

1071. *Major Penrose.*] What can you build a small hut for—such as caretakers live in? That varies very much according to the specifications. If you are going to put an iron roof on the hut, it will probably cost you from £35 to £50, and then it depends upon a variety of other circumstances.

1072. *Mr. Moore.*] What would be the cost of such huts as are put up for caretakers? Well, I can get them put up, apart from material, for about £10 to £20.

1073. What is the cost—material and all? From £40 to £65—that is, for a hut such as men generally live in in that part of the country. Now with regard to these two tanks, I do not know of my own knowledge the manner in which they were leased. Before I was asked to take over the leases a man got so much a year for leasing them. There was no revenue from them at all till I took them over. It could not have been more than a few pounds during two or three years; so, to save the Government expense, I offered to lease the tanks for £1 per year. At the end of that time another arrangement was made, and since then I have been generally looking after the tanks.

1074. But do you not think the tanks of sufficient importance to warrant a caretaker being kept there? Well, I am sure that, so far as revenue is concerned, it would not pay.

1075. Do you know anything about the tanks around Cobar? I have been along the Cobar road, and I know the tank near Matherson's place. They seem to be all useful tanks, with the exception of Kerrigundi. There is not a sufficiently good catchment there. That was the impression I carried away after having seen it during very good years. I have not seen it since 1875. It is near Mulya. One of these tanks struck me as being of very doubtful character.

1076. Was there a better catchment somewhere else? No; I do not say that. I do not know the road sufficiently, nor whether a tank is required in that place or not.

1077. Have you any knowledge concerning the soil about there;—is it better than that on the Paroo? I should rather think it was better, and that it would stand a much steeper slope.

1078. Have you seen much of these tanks generally? I have passed there about ten or twelve times.

1079. Did it ever strike you that there was a waste of public money there? No; because I do not know how much money was spent there.

1080. But you would not place all the tanks where they are? Certainly not.

1081. Yet all the tanks that you observed you considered necessary? Yes, I think so; if the positions are good.

1082. *Chairman.*] Do you know anything about the tanks on the road from Bourke to Wanaaring? I know that the Kulkine tank was a good one. That road requires watering very badly, and it has required it for a very long time. An immense amount of money has been spent on boring, with little result. The machines that they are boring with there are absurd. These people will not take the result of private experience; but they go on, and make all the mistakes that I and others did. They bore with tools utterly inefficient for great depths—such as Wright & Edward's auger and the Tiffin. These are the two instruments that they have been boring with. For considerable depth, in my opinion, neither Wright & Edward's auger or the Tiffin auger are sufficiently good instruments. They are both admirable for shallow depths, up to (say) 300 feet; but when you get beyond that, something in the shape of the Pennsylvania oil drill is absolutely necessary. In any case where I had to go down 400 or 500 feet or more, I should use one of these instruments.

1083. Has the diamond drill been tried up there? No; not in our immediate neighbourhood.

1084. But has it been successful where it has been tried? Yes; where it is applied to boring through dense stuff or rock. Boring up in that country seems to be nearly a matter of certainty. Almost invariably, after going through a certain amount of alluvial, you reach a blue-coloured clay, and in or under that clay you are certain to get fresh water, if you only go deep enough. The shallowest water got in this stratum that I know of, was obtained at 500 feet, while the deepest was close on 1,200 feet.

1085. How high does this water flow through the bore? In some cases the water rises near the surface, and in other cases it flows in a fairly strong stream. I know of no case where a sufficient supply of water has not been got where the water is struck in the stratum, if it can be pumped from a depth of 100 to 200 feet. The weakest bore that I know of gives about 10,000 gallons per day in that manner, raised from 100 feet.

1086. Is it always good water? Always good for stock, but not always quite fresh. Most of it that I know would be useless for irrigation. Now, I believe that blue clay to be all over the country, and anyone who sinks in or under that clay will get good water.

1087. *Mr. Moore.*] That would apparently be the best means of providing water for that particular country. Of course you were only speaking of that part of the country of which you have acquaintance—that along the Paroo? Well, this formation appears to extend from Kallara to Thurlgoona, and from Kallara up to Queensland. At Barcaldine it appears to be similar, and with some slight exceptions, you have apparently the same conditions over a very large area.

1088. Have you any experience of these borings south of the Darling? No; although I know the blue clay exists between the Darling and Willandra, and that good water is always obtainable, and sometimes without going into the clay at all. At Mossgiel we used to get a large supply of very good water after about 40 to 80 feet sinking through the blue clay.

D. Brown. 2 Feb., 1888.

1089. Now, as far as your experience goes with these borings, do you think that the expense of maintenance (provided that you get a supply of good water by boring) would be very much less than the expense of getting it in these tanks? Infinitely less.
1090. So that it would be cheaper in the end to supply these stock routes along the Paroo and south of the Darling by bores? It certainly would, on condition that you expect to get the same invariable result down there that has been got further north. I think it would be worth trying.
1091. And also there would be no reason to doubt the permanency of the water? No reason at all. There is not one tank in the north-western country that is permanent—no mere surface water can be considered permanent for a three years' drought. The only objection that I see to boring is the length of time that would elapse before you could get the machinery, which would have to be worked by steam, and which is rather expensive. Of course, as the country becomes stocked the demands on the routes will be increased, and this is a question which might be fairly considered, as to whether some better system of supply to stock routes might not be adopted. If, by means of these bores, a permanent supply can be obtained, and the expense of maintaining the places made very much less, then the system is assuredly worth a trial.
1092. Do you know of any person who has had any experience in putting down bores? Yes; I have always done the work myself, and always tried to get information from those who had similar work in hand.
1093. But do you know anyone who has had a great experience in this particular kind of work? I do not know one who has put down as many bores as I have myself.
1094. Yes; I know you sunk some immediately after you went up there? Yes; but I then bored with Wright & Edward's tools. I have now, for the last two years, used the Pennsylvania rock drill, and have been trying to work it on the rope system. The other arrangement was unsatisfactory, because the drill sometimes lost its perpendicularity; and I am now going to adopt what is known as the Canadian system of (I think) wooden rods in place of rope.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

John Low called in and examined:—

J. Low. 2 Feb., 1888

1095. *Chairman.*] What are you, Mr. Low? I am an inspector of public watering places. I have a report here concerning the works which I have personally inspected as an inspector of the Mines Department.
1096. Well, we will receive the report and make notes as you go along? This report is written in reply to Mr. Gilliat's memorandum:—

Broken Hill, 7 January, 1888.

Sir,

Referring to R.C. documents, 21/11/87, as to what matters, re objections to works by Mines Department herewith returned, I have the honor to report that the following have been personally inspected by me:—

NARRANDERA DISTRICT.

Fencing here was let by Works Department at the time of my inspection, posts 9 inches x 3 inches, 7 feet 6 inches in ground, which gauge appears to me to be correct. To this opinion I am borne out by Mr. Cooper, station manager, Quandialla, who also inspected posts which at the time were being split. I read specifications and contract, which was £790 for 1,140 chains. Contractor Hackett also showed me a contract where he sublet splitting, erecting, boring, and wiring, at £16 10s. per mile.

This style of fencing will not bear comparison with the fence on Bingagong reserve in same district, erected by Mr. Angus Robertson, Yarraba Park, for which he claimed for material and erection at the rate of £34 per mile. See Public Watering Places, 87-1,967, 6/5/87.

Pullatop Tank.

Drains.—These have have a much too sudden fall, causing water to run too rapidly, cut up drain, thereby carrying silt into silt tank. A drain here with a much more gradual fall could easily have been excavated, embracing the present catchment area.

Water-lifting appliances.—These are placed in the most unsuitable site—dangerous position—being in the lowest ground, and liable in heavy rains to be damaged by water running on and around them, and undermining foundations. No by-wash has been excavated here, and no provision made to protect these appliances, &c.

Embankments.—These have been erected with no regard to being level; in fact are at the corner opposite water-lifting appliances, lowest being 2 feet 7 inches lower than middle of embankments, thus further endangering water-lifting appliances.

Mount Elliot Tank.

Drains.—These have been constructed evidently with little or no idea of what is required of a drain. These drains have been excavated down face of hill, and, although my inspection was immediately after heavy rains, I could discover no trace of water having run in these—not water-wash. Had one of these drains been extended about half a mile, it would have caught the water in a good natural watercourse, which in any ordinary season would be quite equal to filling this tank, thereby saving the outlay incurred for what is and will remain useless.

Holmes Tank.

Drains.—One is here so constructed as to run water from instead of to main tank. This showed plainly at the time of my inspection, owing to water lying in different parts of drain, which had been banked up to prevent water running from main tank. Were this drain opened up and main tank full, I feel confident it would run quite 1 foot of water out.

ALBURY DISTRICT.

Walla Walla Tank.

Main tank.—This is reported to be over 12,000 cubic yards, which, in my opinion, in a district with a rainfall such as this, is about twice the required size. I made every possible inquiry while in this district, and although I met Mr. Douglas (Walla Walla Station) and Mr. Simpson (Burrumbattock Station), two large landholders, who have excavations never known to be dry, I could hear of no excavation equal or approaching in size to this. There is here a large natural basin, which at my inspection was full, and will be equal to all the requirements of this road and district for the next two years. In this opinion I am borne out by Mr. Douglas, of Walla Walla Station.

Water-lifting appliances.—These are so situated as to be liable to be washed away. At my inspection I could see traces of heavy streams of water having run round these and underneath troughing.

Embankments.—These are so erected as to allow overflow of water to run upon troughing and water-lifting appliances, hereby endangering foundations. This could have been easily avoided.

Hewitt's Dam.

By-wash.—103 yards long, 43 feet wide, 10 feet to 6 deep, cut through solid rock, when a good natural by-wash was available at opposite side of creek, and which natural by-wash is of sufficient width to allow water to spread, thus minimising the possibility of its cutting away; but even assuming it had cut into ground, which I consider most unlikely, this

this could have been logged or pitched if considered requisite, I feel certain, at a quarter the cost of present by-wash. At the time of my inspection of this, stock were allowed access to water; but I have good reason to believe water-lifting appliances were proposed to be erected by Works Department, at a cost of £373 7s. 4d., to which must be added cost of buckle-plate, supply tank, and carriage from Sydney—£350; in all, £725 7s. 4d. J. Low. 2 Feb., 1899.

HAY DISTRICT.

Tom's Lake Tank.

Main tank is here excavated in a rotten, boggy swamp, a place which was well-known to all travellers on that road as a spot to be avoided after rain, owing to its boggy nature. Had this tank been excavated about three-quarters of a mile northerly of its present site, it would have been on much better holding ground, and on ground naturally less liable to cut up, which, in fact, is an old natural watercourse into swamp, which has cut up little if any. Mr. Overseer Keighran, of Hay, has for many years known this place, and fully bears me out in my remarks.

Drains.—These are badly constructed, especially one alongside of road, which, for some distance from its commencement, runs water from instead of to main tank. This drain crosses main road almost in front of main tank, having a direct and sudden fall into same, without the waters, as is usual, passing through a silt-tank. Owing to no silt-tank being here and the drain being much cut up both by traffic and nature of ground, much silt must have been carried into main tank, which I feel confident is quite half silted up. This drain could easily and practically have been led to opposite end of tank when water could have run through swamp and silt-tank, thus allowing silt to settle and not be carried into main tank.

Jumping Sandhill Well.

Water.—This water is, in my opinion, not even good stock water. I have on several occasions seen horses taken to it, which, although thirsty, would not drink. It is undoubtedly unfit for human consumption. About a mile northerly of this a good site for a tank could easily have been obtained, which, in my opinion, would have been much more suitable for the traffic; and in this opinion I am borne out by old settlers in this district, such as Mr. Laird, Moonjel.

Polygonum Hut Well.

Water.—This water is quite unfit for human consumption. No better site for a tank could be desired than what is close to this, which, in my opinion, would have been much more suitable for the traffic, and less expensive either in cost of erection or keeping in repair. The fact that during this summer this swamp has held sufficient water to water all stock travelling, is sufficient evidence of its natural qualities and holding capacity of ground.

Water-lifting appliances.—The mode of lifting water here by windmills is expensive in the first instance, and condemns itself so far as use is concerned, as it is continually getting out of repair, and has not, since August—although it is allowed by Mr. Overseer Knighran to have worked more regularly since that date than it had done previously—done more than fill and keep full supply tank. No water during that period has been sold. Sufficient water for requirements could easily be drawn by a single whip, erection of which would not exceed £5.

IVANHOE DISTRICT.

Moonjel Tank.

Fencing.—I have been unable to discover cost of fencing this tenant's lease. Mr. Laird, who knows fence well, values it at £35 per mile, comparing it with the prices he has been and is now paying for fencing. Lawrence Farrell, late contractor, now caretaker, Moonjel tank, knows country well, and would be at any times, if contracting, willing to erect fence equal to this at £26 per mile, were wire put on him.

Excavation.—Original contract reported to be 1s. 3d. per cubic yard. Mr. Laird, Moonjel, is now and has been getting tanks 13 feet deep excavated at 8d. per cubic yard, and strongly advocates 3 or 4 to 1 slopes.

Holy Dog Well.

Water.—The water here cannot be reckoned even stock water, and is perfectly useless for human consumption, thus unsuitable for the traffic. The troughing here has been renewed owing to being worn out or corroded by the water. Much salt can at any time be gathered about this troughing. Mr. Webb, Killara, knows this public watering place well. He would not water stock at it, owing to quality of water. He considers it quite unsuitable for the requirements of the traffic. He has lost sheep at it, and has repeatedly advised drovers not to water their stock at this well, as they would certainly lose some. Mr. Laird, Moonjel, knows this public watering place well; would not water stock at it, owing to quality of water; has heard drovers often say they would not water stock at it, owing to quality of water. A good site for a tank could easily have been got within a short distance of this, which, in my opinion, as also in the opinion of Messrs. Webb, Killara; Laird, Moonjel, and any adjacent station-owners I have met, have been equal to all requirements, and much more suitable for traffic.

Runners.—The runners in this well are fixed in a manner new to me, although I have had considerable experience in this style of work, being fastened by screws, and in most cases only a shell of runner left after place is cut out sufficient to allow head of screw being turned round. This shell has in many cases worn out, leaving a face for the bucket to catch on, which is most dangerous, and liable to cause an accident. None of the well at bottom has, so far as I could discover, never had runners, thereby allowing buckets to get off and being blocked under water, as has already been done to my knowledge.

Ivanhoe Tank.

Main tank.—The batters here are so steep that ground from underneath shoot to a depth of 2 feet has been washed away, thereby endangering shoot. Excavation here is reported to have cost in first instance 1s. 4d. or 1s. 5d. per cubic yard. Mr. Brougham, Tooburst, had tank excavated by Lawrence Farrell at same time, 15 feet deep, at 11d. per cubic yard, embankments 36 feet from and on four sides of excavation. Contractor, it is reported, and I have reason to believe, claimed and received a large amount over his contract price.

Batters.—These are much too steep, water-washed, and cut away, causing ground to sink to bottom of tank, thus bringing it quite as shallow as Tooburst tank.

Drains.—These are badly constructed, evidently with no intention of leading water to main tank, much of them running from instead of to main tank. Two of these drain water from the township, the other runs parallel to main road, overflows silt tank and fills a private tank belonging to Elliott, which water is afterwards sold to the public. This could easily have been avoided by taking drain to opposite end of main tank, as is now being done by caretaker. These were excavated by Lawrence Farrell at 18s. per chain, dimensions being 9 feet x 1 foot. At same time he was excavating drains for Mr. Brougham, Tooburst, 9 feet x 6 inches, at 3s. 6d. per chain, and which, in my opinion, owing to nature of ground, would serve the purpose equally well. Mr. Road Superintendent Hanna is now getting drains excavated at Broken Hill, where labour is much dearer than at Ivanhoe, quite equal to Ivanhoe drains, at 4s. 5d. per chain. In the Albert district I have had plenty of drains of this size—9 feet x 1 foot—excavated at 4s. and 4s. 6d. per chain.

Fencing.—This was originally let to one Bevan; I am informed by Mr. George Williamson, J.P., Ivanhoe, and Mr. Brougham, Tooburst, at £110 or £120 per mile, who sublet it to Elliott, who afterwards sublet to Anderson (my informant) at the following:—30s. per 100 posts splitting; 100s. per 100 posts carting; £18 per mile erecting and wiring. The panels are supposed to be 10 feet, which would allow of the following:—

	£	s.	d.
520 posts, splitting, at 30s.	7	10	0
520 posts carting, at 100s.	26	10	0
Erecting, per mile	18	0	0
Wire	30	0	0
	£82	0	0

The allowance for wire is ample, thus leaving a profit from first contract price of at least £33 11s. per mile. This has no straining-posts, the wire being strained as it runs out. The posts are of split pine, unequal to the strain; in many cases are splitting and drawn over. This description of fencing is new to me, and I unhesitatingly condemn same. In this opinion I am borne out by Messrs. Webb, Killara, Brougham, Tooburst, and Laird, Moonjel, all of whom have had much experience in fencing-timber in this particular district, and neither of whom would erect a fence without straining-posts. I have now a tender for erecting at Ivanhoe a fence of same gauge and style of wire with proper straining-posts, at £70 per mile, although it is a small job, in which case a much higher rate is always allowed.

Inlet

J. Low. 2 Feb., 1898.

Inlet or flume.—The covering of inlet or flume consists of leopard wood—a timber notably known to rot quickly, and which no one having the slightest knowledge of would use for such purpose.

Gates.—12-feet swing, have recently been erected by Bevan, who originally contracted for erection of fence, whose men state he is getting £15 per gate.

Engine-shed.—This was erected by C. Anderson, resident in Ivanhoe, in four days, for which he got from Works Department £10 for labour alone, material being prepared and put on ground by Works Department.

Clare Tank.

Main tank.—This is in middle of a swamp, and at my inspection was surrounded by water.

Embankments.—Are here, owing to being surrounded by water, much cut away, and before many years will be level with the ground, judging from how they have washed since erection, and are so erected as to bank water across Ashaims road, which water has supplied the public free of cost until lately.

Water-lifting appliances.—These are so situated that at the time of my inspection the troughing was at least 9 inches under water, and the pillars carrying supply-tank were also under water, thereby endangering foundations of same. This could easily have been avoided by having supply tank about 3 chains north of present site, which is above water-mark.

Fencing.—This, for over a year, has been in course of erection by Mr. F. Casey, under contract with Works Department, and is still unfinished.

Causeway Tank.

Main tank.—This has been excavated in rotten copai ground, which, owing to steepness of batters, has fallen in to a very large extent. A good site for a tank could easily have been secured near to this.

Drains.—These are here badly laid out, and the system of leading water round excavation inside of embankments, in ground such as this, must lead to damage and washing in of batters.

Willandra Well.

Shaft.—For some years well-sinkers have been at work trying to sink this well. It has now been abandoned and a new shaft commenced.

Water.—Well-water in this locality is not even good stock water, and certainly none fit for human consumption. Mr. Webb, of Kilfera, upon whose property this proposed well is, informs me he has abandoned most of his wells—in fact all where he could get suitable sites for tanks; and near to this proposed well a splendid site for a tank could be got. A tank of 12,000 yards would be quite equal to the requirements of this road, and would perhaps have cost much less than what has already been expended upon what is looked upon by every practical man in the district, even were a good supply of water got, as being a useless piece of work, and at which stock are very unlikely to drink.

Well-sinking.—Well-sinking in this locality is paid for by station owners at the following—20s. per foot for the first 100 feet, 40s. per foot afterwards, owners finding material. Red gum could be delivered at this well at 40s. per 100 superficial feet.

Head Works.—

	£	s.	d.
Whim, round timber, and labour	30	0	0
Sawn timber	10	0	0
Mountings	12	0	0
Carriage and tar	10	0	0
	£62	0	0

Boonoona Tank.

Fencing.—None of this required to be carted more than 4 miles, as there is plenty bullah within that distance. Was erected by Bevan at £120 per mile. The erection of this fence, in comparison with prices paid by station owners in this district, I consider to be worth not more than £30 per mile exclusive of wire; and in this opinion I am borne out by Mr. Webb, Kilfera, who has had much fencing done in this locality, and who, after inspecting this fence, values it at £30 per mile exclusive of wire. Mr. Webb, Kilfera, in 1893, when feed was scarce and water had to be carted at least 8 miles, had tank-sinking done of the following description and rates:—Excavation 15 feet 6 inches deep, embankments four miles of and 22 yards from excavation, at 11½d. per cubic yard, and these tanks have never during the late dry season been dry, although stock have been regularly watering at them. Mr. Webb has all his tanks excavated with 3 and 4 to 1 slopes, considering them preferable to steeper slopes and less liable to water-wash. He approves of water being pumped out and stock watered at troughing, but considers the present water-lifting appliances extravagant in the extreme, and feels certain that a 2½-inch McCrossan water-lifter, worked by hand power, would meet all requirements, would cost less for erection, would be less liable to get out of order, consequently would cost less to keep in repair.

Gates.—These are here being erected by Bevan (originally contractor for fence), 12 feet swing, at £15 per gate, as reported by his employés.

Mount Manara Tank.

Main Tank.—This was in the first instance contracted for by Mr. John Hay, station owner, Mount Manara, at 1s. 4½d. per cubic yard, who afterwards sublet to Fred. Hardie, who did work at 1s. per cubic yard. This, Hardie informed me himself.

Engine-shed.—This was erected by C. Anderson, who was working in the neighbourhood, in four days, for which he got from Works Department £10 for labour alone, material being put on ground by Works Department.

Fencing.—This was erected by Bevan at £120 per mile; has no straining posts, which cannot be too strongly condemned; is about half split, the balance being round saplings (pine), the latter being in my opinion most objectionable and not lasting. None of this timber required to be carted more than 4 miles, which must have left a profit of over £40 per mile.

Gates.—These are being erected by Bevan, original contractor for fencing of tenant's lease, being 10 feet and 12 feet swing, at £15 per gate, as reported by Bevan's employés.

RALRANALD DISTRICT.

Dolgorey Well.

Water.—This is bad stock water, and quite unfit for human consumption, consequently unsuitable for the traffic. A good site for a tank could have been got here, and an excavation of 12,000 yards would have been quite equal to the requirements of this road, which I venture to say would have been much more suitable. The station holders in this district, after years of experience, are abandoning wells and excavating tanks as being more suitable for stock. Messrs. Waugh, of Clare, and Webb, Kilfera, who are large land holders, strongly condemn wells in this district. Few if any stock will ever water at this well, and teamsters complain to me about the quality of the water, and state their stock will not take a good drink of it, even although very thirsty.

Shaft.—This I was unable to examine. A bucket was lost in shaft on 22nd May, and some of the runners broken, although the Works Department mechanic had been there on 20th June to repair same. Up to date of my inspections, 6th September and 3rd October, the bucket had not been repaired nor rope put on whim, and it was only on 30th October caretaker notified me he had received rope a few days before writing, thus taking five months to execute repairs any ordinary man could have done in a fortnight at most.

Box Creek Tank and Dam.

Main Tank.—One embankment here forming a dam would have been quite sufficient for requirements, instead of the large outlay for tank and dam. In this opinion I am borne out by Mr. Lindsay, Manager Tit Tit Station.

Embankements.—The embankments around excavation are of no practical use, and must have increased cost of tank considerably.

Site.—The site would have been a more favourable one and more water conserved had a simple dam been constructed down the creek about three-quarters of a mile—near to "Thompson's Hotel."

New

New Works 16 *miles from Balranald.*

J. Low. 2 Feb., 1868.

Main tank.—This excavation, at my inspection, was almost completed.

Site.—The site is certainly not a good one. A much better one could have been procured within half-a-mile. The present excavation will require a large outlay for drains, if even by these it can be filled with a fair rain.

Drains.—There were 30 chains, 6 feet x 9 inches, excavated here. Although there had been heavy rains shortly before my inspection, these had run no water into silt tank—in fact, they never will, as both drains, in some places, were full of water, but quite dry near the tank, thus showing they would run water from instead of to main tank. Contractor informed me that he was getting 6s. 6d. per chain for these drains, which is quite 2s. per chain more than the work is worth, more especially as the contractor was doing the work when he was, from rain, unable to work in tank, and not as if he was losing time going to and from a small job.

WILCANNIA DISTRICT.

12-Mile Tank.

Main tank.—This excavation, Mr. George Williamson, Ivanhoe, informs me, was in first instance contracted for by Burton Brothers at 9s. 6d. per cubic yard, who afterwards sublet to Ford Brothers at 1s. 3d. per cubic yard, who performed work and made money at it. I have since seen Mr. Burton, who says 1s 9d. was the original price, but admits 1s. 3d. was the rate they sublet at.

28-Mile Tank.

Fencing.—This is of good ballah posts. Works' caretaker informed me cost £96 per mile. No timber had to be carted 5 miles, and contractor averaged two loads per day. He sublet at the following rates: 20s. per 100 posts, splitting; 40s. per 100 posts, erecting; 40s. per 100 posts, boring—which rates would allow of a large profit. This contractor contracted for 12-Mile, 28-Mile, and 46-Mile tenant's lease fencing.

35-Mile Tank.

Fencing.—This is of mealga. Caretaker informed was contracted for at £95 per mile. No timber had to be carted for more than 4 miles. Contractor averaged three loads in two days.

Engine-shed.—This is of corrugated iron, 12 x 12 x 8. Caretaker informs me Davidson was contractor at £30 for material and labour. This is in low ground, and floor of same has been under water.

48-Mile Tank.

Fencing.—This is of split ballah. Contractor informs me he is getting £93 per mile for this, and had not to cart any posts 5 miles.

SILVERTON DISTRICT.

Barbate Tank.

Main tank.—I have been unable to discover price paid for this excavation; but contractor was fined a heavy penalty for non-completion, it is publicly reported.

Embankments.—These have never been level. One on lowest ground, and which banks backwater, shows signs of water-wash within 3 inches of top, which, in a district liable to sudden heavy rains like this, I consider too low, and ought to have been at least 2 feet 6 inches higher to ensure safety.

Thackeringa Tank.

Main tank.—Mr. Davidson, Manager, Thackeringa Station, informed me contractor got 1s. 6d. per cubic yard for excavating this.

Day Dream Tank.

Main tank.—Mr. C. Webster, "Day Dream Hotel," informed me contractor told him excavation averaged 11 feet in depth, was stony in bottom, and that he (contractor) got 1s. 6d. per cubic yard for excavation.

Fencing.—The fence enclosing tank does not extend sufficiently far along creek to protect water from pollution, of which the residents loudly complain.

Parnamoota Tank.

Main tank.—Messrs. Davidson & Gibson, Parnamoota, informed me that they measured this excavation before water got in; that it did not average more than 9 feet 10 inches in depth; that contractor informed them he was paid at the rate of 1s. 1d. per cubic yard.

Broken Hill Tank.

Main tank.—This, at time of my inspection, was unfinished. Contractor informed the area of excavation was to be 76 yards x 70 yards x 6 yards, 2 to 1 slopes, and that his contract price was at the rate of 1s. 1d. per cubic yard.

Silt-tank.—Contractor informed was 30 yards x 30 yards x 3 yards, and that his contract price was at the rate of 1s. 1d. per cubic yard. Mr. Armstrong, of Barta Station, informed me that he has had several tanks excavated to a depth of 12 feet at 8d. per cubic yard. Mr. Binnie, Manager of Mundi Mundi Station, informed me he is now getting tanks excavated to a depth of 16 feet at 8d. per cubic yard. Both these properties are in this district—in fact, the stations nearest to most of the public watering places. I may here add, both these gentlemen are much averse to batters such as 1½ to 1, and prefer 3 or 4 to 1 slopes.

I have had considerable experience in tank-sinking in the Albert district, and had tanks excavated at 10d. per cubic yard for 12 feet in depth; had the embankments finished much better than any Government work I have seen. This was done at a time when labour was much dearer than it is now, or has been lately—when water had to be carted in some instances 8 miles, and where feed was scarce, so much so, that bullocks had to travel 5 miles to feed and water.

Slopes of excavations of Government tanks—1½ to 1—are in all cases much too steep. All batters of excavations that I have seen are much water-washed, which, of course, must sink to bottom, and tend to silt up tank. I am of opinion that anything steeper than 2 to 1 is too steep—in fact, many of the station-holders that I have met and conversed with on this subject prefer to have the slopes 4 to 1.

The uprights of flowing down batters in Ivanhoe tank have had quite 2 feet of ground water-washed from them, owing to batters being so steep.

I have never seen station tanks with a 2 to 1 slope, or more water-wash, nor so cut up in batters as I have seen in tanks at public watering places; so that if any extra price is allowed for excavating owing to steep batters, beyond first appearance it is a great disadvantage, and all practical men I have met with agree with me.

Embankments have in no case I have seen been erected with a view to conserving water inside and by them, as is usually done with amphitheatre tanks, not one of them being finished with the slightest pretension to being level on top—in fact, any that I have levelled are lowest on the low ground, where, were they filled with water, the great weight would be, and consequently most danger of breaking away.

I cannot too strongly express my opinion in favour of watering stock by troughing when the troughing is so placed that all stock can conveniently drink at it. I have had years of experience in a dry climate, and can confidently assert stock do much better when not allowed to get into water; the water lasts much longer—a most desirable object to keep in view; is saved from pollution—a matter to be studied where the water is much required for human consumption, as it is at all public watering places; but I do consider the appliances for raising water from tanks, either by steam or horse power, are much too expensive in first instance, and entail a much too large outlay for working and keeping in repair. One man, with a 2½ inch McConnan water-lifter, can easily draw sufficient water for 10,000 sheep daily, which is much in excess of the average quantity consumed at any public watering place. Mr. Waugh, of Clare Station, has several of these water-lifters, worked by one man, watering that number of sheep all summer, drawing water for 15 feet, and without having the large supply tanks that are at all public watering places.

I have also to bring under your notice the fact that caretakers at Mossgiel, Boonoona, and Mount Manara tanks have reported to me, when asked why they had not performed certain duties, that Mr. Road-Superintendent Stilwell had interfered with them in the performance of their duties as caretakers—in the former case, ordering caretaker not to tar or interfere with slip-rails of tenant's lease fence, in the two latter cases ordering caretakers not to clean out silt tanks; and I have further to report that station owners in public watering place district of Ivanhoe complain to me much of the high prices paid for Government work, such as fencing and tank-sinking; that contractors taking work from them quote Government prices in comparison to the prices offered and paid by station-holders for similar work.

J

J. Low. 2 Feb., 1888.

I beg to enclose letter, dated 29/1/88, from Mr. Parsons, Mourgial Station, re public watering places, which, on perusal, will be found to compare favourably with my report, and with which I entirely agree, with the exception that caretaker's time can be fully occupied if works under his charge are kept in proper order; also, that no case of caretaker's selling grog has been heard of by or reported to me in district under my charge.

I have heard of one caretaker having been reported for such, but he was instantly discharged, and matter placed in hands of police.

I would beg to refer to Messrs. Lindsay, Till Till Station and Waugh, Clare, re prices for fencing and tank-sinking, Balranald district.

I have, &c.,
JOHN LOW,
Inspector, Public Watering Places.

The Chief Inspector, Public Watering Places, Sydney.

In addition, I would add that in the Albert district I had the following works performed as per rates and dates:—1881—3 October: Tank-sinking, 16 feet deep, at 1s. 1d. per cubic yard. 1882—2 December: Drains, 6 feet on top, 4 feet 6 inches in bottom, 1 foot deep, at 3s. per chain. 1883—10 January: Tank deepened from 7 feet 8 inches to 13 feet, at 1s. 3d. 3 May: Tank-sinking, 12 feet 2 inches deep, at 9d. per cubic yard. 7 August: Tank-sinking, 13 feet deep, at 10d. per cubic yard. 1886—25 August: Tank-sinking, 12 feet 6 inches deep, at 10d. per cubic yard. Drains, 6 x 1 foot, at 3s. per chain. And I have further to state that I have known, in 1875, of wells being sunk, timbered, guides fixed, and whim erected for £100 for labour alone, depth of well being from 20 to 25 feet.—John Low, Inspector, Public Watering Places, 1/2/88.

1097. *Chairman.*] What is your district? My district extends from Tom's Lake tank around to Ivanhoe; thence to Balranald; thence to Wilcannia; thence to Silverton; and thence to Lower Darling. I also take in Mount Brown and the Paroo.

1098. We will begin with the selection of improper sites for tanks;—you state in your report that the Clare tank was excavated in a swamp? Yes.

1099. Of course it was dry land when it was excavated? I cannot say that.

1100. What objection is there to a tank in a swamp? Because, if the swamp is rotten it will let the water run away before it gets near the tank; and in the second place, it is so boggy that stock cannot get near it.

1101. You also mention that being in a swamp the supply tank is liable to have all the foundations flooded? In this particular instance the supply tank was liable to have all its foundations destroyed.

1102. Would the person who chose such a site do so had he any means of knowing that it was a swamp? Well, common sense should have told him that it was.

1103. *Mr. Weare.*] What sort of a swamp is this;—has it a hard bottom? It was all covered with water, and I cannot say. I tried to get into it on horseback, and then made an attempt to get into it on foot, and could not. It was too boggy.

1104. Was it a black-soil swamp? Yes.

1105. *Chairman.*] You say that there is another site about half a mile away that would have been a better place for the Tom's Lake tank? Yes; and Tom's Lake tank was in a spot that any one could have seen was a bad place.

1106. *Mr. Weare.*] Is there a better place for this tank near the swamp where the tank is situated? Yes; there is a better site within 300 yards of it. It is good, hard, holding ground.

1107. But still it would be in the swamp? On the side of the swamp. Now no one who knows anything about tank-sinking would think of putting a tank in a swamp. The better site for the tank that I refer to is near the swamp—on the side of it.

1108. *Chairman.*] And that would have been firm ground? Good hard ground.

1109. *Mr. Weare.*] What sort of ground is it? Good strong clay, with plenty of clay-pans about.

1110. You said something about the water-lifting appliances at this Clare tank? Yes; they are now under water.

1111. *Chairman.*] You complain of the site of this tank for three reasons. The first is that it is boggy; next, that it is not such good holding ground as this hard clay-pan soil; and thirdly, that when the swamp is full all the works are under water, tending to damage the pumps, service tanks, and troughing? Yes.

1112. Could a tank have been filled on this site that you spoke of;—could the water have been conducted in just as readily as in the present tank? Yes.

1113. One question I would like to ask about the site of this tank;—did you ever hear that any wells had been sunk in that swamp before the tank was made, because you know numbers of these swamps are seldom filled? No; this is a district that I do not know much about. I have a hazy idea that Mr. Waugh, of Clare station, spoke to me about water being in it.

1114. There is no caretaker, of course, attached to this tank? Oh! yes, there is. There is a caretaker put there to protect the embankments and banks from being washed away.

1115. And yet the swamp is all under water? It is.

1116. And the fences all around, which were erected to protect the tank, are also under water? There is no fence around the water at all.

1117. I suppose the water came down and filled the tank before it was thoroughly completed. It is not usual, I suppose, to give up a tank until all the upper works are completed and fenced? I do not know whether it is usual or not. There is no fence around the tank; but then there is no fence even when there is no water; so that it is not the water that prevented the tank from being fenced.

1118. *Major Pearse.*] I suppose there are other tanks unfenced also? In reference to this particular tank, there is dry ground where the fencing should be put, but there is no fence there, although one has been in course of erection for twelve months.

1119. *Chairman.*] The next one is the Ivanhoe tank. You stated that it was not in a very bad position, for the reasons given in your letter? I do not object very much to the site, but I do not approve of it.

1120. What is your objection to Tom's Lake tank? The Tom's Lake tank is supposed to be very faulty, on account of the boggy nature of the soil. Everyone knew it, yet the tank was placed right on the swamp.

1121. *Major Pearse.*] When was it constructed? I have no idea; but it was some years ago.

1122. *Chairman.*] How long have you been in the Public Service? I entered the service on the 27th June, 1887.

1123. The last two or three years have been good seasons, have they not? Yes.

1124. What previous engineering training had you? I was a station manager for some time in the Albert district.

1125. What part of it? I was managing Gualta and other stations. I went to Gualta in 1879. In reference to Hunaramby tank, I objected also to it. It is on the Balranald to Ivanhoe road, and was sunk in a rotten copai swamp.

1126.

J. Low. 2 Feb., 1882.

1126. What is the meaning of copai? It is a term applied to bad-holding ground. It purifies the water, but makes it very unpleasant to drink.
1127. Then it is not only the nature of the swamp, but the nature of the soil, also, that makes the water bad? Well, it does not improve it.
1128. *Mr. Moore.*] And do you say that at Tom's Lake and at Gunnaramby better sites could have been selected? Most undoubtedly—especially in regard to Tom's Lake. There is a better situation three-quarters of a mile northerly from Mossgiel, alongside the road.
1129. Do you know any reason why these tanks were so placed? No; I cannot account for it.
1130. *Chairman.*] You have stated as your opinion that the designs in many of these cases were faulty, and the slopes too steep; are you aware why the slopes are made rather steep by the Department of Public Works? No; I am not.
1131. Do you not think it is desirable (where it can be done) to confine the water in the smallest possible space, and have the water deep rather than have it flowing over a considerable distance of shallow ground, exposing so much of the water to evaporation, which is very great in that dry climate? I do not think the Government tanks confine the water any better than private tanks after they have been once or twice filled.
1132. You mean by that that the steep banks give way and form their own natural level? Yes; they form their own natural level and silt up the tank. This applies to all tanks I have seen.
1133. Is there any soil in that country able to stand a steep slope? Not in my district—not to stand the 1½ to 1 slope.
1134. *Major Penrose.*] How do you know it is a 1½ to 1 slope? Any practical man can see that with his eye.
1135. But all the contracts are made out 1 in 2? I would be very much astonished if they were. I would not be positive that they are 1½ to 1; but any man can tell if they are 1 in 2 or 1 in 3. 1 in 2 means a 2-foot slope to 1 foot in depth.
1136. *Chairman.*] You have already stated why you thought the slope was too steep. The other points are that the embankments have not been carried out in a proper manner, and have not been finished off and made level? None of them are level.
1137. And in one instance—the Rat-hole tank, near Silverton—you stated that water had come up within a short distance of the top of the embankment? Within 3 inches of the top of the embankment; but this happened in a tank and not in a dam. The lower embankment acts as a dam, and was so low that all the water came within 3 inches of the top during the last season, and the caretaker had to get drains cut to save the embankments.
1138. Now, here we come to another case of what you call faulty construction—the Walla Walla tank. You say it is altogether too large? Yes; it is situated in the Albury district. I consider it to be too large.
1139. Why do you say that? Because I inquired from everybody about, and found that was the general opinion in the district where it was placed. There is a heavy rainfall in that district, and a tank of that size is not required.
1140. *Mr. Moore.*] But is the rainfall a regular one? I cannot say whether it is regular or not, but it is heavy.
1141. *Chairman.*] Do you not think it is necessary for the Government, when making these large permanent tanks for the benefit and advantage of a future time, to go to considerably more expense than private individuals. A squatter has only a limited quantity of stock; but if there is a large stock traffic on the road, larger tanks than the squatters use are necessarily required? I do not think that the Government are justified in spending a large sum of money in such a place as that in which this Walla Walla tank is constructed, where, at the time of my inspection, there was natural water enough to last for two years.
1142. Where is this natural water? It is in a large basin or swamp, and there is enough there to last for at least two years—enough to water all the stock that may come for that period. It is not a big travelling-stock route, and only a few sheep come up and down there. I do not think that the Government have sold one shilling's worth of water from that tank except to the farmers about. No tank was required there for travelling stock, and it should not have been put down.
1143. What is the capacity of this tank? Its capacity was reported to me as being 12,000 yards.
1144. You mentioned here that, from your observation and from what you gathered, tanks are preferred to wells? Yes; in this particular district, and places such as on the Mossgiel and Balranald roads.
1145. Do you think that tanks are better than wells; and, if so, why? I say that they are better than wells in such a district as that between Booligal and Ivanhoe and Balranald and Ivanhoe.
1146. I am only speaking now of the two methods of supplying water? But you cannot compare them till you know the characters of the different waters. You cannot compare them unless you take into consideration the qualities of the water.
1147. Is it really the case that in that country there are no wells which are capable of giving good water? No; so true is it that the best men in the district, and those best acquainted with it, are abandoning wells and constructing tanks.
1148. But this knowledge had to be gained by experience? Yes: but the Government do not appear to be gaining in that way. The Dolmorove well has only just been put down, and the new Willandra well was only undertaken within the last two months, in spite of the failure of the existing one.
1149. Then you think it is undesirable to expend further money on wells where wells have been found to be of no use? Certainly.
1150. Now, you mentioned in your notes something about the relative merits of tanks and dams? In one particular case—that of the Box Creek, on the Balranald Road.
1151. But do you really think that dams are better than tanks? That all depends upon the country where they are situated. If you can get a dam on a creek where there has been no ground cut up by a heavy rush of water, then the dams are just as good as tanks. In this particular case, a dam would have suited the requirements of the route without the excavation of a tank.
1152. Dams, of course, retain very much larger quantities of water than tanks, and at very much less expense, if suitable sites can be obtained, and if they were not liable to be silted up? Well, there is a way of

J. Low. 2 Feb., 1888.

of preventing the silt from getting into the dams as well as into the tanks. It is a very inexpensive way, too, and can be done by throwing logs across. If it is a flat creek, and not a fast running one, you can do that.

1153. Now, with regard to the cost in the case of the Ivanhoe tank, a statement has been made of an excessive demand having been put forward, which you believe was obtained;—what was the nature of this claim? It was said to me by the man who made the claim, that Mr. Stilwell remarked to him, "You know too much, Casey, and we will have to pay your claim."

1154. But what was the nature of the claim? He did not say that, and I cannot tell you. I asked him whether he had got more than his contract price, and he said that he had.

1155. What was the contract price? It is reported to be from 1s 4d. to 1s. 5d. per cubic yard; but I cannot find that out.

1156. Are you aware that the price was 1s. 7d.? No; I am not.

1157. You have mentioned in the paper which you have handed in that many of those drains, instead of running the water towards the tank, tend to run the water from the tank? I do say that unhesitatingly.

1158. You think the levels were badly constructed? Some of them were not constructed at all.

1159. *Mr. Woore.*] You say that some of the drains at the Ivanhoe tank did not run into it? Yes; they ran in a direction from the tank.

1160. *Chairman.*] Then I think you said that in one instance as high as 15s. had been paid for these drains, when they were let to others as low as 4s. 6d.? Yes; a man named L. Farrel (who is now one of my caretakers) contracted for this work. At the same time he was excavating drains on Tierhurst station, which is within 10 miles of the tank. These drains were 9 feet 6 inches deep, and he was excavating them at 8s. 6d. per chain. One drain was as good as the other, because they are both the same after the first rain.

1161. *Mr. Woore.*] You say that at Tom's Lake tank some of the drains were running from the tank? Yes; the fall is away from the tank.

1162. *Chairman.*] How can that be when the whole work is in the swamp? The whole work is at the side of the swamp, and it ought never to have been put there at all.

1163. *Major Penrose.*] I think you said you thought that these drains had never been laid out on this route? The Ivanhoe drains, I should say, were never properly levelled. If so, the man who levelled them was a very poor hand at it.

1164. *Chairman.*] Then you say that the drains are too deep? No, they are not too deep; but a 6-inch drain would be just as good as a 12-inch drain after the first wet weather in that soil.

1165. *Major Penrose.*] What do you consider the maximum slope should be? My idea is to get drains nearly as level as you can. If you can get them on to a dead level it will be all the better.

1166. *Mr. Woore.*] The object being to avoid carrying in silt, I suppose? Yes; you cannot get them too level; that is my opinion about drains. About the prices, I would like to explain that Mr. Road Superintendent Hanna has got drains done at Broken Hill—equal in every respect to the drains at Ivanhoe tank—for 4s. 5d. per chain. They were done just as well as Mr. Stilwell's drains, which cost 15s.

[The Commission adjourned.]

FRIDAY, 3 FEBRUARY, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

John Low called in and further examined:—

J. Low. 3 Feb., 1888.

1167. *Chairman.*] In continuation of your evidence given yesterday we proceeded as far as the Parramoota tank;—I think you said that was only 9 feet deep? I think it is 9 feet 10 inches deep. It may be more in places, but that is the average.

1168. Was any reason given why the tank was sunk so shallow? None whatever.

1169. I presume it was full of water when you saw it first? Yes; full of water.

1170. And you had no idea whether it was full of water or not till the contractor had finished it? I have no information whatever on the subject.

1171. *Major Penrose.*] Do you know anything about Hovell's dam? I inspected it some time ago.

1172. Have you any fault to find with the construction of that dam? Yes; I have fault to find with the extravagant expenditure in the construction of the by-wash.

1173. This was cut through solid rock? Yes; through solid rock.

1174. You think that the natural by-wash on the other side of the dam would have sufficed? would have been quite sufficient. The course of the creek was very flat at that particular spot.

1175. You are not aware of the levels of what you propose as the natural by-wash (above the by-wash on the other side) which has been cut through the rock? I am not aware of the difference of the two—between the natural by-wash and the deeper one which has been cut; but I know that the natural by-wash is sufficiently low for the present embankment.

1176. You do not think that it would have been necessary to make the embankment much higher if the natural by-wash had been used? I do not think that it would have been necessary to raise the embankment to utilize the natural by-wash.

1177. You do not think that there would have been any danger to the embankment by using the natural by-wash? I do not.

1178. *Chairman.*] The object of the last question is this: that if the water is allowed to run around the end of the dam, must not the end of that dam be protected? It could be protected by putting timber all round, and this at very small expense. A couple of men would do all the logging that was wanted in three days.

1179. Have you not known instances where the water running over the by-wash gullies out into a creek;—must not the water flowing around the dam eventually find its way in again in some place, where it will form a new creek? I have known instances of that; but in this case it could have been avoided at very little expense.

1180.

1180. In what way? By logging it, as we do all station by-washes, where the ground is cutting up. J. Low.
1181. Would logging such as you mention be sufficient to carry off the water in a large creek and prevent this? I consider that logging in this particular instance, owing to the flatness of the ground, would be equal to all requirements. 3 Feb., 1888.
1182. Then you are of opinion that although the safe plan was to go through this rocky hill, the cost was not justified in this case? I cannot answer that question.
1183. Well, you know this is what the parties who are complaining about it say was the case? I may not have understood your question.
1184. What I mean is this—with the perfect safety of carrying the by-wash through the rock, would that perfect safety warrant the Department in making this by-wash when there was a chance of forming a new creek by using the natural outlet over the flat? Certainly not. The idea is a perfectly new one to me, although I have a great deal of experience in tank-sinking.
1185. But this is not tank-sinking; it is dam-making? [No answer.]
1186. *Major Pearson.*] You are not aware, perhaps, that engineers, as a rule, take the by-wash through the solid rock if they can? I have never seen a case like that in Australia.
1187. *Mr. Moore.*] What is the character of the ground on the course of the natural by-wash? It is all clay ground and unlikely to water-wash.
1188. What is the fall? It is very flat at this particular spot; it is a very slow running creek.
1189. Has no water flowed that way? No; I do not think the water has ever gone that way so far as I could see at the time. I do not think the water has ever gone through that by-wash.
1190. Has the rock that was cut out been used in making the dam? No; not to protect the sides.
1191. What was done with the rock that was taken out? It is lying about and has not been used. Of course there may be some of it on the inside of the embankment, and I should be very sorry if there was.
1192. Have you ever known a natural by-wash in good clay such as you describe to scour away? Yes; I have known such a case of its scouring away.
1193. And such by-washes have always a tendency to wash away. Is there not some danger attached to that? There is danger in many cases of the natural by-wash scouring away, but in this case there was plenty of timber about close to the dam, and there would have been no expense in protecting it.
1194. I do not think you understand me. No amount of timber placed around the dam would prevent the by-wash from scouring away? Why not log or corderoy the by-wash, as we have done on stations?
1195. But is there a very large volume of water flowing into Hovell's dam? No; I do not think there is ever any water that goes through that by-wash. I made inquiry, and no one could tell me that the water ever went through there.
1196. *Major Pearson.*] How far is the water backed up? A very short distance, indeed. I did not measure it, but I do not think it is more than 150 or 200 yards. I refer, of course, to the time I inspected it.
1197. But if it rose to the level of the by-wash how far do you think it would back up? A long way further than it was.
1198. Practically, this dam has never been filled? So far as I could discover—no.
1199. *Mr. Moore.*] You think this dam has never been filled, do you? I do not think any water has ever run through the by-wash.
1200. But you have had good seasons? Yes; but there has been no great rain to fill the dams, and not much has been caught in this one. I would like to say that I was informed when down there that the water had never run through that by-wash.
1201. *Chairman.*] Now we come to the next question, with regard to the machinery used by the Department in lifting water into the service tanks and then into the troughs. What is the usual form of machinery on all the larger tanks? Well, there are special steam Tangye pumps, with horse-works, and Amos & Smith's pump and horse-works.
1202. You also have M'Comas's? No; none that I have inspected.
1203. In your experience what kind of power have you found the best—steam or horse-power? Well, I should say horse-power.
1204. Now, I want to ask you this question, supposing in a long drought that feed fails, then would not the better mode of raising water be by steam pumps rather than by horse-power? No; horse-power would still be the best.
1205. But then if you use horse-power you will have to carry forage? I do not think it would be necessary to carry forage seeing that the paddocks of the caretakers are fenced; but even if steam pumps were used forage would still be required for the horse that was employed carting firewood.
1206. Does what you say apply to every district? It applies to every district where forage has to be carted a long distance.
1207. Are Tangye pumps put where there is no firewood? They are put in such places that we have to supply caretakers with firewood.
1208. What is the greatest distance that you have to carry timber? I think at Rathole Tank; the timber there has been destroyed for mining purposes.
1209. That is not a case in point. Are there any pumps put in places where there is no timber? No; there are no engines placed where timber cannot be got within a mile, except as before mentioned. As the results of my inspection, I do not think that there any engines put up where firewood cannot be got within a mile.
1210. Then have you any special reasons for objecting to these machines? Is it one of your reasons that they require more expensive caretakers, because the caretaker must be skilled in his work? Yes; my reasons are that these machines are too expensive. From the first erection they are too expensive in keeping in repair, and they require a more skilled attendant. These are my reasons for preferring horse-power, and my experience is that water can be lifted in a much less expensive manner.
1211. Now, one more question. Do you think that hand-power would be sufficient in most of these cases where ordinary whims and Tangye pumps are used? Not as regards whims at wells.
1212. Do you not think that in some districts where the traffic is not large that the work could be done by hand-power? On tanks, yes. I do, most undoubtedly; because I have done it myself with my own hands.
1213. This would not necessitate the erection of these expensive works, and would not require skilled men to keep them in repair? No.

J. Low.
3 Feb., 1888

1214. *Major Penrose.*] What is the usual lifting distance from the tanks into the service-tanks? Well, it would be from 12 to 18, or say an average of about 15 feet.
1215. How many gallons could a man raise in a fair day's work with hand-power? He could water 10,000 sheep by raising water by hand 15 feet—that is, sheep fed on saltbush plains.
1216. That would be something like 10,000 gallons per day? It would be more. A gallon of water is not sufficient for a sheep. I should say it would be from 12,000 to 14,000 gallons per day.
1217. *Mr. Weore.*] You are in favour generally of horse-power for lifting water at public watering places? I am in favour of horse-power where it is necessary, but on such public watering places where the water could be lifted by hand-power I am in favour of it, seeing that it is very much cheaper.
1218. Are you aware that there have been droughts in the Albert District, where 640 acres would not keep a horse in condition to do any work at all? I am not aware that 640 acres, if fenced and preserved in ordinarily good seasons, would not support a horse in any season. Certainly, I have seen 640 acres in the Albert District that would not keep a horse.
1219. I mean average country? No; I have never known such a thing in the Albert District. If the country has been used and not abused I should say that 640 acres would keep a horse in any season.
1220. *Chairman.*] Now in regard to fences, you have laid considerable stress in the report which you have handed over to the Commission on the quality of the fencing used. We would like to get some definite statement with regard to this. We want to know first whether the costly fencing provided by the specifications could have been done without, and then something regarding the very expensive manner in which it is alleged these fences and gates have been put up. Are you aware of any instance where expensive post and rail fences have been put round tanks? No, sir; I do not know of any instance where expensive post and rail fences have been put up. I know of no fences except the wire ones.
1221. You have not found any fencing round the tanks too elaborate or strong? No; not round the excavations.
1222. And you do not complain that the fences round these caretakers' paddocks are too costly in most instances? Yes, I do complain about them; and the style of gates that are put up.
1223. Just give us a specimen of the cost—the exclusive cost—according to the specifications? Well, I will take the Ivanhoe tank as a specimen one, with your permission; and I will also deal with the specification of Mount Manara.
1224. *Major Penrose.*] I would like before you go any further to read you the specification *re* special lease fencing—"The fencing to be erected on lines laid out by the road superintendent or other authorized officer; the posts to be 7 feet long x 9 inches x 3 inches, sunk 10 feet apart from centre to centre, and to a depth of 2 feet 6 inches; corner posts to be 12 inches in diameter securely strutted with 8-inch diameter struts notched into posts sunk 2 feet in the ground, and footed against a dwarf post 8 inches in diameter—sunk 2 feet 6 inches. Six wires to be run through each post and the top one No. 4 gauge, and the rest No. 6 gauge. To be spaced as shown in drawings, and each wire to be strained to the nearest post to the end of coil. No wires to be spliced."
1225. *Chairman.*] Do you think that that wire was unnecessarily strong? Yes, I do; I think it was unnecessarily strong and involved unnecessary delay in re-straining, because one man could not strain a No. 4 wire single handed.
1226. On a sheep run this heavy wire fence is unnecessary? I think this wire fence is necessary to keep stock out of the paddock.
1227. And these posts 9 x 3? Pine posts 9 x 3 I consider simply useless, and unheard of in station fences. You cannot split them.
1228. *Mr. Weore.*] Pine is not the proper timber for that, I suppose? It is the pine posts of that size that I take special objection to.
1229. *Chairman.*] I suppose it is difficult to get the proper timber? 9 x 3 post are simply slabs.
1230. And in some cases you have to go long distances to get the pine timber? Where I saw that 9 x 3 pine being split was on a proposed line of fence or within half-a-mile of it.
1231. *Major Penrose.*] Is it generally used? Yes, in this district.
1232. *Chairman.*] Are these specifications carried out in all instances 9 x 3? They are allowed to have round posts.
1233. So that these specifications must have been modified in some instances? I should be very sorry to have anything to do with them.
1234. This is the only fence you know of that came up to the specification? Yes; this is the only one. When I inquired about the straining-posts I was astonished at the size, and asked the man for his specifications, and he showed them to me as 9 x 3. There is one objection that I have to 9 x 3 straining-posts, and I think I will be able to explain it to you. The timber being only 3 inches thick will not stand the wiring or plug being put in, as it opens the posts up. One wire is turned half-way round the post one way, and the other half the other way, the result being that the post is sometimes split.
1235. In how many instances were these pine posts used? There are pine posts in the Whitton district and at Mount Manara—tank pine posts and pine saplings; and at Mount Elliott, Hulong, and Palletop there are all pine fences.
1236. Do you think it quite unnecessary to have three posts only 10 feet apart. Squatters, as a rule, do not put their posts 10 feet apart? Well, there is a great deal of difference in the style of squatters' fences. Alongside a main road a squatter likes a good fence if he can get the timber. Ten-feet panels are often used on a main road.
1237. But, except on main roads, people will not go to the expense of putting posts at every 10 feet? No; I think 12 feet is about the average.
1238. *Mr. Weore.*] I suppose travelling stock sometimes crowd around the fences attached to the caretaker's paddocks? Yes; and I think it necessary that there should be a good fence alongside a main road.
1239. *Chairman.*] Seeing the very expensive construction of these fences, would you be surprised to learn that the cost of erecting them has been from £110 to £130 per mile? I certainly would be surprised.
1240. Even with that very expensive style of fencing? Yes.
1241. What would you consider a fair value for such a fence—9 x 3 posts 10 feet apart? I consider that the Ivanhoe fence could have been very well erected at £82 9s. per mile, according to the specifications.

1242. *Mr. Woore.*] This has No. 4 and No. 6 wire? Yes.
1243. *Chairman.*] Was £82 9s. per mile the total cost of erection? Yes; the total cost of erection.
1244. Have you ever found fault with anything else, except these pine posts, as being excessive in cost? Yes; at Mount Manara tank.
1245. What timber could have been used at that tank in place of this? There is any amount of pine sapling there; but split pine posts could have been got there.
1246. As to other fences that you have seen, in what way do you consider them too expensive? I consider the Boonoona tank fence (which is constructed of pine and belar) a very expensive one.
1247. What size were these posts? I think they ran to an average of 9 x 3.
1248. And were they of belar? Yes, and pine. They might have been 8 by 4, which are as good as 9 x 3 posts; and, in fact, I consider 8 x 4 very much better posts.
1249. Are there any other fences made of other wood, such as mulga? Yes; but not in Mr. Stilwell's district.
1250. *Major Pearson.*] Have you any complaint to make against these fences as regards the straining of the wires? Yes; I complain strongly of the absence of straining-posts in the Ivanhoe tank (tenant's lease) fence. And, in support of my complaint, I may mention that the posts are already splitting, although the fence has not been long erected.
1251. You do not consider the provision of straining-posts at corners as enough? I do not—not for a mile.
1252. In these old specifications, straining-posts were to be at every twelfth panel? It is just as great a mistake to have a too short strain as a too long one. I do not think that the Boonoona fence should have cost more than £60 per mile.
1253. *Chairman.*] Now about these gates. We have had some complaints sent into us about these gates, and in your evidence yesterday you made the statement, that very expensive gates were put up in the caretaker's paddock, of which no possible use could be made, except to allow the caretaker's horse to go in and out; and yet they have cost a large sum of money? The contractors say that these gates have cost £15 each.
1254. What are they made of? Sawn timber.
1255. Morticed uprights? Yes, and iron hinges.
1256. And you have been told by the contractors that the gates have cost £15 each? Yes, sir.
1257. What ought gates that would do for the purpose cost,—what would you put up in a paddock for a boundary rider? In this particular case something more than a wicket gate is required. I believe gates should be 12 feet, as they are at present. Men may have to go in and take their drays into the tanks, and it would be a great pity to make the gates too small. I think that 6 feet double gates, costing about £3, would be quite equal to all the requirements.
1258. I presume the caretakers live in their paddocks? Yes; and all the cottages are erected there.
1259. Therefore, there is very little traffic? Yes, except occasionally; when men have to go in to make repairs. Of course, at Holy Box and other places they can go in and cart drinking water from the swamp.
1260. And a gate would necessarily be required at one of the Tangye steam pumps to allow firewood to be carted in? Yes, I think a gate is necessary for that and other purposes.
1261. Then that gate would require to be stronger, because it might have to bear the strain of these travelling stock? That would be a gateway from the paddock not liable to be interfered with by travelling stock.
1262. We now come to the question of interference by the officers of the Roads Department with the officers of the Mines Department. This very question that you mentioned yesterday about the bucket being lost will bring it up. You said the bucket was lost in the Dolmoreve well, and that it was there from the 20th June to 30th October? From the 22nd May. On the 20th June the roads mechanic went to repair it. The well was out of repair all that time, although the bucket had been taken out.
1263. Now, I want to know what charge these caretakers have over the wells, and whether they are responsible from beginning to end. A caretaker has charge we will say of a well and of the buckets and ropes;—now, if the rope breaks, whose duty is it to repair it? I consider that the caretaker's duties are to protect the works, and to do all the work in connection with them that one man can do unless skilled labour is required.
1264. You do not call that skilled labour—to attach a bucket to a rope? There is no one man who can go down a well and fetch a bucket up by himself.
1265. Would the traffic on these roads be so small that the caretaker could not get the assistance of a traveller to do this, necessitating sending for a man many miles to get the work done? I would not go down a well with any ordinary man that could be picked up, on top.
1266. So that you do not think that it was the duty of the caretaker to make this repair by himself without calling in the assistance of an officer of the Roads Department? I do not know whether he called him in or not; he certainly could not have done it himself.
1267. So that the public might have been inconvenienced all these months because a bucket had fallen down a well and there was no one to attach it to the rope? The bucket could not have been got up even if it had been attached to the rope. The bucket was smashed before it was brought up.
1268. This is a new phase of the matter? The bucket had to be repaired after it came up.
1269. *Mr. Woore.*] Was the bucket stuck in the well? Yes; and it could not be got up. You cannot pull up these buckets when they get stuck; you must drive them down with a weight.
1270. Now, would all that delay have occurred had one Department only control of the maintenance and necessary repairs of these works? It would appear that this long delay was incurred by the transferring of this particular repair from one Department to another. Had these repairs not been under the charge of the Works Department at the time I inspected I should have had the well in working order within a fortnight.
1271. Now give us the reasons for that long delay, so far as you know? The bucket was sent to Hay and there was no rope sent. It was taken away by the Works Department.
1272. What distance is Hay from this Dolmoreve well? I should say it was about a three days' drive in a trap.
1273. What then took place? The bucket was sent to Hay and there was no rope sent back with it. There was no bucket at the time of my inspection. It was sent back about the middle of September.

J. Low. 3 Feb., 1888

1274. And when the bucket came back a new rope was required? There was no suitable rope there; the rope had become rusted, and was unsafe for me to inspect the well with.
1275. This was a wire rope? Yes.
1276. Then to whom should a requisition be sent for a new rope—to the Works or the Mines Department? At the time of my inspection I heard that a new wire rope was on the way up. I telegraphed to Mr. Gilliat, protesting against the wire rope being sent because I would not go down a well to inspect it with that kind of rope.
1277. *Major Penrose.*] Was the water salty? Yes; salty and brackish.
1278. *Chairman.*] After your expostulation was a wire rope sent up? I believe so; but I have not been there since. In fact, an officer in the Works Department told me that it was a wire rope; but I have not since inspected the place, and cannot say of my own knowledge.
1279. To whom was the requisition sent for a new rope—who wrote for it? I do not know.
1280. But you had heard that a new rope was wired for, and you said it was unsuitable on account of the brackish water? Yes; and that I would not go down a well of that description to inspect it with a wire rope.
1281. The Mines Department, having taken charge of these works after being handed over, is it not within your authority to order such things as new ropes and buckets? That I do not know; because one department is continually running against the other. We cannot put a man on to repair a well without another man coming and running against him.
1282. You do not know who orders new material in the event of old material wearing out and breaking? I do not. I really wish that I did know, as it would simplify my duties very much.
1283. *Mr. Woore.*] What caused the bucket to stick in the well? It stuck in the well through the rope breaking.
1284. Was the bucket full when the rope broke? All I know is that the caretaker was drawing water at the time that it broke.
1285. Do you know how long that rope was in use? I believe it had been in use about twelve or eighteen months.
1286. How long does a rope of that kind last in good water? I have known one of them to last eight years in good water, on such a station as Burrabogie, on the Murrumbidgee River.
1287. These ropes are made of iron? Yes; they are galvanised iron or steel, I am not sure which. I do not know much about them, and I do not want to.
1288. *Chairman.*] They are the grandest ropes ever made? Not in that kind of water, with all respect to you, Mr. Cox.
1289. Now we have had it in evidence that sometimes these caretakers are very neglectful of their duty; that they allow the works under their charge to get out of repair and the embankments to be broken down, and that they are guilty of other pieces of neglect;—do you pay periodical visits to your various tanks and wells? My district is so large that there are some tanks in it that I have seen only once; some of them I have seen two or three times.
1290. Have you had occasion to find fault with any of your caretakers with regard to their apparent neglect of duty? Yes, I have; and I have tried to keep them up to the mark as well as I can.
1291. Have you ever known an instance of a caretaker living in an engine-shed and using the boiler to cook his meals? I have never heard of such a thing, and I have no hesitation in saying that no such thing has occurred in my district.
1292. Do you know any instance where caretakers have left their tanks and gone to a public-house and remained there for days drinking and leaving the tanks to the mercy of travellers? No, sir.
1293. What would you consider your duty in regard to a matter of that kind? I would suspend the caretaker and report the matter immediately to the chief inspector of public watering places.
1294. Now supposing a road superintendent, having visited one of these tanks, found anything going wrong, would it not be his duty to report it? To whom?
1295. Well, I presume he would find fault with the caretaker, and would you take it as his duty to report it to you or to his own Department? I would have no objection to any road superintendent inspecting the works under my charge. I would have no objection to his reporting any complaint to his own Department so long as I was made aware of it; that is to say, so long as the same report that was sent to his Department was also sent to me.
1296. In fact you would deem it to be his duty as a good public officer to make a report on any work that he saw was going to the bad? I think so; I would have no objection to it.
1297. In fact anyone else ought to have done the same? Yes, any Government official.
1298. Are you aware that any friction has been caused by these road superintendents making complaints after the works have been handed over to the Mines Department? I know this, that at the Boococma and Mount Manara tanks, before they were filled, I asked the caretaker why he did not clean them out, as I considered that it was a part of his duties. The caretaker then informed me that Mr. Road Superintendent Stilwell told him to leave the work alone, and that he would see about having the tanks cleaned out. I also know that I ordered the caretaker at Moongiel to tar some rails and slip-panels which were very veiny and were cracking. The caretaker complained to me that Mr. Stilwell told him not to interfere with them.
1299. *Major Penrose.*] Were all these works handed over? I do not know. If I saw the timber going to ruin with cracking and veins running through it, I would have it tarred, no matter in whose Department the work was.
1300. Are these tanks not in your district? They are.
1301. Then these very tanks that you speak of were handed over to you? Oh! yes; they were handed over.
1302. *Mr. Woore.*] And they were under your control at the time? Yes; and in the charge of a Mines caretaker.
1303. *Chairman.*] It was not a part of Mr. Stilwell's duty, then, as a road superintendent, to interfere with you and the caretaker? I consider it was no part of his duty to interfere with servants under me and officials of the Mines Department.
1304. Was any reason given why the caretaker should not clean out these tanks? The caretaker reported to me that Mr. Stilwell said it was too much for one man to do. Mr. Stilwell said to him to leave the work alone and he would get it done for him.

1305. *Mr. Woore.*] Was that work too much for one man to do, in your opinion? No, not if the works had been kept in proper order. But if you allow silt to accumulate, certainly there would be too much for one man to do—to clean out a silt tank with a barrow and attend to other duties.
1306. Is that particular caretaker a good man? Not a better man in the Department.
1307. *Chairman.*] Then you feel sure that he did not tell this story to cover his own lapses? I am quite sure that he would not be guilty of such a thing. I have known this man for many years, and I do not think there is a better man in the Department; but if I thought he would be guilty of such a thing I would have recommended his suspension in a minute.
1308. *Major Pearson.*] You have a very large district? Yes.
1309. So that you would not be able to visit one tank at a less interval than one year? Oh! yes; I can inspect some works every four months.
1310. But suppose anything happened just after your inspection, who would attend to that? The Local inspector of stock is overseer of public watering places.
1311. So that the tanks are constantly being inspected by officers of the Mines Department? Yes; there is one thing I should like to add here. I should like to say that on all occasions where employees of the Works Department have been employed at these works I have given instructions to the Mines caretakers to render them every assistance, and I have entered that fact in the journals.
1312. *Chairman.*] Have you had occasion to suspend any caretakers in your district for gross neglect of duty? Yes; I have had occasion to suspend caretakers.
1313. Will you tell us what has been the ultimate result. Have the men been dismissed or were they reinstated? Every one of them was dismissed.
1314. *Major Pearson.*] Do you think that, as a rule, the caretakers are good men, who are anxious to forward the public interest? I think so, taking them generally. Certainly every man at present under me is a good man.
1315. Do you think that they are all capable of attending to their duties? I think that in all cases they are quite capable of attending to their duties as caretakers.
1316. Except in regard to making repairs in the machinery and other apparatus? Except where skilled labour is required. I do not mean to say that these men can go and repair a shaft, but they are good men to the extent of their duties.
1317. Skilled labour is required in most cases to erect pumps and engines? Yes.
1318. *Chairman.*] I suppose it is very difficult to draw the line if the caretaker is compelled to look after the machinery under his charge, or whether he shall apply to a skilled mechanic to help him? Well, I do not think so.
1319. Well, I will put a case in point. It is in evidence that a caretaker had a plunger disconnected from the rod of the pump by the pin falling out. That man applied to the Works Department for a skilled mechanic to mend this thing, causing a journey of some 50 miles to put a thing together which was done in five minutes. Do you not think that it was part of the caretaker's duty to attend to this? If such a thing occurred under my supervision, I should have suspended the caretaker straight away.
1320. Well, that brings in the point that it is difficult to say where a caretaker's duties begin and end? Well, I consider that a caretaker ought to be able to put in a valve, to look after the engine, and in fact, to do everything else about it, except to repair a breakage. At the same time I consider that a skilled mechanic ought occasionally to visit these places, to see that the appliances are in proper working order. Although you may get men to look after things, and keep them right, the visit of a practical mechanic is also required, because there are many things which a practical man would see that would pass the eye of an ordinary man.
1321. Then should not the skilled mechanic belong to the same Department as the caretaker? Certainly he ought to belong to the same Department, or how could we put things right? If not we would have to apply to another Department.
1322. This causes not only considerable delay and inconvenience to the public, but loss of money and loss of time to the Government? Yes; loss of time and money, and inconvenience to the public.
1323. Now do you know of any contracts let at exorbitant prices by the Government, and afterwards sublet at lesser rates? I think I had better confine myself to information from the contractors. The Ivanhoe tank fencing, which I have already referred to as having been let at £110 per mile, was first sublet at £82 9s. per mile, and afterwards at £52 9s. per mile, exclusive of wire.
1324. Which wire you would put down as costing £30 per mile? Yes; and the great objection to this wire is that one man cannot strain a four-guage wire fence, and in case of a break he cannot repair it.
1325. You have also mentioned the subletting of contracts taken for excavation? Yes; and I referred to the Twelve-mile tank, which Burton informed me he got at 1s. 9d., and sublet afterwards at 1s. 2d. to Ford, who told me the same.
1326. It is sufficient evidence for us to go on. Of course we cannot prove the fact unless we have the contractor here. Now, we will go into the matter of wells. You made various allusions with regard to the faulty construction of wells, and the excessive cost of machinery—an engine in one instance costing £750? Not in wells. This was in connection with the proposed works at Hovell's dam, and the cost was to be £705. The only well that I have any objection to the outlay for water-lifting appliances, is the Polygonum Hut well.
1327. Have you any fault to find with the construction of wells in your own district? None, except those which I have stated.
1328. What do you deem to be faulty in the construction of the Polygonum Hut well? No; I think I will withdraw that, and say that I have no fault to find with the construction of wells. The Polygonum well is only a small shaft, and is useless as a well.
1329. Are you aware that expensive head-works have been put up in some cases before water was ever found; or, when discovered, was found to be useless? Yes; I have.
1330. Will you state the cases that have come within your own knowledge? I know of the Willandra well. There all the watering appliances—troughs, service tank, whim, &c., were put up before the water was found. No supply of good water has been got there, and the well has since been abandoned and a new shaft commenced. That must be pretty fair evidence that there is no water there.
1331. And all these head-works were put up before it was known whether the well was any good or not? Yes; and it has since been proved to be useless.
1332. The trial-shaft did not get any water, then? It was a main shaft they put down. 1333.

J. Low. 2 Feb., 1883.

1333. Is there any other instance but this Willandra well where the head-works were erected before water was obtained? [No answer.]
1334. *Major Penrose.*] Would not these works come in for a new well? Yes, if water is found; but every time you take a whim down and remove it, it takes three years off of it. I have had a few whims erected.
1335. *Chairman.*] And the erection of these head-works before the water was found, was a very unnecessary outlay? Yes; unnecessary and unusual. It is a thing that a squatter would never have done in the back country.
1336. No squatter would be guilty of such extravagance? No.
1337. Are you aware of the excessive cost in the construction of wells? No; I have no knowledge of what is paid for sinking. I go by what I had the work done for myself, but I have no knowledge of the price the Government have paid.
1338. *Major Penrose.*] Have you any wells in your district that require constant baling, in order to improve the quality of the water? No; constant baling in my experience does not improve the quality of the water.
1339. *Chairman.*] Is it a regular thing to keep the pumps going at these wells, whether the water is required or not? It is not in the regulations, but I always insisted upon its being done, at least once a fortnight.
1340. And very properly so, I should think. Regarding the Polygonum Hut well, there is a windmill used for raising the water, and this is said to be so ineffective that it cannot do more than keep the service tank full. In fact, in that country windmills appear to be very uncertain? I would not like to object to windmills as a method of lifting water, but I should object to them where there is only one man stationed, because if anything goes wrong, a man cannot put it right without assistance.
1341. That remark would apply to the horse gear and steam pumps? Yes.
1342. *Mr. Woore.*] What height does this windmill lift? About 100 feet, I think. I could have erected a simple whip for £5 which would have drawn more water than this windmill.
1343. *Major Penrose.*] I believe this is the only windmill attached to public watering places? Yes; and it is to be hoped it will be the last one.
1344. *Chairman.*] Do you know anything about the hutting of caretakers? Yes; five huts were erected at Silverton since I was appointed.
1345. Just state what you know about these? They were 25 x 12 x 10. I am speaking now from memory; they are two-roomed huts.
1346. Are they all constructed of the same material? Yes; corrugated iron sides and roof, that is the usual way in my district.
1347. No covering on the outside to keep out the heat of the sun? No.
1348. *Mr. Woore.*] No refrigerating composition on them? No.
1349. *Chairman.*] What has been the cost of these? £30 per hut.
1350. Were they put up by the Works Department, or by the Mines? They were put up by the Mines Department.
1351. Were they floored? Yes, with T. & G. sawn timber.
1352. Are there chimneys? Yes, iron chimneys lined with brick, and ledge doors. They contain two glass windows and three doors, which is the usual style in that locality.
1353. Have you heard of huts being built at a cost very much exceeding that? In the Public Service?
1354. Yes? No; I cannot give any information about that.
1355. Have you ever had any reason to find fault with the troughing at the tanks and wells, or with the way in which it was put up and protected from the inroads of stock? Yes; I have a good deal of fault to find.
1356. Just state what your complaints are with regard to that? Well, in the first place I object to the fencing and troughing, with two rails on one side and one on the other. One side is for cattle, and both sides for sheep. Had a single rail been bolted on the inside upright instead of being laid on to the top, it would be much better for both stock.
1357. Why? Because by moving the rail from the top to the inside, it would give the stock better access to the water. I believe that a single rail is infinitely preferable; but I consider that if a rail is necessary at all to protect the troughing there should be only one rail up the centre. I think steel troughing is the best.
1358. How does this steel troughing work? Well; I saw the salt on it at the Holy Box well, and it has only been down for a couple of months.
1359. *Mr. Woore.*] Do you think that where the troughing is sufficiently substantial a rail might be dispensed with altogether? Yes; providing the troughing is sufficiently substantial.
1360. *Major Penrose.*] Is not your troughing set in concrete? Yes; in certain cases they are set on blocks about 14 inches square.
1361. *Mr. Woore.*] Is it your opinion that those rails frighten the cattle away from water? Yes.
1362. *Major Penrose.*] You do not approve of a rail down the centre? I have no serious objection to it, but if I were a drover I would sooner have it away altogether. I think that old cows are more easily frightened than any other stock.
1363. These troughs being only in 9-feet lengths would it not be dangerous to allow a mob of thirsty cattle to get at them without the protection of a fence? When the troughs are full I think they will be found too heavy for the cattle to displace them.
1364. *Chairman.*] I suppose you think the steel troughs are better? Yes, I think they will be a great improvement.
1365. But there has not been time to say how the brackish water would affect the steel troughing? No.
1366. *Major Penrose.*] How is this troughing preserved? I am tarring it.
1367. *Chairman.*] Are you aware whether there is much friction between the two Departments? I have no departmental knowledge whatever. I have never heard anything more about it than what I heard before I was a Government official. I then heard more about the matter than I have since.
1368. Now is there anything that you would like to add that we have not questioned you on? There is one matter—the prices given for tank sinking. I quoted one price as 1s. 3d., paid in January, 1883, in the Albert district by me. I would like to add that the rate of 1s. 3d. paid by me for tank sinking was paid for deepening a tank that had been sunk to a depth of 7 or 8 feet.

1369.

1369. *Major Penrose.*] What is you opinion as to the relative merits of watering stock from troughs and allowing them to go into the tanks? There can be no two opinions about that. J. Low. 3 Feb., 1888.
1370. You are in favour of watering the stock from the troughs? Yes.
1371. Do you think it likely that any large quantity of stock would die through their being frightened away from the troughs? I have had a large experience in taking stock to troughs. I have taken stock to troughs that could never possibly have seen troughs before, and I have never lost a sheep by their not drinking at the troughs, if the troughs were kept full and the appliances right.
1372. *Mr. Weare.*] It has been said that these rails placed along the troughing to protect it are too high for cattle to drink over? Yes; for the reasons I have explained.
1373. Are these rails placed too high in the first instance? Yes.
1374. Was it not due to the ground being worn away by the cattle watering? No; the rails were too high in the first instance. In some places the ground has had the effect of enlarging the difficulty; but in the first instance the rails were placed too high and not in the proper style.
1375. And where the ground is worked away by cattle, is it not the caretaker's duty to make it up? Yes; and it has been done by them, and made up to the original level.
1376. So that you think this is faulty construction? Yes.
1377. Have you ever known cattle to be unable to water in consequence of this faulty construction? Yes; I have had drovers complain to me about it; that cattle would not water owing to the rails being too high; and I have always instructed the caretakers to knock off the rail rather than allow the stock to perish for want of water.
1378. Then these rails are not always kept in their original position? I only had them taken down to allow the stock to water. They had to be shifted only in a few instances.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

Percy Hollo Brett called in an examined:—

1379. *Chairman.*] What position do you hold under the Department? I am an inspector of stock and overseer of public watering places for the district of Urana. P. H. Brett. 3 Feb., 1888.
1380. How long have you been a public officer? Since 1882.
1381. In the same district? Yes; in the same district.
1382. You consequently have observed a good deal that has been going on with regard to tanks and wells during that time? Yes; I have had a very large experience in the construction of tanks and wells as a contractor previous to my joining the Department.
1383. Now, this is a matter about which we are particularly anxious to examine you—whether you, as a contractor, know anything about the way these tenders have been called for and contracts have been carried out between individuals and the Government? I have not been a contractor for the Government and I do not know how they manage their business. I have been a contractor for work belonging to private individuals and on stations, but I have never in any way been concerned in Government contracts.
1384. I presume you know something about the specifications for Government work? Yes; I believe they are something similar to the specifications governing station work.
1385. Now, is there any distinct difference between the specification of contracts called for by squatters and the specifications of contracts called for by the Government? I do not think there is much difference. A squatter requires his work to be done equally as well as the Government. The only thing is that contractors ask more money from Government on account of the system of deferred payments.
1386. Then are you aware that the Government, as a rule, have to pay higher prices for the construction of tanks and wells than private individuals? I am really not aware of it, but I have frequently heard contractors say that they have done remarkably well out of Government contracts.
1387. Is it a matter of general notoriety? Yes; that the Government have to pay a great deal more than private individuals.
1388. Now we shall be glad to hear of any reasons why this should be the case. Of course every one is aware that Government money is good money, and there is no danger of a man not being paid if he does his work? The reason I have heard is this—the contractors say that the Government is fair game to work on. In working for a squatter if you want a cheque for £30 or £40 you can get it, so long as a certain amount of the work has been done.
1389. Are you aware that in the specifications for these Government contracts, it is provided that contractors may receive 50 per cent. of their money as the work goes on? I am not positively aware of it; I believe it is the case; but even then there is a great deal of delay.
1390. Are you aware of any combinations among contractors to obtain high prices from the Government—is there not an arrangement amongst them to send in tenders considerably in excess of what other people would give for the work? No; I have never heard of that.
1391. You have no knowledge of any conspiracy of that kind? I have no knowledge of any conspiracy at all.
1392. You have said just now that you believed the specifications for work to be performed for the squatter and on behalf of the Government are pretty much the same? Yes; I think they are very much the same.
1393. Are the specifications with regard to the batter different in the Government tanks to the specifications with regard to batter used by private individuals? That would depend greatly as regards the district.
1394. Are you aware that the Government, as a rule, make very steep batters? Yes: rather too steep.
1395. Would that tend to increase the cost? Not at all. It would not matter in regard to the cost, and should not increase it in the least. If I were a contractor, it would not cause me to ask a higher rate. If a tank is sunk and the whole four batters are steep, say, 2½ to 1, then it would be a different affair.
1396. The reason being that on a very steep batter it would not be possible to get up the incline with ploughs and scoops? Some of our tanks were made steep on both sides, but that would not increase the cost.
1397. If you have to deposit the soil equally round the tank, would not that make a difference? Very little difference—no more than a mere fraction. Some of the tanks that I have sunk for Mr. Samuel M'Caughey, of Coonong, had the soil which was excavated placed all round the embankments, so as to increase the depth of water that might be filled in by baling machines or by pumping. 1398.

P. R. Bratt
3 Feb., 1868.

1398. Do you say that if two sides had a considerable batter it would not matter very much about the other two sides; but if you had to place the soil equally all round the tank, would not that make a difference? Yes; because you could not get out anywhere round the tank. But it could make no difference so long as we were allowed to place the stuff wherever we liked. Of course, if we had placed the soil equally all round these embankments, it would increase the cost because we would have only two ways of coming out.
1399. Are you aware that in some instances Government tanks are somewhat deeper than private tanks? I believe they are.
1400. How deep are private tanks? From 10 to 16 feet.
1401. And Government tanks go down to 18 feet? I believe they do.
1402. And do you not think that this would increase the cost of Government tanks as compared with private tanks? Yes; I suppose it would very slightly; but I do not think it would make very much difference under the old system of carting. A large tank would cost less in proportion than a small one; because in a large tank you would have a large face to work upon. But working by the scoop under the present system would make a difference; for the deeper you go the more pulling you have.
1403. Are you aware that the Government are in the habit of insisting on the soil being taken a further distance away from the excavation than the squatters are in the habit of asking shall be done? I am aware of that.
1404. What distance have you taken the soil out? About 25 feet from the toe of the batter. This was in a tank where we intended the water should be pumped in afterwards, raising it above the surface. These tanks were on the edge of swamps, but not in the swamps. We never made a tank in a swamp.
1405. Do you think it would tend to increase the cost of these tanks if the soil had to be taken, say 30 feet from the excavation, instead of having it only 10 feet away? Would it not increase the cost of the work if the toe of the embankment were 30 instead of 10 feet from the edge of the excavation? It would make a difference; but we never thought of leaving the stuff 10 feet away, because the sheep would bring it in. It would make a certain difference, but I think a very limited one. In contracting for a tank I would not think it anything important if the stuff had to be shifted, say 30 feet; and if the squatter or Government insisted on having it taken 5 feet further, it would not make any difference to me. But, of course, I would try and get a little more for it.
1406. Is it a fact that the squatters insist on having the stuff taken 25 feet away? No; it is not usual. Mr. M'Caughey is the only man who has made tanks in that way. A few others may have done the same thing, but not many.
1407. Is it usual for the squatters to insist on the embankments being made all round the tank at an equal level? No, but they like them fairly even. The embankments are levelled with the pick and shovel afterwards. They would not be dressed down only so far as they could be dressed with scoops.
1408. If they were dressed down afterwards it would cost more money? Yes, a little more.
1409. Are you aware that the batter, too, in Government contracts is required to be dressed down to a nicety? Yes.
1410. More so than the batters of the squatters' tanks? I don't know but that some of the squatters want it done, too, because if you only leave a little mound here and there they will think you are getting at them.
1411. Are you aware that the Government insist upon the bottom of their tanks being perfectly level? Yes, and in private we would have to do that, too.
1412. Do the squatters insist on that being done? Yes; they want their tanks as level as you can make them.
1413. But do the squatters insist upon the same absolute evenness of the bottom of the tanks as the Government insist upon? Some squatters would insist upon it; they want their work done just as well as the Government get their's done.
1414. Well, now having gone so far, have you any other valid reason why the Government should pay so much more than the squatters? I cannot account for it.
1415. But you know it is the case? Yes; men have told me that they got good jobs from the Government. In fact, I know one man who took the excavation of 20,000 yards for 7d. per yard, and under a man who knew what the work was, and would insist upon its being done properly. Had the Government wanted the same work done the probability is that they would have had to pay 1s. per cubic yard.
1416. *Major Penrose.*] Is it usual for squatters to have the tops of their embankments dished? No; they would rather have the tops convex. You will never see the embankments on squatters' tanks widen out as the Government tanks do.
1417. Would dishing the embankments increase the cost of formation? I do not think so. Of course, the formation of drains would increase the cost, but I think it would be a great mistake to have water lying on the top. The water would soon percolate through.
1418. Not if properly drained? Oh! no; but I have never seen anything like that.
1419. *Chairman.*] The contractor, when he wants money to pay his men, can go to the squatter and obtain it—can he not? Yes; he gets the money so long as he has a certain portion of the work completed. The squatter is not bound to pay any percentage, although I have, in fact, seen some of the contractors overdrawn. In some cases these men have a right to buy rations at the station, but there is generally a township close by where they can be supplied.
1420. Then men who contract for Government work must be men of means? Yes; or they would not be able to go fairly into it. Large contracts like these necessitate a large plant. I am not in a position to say what percentage the contractor gets from the Government.
1421. The contractor receives 60 per cent. from the Government. When the work is finally completed the squatter goes to the contractor, measures the work, and pays him off,—does he not? Yes; the squatter either goes himself or gets somebody to measure the tank for him. The contractor is paid off, and leaves for another part of the country.
1422. Do the Government do the same thing? I do not think so.
1423. Are you aware that the Government send out inspectors? I know that I have had to take over some of the works.
1424. And that the inspector has to report to the head office before the money is paid. Are you aware that sometimes months elapse before the contractor is paid off? I am not actually aware of it, but I believe that it is quite possible.

1423.

1425. That would tend to induce men to demand larger prices from the Government? Yes; and that is why the larger prices are asked—because there is so much red-tapeism. P. R. Brett. 3 Feb., 1888.

1426. So that, knowing all these facts, you are quite prepared to believe that the Government has to pay for the same work much larger prices than the squatters? I do not know that they pay much larger prices, but I know that men being out of their money so long would expect a little more. It should not be very much, however.

1427. You stated you knew of one instance where a man took a contract from a private individual at 7d. per yard, and that if he were doing the same work for the Government he would have asked 1s.? Yes; but he might not have got it. I have taken out large quantities of earth in 1880 and 1881 at much less than 7d. per yard—at 6d.—and I must say that it paid remarkably well. I was working with patent scoops. I got 4d. per cubic yard from Mr. M'Caughey. He provided the scoops, and I supplied everything else, and was very well satisfied with the work. The only thing I had to buy from him was horse-feed—chaff, bran, and oats.

1428. Now, knowing this to have been done, you think it very extravagant for the Government to have paid 1s., 1s, 2d., and 1s. 9d. per yard, where they might have saved a considerable amount by using these patent scoops? I should say that it is very extravagant to pay these high rates when the work might have been done for so much less; in fact, I had no idea that they paid so much. Twenty-five years ago, when the work used to be done with wheelbarrows, it used to be performed for 2s. per cubic yard. This is the highest price I have ever known; and in this case the work was not tanks, but dams across a creek.

1429. Is there anything else that strikes you as being different in Government contracts and in the contracts of private individuals? I have seen great mistakes made in the ground selected for the sinking of tanks and wells. I have seen a tank sunk in sand, which no one but a lunatic would have gone on with. Before we sunk a tank at a place we always put down trial shafts—one at each corner. If, for instance, any one of these shafts struck a little sand, we would send another down to see whether the bed of sand was a large or a small one. I have seen other tank-sinkers do the same thing, and if the trial shafts put down were not satisfactory, we generally shifted somewhere else. In most cases, if sand was struck the place was abandoned at once.

1430. Are you aware what policy the Government pursued in carrying out these works, in the event of trial shafts not having proved satisfactory? I know of one case—that of the Lowesdale tank; but I do not know that a trial shaft was sunk there. I know this tank was sunk several feet into the sand. I saw it fill once, and in three days afterwards it was nearly empty. It now retains water, because it has had clay carted into it. A great deal of silt became deposited over it, and the traffic of stock has now made it hold.

1431. Have you ever had any contracts for fencing? Yes, for wire fencing; but never where I had to supply the wire. I only supplied the posts, and erected the fences. The station supplied the wire.

1432. What was the highest price you received from the Government? I never had a contract from the Government.

1433. What was the highest price, then, you got for the fences that you put up for private individuals? About twenty years ago I fenced a run of 80 miles, and I got £26 per mile for it.

1434. Did the proprietor of the run find the wire? Yes; I sublet almost the whole of the work—the putting in of the posts and the wiring—and made a very fair profit out of it.

1435. Making allowance for the cost of the wire and the carriage up to the station, what would this fence have cost the squatter? I suppose that in those days the wire must have cost him from £22 to £23 per ton. I really would not like to answer that question. I am speaking now of twenty years ago, when wire cost much more than it does to-day. I suppose that the fence which I erected then might be valued at £60 per mile. It was a wire fence of 10 feet panels; the posts were 10 × 5; they were split posts, and were placed 20 inches in the ground. There was a straining post every twenty-fifth post—say, from 10 to 12 inches through, about 3 feet in the ground. These were stayed with two stays; but these were only left there while the fence was being put up.

1436. What kind of timber was in the fence? Murray pine.

1437. Have you heard of a similar fence to that which you put up having been erected by the Government at £120 per mile? I would say that it was ridiculous and absurd. It was madness to pay such a price, unless the timber had to be carted a great distance. In regard to the fence that I spoke of, a couple of miles would be the furthest that we would have to cart timber. We might occasionally have to go further for straining posts, but we went through the country, and got the timber as near as possible to the line of fence. As a practical tank-sinker, I would never think of sinking a tank in a swamp, because before the tank can be filled the swamp would have to be flooded, which would take a long time and a great rainfall. I would prefer to sink a tank on the edge of swamps, where the ground is hard. In all our Riverina country there is good hard land on the edge of the swamps. Put a tank on the edge, and run back a high-level drain to intercept the water as it comes into the swamp, and then the tank would fill before the water went into the swamp. If the water fell into the swamp first it would be swallowed up by the cracks that occur in the soil. Mr. M'Caughey never put a tank in a swamp.

1438. So that you think that a tank put in a swamp would be a very great mistake indeed? Yes; and we found that out very quickly in Riverina, where it is very hard to fill the tanks except in wet winters.

1439. *Major Pearson.*] Do you know of any Government tanks that have been made in swamps? I know two cases of that kind. I know them simply by seeing them as I drive by. Some of our swamps extend for miles, and contain from 100 to 3,000 or 4,000 acres of land.

1440. *Chairman.*] Have you had any experience in dam-making besides this one many years ago? I have dammed creeks since.

1441. Have you ever sunk any wells? Yes, I have; but never by contract. I have sunk wells for myself, and I have let the sinking of others.

1442. What was the usual price for sinking wells, say 100 feet? What we had to do there was this—we let the work at so much for the first 100 feet, or until water was struck. If we did not get water until 120 or 125 feet was reached, it meant an extra charge. Most of the wells that I had to do with were single shafts; this would be 3 x 3 or 4 x 4. The cost of this, again, would depend upon the carriage of timber. We very seldom used sawn timber, and I do not believe in it; because I have seen several accidents with it in the old days in Victoria. We got it dressed and split into about 10-inch slabs.

P. R. Brett. 8 Feb., 1888.

1443. What was the usual cost of sinking and timbering? A 4 x 4 shaft would be about 12s. per foot. For the sinking of a double shaft the cost would be 20s. to 25s.; but it would depend entirely upon the distance the timber was away.
1444. *Mr. Woore.*] And the nature of the ground? No; that would not make much difference, unless we got into rock; but we never got any rock there.
1445. *Chairman.*] Then, in putting up what they call head works—whim, and so forth—how much would they cost? You ought to get a very good whim for £50.
1446. That would be about 10s. per foot? Yes; you ought to get a remarkably good one for that.
1447. Then the total cost would be 30s. per foot? Yes; and perhaps more if the timber were far away.
1448. Have you ever heard of a Government well, say 100 feet deep, costing £10 per foot;—if you did hear of it, I suppose you would wish to know where the money went to? I would be only sorry that I did not have the contract.
1449. *Mr. Woore.*] You know nothing about the subletting? No, nothing at all; except that I frequently sublet work myself.
1450. But you do not know anything about the subletting of Government contracts? No; nothing. There is one good well in my district, but I do not know what the cost of it has been.
1451. *Chairman.*] These matters are beyond you? Yes; I think that the troughing put up at the tanks should be an inexpensive work. The Government work with which I have to do is remarkably substantial; in fact, too much so.
1452. As a matter of fact, squatters make their tanks so that stock will water themselves? Yes.
1453. And in Government tanks the water must be supplied by pumps? Yes; even where the squatter has 5 or 6 feet above the surface, the sheep will go over the embankment, and are not fenced out anywhere. If the tanks were used for cattle they would not allow it.
1454. Then, again, you must be aware that there is another difference between the Government and private tanks;—private tanks are used merely for stock, and Government tanks are for human beings as well as stock? And the private tanks are used by human beings, too.
1455. Have you had any experience in boring for water? No, except to the depth of 15 to 20 feet.
1456. You know nothing about going down hundreds of feet? No; I have seen many good springs struck by going down a few feet in the bottom of a well.
1457. How long have you been a Government officer? Since 1882.
1458. Are you aware that there is some little friction between the two Departments—the Mines and the Works? I have heard so.
1459. Have you ever found that there has been any ill-feeling between the two Departments? Not that I am aware of. In fact, I did not know that I was to be called until to-day. I happened to be in town, and Mr. Gilliat asked me to come up here.
1460. *Major Penrose.*] Do you know Hovell's dam? No. What district is it in?
1461. Albury? I know that there is a large tank at Jindera.
1462. Is it not a matter of importance in dam-making to get a thoroughly safe by-wash? It is. I knew a dam 32 feet to be carried away because there was not a proper by-wash. At one tank 2½ miles from my place—Coreen or Daysdale—I was rather amused to see a by-wash cut out of the creek. If at any time there came a heavy winter, the whole of the embankment must have gone. I thought it a very ridiculous thing when I saw it.
1463. *Mr. Woore.*] Was that a Government tank? Yes; I was present when the tank was taken over by Mr. Gilliat.
1464. *Major Penrose.*] A by-wash cut through the solid rock would be the best? Yes, if you can get it; but as we cannot get solid rock we try to get it as far away from the head of the dam as possible.

[The Commission adjourned.]

THURSDAY, 9 FEBRUARY, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.
MAJOR PENROSE, R.E., | J. C. WOORE, Esq.

Charles Alfred Cheney called in and examined:—

C. A. Cheney. 9 Feb., 1888.

1465. *Chairman.*] What is your occupation? I am a pastoralist.
1466. Where do you reside? At Tindarey station, near Cobar.
1467. Are you at all aware of the objects of this inquiry? Yes; I have some idea of it. It is with reference to a so-called friction between two public Departments—the Works Department and the Department of Mines.
1468. Are you aware that certain allegations have been made by officers of the Mines Department in connection with works handed over to them by the Roads Branch of the Public Works Department? I know it merely by newspaper reports. I know nothing of my own knowledge.
1469. You have made some communication with reference to this subject to the Mines Department? No; not directly to the Mines Department. My communication came directly through the public press. I published some letters in the *Daily Telegraph* some short time ago.
1470. How far back does your experience with pastoral affairs in the interior of this Colony go? My experience goes back over eleven years.
1471. And what extent of country have you known personally during that time? I know all the country from the Yanko and Colombo Creeks up to the Darling.
1472. *Major Penrose.*] You are a civil engineer? Yes; I am a graduate of the Queen's University in Ireland, and also of the Melbourne University, in engineering.
1473. *Chairman.*] I will briefly read for you the points upon which we desire you to give evidence. We will first go into the matter of selection of sites for tanks. Have any of these tanks, constructed by

by the Works Department, been, in your opinion, sunk or excavated upon bad sites; and, if so, where? I do not think there are any in the Cobar district. I think around the immediate district the sites have been fairly well chosen. No doubt in many cases better sites could have been obtained; but I do not think that it would have been desirable to put down tanks on these better sites, because they would not have watered the road so well.

1474. Of course, the great object in view is to give every facility for the passage of travelling stock and for public conveniences along these proclaimed stock routes? That is my idea; and if you put the tanks at the best places you would have to put them too close together, and that would not be desirable.

1475. In any other parts of the country have you had reason to find fault with the sites chosen? No; I have not given much attention to tanks elsewhere.

1476. *Major Pearson.*] Do you know the Peri Springs tank? No; I do not.

1477. *Chairman.*] Now we will go on to defective design and faulty construction of tanks: Are you aware of the form of specification for the construction of these tanks? Yes; I have seen some of them with contractors.

1478. Have you any reason to find fault with the manner of construction? Yes; I think the sides of the excavation are made too steep.

1479. Why do you think so? I think that a slope of 1½ to 1 or above 2 to 1 is too steep, if you allow stock to drink out of the excavation; that is to say, if the sheep are at all weak.

1480. Would your objection to the slopes being too steep apply if the water was pumped into troughs? No, certainly not. The embankments as well (which in many cases are completely around the tanks) are made with very steep slopes to them, so that it would be a matter of impossibility for weak stock to get over them if the pumping gear were broken down. These embankments being four-sided ones, the stock could not get to the tank if the pumping machinery broke down.

1481. Now, do you think it at all desirable that stock should be allowed into the tanks to water? I certainly think so, especially in the back country; because, as a matter of fact, stock not accustomed to water at troughs will not water at them until they are thoroughly broken into it; and, of course, the mere fact of having to pump the water implies that you must have troughs for the water to be used in.

1482. Have you never found that a large quantity of water is wasted by the stock being allowed to go into the tanks, and that the quality of the water deteriorates thereby? I think that if the tanks were properly fixed there would not be the least waste. But to get out of the difficulty of this waste I should propose to put a set of iron hurdles across one side of the tank, to prevent the sheep from going into the water. I would allow them to water at one side of the excavation.

1483. You are aware that in very hot weather sheep will plunge into the tank, and swim about in it like dogs? Yes: and I have seen them do the very same thing in troughs, too, in hot weather.

1484. In coming out they would carry away with them a large quantity of water? Yes; but by putting the hurdles as I propose they would not be able to get into the water.

1485. Then, irrespective of that, are you not aware that stock, continually watering at public watering places in this way, keep slipping in and breaking in the ground? Yes; but I think that improves the ground, and makes it hold the water better. I think it is a great thing at these places that sheep should puddle a tank.

1486. But that would apply only to particular soils? Yes; I was going to make that remark. What I say now has particular reference to the Cobar district; but all through that back country tanks do not get silted up as they might in the Wilcannia district.

1487. Then you are aware also that the water in these tanks is required for human use as well as for the use of stock? Oh! yes.

1488. Then would it not be very objectionable to allow large mobs of cattle to water there, especially as you know that cattle drop their excrement wherever they may happen to water? I do not think so. I think that tanks, such as are constructed along these roads by Government, are not liable to pollution in the least. They are in no worse position than station tanks, the water of which is used for human consumption. I admit that cattle drop their excrement where they water; but, in these large tanks, I do not think it does the water any practical harm. A large mob of cattle would not, perhaps, water at one of these tanks at intervals of less than one or two months.

1489. Then you do not wish your remark to apply generally. You say that in some parts of the country it is desirable to have stock water in the tanks; but you do not wish that remark to apply to every part of the country? I say that in any part of the country, where the silting up of tanks is possible, it might be desirable that the stock there should be watered at troughs; because, out of two evils I would choose the lesser.

1490. The matter of pumping would not be an extra expense, because a caretaker would have to be stationed at these tanks? I do not think there is any necessity for caretakers.

1491. So that it would be a saving of expenditure to have tanks without caretakers to pump the water out? It would be a great saving.

1492. *Major Pearson.*] Would it not be necessary to have a caretaker to alter the position of this iron hurdling which you propose, as the water rose and fell? I do not think so. I should have travelling inspectors with a couple of assistants always on the road, who would have charge of and inspect the various tanks. I would make these men working overseers, with an assistant to help, and they would be kept travelling from one tank to another.

1493. But would it not be necessary to alter the position of these hurdles, and put them straight? Yes; but only necessary once in three months. It all depends upon the season.

1494. And you think that these hurdles would keep a mob of thirsty cattle from breaking through into the main tank? I am certain of that.

1495. *Mr. Wearne.*] But in the event of hurdles being fixed at the lowest point where the water is low, would not a sudden rush of water coming into the tank cover them up? Yes; but it would be very easy to shift them.

1496. Yes; but there would be no one there, and the stock might get in over the hurdles? It would be very easy to have a series of floating logs that would rise and fall with the water, the same as they have with fences across creeks. A small boom could be made that would rise and fall as the water went up or down.

1497. You think that cattle would not get over that? No; not if a fence were put on top of it. This is merely the idea that I want to get at without going into details.

C. A. Chesney. 9 Feb., 1888.

1498. This would require that the fence should move laterally? Yes.
1499. *Chairman.*] Then you do not think that a batter of 1½ to 1 is too much where the water is pumped? It is not so objectionable, except that it costs more in the making of the tank.
1500. Because ploughs and scoops cannot be used? You can use them, but you cannot get the stuff out. I never gave more in the back country than 1s. per cubic yard, although the Government have given a very much larger price.
1501. Is the cost of making the steep batter the only reason for the excessive prices paid by the Government? That is one great reason, but other reasons are given in my letter to the *Daily Telegraph*, which I will read to you.
1502. We must have everything verified on oath, but you are quite at liberty to read the article? This is what I said:—

Government Tanks—Their Management.

To the Editor of the *Daily Telegraph*,—

Sir,

"The Problem of the West" articles have had in me an earnest and appreciative reader; but I am sorry that the writer of these did not, during his trip, journey as far as Cobar, as, having only mentioned his mission, he would have been supplied with such facts as on publication would have opened the eyes of your readers to the grevious waste of public moneys, exclusive of the rabbit business, which is now, and has been for years, taking place throughout the length and breadth of this arid district. Recent events, more especially the action of Mr. John E. Kelly, M.P. for the Bogan Electorate, in making inquiries of the Government in the House, on 27th September last, about the public watering places of the Colony, have induced me to institute inquiries locally concerning them, so that I might be in a position to put facts—not theories—before your readers to enable them to judge whether my conclusions are correct or not. I propose also to show how the Watering Places Branch of the Department of Mines may be made, instead of being a serious financial drag on the country, to add considerably to the State coffers. According to an answer given in our Legislative Assembly to Mr. Kelly, M.P., by the Minister for Mines, it appears that the total expenditure during the past two years upon the public watering places for travelling stock was £70,259 5s. 6d. sterling. Well, to my mind, this way of stating the expenditure is very misleading, as I will show later on. It does not let the public understand whether this amount is for new works constructed during these two years or whether it is the total loss the Consolidated Revenue suffers from the way these public works are at present managed. If it represents the former, why not give the latter also, so that the public may have an insight into the amount spent on new works, and the loss on the working per year of existing works? If the £70,000 odd represents new works, then the total expenditure during the past two years has been understated by £70,000 or £90,000. This, of course, is taking into consideration a low rate of interest on the money invested, the caretakers' wages, less their takings from stock watered, to say nothing of the cost of supervision, engineers, and travelling expenses of the various heads of Departments.

To many people who have not thoroughly considered the matter in its different bearings it might appear that these watering places are self-supporting; but when it is found that, during the year preceding the issuing of the Report of the Royal Commission on Water Conservation, only £400 was raised as revenue from the various watering places of the Colony—seven wells, four dams, ten springs, and thirty-five tanks—it is self-evident that both cost of construction and maintenance are wholly defrayed from the public revenue. But to details: In the first place, the Government tanks pass through the hands of two Departments. The Works Branch construct them, and when finished, they are taken charge of by the Mines Department; and while in both hands they are equally mismanaged. In the first place I shall deal with them while in charge of the Works. Presuming that the best and most convenient sites have been chosen for the tanks; that the plans have been properly prepared; that the trial shafts have been sunk to ascertain the nature of the strata; and that, in fact, everything has been made ready for commencing the work, and that tenders have been called for and accepted, the first thing that strikes me on reading the amount of the accepted tender, is the high, in fact exorbitant prices, ruling for this class of work, compared with what work of a similar nature can be done for by private individuals. My business since the first extension has taken place is to find out the reasons for the difference shown, and which I conclude are as follows:—

1. The Government contractor requires to employ so much hand labour after the main work has been finished—in pick-dressing the sides of the excavations and making the bottom level enough for a bowling green or tennis-court, while the embankments require such unnecessary levelling, filling up, and grading—that the contractor calculates a large loss in this item, and consequently adds a considerable margin to his tender to cover it, although this extra labour is mostly done for show.
2. There are too many Superintendents of various grades to supervise the work. If a superior Inspector desires to make himself officious or disagreeable to another who may be under him, he may not pass the work when completed through some trivial reason, though the superintending overseer may have been perfectly satisfied with the way the contract has been carried out. The result is that the contractor suffers. His camp in the meanwhile may have been broken up, his men and plant may have gone away, as these contractors, as a general rule, cannot allow their plant to remain idle for even a short time. The contractor has then, in a case of this sort, to complete the contract to the satisfaction of this superior officer, and consequently, in justice to himself, to allow a considerable factor of safety in the computation of his tender price to cover this risk.
3. After the work has been completed and passed as satisfactory by all concerned, through some red-tape arrangement, the contractor cannot get paid his due for six or perhaps twelve months. What is the result, unless he be a man of means? He cannot pay his labourers, his storekeeper, or his produce dealer. Thus the contractor (firstly) has to pay a higher rate for labour on the Government contracts than on private ones, as the workmen know they have to run the risk of not getting their money for a considerable time after having been earned; and (secondly) the contractor has to pay exorbitant prices for his stores and produce, because storekeepers as a general rule do not care about waiting too long for the payment of their accounts of this class without a corresponding advantage to themselves; and further, he has also to pay a high rate of interest on the renewed bills to these storekeepers, as it was expected that when the bills matured his contract money would have been in hand to meet them; and (thirdly) the contractor may be forced into the most undesirable position of having to shelter himself in the Insolvent Court, and having at the same time the satisfaction of knowing that, could he only get his due, he is a solvent member of the community; so we see that a further factor of safety is required to cover this risk.
4. The change of plan that so very frequently takes place during the progress of the work requires also consideration for the trouble and anxiety that the contractor has to endure.
5. The division of what ought to be naturally one contract into a number of smaller ones leads to higher rates. For example, the Department, instead of calling for tenders for everything required about any particular tank, divide the whole up into a number of smaller contracts, somewhat as follows:—
    1. Excavating main tank.
    2. Enclosing embankment with fence.
    3. Fencing in 200 acres round excavation.
    4. Erecting troughing and service tank.
    5. Erecting pump and engine or horse-works.
    6. Erecting caretakers' cottages.
6. What one Inspector orders to-day another countermands to-morrow, and refuses to pass often after the work has been completed, alleging as a reason that the one who ordered such work exceeded his authority. A friend of mine, a Sydney gentleman, was in this predicament, and only obtained his contract money after a long delay and much trouble. What is a contractor to do under the circumstances? He has to do his work by order, and, after completion, is refused payment. He can't fight the Government, or if he does he is sure to come off second best, although he may get a verdict—for instance, the late arbitration case of Messrs. O'Rourke & M'Sharry; but one thing certain is, that when he next tenders he allows a further margin for this risk.
7. The extraordinarily steep slopes that the Government insist on having on every side of their tank excavations, viz., 1½ to 1, raises the price of work to a great degree. No horse could haul a load of earth up such a slope, and,

and, as the Government will not allow roadways, it stands to reason it must be a troublesome and expensive job to get the bottom clay out of a cutting 18 feet deep with such slopes. However, the Government contractor sees an easy way out of the difficulty, and his method is worth public notice. In sinking the tank he leaves a roadway with a slope of 3 or 6 to 1 on one side of the excavation, as he proceeds with his work. Up this slope a horse can haul the excavated earth. When he arrives at the contract depth he does not then knock off sinking, but continues several feet deeper, according to circumstances. Into this extra depth he puts all his road material, and levels the bottom up to contract depth, so that, as a matter of fact, in a number of Government tanks with these steep slopes there are several feet of loose earth left, which, as soon as the tank gets filled with water for the first time, turns into sludge. C. A. Chesney. 9 Feb., 1888.

These are some of the reasons for the high prices ruling for Government work of all descriptions in the back country, as compared with that of a similar nature required in the same locality by private individuals. The latter want their tanks for use, not show, and so long as they know that a certain work being done for them is carried out in the true spirit of the contract they are satisfied, and the money is waiting the completion of the job. I have been told by several of the most successful Government contractors in the Bourke and Cobar districts, that they would much rather excavate earthwork for a squatter at 9d. per cubic yard than for the Government at 1s. 6d. Their principal reasons for this preference I have pointed out above, and the fact remains that earthwork can be done for pastoralists from 9d. to 1s. 2d. per cubic yard whilst the Government have to pay 1s. 6d. to 2s., the contractors making more money at the former price than at the latter. The works are equally good, and the embankments are as level after the first rains, for, although the Government dams and cuttings look better just at first, still this niceness at the onset is a mere and a delusion, as holes are filled up temporarily to pass the inspector, and after the first heavy rains this filling up either washes away or sinks, leaving the last state of the dam as bad as the first. I have actually seen a contractor carting earth that had been already taken out into the excavation again to fill up and level the bottom so that it might pass the inspector; and furthermore, it is reported, with good foundation too, I believe, that in one of the Government tanks on the Nyngan and Cobar road 1,000 or 2,000 cubic yards of earth were filled into the centre of the excavation when full of water to make a horse-walk so that the pump might be worked. To my mind all this shows the absurdity of the pick dressing and levelling. I do not see the reason of this absolute precision, as I fancy the great object in constructing a tank is that it may hold so many gallons of water, and be of a certain average depth, with provision being made to hold as much water as possible over the surface.

The first remedy I would suggest to obviate the difficulties enumerated would be to design the tanks so that they could be constructed by scoops or other machinery, and do away with the great amount of hand labour required to dress them up unnecessarily. So long as a proper hole is made, with slopes fairly near that mentioned in specification, the bottom of cutting fairly level, and the embankments of the proper height fairly and honestly made, I would be quite satisfied. This item would reduce the prime cost considerably.

The second remedy would be to place one competent man in charge of the various works of a district, and let him reside in the district. He, and he only, would be responsible to the local board or trust, either nominative or elective, or a combination of both systems, for the proper construction and maintenance of the work. If found to be untrustworthy or incompetent, let him be replaced by a more reliable man. It is all very well in theory to have flying visits to the various works of the Colony from Sydney inspectors every year or two; but I hold that a man to be properly in charge of works ought to have the right of determining whether a contract is being properly carried out or not. He must also have the authority to pass the work for payment when finished, and he must not be placed in the disagreeable and unsatisfactory position of having some superior official who may happen to be in the district on one of his flying visits condemn the works when everything has been completed.

The third and most important remedy is, when the work has been passed let it be paid for at once.

1503. *Chairman.*] Then the practice of the Government necessitates the employment of large capital; so that whereas half a dozen men of small means might be prepared to go into these contracts, it is only men with large means that can go into them under the present system? Yes; the number of men who can contract is limited. They have the matter all in their own hands.

1504. So that if there are only two men tendering for the contract they can arrange between themselves to put up the price to a certain amount? Yes; and as a matter of fact they do do so. It has been done repeatedly, and I have frequently had letters from contractors, asking me to draw the attention of the Government to it; but these being vague reports I refused to act upon them. There is another matter, too, which I would like to mention—the practice of carrying out Government works without calling for tenders.

1505. Is that really done? It is; but, of course, I do not want to say anything about individuals. I go on the general principle that whoever does it, it is a wrong thing to do.

1506. What works can you specify as having been carried out without calling for tenders? Such things as sinking trial shafts over a certain area to discover the best place for tanks. There are many other works—repairs, &c., that have been carried out, and for which I hold that the Government should have called for tenders.

1507. *Major Pearson.*] Would it not lead to a great waste of time to call for tenders in small matters? I do not think so.

1508. Might not contracts for repairs of that nature be allowed under some system other than calling for tenders? In what way?

1509. By entering into a small contract for small repairs for two or three years? These works extend over hundreds of miles of country.

1510. But the calling for tenders for small repairs is absurd? [No answer.]

1511. *Chairman.*] In referring to the steep batter, you spoke of the increased cost of construction;—now, do you think that this extra cost of construction is made up for by the very much less exposed surface of water to the sun? I do not think so.

1512. You know that in this very hot and dry country a very large amount of evaporation takes place;—is it not, then, desirable to confine the water as far as possible to the smallest possible surface, to guard against evaporation? It would be desirable.

1513. And do you not think that the extra cost of making these steep batters is compensated for by the lessened amount of evaporation that takes place? No, I do not think so. In my own tanks, I make three sides 2 to 1 and the fourth side 5 to 1. This allows the contractor to get the stuff out, which cannot be done by other means. Another cause of expense is the extraordinarily nice work which the Government require in finishing.

1514. Now, what I want to ask you is—Do not these steep batters—by the fact that they offer less surface of water to evaporation—in this way compensate for the extra expense in making them? No; I do not think so.

1515. *Major Pearson.*] You do not consider a batter of 2 to 1 too steep to provide against the washing down of the banks by wind action? Oh! no.

1516. Because it has been said that the banks are too steep and got washed away by caving in? That has not happened in my experience. I could understand an embankment washing down, but not an excavation.

1517. *Chairman.*] You think there is no good reason for the Government having embankments all round their tanks? I do not think so at all.

C. A. Cheney. 9 Feb. 1888.

1519. Does it not tend to lessen the action of the wind on the surface of the water by having embankments all round the tanks? It no doubt does—a little.
1519. And of course you are aware that wind is a much greater evaporator than the sun? Yes.
1520. *Major Penrose.*] Do you not think it a wise provision for the Government, in case they wish to store more water, to have these embankments all round? Yes; but in this place they could not possibly store more water by having a fourth side. A three-sided tank will hold as much water as a four-sided one; and in the Cobar district four embankments are quite unnecessary, because there is no water available to fill them if it is thought desirable to retain the water above the natural surface. We generally put our tanks on the edge of a sideling, leaving the fourth side open towards the slope of the country.
1521. *Chairman.*] I gather from what you say, that you think one specification for tanks for all parts of the country is clearly wrong? Yes.
1522. Each part of the country should have its own specification, and a tank made accordingly? Yes; that is my idea. One specification will not answer all parts of the country.
1523. Now, in the laying out of drains to take the water to these tanks, have you had any reason to find fault? No; I have never found the levels to be defective. I never checked the levels at all.
1524. We have had it stated here that, with some of these drains, the water, instead of running into the tank, runs away from it? I do not know that. Was any particular tank mentioned?
1525. Yes, the Ivanhoe tank? I am not aware of it; but there is one thing that has come under my observation in connection with a tank between Nyngan and Cobar—I am not sure if it is 20 or 21 on the map shown; I fancy it is Muriel tank, because it is worked by horse-power. In this tank, after it was excavated, about 2,000 yards of stuff were returned into the water to form a horse-walk—that is to say, out of a 10,000-yard tank 2,000 yards were put in again; while, at the same time, this horse-walk might have been put at the side, and the pump out on clear ground.
1526. Is there anything further about drains? No; I have no complaint to make about the drains.
1527. With regard to expensive forms of machinery, I think you said that you did not want machinery at all? I say that, if it is necessary to have machinery, it should be of the simplest possible kind that can be obtained. A common chain lift—one of the M'Comas pattern—ought to be sufficient.
1528. What about steam machinery? I think it is a great mistake.
1529. I presume it is liable to get out of order? Yes; and besides, it requires a skilled man to work it.
1530. Now with regard to the horse machinery, what is your chief objection to it? I think that horse machinery works very well, but I object to any machinery. If you must have machinery, horse machinery is better than steam; still they are all too expensive, and liable to get out of order.
1531. Of course you are aware that we are subject to very long droughts in this country? Yes.
1532. Then, in that case the question would come up, which is the most economical—horse or steam machinery? I do not think, as a matter of fact, that a drought will ever effect these Government tanks in the back country. Many of them are practically unused, and there is nothing, except evaporation, to take away the water.
1533. *Major Penrose.*] You think that a hand-pump would in most cases be equal to the work demanded of it? I think so.
1534. How many gallons a day could a man lift with a M'Comas pump say 20 feet? I made a calculation some time ago, but I forget now. My idea is that every drover should be made to pump his own water. This is a part of my scheme.
1535. *Mr. Weare.*] He might not have hands enough? Every drover going with stock along the stock routes has sufficient hands.
1536. But the caretaker is always at the tank, and a man might come along with 20,000 sheep? A man with 20,000 sheep will always have plenty of hands.
1537. If drovers were obliged to lift their own water, a service tank would not be necessary? A service tank might not be necessary.
1538. And if every drover had to lift his own water there would be no use in having service tanks, because he would have to lift the water for the next one that came along? I object to these service tanks altogether. My idea is to do away with them, and also with the caretakers.
1539. *Chairman.*] Now, supposing that there are tanks—and you have admitted that there are such—in which it would be very undesirable for stock to water, in the event of there being no caretaker stationed there, would there not be a risk of the banks being injured? Yes, there would be a risk; but every station manager is open to the risk of having his sheep stolen. Any one breaking the regulations by breaking down fences could be followed up by the inspectors and duly punished. Of course, I am a thorough believer in local self-government in that respect; and my idea would be to have a Board of five or six members, residing along the different routes, who would keep their eyes on these works—the same as our Sheep Boards are managed now.
1540. And this would do away with a large staff of Government officials? Yes; both in Sydney and in the country.
1541. Our attention has been called to faulty construction and cost of fencing. This means the fencing off of the paddocks of caretakers from travelling stock; have you any reason to censure the Government for this? I certainly do. So far as I can make out, from what the contractors told me, the Government have given ridiculous prices for fencing, ranging from £140 to £240 per mile; while, at the same time, a fence which could be put up for £35 per mile was good enough for all purposes.
1542. Are you aware of this extreme price having been given? No, not of my own knowledge; but it is very easy to get accurate information. The contractors told me about it.
1543. What tanks do you refer to? All those on the road that I have mentioned. There is the Booroondarra tank, and the Nullamut tank, and several others. In fact, nearly all the tanks out there have been expensively fenced.
1544. Just describe the kind of fencing? It is a top-rail fence, with 5 wires—I think the wire is No. 4 gauge—the posts are 3 feet in the ground; whereas a fence made with No. 8 or 10 wires, without a top-rail, and the posts 22 inches in the ground, with strainers about 3 chains apart, would be quite sufficient, and would not cost more than £35 per mile.
1545. *Major Penrose.*] You are speaking now of the fence immediately round the tank? Yes; and round the caretaker's paddock.
1546. *Chairman.*] As well as the tanks? Yes: there are some tanks that might be less expensively fenced; but I am speaking particularly in regard to the fences round the caretaker's paddocks.

1547. Would not an extra strong fence be required around the tanks, to prevent cattle from bursting in that were very thirsty? I do not think so. Cattle that have been on the road for some time are not very wild. They are timid, but not wild. C. A. Chesney. 9 Feb., 1888.

1548. Are you quite sure that this top-rail fence is put round the caretaker's paddock as well as round the tank? Yes; and there is a large amount of money squandered on them. In several cases, also, the entrance to what I may call the watering lane is very badly designed.

1549. *Major Penrose.*] In what way? It is inconvenient. In one case that I know of, stock had to pass the tank about half or three quarters of a mile before they could get into the gate, and then had to come right back to the tank. It was badly designed and laid out in every way.

1550. *Chairman.*] Which particular tank do you refer to? I refer to the Matthews' Flat tank on the Louth road. It is called Cuttygullyaroo. There is another tank called Holman's tank on the Bourke road. The troughing of this tank is open to the public, and has not been closed at all. At the same time, the caretaker's paddock is closed with a costly style of fence.

1551. Have you observed that any needless expenditure has been incurred on the gates to these paddocks? Yes; there are many too expensive altogether. I do not know the price of them, but they are very good gates, and I think were brought from Sydney.

1552. You think that they are unnecessarily expensive? I do.

1553. Would it surprise you to learn that they cost £15 each? If they got them for that I should say they were very cheap. There is a lot of ironwork about them, and they must be very expensive gates.

1554. What do you think an ordinary gate could be put up for? For about 20s. or 30s.; and it would answer the purpose quite as well. The fence I must say is a good fence, but it is altogether too costly.

1555. And quite unnecessary round the caretakers' paddocks? Yes. Referring to this matter of fencing, the Government have surveyed round the tanks, and have given the caretakers 640 acres, and fenced it in for them. In fact, by making these places for them, they have turned the caretakers and lessees into small squatters.

1556. *Mr. Weore.*] When you say that these fences are too costly, do you mean that a larger amount has been paid for them than they are worth, or do you mean that the class of fencing is too good? Yes; for the class of work that is required of them, and too good for the purpose for which they are intended; and they cost more than they are worth as well.

1557. *Major Penrose.*] Of course, you have no actual knowledge of what they cost? No; I cannot say what they have cost, but I have no doubt in my mind at all.

1558. *Chairman.*] The next question is interference with caretakers and overseers;—have you found any interference between the two Departments? Not between the two Departments.

1559. Well, between the caretakers and the roads superintendents? Well, I will tell you the case that I refer to. Some time ago, after the Public Watering Places Act was passed, it was provided that any persons trespassing on stock tank reserves should be prosecuted. With a lot of other holders of property in the Cobar district, I got a notice from the local stock inspector, cautioning me, as a pastoralist, not to allow my stock to go on these reserves, although at the same time these very reserves were under lease to us. I wrote down to my agents in Sydney, and others did the same thing. The agent interviewed Mr. Gillies, and that gentleman wrote up, snubbing the inspector for doing that which he had actually done under instructions from his own Department. I think there is something wrong about that.

1560. Now, have you found any friction or interference between the road superintendents and the caretakers? No, not of my knowledge; but it is well known throughout that part of the country that there is a large amount of friction. I will not specify an instance.

1561. *Major Penrose.*] Have you known any case where this friction has prejudiced the public interest? No; I cannot say of my own knowledge. Of course there are many reports going about, but I take no notice of them.

1562. *Chairman.*] Now, in the matter of subletting contracts, you said just now that had heard from contractors that they had obtained contracts at one price and then sublet them to others at a lower rate? I know that contracts have been sublet, but I would rather not mention names. It might look as if I were picking out some one specially; but I know as a matter of fact that what I state has taken place.

1563. Well, just state the facts without mentioning names? One of the tanks on the Wilcannia to Cobar road—I cannot remember the name of it just now—was sublet, and the original contractor did not carry out the work. I do not mention the name of the contractor, because it is a very difficult thing to prove that subletting has taken place, although in one's own mind he may be certain of it.

1564. Then, something like collusion goes on, does it? Yes; I know as a matter of fact that this was a sub-contract.

1565. And do you know the difference between the two prices? No. I cannot state the exact prices, but I know that the sub-contractor made a considerable amount of money out of the work.

1566. We have had extreme difficulty in getting information on this matter; hearsay evidence is not sufficient? To get out of the difficulty, I would suggest to the Commission to take a trip to Cobar, and you will get dozens of persons to give information. One of the men to whom I refer was down in Sydney last week, and I telegraphed to him; but he had left town before the message reached him.

1567. Can you name any person who is likely to be able to give us reliable information on the subletting of these contracts? I think that Mr. James Budd, contractor, of Cobar, can do so. I may mention that in some cases these contracts are taken by storekeepers and publicans, and are sublet to their men, in order to get the contract money into their own hands.

1568. You have stated that there is considerable difficulty in watering sheep at Government troughs? I can give my reasons for making this statement, because, as chairman of the local board for some years, drovers used to come to me regularly (I have three Government tanks on my run), offering me double the Government rates if I allowed the stock to water at my tanks, although there was a Government tank only 8 miles away from one of my tanks.

1569. *Major Penrose.*] Can you give us the reason for this? In every instance the reason was that the sheep would not water at the troughs. They would not face the tanks to water at the troughing.

1570. Do you think that this was due to the faulty construction of the troughing as at present laid down, or to the fact that the sheep, not being accustomed to the troughing, would not water there? I attribute it to both causes.

1571. *Mr. Weore.*] Can you suggest any way of constructing these troughs so that any sheep will water from

C. A. Chesney. 9 Feb., 1888.

from them? Not that any sheep will water from them. What I meant was, that sheep not accustomed to water from troughs require a considerable time to be broken into the habit of watering at them.

1572. One reason given to us is that the sheep will not water at the troughs because of the way in which they are constructed;—can you suggest any other way? Yes, another way can be suggested. In the first place, the rails are not properly put up. At one side, where the sheep have to drink, the rails are so low that large sheep cannot get to water. Thus, these sheep have to lean over the fences before drinking, but the trough is then too far away. What I propose to do is just what we do with the wells in Riverina, and is about the simplest arrangement that I know of. This is simply to have a rail up the centre of the troughs and a fence on top of it. You cannot have a simpler arrangement than this. The rail is sufficiently elevated to allow the sheep to get their heads in, and the fence to prevent them from going across. At present small cattle cannot reach over in one place, and cannot get in in another. I have seen places where the troughs were actually covered with sheep. This would have been obviated by having a single rail, as I stated in these papers. Those who constructed the troughing knew nothing of the requirements of stock.

1573. Now, we will go into the matter of wells? I do not know anything about them. There are no Government wells in our neighbourhood at all.

1574. Do you know anything about the putting of caretakers? The Department are erecting huts at all the Government tanks in my district at the present time.

1575. Are these huts suitable residences? Yes; I do not object now to the huts so much. My objection was to the original plans, as first called for.

1576. You objected to them as being unnecessarily costly? Yes; but now, as the plan only provides for two-roomed houses, I do not think the cost is out of the way.

1577. The original plan was too costly? Yes; but at the same time I hold that as there is no necessity for caretakers at these tanks, so there can be no necessity to put up huts for them.

1578. *Major Pearsee.*] Do you think that with improved troughs your objection to the troughing would be done away with? Not quite. There is always the same objection, as sheep not accustomed to water will not do so at these troughs.

1579. I presume you will allow this—that where there are wells it is necessary to have troughs? Yes.

1580. Then if there are a great number of wells in the country the travelling stock will have to become accustomed to drink at the troughs sooner or later? Yes; but they run the risk of dying before they will drink. Of course we cannot help it in that case, as there are no tanks. I believe tanks to be the proper means of watering the back country instead of watering it by wells—that is to say, where you can get a proper catchment area.

1581. *Chairman.*] You have heard occasionally that some artesian wells have been made and good water obtained? Yes.

1582. Do you not think that they would be preferable to tanks in certain parts of the country? Certainly; if you can get artesian water. This comes out especially in the country north of the Darling, and always comes over the surface. At Dunlop station it does not come over the surface, but within 10 feet of it. This was, I think, the first well put down in the Colony by boring.

1583. Then you have come to the conclusion that, apart from artesian wells, the system of watering by tanks is better than the system of watering by wells? Yes, if you can get a fair catchment area.

1584. Now, would that apply in all parts of the country, where the rainfall is very slight,—on the Barrier Ranges, for instance? I think that on the Barrier Ranges, if the tanks were properly made and a good catchment area secured, tanks will answer all purposes. The Barrier Ranges is a much drier country than that around Cobar.

1585. What is the average rainfall there? About 13 inches; but we sometimes have heavy thunderstorms, which will bring up the average. Last year we had 19 inches of rain, and there is plenty of water in the tanks, which always appear to go to the same level. It was a wonderfully steady rain. Of course the filling of the tank all depends upon how the rain falls.

1586. Now, where there is a clear catchment area, do you think that these tanks which you speak of would be fairly reliable in a long continued drought? Well, I was never short of water, although in one year I had only 7½ inches, and in another 9½ inches. Whenever I lost any stock it was for want of grass and not for want of water. Another thing about these tanks is this—they are made far too large in this country. I think a 10,000-yard tank, if properly made and a good catchment area selected, is sufficient for all purposes.

1587. To what depth do you usually sink your own tanks? About 15 feet. This is the average depth; but there are some over and some under.

1588. Are you aware that the Government sink their tanks 18 feet deep? I am.

1589. Do you not think that the sinking of the extra 3 feet makes a great difference in the cost? No; because if you calculate the extra amount of excavation required to take out these 3 feet it will be found to be very small in proportion to the size of the tank. When you are down about 6 feet in a tank you have taken out about half the stuff of an 18-feet cutting.

1590. *Mr. Woore.*] Of course that all depends upon the slope? I am speaking roughly. There is really not much material taken out when you get towards the bottom. A good deal depends upon the slope, and if it were a complete pyramid, about half the tank would be excavated at a depth of 6 feet.

1591. Then you think a 10,000-yard tank, 15 feet deep, is quite sufficient for a Government tank on any stock route during droughty seasons? Yes, I think so; during any drought.

1592. *Chairman.*] Have you ever lived to the north-west of the Darling? No, never.

1593. *Major Pearsee.*] Properly speaking, the size of a tank would be regulated by the rainfall, the catchment area, &c.? Yes, the size would depend upon the drains, the catchment area, and the character of the rainfall.

1594. *Chairman.*] Then, I gather from what you say, that where there is only a very slight rainfall you would have only a small tank? It is more the character of the rainfall than the amount of it. Half an inch of rain might fill your tank, whilst perhaps on a neighbouring run there is a drizzle which does no good. If the country is subject to thunderstorms a smaller tank will do. During my eight years' experience in the back country I have put down twenty-five 10,000 yards tanks, and I was never short of water.

1595. *Mr. Woore.*] What is the longest drought you have known? We had only 7 inches of rain in one year.

1596. But the number of months without any rain? I cannot tell exactly now, but the whole year we had practically no rain. A few points came now and again, but that rain did no good.

1597.

1597. *Chairman.*] Are there any other points that you have not touched upon? Not in connection with tanks, but if you have no objection I will read a few items here which I have proposed to remedy this unsatisfactory state of affairs, more particularly the annual loss the Mines Department incurs through the Watering Places Branch:— C. A. Cheney. 9 Feb., 1889.

1. That they discharge all caretakers of Government tanks, as they are expensive and unnecessary luxuries.

2. That all the tanks be left free to water at, after fencing in the embankment alone and enclosing with a good six-wire fence about 50 acres around each tank. I propose to erect this merely for the purpose of protecting the water from the pastoral lessees' stock which might water at the Government tank if not fenced off. Erect two pairs of gates, one set for ingress of travelling stock to water, the other set for their egress.

3. That a travelling working tank superintendent with two assistants be employed for each district. His duty would be to travel round the various tanks in his charge with his assistants—working men—in a suitable conveyance, and make any repairs to dams, drains, or fences requisite. A strong box could be put at each tank, under lock and key, to hold tools, such as picks, shovels, axes, straining tools, &c.

4. That all pastoral, conditional, and homestead lessees and others be liable to a heavy penalty for wilfully watering their stock at these tanks unless under permit, as hereinafter described, and appoint some person, such as the inspector of stock or the Chairman of the Sheep Board, or of a Water Trust, if formed, in whose name, and by whose authority persons infringing regulations may be sued.

5. That a watering charge be put on all travelling stock in the Colony, including sheep, cattle, and horses, with certain provisos in favour of teamsters, &c., and those who, under the present Diseases in Sheep Act and its amendments, are not required to take out permits. This charge would be one rate, according to the distance to their destination by the specified route for which a permit had been granted.

6. That all travelling stock, horses and cattle, as well as sheep) be made to obtain, before starting on their journey, a permit from the nearest inspector, and be made to pay him the authorised charges, said charges to be handed into a separate account at the Treasury.

7. That all stock travelling without a permit be liable to a heavy penalty.

8. That every person damaging the tanks or their works, or wilfully or negligently leaving the gates open, be also liable to a heavy penalty.

9. That where troughing has been erected, let the present expensive pumps be changed for hand-pumps, of the M'Comas or other pattern, and let those who use the water raise it into troughs. I am sure no drover would object to pump the water if he would only get it free.

10. Where no troughing has been placed let the stock water direct at the excavation.

11. Put the management and control of the tanks in the hands of a local Board or Trust.

The above suggestions, if carried out properly, would do away with a lot of grumbling among drovers. By the present regulations a man has to pay for water according to the number of stock entered on his permit, or travelling statement, as the case may be, even if he only waters a small portion of his flock. So that under the present system it is impossible for a drover to water only a portion of the mob, unless he is prepared to pay for watering the whole lot. On the other hand, rain may come when a drover with stock is near a tank, so that there is no necessity for him to use the Government water. Still, as the country has made the tanks for his benefit, I think as a matter of fairness he ought to contribute something towards their revenue and maintenance. No doubt the Department will take exception to my saying that the tanks were made for the benefit of the man who travels stock. I have at present in my hands a minute paper signed by the Chief Inspector of Public Watering Places, in which he says, in reply to some strictures of mine re the tank question, that "the public watering places are not for the convenience of squatters or pastoral tenants alone, and while the action of the Government in watering the main stock roads of the Colony enables them to move their sheep and cattle with a minimum of loss in most seasons, they are also for the use and convenience of the travelling public." I quite agree with him that tanks and troughs are not for the convenience of squatters or those who have to travel sheep. I am endeavouring to prove that the Department through the incompetency and bungling of its officials, has made the tanks as inconvenient to the travelling public as it is possible for the official mind to devise. They have succeeded admirably. The suggestions thrown out by me as above are only equitable and show one method whereby these expensive works may be made to pay. Drovers would then have the same inducement to steal in the dead of night down to a private tank and surreptitiously water the stock in their charge. This is often done to save the cost of watering at the public watering places by those drovers who, driving their stock under a specific contract, endeavour to reduce their expenses to the lowest limit. Who can blame them?

In conclusion, I must reiterate that the Government have no right to supplement this cost of the tanks as originally constructed by the addition of steam or horse-pumps, expensive receiving-tanks or troughs, all of which require a certain amount of skilled labour to repair and work, when, as originally constructed, they answered their purpose admirably. I must now close, as I fear I have trespassed too far already on your valuable space; but the importance of the subject demands proper ventilation, and as I know your sympathies are with those who have sunk their fortunes in the west, I ask you, on behalf of the stockowners and drovers in this arid district, to publish the result of my inquiries. I feel certain that when once the matter is ventilated good will come out of it. The public do not at present know the amount of loss the revenue suffers from the departmental bungling and incompetency that exists in this particular branch, not only when the works are in progress, but while in operation. The subject is far from being exhausted, and I have no doubt now that the ball has been set rolling, but that the travelling public will keep agitating till a superior system of management supersedes the present one. The more constant the agitation the sooner the remedy will appear.

1598. Now I do not quite see what check you would have over people using the water if the caretakers were taken away? My plan would be this: As drovers have to pay now for a permit to go 100 miles, I would make them pay for the water over that route whether they went to the Government tanks or not. The Government have made the tanks for the public accommodation, and whether the drovers required the water or not, I do not see why they should be allowed to go along without paying their share of the cost. I speak as a person who has travelled a good deal of stock through the Colony.

1599. *Major Penrose.*] I understand that you would collect the money for the water when the permit was being issued? Yes.

1600. *Mr. Weare.*] Who is to look after the entrance to the enclosure? I would put a heavy penalty on any lessee who wilfully watered his stock there.

1601. *Major Penrose.*] You consider that the present system is very expensive? Yes; expensive and unsatisfactory.

1602. And that great economy would result from the adoption of this plan? I am certain of it, if the work was administered under the Local Board. I believe it would save the country a large amount of money yearly.

1603. Have you made any calculation to show what saving would be effected? I have done so, but I am not prepared to produce it just now. Another great objection to the present system is that when a drover with a permit goes to one of these tanks, he has to pay for the number of stock mentioned in his permit, whether they water or whether they do not. A drover goes with, say 10,000 sheep, and although perhaps only 100 may drink, he has to pay for the whole 10,000. He may have lost or sold some on the way, but he will have to pay the full amount just the same.

1604. That would apply to every case of permits? Yes; but a drover would have to get a change of permit in any case.

1605. *Chairman.*] I presume you would insist, then, that these local boards should be appointed in all the districts? Yes, all over the country.

C. A. Chesney. 9 Feb., 1888.

1606. Do you think there would be any difficulty in working that arrangement? None whatever; no more than there is in working the Noxious Animals Act. Under that Act we have to tax ourselves, and in the Cobar district we have taxed ourselves to the full amount required, with the result that we have destroyed nearly all the noxious animals up there.
1607. *Major Penrose.*] Do you think that these local trusts would be fully able to undertake the work of erecting tanks where necessary? Oh! yes; they are all practical men. Not only would we see to that, but we would see that the work was properly carried out.
1608. Do you think they would get the work done at a cheaper rate? Yes; much cheaper.
1609. *Mr. Woore.*] What you propose is that the matter should be taken out of the hands of both Departments and put into the hands of Local Boards? Yes.
1610. You would give the construction, maintenance, and supervision to these Boards? Yes.
1611. *Major Penrose.*] But suppose that that were impossible for the present, would you recommend that the present state of things should continue? No; the present state of things cannot continue; it is too unsatisfactory.
1612. Then which Department should take charge of construction and maintenance—that is, if one must do so? It is very hard to say. In my opinion, one Department is quite as bad as the other. I do not see any difference between them. We could do the work very well locally.
1613. *Chairman.*] I notice here in your letter, with regard to the difficulty of getting sheep to water at troughs, you say that if the drover actually tries to break them in, he is then liable for not travelling the usual distance in twenty-four hours? Yes; because he must travel the 6 miles in twenty-four hours. It takes a full day to water 10,000 sheep separately at troughing, and yet the drover is supposed to travel 6 miles in twenty-four hours; and if he does not do so he is liable to be fined.
1614. He is really then, between two fires—the sheep must go away without drinking or he will be fined? Yes; that is rather awkward. If he goes away his sheep die; if he stays he is fined.
1615. *Mr. Woore.*] In the third paragraph of your letter to the *Daily Telegraph* of the 11th November, 1887, there is a statement which you would perhaps like to explain. It refers to caretakers. You state concerning them "that when the works are completed by the Department of Works, they are taken over by the Department of Mines and worked by it. Caretakers are appointed at wages ranging from 6s. per day upwards, and if they are required to supply a horse to work the horse-pump, they get an extra allowance from 10s. to 15s. per week; and for all this wage they have absolutely nothing to do"? Neither have they, practically, anything to do.
1616. But they are supposed to keep the embankments and drains in repair, and you say that this is a nominal matter? So it is.
1617. Have they not to raise water for the stock? For all the stock that water at these places in twelve months, they could raise sufficient water certainly within a week. This is what I consider having practically nothing to do.
1618. *Major Penrose.*] That is, in a good season? In any season. Look at the returns from all Government tanks with caretakers, and it is very small. The report of the Water Conservation Commission states that in the preceding year to the issue of this report, there were only £400 taken at the various watering places of the Colony in fees; so that practically the whole cost of construction and supervision was defrayed from the public revenue. In the returns presented to the House in September last, it was stated that out of forty tanks constructed during the previous two years, the cost of maintenance was £6,500, and the revenue only £1,300, showing a practical dead loss to the country, independent of the interest on the money, which the tanks cost originally. At the same time one-half the money raised as revenue was received from lessees of eight of these tanks.
1619. So that out of the total of £1,300, £650 was paid as rent? Yes; this was from eight tanks, which no doubt were in favourable positions, where it suited the men who leased them, to give the Department the minimum price.
1620. I gather from this, that you think the charges for water are too low? I think the charges are quite high enough; it is the expensive way in which the tanks are constructed and managed.
1621. Is there sufficient check over the money taken by these caretakers? I cannot say. I know that there is no check whatever as far as I can see, except the declaration which the caretakers are obliged to make every three months. These declarations are often made before me.
1622. So that if a man chooses to make a false declaration there is nothing to prevent him from doing so, and from keeping some of the fees which he receives from the drovers? Nothing whatever. Of course he runs the risk of being bowled out occasionally, but the arrangement is not at all a satisfactory one.
1623. *Mr. Woore.*] Have you considered that during good seasons there can be no return at all from any of these tanks? Good or bad there should be a return, because out in that country there is no natural water at all; so far as I can see there are no clay pans there. There is no natural water, as I have said; but, in a good season, water might be lying on the road. I have 350,000 acres on my run, and there is not a drop of natural water on it. It may rain very heavily now, but go out in twenty-four hours after the rain has ceased and you will not see a drop of surface water about.
1624. *Major Penrose.*] Therefore, the return ought to be the same in both seasons? Yes; so far as Cobar is concerned.
1625. Do you think that the returns under your system would be much greater? Certainly; because I would make Riverina, and Victoria, and Queensland stock that come along these roads contribute to the revenue. Perhaps the rain may come as one of these mobs come along from Riverina; they may then get to the Bogan, and run it up to Bourke without paying anything at all for water.
1626. *Mr. Woore.*] Then you propose to make the drovers come to these tanks whether they like it or not? I propose to make them pay for the water whether they use it or not, because these tanks were made by the public principally for the use of pastoralists.
1627. *Major Penrose.*] Do you think that public tanks are necessary at all? On that dry road I think they are; but if they are necessary, it seems to me that it is very desirable they should be made to pay expenses.
1628. And that the payments should be made by those most concerned? Yes; and not by the country at large. In fact, in this way it would be the men who travel stock who would bear the expenses.
1629. *Chairman.*] You say that you would give the local boards full control over these works. Where is the money to come from? I propose that the Government spend the same amount of money in the district as now; with this difference, that the money is controlled by local men. 1630.

1630. Do you think that you can get competent men in all those districts who will see that the work is carried out in a proper manner? I think so. Of course they would have to have a professional man employed who would measure the tanks, and see that they were carried out in accordance with specifications. C. A. Chomley. 9 Feb., 1888.

1631. *Major Pearson.*] In the same way that public works are carried out in Ireland? Yes; the grand jury system in Ireland is decidedly the best way. They do not let much go to waste there, because they tax themselves.

1632. *Chairman.*] Do you not think that this system would be liable to abuse if the Government had to find the money for the work? That might be a matter of policy for the Government to consider.

1633. What control would you have over the expenditure? I should certainly give the Government control. The plans ought to be submitted to Government for approval. Not as to whether the works were being properly constructed, but as to whether the works should be done at all or not.

1634. Of course no Government would give unlimited control to local boards? I do not propose that.

1635. Parliament would never put up with that, you know? If it did the Treasury would soon be empty, I am afraid.

1636. But you think that this might be all provided for by regulation? Yes; this is the general idea which I have given you without going into details. There is another matter which I would like to mention. It is a very unsatisfactory arrangement that although the squatters have to pay rent for these travelling stock reserves around public watering places and along travelling stock routes, they are not allowed to use them. I think all the travelling stock reserves ought to be resumed by Government and fenced off from the run, and the squatters called on to pay half the cost of fencing. I would urge this especially on the main line of road from Murrumbidgee up to Bourke; by this means those who travel stock would have plenty of grass always, and it would save the lessees, through whose run the routes go, a good deal of trouble and annoyance. As far as I am personally concerned, I should be very happy to pay half the cost of fencing and give the Government the land.

1637. And this would prevent the necessity of sending notices forward to the squatters? Yes; because there would always be plenty of grass on the roads. I think this matter might be taken up in connection with public watering places.

1638. *Major Pearson.*] Does the squatter pay rent for these reserves? Yes; he does. They are a mile wide, and round the Government tanks there is a reserve of 3,000 acres. The public have the right to use this, and the squatter who has to pay for it has not the right to use it. There are a lot of people who never had a run at all; they are simply stock holders, who buy sheep and "loaf" all around the country with them. They steal the squatter's water and eat his grass, and pay nothing to the revenue. A water charge would get at these men.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

Farquahar M'Kenzie called in and examined:—

1639. *Mr. Moore.*] What position do you hold in the public service? I am an inspector of public watering places for the Bourke and Narrabri districts. F. M'Kenzie. 9 Feb., 1888.

1640. How long have you been acting in that capacity? I was appointed on the 27th June, 1887.

1641. *Major Pearson.*] Have you been in the public service before? No.

1642. What was your experience before? I was a station manager for many years.

1643. *Mr. Moore.*] In what part of the country? In the Albert district.

1644. I understand you have a paper which you wish to read to the Commission? Yes; it is as follows:—

Sir, Public Watering Places, Mines Department, 6th February, 1888.

I have the honor to acknowledge your letter of 1st January, and to reply to it dealing with each question in the order indicated.

From my personal experience I am strongly in favour of supplying water to stock from tanks by means of troughing in preference to allowing them to water from the excavation. Stock, if allowed into an excavation, carry out large quantities of water, and in the case of full-fleeced sheep they waste considerably more than they drink, and the water becomes so much polluted through the droppings and washing out of the yolk being carried in that it becomes unfit for any stock to drink, and poisonous for domestic purposes.

I have no hesitation in stating that I consider the troughing much preferable to allowing stock into the excavation, and as many of the Government tanks it would be impossible for them to drink owing to the steepness of the batters, viz., 1½ to 1.

In the case of open drinking-tanks the objections are much the same, only that being smaller they become polluted much sooner.

These tanks are in use at Ranghill and Boro, in the Walgett District, and after one lot of stock have watered, the water, from being stirred up, becomes quite think and green, and nothing will drink it until it again becomes settled.

I have had many years experience in the West Darling country among stock and tanks, and I found that no tank would last through a severe drought when stock were admitted. I then adopted the plan of fencing them in and supplying water by means of M'Comas pumps, and troughing, and the saving of water quite justified the extra expense. One man could water 8,000 sheep in a day.

The cost of excavation by private enterprise varies at from 9d. to 1s., and I have had many thousand yards excavated at the former price, where contractor had to drive his cattle some miles to water and cart the same for domestic use. Where plant is found the work can be done at from 5d. to 6d. per cubic yard.

On Corella Station, Mr. Featherstonhaugh has had tanks excavated to a depth of 16 and 18 feet, at 11d. and 1s. per cubic yard.

I am informed that 2s. 6d. was paid for excavation of Government tank Kerrigundi, Helman's tank 1s. 9d., Bendemere 1s. 9d. Well-sinking within my knowledge has been done in alluvial at 25s. per foot for first 100 feet, including timbering and centering, 30s. per foot for second 100 feet, and 35s. per foot for third 100 feet.

I believe that much higher rates than the above have been paid at Balooloo, Normanstone and Mannum wells, in the Gunnedah District.

The Balooloo well has been sunk in basaltic country to a depth of 145 feet, and is now abandoned. A whim has been erected, and the wooden frame-work of supply tank, both of which are rotting from neglect. Normanstone well, also in basaltic country, has been sunk to a depth of 180 feet, at which depth a small quantity of brackish water was struck, and a fresh contract has now been let to bore 50 feet. I can state positively that the sinking cost £5 10s. per foot.

Trial-shafts I have had sunk at 2s. 6d and 3s. per foot for first 100 feet and 5s. for second.

The cost of whim complete should not exceed £75, and I know an instance where a substantial whim with best mountings was completed for the sum of £62.

Wood and iron supply-tanks, 22,000 gallons, can be erected, inclusive of material, at from £60 to £70, and troughing about 4s. 6d. per foot.

The

F. M'Kenzie.

9 Feb., 1898.

The appliances used for raising water, notably steam pumps, are probably more effective than simpler methods, but far more difficult and costly to keep in repair, besides the extra cost of fuel, which in some cases has to be carted long distances.

The expense of steam pump and shed, as erected, is enormous. Horse works and pumps are quite sufficient to answer all requirements, and where the traffic is small a M'Connas pump is all that is required. One man can with ease lift water from 18 to 20 feet.

At Girilambone and Ballagroom tanks, where there is little or no traffic, costly steam pumps and engine-sheds have been erected, and although the former tank has been completed over two years there has never yet been a flock of sheep or a mob of cattle watered.

There should be no cause why Government works should be paid for at higher rates than private. The reasons that can be brought forward are that there is inefficient supervision, too much fancy work, and too great delay in payments. These avoided, the work should be done at current station rates or under in works of magnitude.

It is only contractors who have money at their disposal who can afford to take a Government contract. A poor man, who might be equally efficient and as well provided with plant, could not carry out the work through being unprovided for until his contract is completed.

Consequently, the few men who work for Government can make their own prices, where, under different circumstances, the work could be done at station rates.

The extreme steepness of the batters, viz., 1½ to 1, precludes the use of bullocks, and the more expensive plan of tip-drays and shovels is resorted to, when it becomes necessary to make roadways to enable the horses to climb the batters; and, although embankments are placed on four sides of the tank, they serve no purpose, as the water is admitted by means of open flaming, whereas, if pipe and valve were used, the water could be pumped in and many feet of water saved which now goes to waste. The engines are now so fixed that the pumping of surplus water cannot be resorted to.

The fencing at all Government tanks is heavier and more costly than necessary, and the rates paid are much in excess of private work. At Goonery Bore, the fence enclosing T.L. cost £90 per mile, and at Mulga No. 5, £75. The same description of fence has been erected in the district, with no better facilities for obtaining timber or carriage, at from £35 to £39 per mile.

The fencing at Barradine well, I am informed, cost £100 per mile. It is 5 feet high, split iron-bark posts, and top rail and five wires. I think No. 4 wire is ridiculously strong and out of all proportion to requirements. I have written several letters on the subject of railing at the troughing, which is in nearly every case much too high, and at some places as much as 2 feet 10 inches from ground-level, viz., Booroondarra tank, Barradine well, and other places. Consequently, sheep crawl in underneath and foul into the troughing, stirring up and fouling the water; on the other hand, cattle cannot reach over the top, and, unless some of the railing is removed, it is impossible for them to drink. An alteration was suggested by this Department which has been adopted by the Works Department in the Cobar district, and at a nominal cost, has proved a great success.

In conclusion, I wish to bring under your notice the state of inlet from silt to main at some of the tanks in my district, which in many cases is a narrow cutting through the earthwork of embankments, which, in time of flood, keeps cutting away and filling in, and consequently all loose earth is carried into main tank. This could be remedied by having the sides of embankments logged or stoned to prevent cutting the tanks. Where this is most required are Holman's tank, Booroondarra, and Mulga No. 5.

I have, &c.,
F. MACKENZIE,
Inspector, Public Watering Places.

The Chief Inspector, Public Watering Places.

1645. Do you know of any faults in the selection of sites? Yes; there is the Mulga tank on the road from Louth to Cobar.

1646. *Major Penrose.*] Is it quoted in these papers? [referring to Blue Book.] I do not think so; at least it is not quoted by me. I only just inspected it before I came down here. That tank has been put down over twelve months, and has never had more than 5 feet 2 inches or 5 feet 3 inches of water in it.

1647. Has there been sufficient rain to fill it? Yes.

1648. What is the reason, then? It has been put on rising ground. The drains have been so formed that the water will not run in. It is on considerably higher ground than that surrounding, and the drains are so constructed that the water runs back.

1649. How does the water get in, then? There has been an alteration made lately in the drains for that purpose, and the water will, I believe, run into the tank; but we have had no rain since.

1650. Was there any necessity for a tank at this particular spot? Not actually at this spot, but a tank is required in the vicinity somewhere.

1651. *Mr. Woore.*] Is there any other place that would have been a better site? Yes; within a quarter or half-a-mile of this place there is good, hard, red ground.

1652. Who proposed the site for this tank? I really do not know; it was constructed before my time.

1653. Then you think a tank is required somewhere in the vicinity? Yes.

1654. *Major Penrose.*] Do you know who it was that recommended the alteration in the drainage? I believe it was the overseer of public watering places for the district of Cobar. He is also stock inspector for the same district, and his name is Mr. Cotton.

1655. This tank was constructed some time before you became a public officer? Yes.

1656. Was there any water in it when you first saw the tank? The first time that I saw it was about ten days ago, and there was then about 5 feet 10 inches of water in it.

1657. *Mr. Woore.*] How do you know that the original drains would not run into the tank? I heard that from the caretaker, who had the thing recorded in his book.

1658. Then you do not say this of your own personal knowledge? No; but from information received, and I am confident from the rainfall that the tank would fill if the drains were properly made.

1659. Is there any other tank in your district the site of which you have reason to find fault with? There is the Ledknappa tank, on the road from Brewarrina to Enngonia.

1660. What fault have you to find with the site of this tank? Not so much with the site of the tank as the site of the troughing. The tank is right enough, but the troughing has been submerged. The site of the tank is a suitable one enough, if the troughing with it had been properly constructed on the opposite side on high ground.

1661. The troughing ought to have been made on the opposite side to where it is at present? Yes; there is a sand hill there, and there could not have been a better place for it. The consequence of putting it where it is, is that it has been submerged, so that the stock cannot get into it.

1662. But then the tank has not been required lately? No, because there is plenty of other water about; but in the time of a drought it would be required. In the meantime these works have been very much injured by the water being on them. All the works in fact are being damaged by the water.

1663. *Major Penrose.*] How many tanks, more or less, have you in your district? I think I have about sixty-five altogether—that is including tanks and wells.

1664. You have no fault to find with the sites chosen for the remainder of these tanks? No; I wish it to be understood that I do not find fault with the site of this Ledknappa tank, but only with respect to the troughing and so-forth.

1665. *Mr. Moore.*] Have you anything to say with regard to defective design and faulty construction of tanks in your district? No; with the exception of these two. I think in some cases the design is bad in having the embankments all round the tank so that they cannot be utilized for the storage of more water. This is owing to the tank not being closed up, so that the water rises only to the level of the excavation, and in some cases a few inches over it. F. M'Kenzie. 9 Feb., 1888.

1666. If they were constructed so that the embankments could be utilized, about double the amount of water would be conserved? Yes, if they were properly embanked all round perhaps 6 or 8 feet more water could be put into them.

1667. *Major Pearson.*] That would entail special arrangements in regard to pumping? We have at present no engines for pumping water over the bank that can be utilized; they are so constructed that they cannot be utilized for anything except to pump water into the supply tank.

1668. Very little change would be necessary in them? A very little alteration would make them suitable for both purposes.

1669. In that case, pumping water would be done from the silt-tank? Yes, and from the water lying outside. Of course, in many cases—in the Ledknappa case, for instance—there is over a mile of water outside, and if the water was pumped from the silt-tank, as proposed, we could conserve 8 or 9 feet of it inside the embankment.

1670. *Mr. Moore.*] Is there any other fault you have to find with the construction and design of tanks and generally with regard to batters? I think the batters, being 1½ to 1, are too steep. In these big tanks the wind blowing against the sides often causes the bank to break down, and in many cases the batter is increased to 4 to 1. This is caused by the bank being washed in. This takes so much more off and decreases the holding capacity of the tank. I should say, perhaps, that the batter is 3 to 1 instead of 4 to 1, if I may be allowed to amend it.

1671. Has there been any carelessness shown in not taking advantage of the formation of the ground and utilising catchment area so as to avoid collection of silt? This is what I have mentioned before. There is the Kerrigundi tank which is placed in a depression in undulating country, and the drains go into it from a very steep slope. Consequently, everything is washed down into it from the hills. It is most difficult to keep the silt tank clean, and at the present time I believe the water is only 3 feet deep.

1672. Is there a better site there where this collection of silt could have been avoided? Yes; about a mile nearer to Louth there is a much more suitable site; the ground is more level and there is plenty of catchment.

1673. Had a tank been placed there this collection of silt would have been avoided? Yes, considerably avoided. I consider it a great mistake in every case to have falling ground into a tank.

1674. *Major Pearson.*] I suppose you mean steeply falling ground? Yes; my experience is that if you can get your drains nearly level you will get less silt into your tank.

1675. *Mr. Moore.*] Do you object to the particular form of tank for that place? No.

1676. Are these tanks made by the Government all made to the same plan and design? Yes, all but the older ones. The old ones are made on a different plan; all the new ones are made in one way. The character of the country up there is so similar in all respects that I consider one form and design of tank is suitable for all places, where they have been already constructed in my district.

1677. You also consider the square tanks very suitable for that country? Yes.

1678. That is if the embankments are made use of? Yes, but they are useless in every case now. As to the fluming at Helmau's, on the road from Cobar to Bourke, it is only carried from the inside of the embankment to the bottom of the tank. I consider that some provision should be made to prevent the banks from washing in. I regard fluming 2 feet high as being of very little use, because in high floods the water gets behind the fluming, which, with the great rush of water at particular places, will not be sufficient to protect the embankment.

1679. You have said something about the careless laying out of drains in one instance; do you know of any other? No; that is the only case I am acquainted with.

1680. Do you know anything about the excessive cost of constructing these tanks? Yes; there are cases I mentioned in the matter of fencing.

1681. Has the cost of construction increased in consequence of these steep batters? Yes, undoubtedly; because men cannot work in a tank like that without a long roadway; it has to be taken out afterwards; he cannot work up the slopes at 1½ to 1 with any stuff.

1682. How do they get the earth out, then? They form a roadway all the way down, which is taken out after the excavation is completed.

1683. That increases the cost of construction? Yes, it is all extra cost.

1684. The object of making these steep batters is to expose as little surface of water as possible to evaporation, and, according to your account, this is to a great extent counteracted by the banks being broken down by the water washing against them? Yes; I consider that it is more than counteracted. The batter is the same or greater afterwards through the washing-in of the banks. They do not remain at 1½ to 1.

1685. But where the ground is suitable and the banks would stand that batter, would it not be an advantage in the way of protection from evaporation to have a less surface exposed? It might be a very small advantage, but if stock were allowed into the excavation I should say it would be a very great disadvantage.

1686. *Major Pearson.*] You are in favour of stock watering from the troughs? Yes.

1687. Do you think it would be possible or even advisable to water the stock from the main tank itself if a small portion of it were railed off with iron hurdles? No, I do not think it would be any advantage. The stock certainly could not get into the tank and swim in it, but the water would still be polluted by their going in a short distance. I have seen that tried, but not successfully.

1688. It would do away with the expense of pumping gear and caretakers? It certainly would do away with them, but I do not consider that any ordinary tank would last through the drought if treated in that way, because if the water went down to 3 or 4 feet the stock would not drink it. I have seen stock turn away from green water.

1689. You do not think that plan would answer at all? No, not for public watering places. I think the best way of dealing with water is by using troughs, especially when full-fleeced sheep are watering. If a sheep drinks 1 gallon of water he carries out 3 with him if he is allowed to go and swim in the tank; and of course, with these Government tanks, it would be quite impossible for sheep to water without their going in and swimming in hundreds.

F. M'Kenzie. 9 Feb., 1898.

1690. *Mr. Moore.*] The next subject is expensive forms of machinery for lifting water, necessitating greater cost of maintenance;—do you consider the forms of machinery for lifting water at these tanks are of a too expensive nature? I think a steam pump is both expensive and unnecessary.
1691. What would you suggest to raise water as quite as effective and not so expensive? I think that a horse-pump on roads where there is a lot of traffic is a suitable machine. On roads where there is not much traffic a M'Comas pump would, I think, do; that would cost very little in alteration, and I have had a lot of experience in watering sheep with a M'Comas pump.
1692. What number of sheep would a man water in a day with a hand-pump? I consider that one man would water 8,000 sheep in a day. I have had it done myself.
1693. *Major Penrose.*] This would be a good day's work for a man? Yes, a fair day's work.
1694. Then if drovers had to water their own sheep, and had four or five horses with them, they could water the sheep a great deal quicker by horse-power than by hand? Undoubtedly.
1695. All I want to know is, is there any limit to the number of sheep that a man can water? Of course a dozen men taking shifts might water 13,000 or 14,000 in a day, and I have watered 18,000 with four shifts, one man to each shift, in twenty-four hours. I have done this every day for a month till the rain came. This was done with a 3-inch M'Comas pump.
1696. What lift had you? About 16 feet, I think.
1697. Can you make any estimate as to the number of gallons raised per sheep at that time? I consider that each sheep drank a gallon and a-half within the twenty-four hours. I have known sheep to drink 3 gallons each during the drought, and perhaps in saltbush country they would drink more.
1698. *Mr. Moore.*] Is it not hard work to raise water 16 feet with a 3-inch M'Comas pump? Yes; but we used to rig a buggy or dray wheel, and by means of this fly-wheel the work would be very much lighter. It answered the purpose of two men working.
1699. Are steam-engines for raising water at Government tanks unnecessary in all cases? Except they are utilised as pumping-up engines as well, they are. In that case they would be a great advantage.
1700. But you think that they would be necessary for pumping over an embankment? Not altogether necessary, because a portable engine might be able to do it—similar to what is used on many stations.
1701. But cannot a M'Comas pump be used for pumping over the bank? Not without removing it. If you had two M'Comas pumps you might use them in that way.
1702. What is the cost of a 3-inch M'Comas pump? I do not know positively, but I think about £15.
1703. Then you think that a M'Comas pump would be quite sufficient to raise water for the supply of stock? Yes.
1704. And that a portable engine might be used to pump the water over embankments? If the tanks were made suitable a portable engine might answer. One for each district might be used to pump the water over the embankments.
1705. *Major Penrose.*] Do the pumps in your district necessitate great cost in maintenance? Yes; I think they are more costly than horse-pumps, and in many cases we have to cart firewood for them; a caretaker has to leave his work and go and cart firewood, perhaps for several miles.
1706. Are the caretakers as a rule capable of maintaining these engines in proper order? No, not ordinary caretakers.
1707. *Mr. Moore.*] The next matter is the faulty construction of fences;—do you know anything about the fencing of caretakers' paddocks? I could mention cases of excessive cost, but I cannot find fault with the fences in my district, except with the fence at Paradise well.
1708. What have you to say with regard to the fence there? That it is unnecessarily strong.
1709. You are speaking now of the fence around the tanks? No; of the fence around the tenant's house, or what is known as the caretaker's paddock. The fence is 5 feet high; the posts average about 10 x 6 or 8. They are split ironbark posts, and the rails average about 8 inches.
1710. How many wires? I believe there are five wires and a top rail.
1711. What is the number of the wire? I think it is No. 4, but it is a strong heavy wire.
1712. Have you any idea what this fence cost? I am informed that it cost £100 per mile.
1713. You think that it is too expensive, and altogether too strong? Yes, far too strong.
1714. How many miles of this fence are there? I cannot say; I think about 2 miles. It enclosed some 204 acres of land.
1715. Do you know any reason why this fence should be stronger than any other fence? I have no idea. I think that it must have cost well within £80 per mile, if it did not cost considerably more.
1716. What would such a fence as you propose cost? I could have got a six-wire fence erected suitable for all purposes, for £35 to £36 per mile. Those heavy wires are a great mistake, as it is impossible for one man to strain them.
1717. Are these gates to the caretaker's paddocks? Yes, 12-feet gates.
1718. Are they expensive gates? Yes, very expensive. They are constructed of sawn timber, and very heavily mounted with iron. I do not know the cost, but some of them on these Government tanks must have cost as much as £15.
1719. This is the only instance that you know of excessive cost of fencing? Yes, I know of two other places; one of them was at Goonery bore, on the road from Bourke to Wanaaring. This fence cost £90 per mile, although it was only an ordinary six-wire fence.
1720. What number wire is used in this fence? There are five wires No. 8, and the top wire is No. 6. It is a suitable fence for the place.
1721. What kind of posts were used? Split pine posts.
1722. What do you consider the value of such a fence? I could have a fence of similar character put up in the same district for from £34 to £39 per mile.
1723. *Major Penrose.*] Have you seen the Government specifications for fencing at tanks? No, I have not seen the specifications, but I know the measurements. The posts are 9 x 4; I believe they are 10 feet apart, and 2 feet 6 inches in the ground. It is very unnecessary to have them 2 feet 6 inches in the ground. I believe that in many cases they have made no difference with the strainers, and have no stays at all.
1724. *Mr. Moore.*] Do you know why this particular fence at Goonery bore cost so much? Well, I do not think that it has cost more than Government fences generally, but this is not the only case that I know of. There is the Mulga tank, on the road from Brewarrina to Gongolgan and Byrock. Although there is plenty of timber in the vicinity, this fence, which has lately been erected, has cost £75 per mile.

1725. *Major Penrose.*] Describe that fence? It is a six-wire fence, five of the wires being No. 8 gauge and the top No. 6. The posts are 10 feet apart, but I cannot say what depth they are in the ground. There was no caretaker there when I visited the place. F. M'Kenzie. 9 Feb., 1888.
1726. Are the posts of split pine? Principally of split pine, but there are a few of mulga and belar.
1727. Have you noticed any bad effects due to straining wire to any posts? You mean without making provision for regular straining-posts?
1728. Yes? Yes, undoubtedly. In many cases the straining of the wire will drag the posts out of the ground.
1729. You have actually noticed this in connection with Government fences? Yes.
1730. *Mr. Weare.*] Have you known that the contracts for these fences have been sublet? I have heard of a great many cases, but know of none of my own knowledge.
1731. Do you know of any reason why the fences generally should cost so much? No; I know of no reason why they should cost more than station or private work.
1732. Has anything come under your notice with regard to interference with caretakers and overseers at these watering places by officers of the Works Department? No.
1733. Do you know anything of the construction of wells in your district? Yes, there is the Baloola well. In this well they have not obtained any water at all. It is on the road between Gunnedah and Coonabarabran. It has been sunk 145 feet, and has cost £5 10s. per foot.
1734. *Major Penrose.*] Then there is the Normanstone well? They are both almost the same.
1735. *Mr. Weare.*] Does the sum you mention include the whole cost of timbering, and so forth? Yes, it includes the timbering. A whim has been erected there which is not included in cost of well.
1736. *Major Penrose.*] I see that it has since been abandoned? Yes; a whim had been erected, and the woodwork of a supply tank, but it has never had the iron put in. This tank has been partially erected.
1737. And this was done before ascertaining whether the well would yield water or not? Yes; before they proved that there was any water there.
1738. Is there no water there? Well, there is rain water, but they never succeed in getting any other.
1739. And the Normanstone well—is it as bad as the other? Yes; I considered it a mistake from the first to sink for water in the basaltic country, because water is never obtained there, so far as my experience goes. All the headworks have been erected for a considerable time, and they are now rotting.
1740. *Mr. Weare.*] And do these remarks apply to the Normanstone well? No; not in the same way. Normanstone well is 180 feet deep, and a small quantity of brackish water was got at that depth; a contract has been let to go 50 feet further. No headworks have been erected at that well.
1741. *Major Penrose.*] Is water much required at that place? Yes; especially in dry seasons. A great deal of stock travel backwards and forwards.
1742. *Mr. Weare.*] How are the stock supplied now? Water is now obtained by travelling stock from private tanks and wells.
1743. *Major Penrose.*] Then there are wells in the vicinity which hold water? Not in close proximity, but in the neighbourhood there are some.
1744. *Mr. Weare.*] How near to the Baloola well is there any private tank or well? There is a natural spring at Garrawilla station, about 8 miles from Baloola well.
1745. Has any well been sunk in the neighbourhood of Garrawilla? I think the Baradine well is nearest. We spoke of that well just now.
1746. Was a well sunk near Normanstone well before Normanstone was put down? I do not know of any; still there might have been one on the neighbouring station.
1747. *Major Penrose.*] Have you any idea why wells were put there instead of tanks? As I understand it, watering places were required in this neighbourhood, and they were put down where they were required without considering the probability of obtaining water.
1748. But surely something must have determined them to sink a well instead of a tank? Well, I believe it is a difficult matter to excavate in that part of the country, but there is a very good catchment close to Normanstone well; the ground is suitable, and Cobb and Co. have a tank close by. At Baloola there is no suitable place for a tank in the vicinity.
1749. *Mr. Weare.*] Is the water obtained from Normanstone well unfit for stock? No; it is good stock water.
1750. What did this Normanstone well cost? I believe it cost £5 10s. per foot.
1751. Do you know this of your own knowledge? No.
1752. Do you believe it? No; I do not say that I do. I know that it has cost that, but only from hearsay.
1753. Do you consider that too great a price? I consider it very excessive indeed.
1754. What do you think a well ought to be sunk for in that neighbourhood, up to that depth? I think it could be done down to 180 feet for £2 per foot. Of course that is not in rock.
1755. Is powder required in getting through this rock? I believe that lately powder was used. The rock got harder and harder as they went down.
1756. Was it generally known in the neighbourhood that the formation of the ground was very unfavourable for procuring water? Yes; all the squatters were very much opposed to the sinking of a well anywhere about there. In fact, no one would sink a well.
1757. But before this well was commenced? Yes, undoubtedly; it was well-known that it was basaltic country, and unfavourable to wells.
1758. Was this basaltic rock struck down far under the surface? It is visible in places on the surface, and it would not have been easy to mistake it for slate; it crops up in different places.
1759. *Major Penrose.*] Do you think that the head works to wells in your district are, as a rule, constructed in too expensive a manner? There are very few in my district—only about five altogether I cannot say what they cost, although they are, I think, unnecessarily costly. There is sawn timber put where round timber would have done as well; but I really cannot say what is the cost of any of these head works to wells in my district. They have all been erected for many years.
1760. *Mr. Weare.*] Do you know anything about the caretakers' huts? Yes, the huts erected by the Works Department were built upon a very expensive plan altogether.
1761. What did they cost each? From £100 to £120 and £130. We have had similar huts built, not exactly the same, for from £40 to £50; there is an additional room in the huts erected by the Works Department.

F. M'Kenzie. 9 Feb., 1898.

Department. I think the average cost of our huts has been considerably less than £50 each.
1762. Have these huts erected by you had less accommodation than the huts erected by the Works Department? There is a room less, but the accommodation is quite sufficient. The Works Department had an additional small room at the back.
1763. Were the huts constructed by the Works Department better huts than those put up by the Mines? Yes, so far as material was concerned.
1764. And they were unnecessarily good? Yes; but I should say that our huts were quite sufficient as caretakers' cottages.
1765. *Major Penrose.*] Do you know anything about faults in construction of troughing? Yes, I know a good many cases.
1766. In what way is the troughing defective? Well, it is really so high that in nine cases out of ten the cattle cannot reach the water unless the rails are removed.
1767. But this has been altered? No; only in the Cobar district, and there only within the last few days.
1768. You only find fault with the protection rails, and not with the troughing itself? Yes; these rails are in many cases 3 feet 10 inches above the ground level.
1769. Were they placed that way originally, or is the ground worn away by the continual traffic of stock? Some of the cases that I speak of are new works, and the ground is as it was at first; but in others the ground has worn away, although originally constructed in this way.
1770. This troughing must be protected in some way. What way do you suggest? The troughing that I find best is steel troughing, with centre rail. This rail is secured to struts bolted to the sleepers, which prevent the sheep or cattle from getting into the troughing. I consider that this form of troughing is the best that I have seen used.
1771. Have you ever experienced any difficulty, or have you any knowledge of any difficulty having been felt, in watering sheep or cattle at troughs? I have heard of such with the old form of railing.
1772. But with the form of railing proposed? No, it seems to answer admirably. One disadvantage with the old railing was that sheep would get into the trough, blocking it up and polluting the water.
1773. But there is no difficulty to get stock to water at any troughing that has a rail down the centre? None whatever.
1774. Do you consider the present system of public watering places to be effective and economical? No; I do not consider the present system to be an economical one.
1775. I mean apart from the question of construction? No, I think the machinery is too expensive, and that the watering places could be worked much more cheaply if the machinery employed was of a less costly character.
1776. But apart from all that, is the system of maintenance an economical one? I do not see that tanks can be maintained any cheaper; at least not with the existing form of construction and machinery.
1777. You think, then, that to maintain them more cheaply, it would be necessary to do away with the present machinery? Yes, with the costly machinery.
1778. Do you think, from your experience, that it would be possible to do without caretakers at all, supposing the machinery was absent? No; I certainly think it would be a great mistake to do away with the caretakers.
1779. Do you not think that the drovers would help themselves to water? Yes, but they would not pay for it.
1780. *Mr. Woore.*] Do you know that there has been considerable misunderstanding or friction between the officers of the Department of Mines and Works with regard to the maintenance of these public watering places? Yes, I have heard at different times of little troubles.
1781. Can you mention any instance where this has come under your notice? Well, of course where two Departments are working together there is always some trouble. I am sure that if we had the works independent of the Works Department, we would get on more satisfactorily.
1782. You think, then, that this friction is only the natural result of a divided control? Yes, and I think it must always be the case where two Departments are working in this way.
1783. *Major Penrose.*] How do you get your repairs done now? There is always a travelling mechanic obtainable from the Works Department to effect those repairs which the caretakers themselves cannot do.
1784. And do you ever find any difficulty in your district in having the repairs attended to at once? Yes, I have found considerable difficulty, because there is only one man for that large district, and he may be at one end of it when you want him to carry out some repairs at the other. In this way the works may have to wait for weeks.
1785. But would that not occur in any case, even if the whole of the works were transferred to the Mines Department? It might happen certainly, if we did not have men who could do these repairs themselves; but at present there is only one man on each road, and one man is not competent to travel around and keep the machinery in repair. The work requires more than one man to do it.
1786. You mean that if the work were under the Mines Department, you would make better arrangements? Yes.
1787. And you think that this divided control is very objectionable? Undoubtedly yes; and a great deal of expense would be saved if the whole arrangement were under our Department.
1788. You think that the maintenance of these watering places could be more economically managed by one Department than by two? I think so undoubtedly. If all were under one Department it would mean a great saving of public money.

FRIDAY,

FRIDAY, 10 *FEBRUARY*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E., | J. C. WOORE, Esq.

George William Townsend called in and examined :—

G. W. Townsend. 10 Feb., 1888.

1789. *Chairman.*] Where do you reside? At Burwood. I belong to the Railway Department.
1790. You are, I presume, aware of the object of this inquiry? I have some knowledge of it.
1791. You are aware that what has been called friction has arisen between the Mines and the Works Departments with regard to the management of tanks and wells? Yes; having been on the Water Conservation Commission I necessarily acquired some knowledge regarding what had arisen between the two Departments.
1792. You were engineer to the Water Commission? No; I was merely one of the Commission. I was a member of the body itself.
1793. And in your various tours through the country you became aware of this thing? No; it was previous to that, and before I became a member of the Commission at all that I became aware of the facts which I am likely to be questioned about.
1794. There are many points that we have been going through with regard to fences, selection of sites of tanks and wells, excessive cost, and various other items, and we wish to obtain such information from you on those points as come within your own knowledge? Well, I am not personally aware of any of the facts which you speak of. I have heard of them, and I have noticed in my travels that some of the tanks were badly situated.
1795. Our object in asking you to give evidence is that as your name has been used in communications from the officers of the Mines Department to headquarters we wished to test the truth of the matters stated to us;—we thought you would have been able to give us information on certain matters? I remember a certain conversation perfectly. It was a conversation between Mr. Gilliat and myself, and I think Mr. M'Kinney was present.
1796. Will you kindly state the substance of this conversation, and where it took place? It was some months ago. I cannot give you the exact date, but it was about the time that the Minister for Mines was going to give Mr. Gilliat the entire charge of the tanks and wells. I then said to Mr. Gilliat and Mr. M'Kinney that I knew of one instance (not from official knowledge, but from hearing the matter talked about between contractors while I was engaged on the Forbes-Wilcannia survey) where Burton Brothers, who had a large contract under the Roads Department, were paid, I believe, 2s. 6d. per yard for earthworks. They sublet a very large portion of this contract to a party named Ford Brothers for from 1s. 2d. to 1s. 4d. per cubic yard. This was for the excavation of several large tanks and a considerable amount of earthworks.
1797. Will you name these tanks? I think the 37-Mile tank is one of them, and the 48-Mile tank is certainly one. I was camped at the 48-Mile tank at the time.
1798. Was the 12-Mile tank one of them? I do not think it was in that contract, though I believe Burton Bros. had it. There was a 7-Mile road between Stony Rises and Wilcannia, and I don't think any of that was sublet. The work was done with ploughs and scoops, and I should say that it was performed for about 1s. per cubic yard—most probably less than that. This is what I said to Mr. Gilliat—and what I heard so frequently from these men (Burton Bros. and Ford), and also in Wilcannia. There was another tank being made for a station close by. I know the man intimately, and was frequently at his camp, and had dealings with him. I know that he had a large tank for about 1s. 2d. which he was excavating within a mile of the 48-Mile tank, and for about half the cost that was being charged for the 48-Mile tank. I think the amount he was getting for that work was 1s. 2d. It was the common talk of the district at the time—the prices paid by the Roads Department for the earthwork of these tanks and roads. I did not volunteer this information, but having said it to Mr. Gilliat and Mr. M'Kinney I will not go back on it now.
1799. You do not know of your own knowledge that this money was paid? No; I was merely told by Burton Bros. and others.
1800. Could they have any object in misleading you? I have no idea what their object could be in misleading me.
1801. And would you be surprised to learn that this tank only cost the Government 1s. 9d. per cubic yard, instead of 2s. 6d.? Yes, I would.
1802. Can you give us any idea, from your residence in the interior, why the Government have to pay this excessive price, as compared with the prices given by private individuals—squatters and others—for similar work? Yes; I believe I can.
1803. Well, we would like to hear you on that matter? One reason is that the Government are too particular in dressing the slopes of the tanks.
1804. Would that apply to embankments as well as to the cuttings? Yes; there is no object to be gained by it, because it is all washed down by the rain shortly after being made. Another reason is, that the very steep slopes adopted in Government tanks necessitates the giving of an extra price for the work, because of the amount of difficulty in getting the stuff up the sides.
1805. Precluding, I presume, the use of ploughs and scoops? To a certain extent. I do not know that I can state this from my own knowledge, but I believe the contractors suffer great delay from the orders and counter-orders they receive. This necessitates charging an extra price, so as to allow for the vexatious style carried on by certain of the overseers.
1806. Are these alterations from the specifications? I can't say.
1807. No other reason? No, I do not know of anything else; but I think these facts form the cause why the Government work costs a great deal more than other work. I know that Mr. Wilson, of Trida Station, told me he gets his work done for about 6d. per cubic yard—at least so he informed me. He finds the plant and bullocks to work the thing, and he reckons to pay 4½d. per cubic yard, the interest on the cost of plant, &c., bringing it up to 6d.

G. W. Townsend. 10 Feb., 1868.

1808. Are his tanks the same depth as the Government tanks? No; but within a few feet of the same depth. All the tanks that I know of are about the same depth. The depth of the squatters' tanks is usually governed by the layers of gravel. If a tank-sinker finds gravel in putting down a tank for a squatter he does not go on; but I am told the Government specifications call upon the contractors to go through the gravel, and in more than one instance they have gone down through it.
1809. Is it usual to sink trial shafts for excavating large works? I do not know; but it certainly ought to be.
1810. I presume you are aware that the extra 2 to 3 feet which the Government tanks are sunk lower than private tanks, very materially increases the cost of the excavation to the Government? Well, I have had a great deal to do with earthworks, and all I can say is that it ought not to materially increase the cost. There is no doubt that the last few feet of excavation will cost more than the first few feet; but this will not largely increase the average cost of the work, because where the last 2 or 3 feet are taken out the tank is narrowed down very much, so that the extra depth increases the local cost per yard, but not the average cost. Between 17 and 20 feet the increased cost will be about 1½d. per yard.
1811. Now, being an expert, do you think it very desirable in that hot country to confine the surface of the water as much as possible? I am of that opinion.
1812. Do you think that the extra cost of these steep slopes would be made up by the lessening surface of water exposed to evaporation? I am rather doubtful about that. It is a matter that I have studied carefully, and there can be no doubt that flattened slopes do increase evaporation; but whether the difference in the cost between 1 to 1 and 1½ to 1 would be made up for by the lessening evaporation is a matter upon which I cannot definitely give an opinion. I have observed the matter very carefully; but I am hardly prepared to say whether the difference between 1 to 1 and 1½ to 1 would cause such an increased evaporation as would warrant a difference of expenditure for making a very steep-sided tank. But if you get slopes of 3 or 4 to 1, then I am certainly of opinion that the evaporation would be very largely increased, and that it would pay to make steeper sides.
1813. *Major Penrose.*] Of course, the ratio of increase depends upon the size of the tank? Yes; of course it does.
1814. Now, if your tank was a mile wide? Oh, we deal with tanks of a certain size. We are not supposing lakes, but tanks such as we are accustomed to see constructed. I am speaking now of ordinary squatters' tanks, and they run from 15,000 to 25,000 yards. The water, shallowing much by the flattening of the sides, causes a thin film of water round the edges of the tank, from which there is a much greater amount of evaporation than there is from the surface of the water in the bed of the tank itself, where the water is deeper. Besides this, in the shallow flat-sided tanks with easy slopes there seems to be a greater amount of capillary attraction by which action the water creeps up from the edges into the dry earth round the sides of the tank causing a greater amount of evaporation than in the steep-sided tanks. Why there should be less effect from capillary attraction in the steep-sided tanks than in flat-sided tanks I am not prepared to say, except that in the flat-sided tanks there is a greater surface exposed in proportion to cubic contents than there is in steep-sided tanks.
1815. *Chairman.*] Are you aware that as a rule squatters make long slopes for the purpose of allowing stock to water in the tanks? In some instances I know they allow the stock into the tanks to water; but in others I know that the stock get the water from the troughs. I do not think that on stations you will find so steep a slope as 1 to 1 or 1½ to 1, which would be a steeper slope than would be allowed where stock could go in. In tanks into which stock are allowed, you will find that the slope is about 4 to 1.
1816. *Major Penrose.*] Do you consider that a slope of 2 to 1 would be a fair average slope for a Government tank? Yes, I should say so, if it were found that the work would be much cheaper by having it done that way. I think if tenders were let, leaving it to the contractor to arrange the slopes, you would find a material difference in the prices tendered for.
1817. Are you aware that the Government tanks are made with slopes of 2 to 1? No, I believe they are made with a slope of 1 to 1. I have never measured any of the slopes; but looking at them with my eye, I should say that they are 1 to 1. However, looking at the plans that you have shown me, I see that the tanks are made with a slope of 2 to 1. This makes me more surprised at the extraordinary price given by the Government, as compared with the price given by the squatters.
1818. *Mr. Moore.*] Have you ever heard any contractor say his contract price was 2s. 6d. per cubic yard for sinking a Government tank? Well, I cannot swear to that; but I was under the impression that one of Burton Brothers told me he was getting 2s. 6d. per cubic yard. It is now more than nine years ago since this occurred; and after that length of time I am not prepared to say whether I heard it from Burton Brothers or one of the Fords; but I was certainly told that this was the price that Burton Brothers got for doing the work.
1819. And was that generally believed in the district at that time? Yes; that was the general belief in the district.
1820. You said, at the commencement of your evidence, that you learned this from conversation which you had heard between contractors? No; I said I learned it while associating with the people who did the work.
1821. You heard them talking about it between themselves? No; I was not in the position of overhearing anything that was said. I was present at the conversation. I am quite positive of that.
1822. And those persons whom you referred to are Messrs. Ford Brothers and Messrs. Burton Brothers? Yes; and other people in Wilcannia.
1823. *Chairman.*] Where do these people—Burton Brothers—live? I fancy they came from Hay, or some place on the Murrumbidgee. I know that they had mail contracts between Menindie and Bourke.
1824. Are you aware that the Government, as a rule, insist upon the earth being taken a greater distance from the excavation than the squatters? Yes; they insist on leaving a greater berm. I have often noticed that.
1825. Would not that tend to increase the cost of construction? Yes; I think it would.
1826. Have you heard that there is sometimes considerable delay in obtaining payment from the Government after the tanks are completed? Yes, I have heard that; but I do not know it of my own knowledge.
1827. Do you think that there is another reason why an excessive charge is made? No.
1828. There is another reason that has been given us. Have you ever heard of such a thing as an arrangement or a conspiracy between the contractors to send in tenders very much in excess of what they would expect

expect to get from private individuals, and taking care between themselves that they will not go below a certain price? No; I have never heard of that.
1829. Then, the effect of this long delay in paying the contractors would probably lessen the number of tenderers, because only men of means would go into such contracts? Yes.
1830. If many months elapsed, a contractor (who would have to pay his men somehow or other) would be put to serious inconvenience, and, unless he were a man of means, he might be ruined? Yes; the small men are invariably shut out of these contracts. There is no doubt whatever about that.
1831. You are aware, also, that the Government insist on the earth being spread out evenly all around the tank? Yes; and the slopes just the same as the tank.
1832. Would the effect of having the earth so distributed be to increase the cost of the whole work? Yes: I should say that it would materially add to the cost.
1833. Do you know why this is done? No; except it is done to secure uniformity of appearance.
1834. Well, in your opinion, is it desirable to have the embankments around the tank for the purpose of lessening the action of the wind upon the water—the wind causing more evaporation than the sun? The embankments would always be put around the tank for the sake of decreasing the lead; but there is no necessity for the earth being so regularly distributed around the tank. I admit, of course, that it looks better. I know that this is another thing which increases the cost of these works, because I have heard it from men who "chucked up" such works on this account. I have heard this matter discussed on many stations, because tank-sinking is one of the principal topics discussed in the back country, where it is talked about at almost every table you go to.
1835. Now, is there anything else that strikes you? No; I cannot say there is anything else.
1836. *Major Penrose.*] Do you consider the construction of any of the tanks faulty from an engineering point of view? No, I think not; excepting that, in my opinion, they ought to have been done at a less price; and flatter-sloped tanks could be constructed at a less price; but if, as I see by the plans, the tanks are made with a slope of 2 to 1, I would not be in favour of making them much flatter.
1837. *Chairman.*] But in case the stock were admitted to the water? I would not consider that because I would not allow it. I believe that sheep if allowed into the water will carry away more in their fleeces than they will drink.
1838. You have made some statement about contractors being obliged to go through gravel? Yes; but on reading the specifications I see that it is provided that the depth shall be varied in accordance with the quality of the earth met with; but I do know one tank where the contractor had to go through a stratum of gravel. This tank is close to the 35-Mile tank on the 70-Mile track; it is near the 37-Mile. This is the tank that I alluded to as having been sunk through gravel.
1839. *Major Penrose.*] The terms of this specification, as regards earthworks, appear to you to be good? Yes, except this one matter, which is evidently a clerical error.
1840. *Chairman.*] Have you seen anything in connection with wells in the back country which calls for comment? Not in Government wells.
1841. Do you think that instead of making tanks and dams and walls, it is desirable that attention should be given to artesian boring? No, I do not; because, although when only a few wells are put down the supply appears inexhaustible, when a number of wells are sunk in the same locality it will be found here, as it has been found elsewhere, that the supply will materially decrease, and that instead of the water coming over the surface as at present, it will have to be pumped up.
1842. You are aware of a wonderful artesian bore which has recently been put down at Barcaldine? Yes; I read of it.
1843. You saw that it gives many hundred thousands of gallons per day? Yes.
1844. Do you think that boring alone will decrease the supply? I think so; I noticed that the supply from a large 22-inch well near Paris decreased, although it had a larger flow than Barcaldine well.
1845. Have you ever had reason to find fault with the selection of the sites of those tanks that you happened to come across? Yes; I think the 35-Mile tank is badly selected as to site.
1846. For what reason? Had it been situated on a slope, instead of on rising ground, it would have caught more water.
1847. Was there equally good soil there where it could have been sunk? That I cannot say. Of course I never looked attentively to see whether there was anything wrong with these things. I merely say that it would have been better situated for catching water lower down; but there may be good reasons for putting it where it was.
1848. Have you seen any wells sunk in improper places? No.
1849. You think the specifications which have been shown you are fairly good ones? Yes.
1850. Have you observed the machinery which is attached to these tanks and used for raising water to supply it to the troughs? No; because I think that most of the machinery at present in use was put down subsequent to my having been down in that part of the country. All the machinery that I can recollect was the M'Connas pump.
1851. There are now Tangye steam pumps? Yes; but I have not seen any of them.
1852. With your knowledge of the country, do you think that the use of one of these pumps entails unnecessary expenditure of money? I think I should be inclined to be guided by what the squatters in the district do. It is really hard to say, where there is a big mob of sheep or cattle that have to be watered in a hurry.
1853. You are aware that at all these works there are service tanks that can be kept full? Yes; I know that. The service tank and the troughs are supposed to be kept full. I really do not see that a steam pump is needed.
1854. Besides, it requires a better educated man as caretaker? No doubt about that; and there must be so much idle time that it would do a man good to work the ordinary pump. It often struck me as wonderful that they did not put windmills on the tanks.
1855. They would be the cheapest? Yes; and in case the water was not wanted, it might be allowed to run back into the tank again.
1856. Have you observed the fences around the caretaker's paddocks and around these tanks? No; I have not.
1857. *Major Penrose.*] Have you had much experience in wells? No, very little. I have seen a great many wells, but had nothing to do with the sinking of any. I have a good knowledge of putting down mining shafts, but not of wells, in this country.

G. W. Townsend. 10 Feb., 1888.

1858. A good many of these are supposed to be salty? I know some of them are.
1859. There are the Mossgiel, Holy Box, and Dolnorere wells? Yes; that is common to private wells also. No one can tell whether the water will be salty or fresh until he gets down.
1860. Do you think that the constant baling of water will freshen it? I believe not. I know men who started at it and gave it up.
1861. Did it improve the quality of the water? Unless I had some evidence to prove that it did improve the quality of the water, I should not care to incur the expense. Both the Government and private individuals throw away money in sinking wells instead of boring. They go and sink wells before they know whether they are going to get fresh or salty water; whereas, were they to get a boring-rod or water-auger, and bore preliminary to making wells, they could have satisfied themselves as to the existence or non-existence of water, and could know whether the quality of the water was good or bad for as many shillings as it now costs them pounds.

[The Commission adjourned.]

THURSDAY, 16 FEBRUARY, 1888.

The Commission met at 10 a.m.

Present:—

Hon. G. H. COX, M.L.C., Chairman.

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

Edward Quin called in and examined:—

E. Quin. 16 Feb., 1888.

1862. *Chairman.*] Where do you reside? At Tarella, near Wilcannia, on the Darling River.
1863. You were formerly a Member of the Legislative Assembly for the district of Wentworth? Yes, I was member for the district embraced in that country.
1864. From your long residence in that neighbourhood, have you any personal knowledge of the wells and tanks put down by the Government? Yes; I have a knowledge of a number of them.
1865. Can you give us any evidence showing glaring faults in the selection of sites for tanks and dams? Yes; I know of three very glaring cases: the Peri tank, the Tarella tank, and the Victoria or Mereenie tank.
1866. *Major Penrose.*] Was the public watering place at Tarella a tank or a dam? It was a tank. These are the most glaring cases that I know of.
1867. *Chairman.*] Well, we will take the first one—the Peri tank;—what fault have you to find with that? Well, I have frequently seen a large body of water there. The station sheep watered there for years. It is very near, or right on, to the stock route, and the tank is close by to the springs, which are really on a Government reserve. The consequence of being so close to the springs is that the tank is never used. The springs are flowing over the surface, and a large body of water flows away. I consider the putting of a tank there a serious mistake.
1868. Was the spring on the travelling-stock route at the time that the tank was constructed? It was on, or very near, the route, and was used then. It was only recently that many of these stock routes were proclaimed; and proclaimed, I may say, through my exertions in Parliament. I thought it desirable that it should be done to prohibit selection and the alienation of water frontages.
1869. If the Peri Springs were not open to the public, was it not desirable that a tank should be sunk at that place for the supply of travelling stock? But it was on a reserve years ago—before the tank was ever sunk at all.
1870. *Mr. Woore.*] Was this a reserve from sale or lease? It was a reserve for public purposes. You know the people in the country districts merely know that a place is a reserve for one purpose or another; but what the purpose is, they sometimes are hardly aware. The stationholders never refuse admission to the tanks, and the manager of the station mentioned how absurd it was to construct a tank so close to the springs. I had a conversation with Mr. Fred. Bonney and others on the subject, and this was the effect of it.
1871. Had the springs been open before the tank was put down? Yes; the springs had been open years before. I saw large bodies of sheep watered there fifteen or sixteen years ago. I was driving round the country then with Mr. Bonney.
1872. Are you not aware that Mr. Bonney himself was very much against interfering with the springs, and very much in favour of a tank? I am not aware of that, because Mr. Bonney pointed out the absurdity of the thing to me later on.
1873. Oh! he did that later on; but not at that time? I am speaking now of Mr. Fred. Bonney.
1874. And I was referring to Mr. Edward Bonney? [No answer].
1875. *Chairman.*] Then, considering the abundance of water at the Peri Springs, and believing that they were on a travelling-stock reserve, you think it was a great waste of public money to excavate this tank? I do certainly think so.
1876. But would your objection apply in the event of springs being on the leasehold area of the run? No; not if the lessee had power over the springs, and refused to allow travelling stock to water there. It might not apply under these circumstances; but the present manager of the station, Mr. Hogarth, who would have no objection to stock watering there, often drew my attention to the absurdity of putting down a tank there.
1877. *Mr. Woore.*] But do you not know that the springs were within the squatter's lease? I was not aware of that. Mr. Hogarth told me that the object of closing the springs was to prohibit stock from watering there, and to compel them to go to the tank. I cannot, of course, say this authoritatively; but I believe it was done so that the stock might be made to pay for watering at the tank. In pointing out to me the absurdity of the thing, Mr. Hogarth stated that there is so much water in the springs there that it was simply ridiculous to sink a tank; and, as a matter of fact, the tank has never been used, and the springs are watering the stock still.
1878. Is it not within your knowledge that the springs and the tank together were insufficient to supply travelling stock with water during the last drought? No; such a thing as that is not within my knowledge.

1879.

E. Quin. 16 Feb., 1888.

1879. *Major Penrose.*] Apparently this tank was constructed on the recommendation of Road Superintendent Cambridge, who stated that the site had been approved of by some of the oldest residents in the district, to whom he was indebted for much assistance and information. He referred to this and to the Peri Sand-hills tank;—do you think that this is a fair statement? I can only say that Mr. Fred. Bonney complained very much to me of Mr. Cambridge fixing this place as the site of a tank, and also again complained of the tank being placed there. He also complained of a tank being placed at Copago, where he was sure it would quickly fill up with silt.

1880. Then, in the minute by Mr. A. P. Wood, of the Roads Branch, Public Works Department, it is stated:—"The Peri Springs tank: This work was constructed before I had any connection with this Branch, and I have never seen the site; but I know that it was approved by the Crown Lands Commissioner, and by those who petitioned for the works on the Paroo Road"? I merely tell you what Mr. Fred. Bonney said to me in reference to these tanks.

1881. You do not know whether the sites of these tanks were generally approved of by the other residents of the district? No; I do not know that. I am aware that the general policy of placing tanks on the road was approved of; but as to whether the particular sites selected met with approval I cannot say.

1882. Do you think that this particular spring is capable of watering all the stock that may go down that road? I would not like to say definitely that it was capable of doing this, but whenever I saw the springs there was a large body of water flowing out; and both managers—Mr. Hogarth and Mr. Bonney—told me that they did not see any necessity for a tank. Indeed, Mr. Hogarth came to me when I was a public man and complained of it as a waste of public money.

1883. Supposing that the yield from this place was only 7,000 gallons per day, would it not be necessary to construct other works, in conjunction with these springs, in case mobs of 10,000 sheep, which might drink 20,000 gallons of water, came along. The public might have had access to this particular water: but if the land were under lease they would have no control over it, and though a lessee might have no objection to stock watering at these springs, still he might object to the springs being meddled with? As to that I cannot speak; all I can say is that the managers of the station who controlled the springs said that it was absurd putting a tank there.

1884. But meddling with a spring often stops the supply—does it not? In some cases it does; not often, but in some cases.

1885. *Mr. Wood.*] These springs being situated in the lake, do you not think that the cost of opening the springs and erecting works for supplying water to the large numbers of stock that pass that way would have been equal to the cost of making a tank? Well, I have not taken the levels, but I should hardly think so.

1886. You are aware that the springs are in the lake? Yes; but whenever the springs are not accessible the lake is full of water. The works would always be submerged when the lake was full.

1887. Have you any idea of the number of travelling stock that have gone down the Paroo along the stock route within a given time? I cannot say, but certainly very large numbers have gone down there.

1888. And do you think from what you know of the springs that they would yield sufficient water to supply a very large number of stock travelling that way through a severe drought? I would not like to say that the springs would yield an unlimited supply of water per day, but I have no doubt that they would give sufficient water to water a very large number of stock if the stock were distributed over several days. Of course, if 50,000 or 60,000 head of sheep came in one day, I do not think the springs would be sufficient to meet their requirements; but if the stock were distributed over several days, I think the supply of water there would be ample, if proper appliances were put down for conserving water. I mean by proper appliances, buckle-plated iron tanks, such as are now being constructed; and if these were put down I think it would enable the number of stock I have mentioned to be watered.

1889. *Major Penrose.*] That would necessitate pumping water from the springs, would it not? Yes.

1890. *Mr. Wood.*] You say that this spring was opened—in what way do you mean? I mean that it was opened for watering purposes, and that the water was flowing out of it.

1891. But had anything been done to the spring? Only that a fence was put round it to protect it from the stock.

1892. Except for that the spring was in its natural state when the tank was made? Yes; with this additional exception—that there was a drain and a small dam made there to catch the overflow.

1893. And since the tank was made has not something further been done to the spring? Yes, I believe so.

1894. Do you know of your own knowledge? No; I cannot say that. I do not know what has actually been done, because I have not seen the spring for some time.

1895. But something has been done in the way of opening up the spring with a view of increasing the supply of water? Yes; I believe that Mr. Hogarth has done it.

1896. Are you not aware that the lessee's stock, grazing over a very large area of country adjacent to this spring, were entirely dependent on this spring for water? Yes, I am aware of that. I am aware that they were dependent for water on the spring in time of drought.

1897. And do you know that the spring was in fact a sort of refuge for the stock of the Momba station in time of drought? Yes; that is so.

1898. *Chairman.*] That being the case, Mr. Quin, do you not wish to qualify to some extent your previous statement, that it was undesirable to sink this tank in close proximity to the spring; because, in the event of the squatter requiring a very large quantity of water from this spring for the use of his own stock, is it not probable that none would be left to supply the requirements of travelling stock? Well, I think that if the spring were reduced to such a state as that, there would be no large body of stock travelling. When this place becomes a refuge for the station stock, very few travelling stock will pass, because it is only when the country is passable that a large amount of stock will travel.

1899. *Major Penrose.*] But the object of putting down public watering places is to make these routes passable? Yes, but a route may become impassable as much from want of grass as from want of water.

1900. *Mr. Wood.*] Is it not a fact that the lessee of Momba station during droughts watered as many sheep at the Peri Springs as they consider the springs capable of watering? Yes; I believe they did.

1901. The springs being the only permanent water on that large station? Yes; the only permanent water during drought time—it and the other spring that has since been opened.

1902. It is the only permanent water, then, for a large number of stock? The only permanent water for the country in its natural state was the Peri Springs; but if they depended entirely on permanent natural water,

K. Quin.
16 Feb., 1888.

water, and no works had been constructed, no stock could travel at all, because the gaps between one watering place and another were so tremendous.

1903. Are you not aware that the lessees of the Momba station were strongly averse to the springs being interfered with? No; I never heard them say anything with regard to that. I know that Mr. Fred. Bonney was one of the first to complain to me of a tank having been put there.

1904. *Major Penrose.*] Did they collect rates for the water from the travelling stock? No.

1905. *Mr. Woore.*] Do you think that the site chosen for the tank is a good one for catchment? Yes, it is a good catching place; but I do not think that it was a judicious selection, seeing that a large number of station sheep were watered at the springs within half or three-quarters of a mile of the tank, where there was every likelihood of the sheep boxing. Putting the tank there was very likely to lead to a great confusion; and if the springs got so dry that the station sheep only could be watered, there would be no use in sending stock to travel, because there would be no grass anywhere.

1906. Did the manager of the station himself suggest the site of the tank to Mr. Cambridge, the Road Superintendent? No; I am not aware of that.

1907. Is not the road by Peri Springs the road chosen by the public to travel their stock at the time when the country was opened to them to go anywhere they liked? Yes; that is so.

1908. It was in those days the most convenient road? Yes.

1909. *Chairman.*] Now, you mention two other sites for tanks that you took great objection to? Yes; the Tarella tank is one of them. My reason for objecting to the Tarella tank is that it is not required. When the excavation had proceeded some 7 or 8 feet, I communicated to Mr. Bennett personally my opinion that the tank was being placed in an unsuitable position. I objected to it, not because the catchment was not good, but because it was not necessary there at all. It was placed at a spot about 4 miles above Tarella station, and I had large dams near it, one of them being 3 miles beyond it. Both these dams were on the roadside, and available to the public for ten years before. The name of one of these dams was the Koonawatta, which was on land made a reserve by the Crown Lands Commissioner; and the other place was called White Cliffs, which was about 3 miles above the tank. The two dams were only 8 miles apart, and the public had access to them at all times. I certainly did not deem it necessary for a tank to be put down there, on account of these dams being within the boundaries of a stock route.

1910. *Mr. Woore.*] Were the stock routes proclaimed then? No; the stock routes were not proclaimed until quite recently, but the public road was there.

1911. *Chairman.*] Then the proximity of these dams to the public road made you think it was a waste of public money to proceed with the Tarella tank? It did. When I went to see Mr. Bennett, he told me in reply that the contract had proceeded so far that the compensation which would have to be paid to the contractor would equal the cost of making the tank to the original depth. The reason why I did not communicate with Mr. Bennett sooner was that I was then partially a resident of Sydney, and did not know the exact site of the tank. Mr. Bennett was always very anxious to get correct information, and to do what he considered best in the public interest, and paid every attention to the communications which I, as a public man, addressed to him. It was on that account that I at once communicated with him as to the site of the tank.

1912. Are you aware who it was that chose the site of this tank? I am under the impression that it was Mr. A. P. Wood, of the Roads Branch; but I cannot say positively.

1913. Do you believe that Mr. Wood is personally responsible for choosing the site of this tank? Yes, I think so. While there remains a drop of water in my dams I do not think the Government will be able to sell any water from this tank, because my dams are on the road side.

1914. *Mr. Woore.*] But before the stock route was proclaimed, did the public possess any right to water at these dams, or did they water their stock there merely on sufferance;—I think Koonawatta was reserved by you? Yes; to prevent it from being selected.

1915. *Major Penrose.*] Did you think that travelling stock had a right to water there? I never thought that I had any power to stop them. The stock always had power to go half a mile each side of the road.

1916. *Mr. Woore.*] At the time you speak of, very little stock travelled that road? Yes; a considerable quantity of cattle from Queensland.

1917. Very seldom, I think? Large numbers came even then. Mobs of 300 and 400 cattle used to come from the Bulla Downs, from Thargomindah, and Cooper's Creek.

1918. You consider, then, that, notwithstanding the lessee had conserved this water by dams, the public had a right to water their travelling stock there? Well, I never thought that I had any power to stop them, the dams being within half a mile of the travelling stock road and within the stock reserve.

1919. *Major Penrose.*] Which means that the travelling stock had a right to water there? Yes, I always assumed that they had such a right, and unless travelling stock were interfered with by the lessee I think that tanks should not have been put down. It is only when found absolutely necessary that they should be constructed.

1920. *Chairman.*] Was this Tarella tank excavated on a travelling stock route? Yes; right along the side of a road.

1921. In the case of the Mootwingee well, do you also think there is reason to find fault with the site? Yes; it is certainly within a mile or a mile and a half of a waterhole that I have seen dry only once during the past 20 years.

1922. Was this waterhole accessible to travelling stock? Yes; and there is a 3 or 5 chain road right down to the water.

1923. But when this well was made there was no travelling stock road? No; but we always used a road. The Land Act defended travelling stock going by the road. I never looked at the proclamation of these routes as altering the conditions at all.

1924. *Mr. Woore.*] Do you think that if the lessee chose to fence in water, conserved at his expense, people travelling with stock would have any right to pull down his fences and take the water? No, I do not; because if they did the owners of stock would not have enough water.

1925. Then the water was used merely on sufferance? There was access to a large body of water, apart from the purchased land.

1926. But, under the circumstances I have stated, would not the water be used merely on sufferance? Yes; on the purchased land; but there was a great deal of water which was off purchased land.

1927. If the lessee chose to fence in the water conserved by him in dams made at his own expense, would the public have any right to pull his fence down and water their stock there? The lessee could only fence in a certain portion of the frontage, and there would be a large portion of the balance accessible to the public.

1928. *Chairman.*] In carrying out these works, I presume that Mr. Bennett, the Commissioner for Roads, can act only on the advice of his subordinates? Yes; certainly.

1929. In this instance you said that it was Mr. Wood who had selected the site? Yes.

1930. And if any mistake is made, it is Mr. Wood who is to blame? Yes; whoever selected the site.

1931. *Major Pearson.*] Mr. Wood says, at the conclusion of his letter of 3rd June, 1884, that "I may add that I gave Mr. Quin, M.L.A., a list of the works let during that visit, and that the people in that district, through that gentleman, expressed their satisfaction at the course adopted by me at the time"? Yes; that is quite right; but in giving the list, I may explain that I was then the representative of the district, and Mr. Wood dropped me a note, I suppose in consequence of my representative capacity. On the back of this note he had a list of names of various works, including an item—tank at Tarella. Well, as Tarella is 40 miles through, I had no idea of the particular spot to be selected. Meenamurtie is 35 miles through, and the site there also was not specified. As the people of the district had been very eager for the construction of these works, and as Mr. Wood said that that would be a convenient opportunity to get them done, I wrote to Mr. Bennett, saying that Mr. Wood's action was very generally approved of; but I must say that I did not know where all the sites of the tanks were, nor did I think it my province to interfere. When an officer wrote to me about a matter of that kind, I did not consider it my duty to bother my head about the exact sites to be selected.

1932. This letter was prior to the time you found that the tank at Tarella had been sunk 9 feet deep? Yes; I did not know where the tank was to be put until it was down 9 or 10 feet.

1933. *Mr. Woore.*] Where else would you have put a tank at Tarella? I do not know that I would have put a tank there at all.

1934. Is it not a fact that the position chosen for this tank was the best position, as a catching place, on the road? I would not say that, because the road is full of good positions. The tank was certainly put at a place where it would fill very readily.

1935. *Chairman.*] Then, you qualify your previous statement that you were at first quite content that the tank should be put there, and that afterwards you found reason to find fault with it? I do not think that any necessity had arisen for a tank there. Tanks were wanted in other places much more.

1936. On the same run? Yes; a tank could have been put 5 or 6 miles above the tin hut to greater advantage. When the upper portion of the creek was dry the lower portion had large dams which held out. I never interfered with travelling stock for ten years previously.

1937. Therefore, although you gave your approval to the construction of works on this particular run, you were not aware that this unfortunate site would have been selected, and that a place would have also been selected in such close proximity to permanent water? No; certainly not. I do not know what revenue has been received from these tanks for the last three years; but I should imagine that it would be very small.

1938. In good seasons like the present, many of these tanks are not required at all, and, therefore, no possible return could come in from their use? Yes.

1939. *Mr. Woore.*] If station improvements were sufficient for the use of travelling stock, what necessity was there for making any public watering places at all where there were such improvements? I only mentioned one or two cases as being unnecessary. The bulk of the other watering places are, I think, of great use, and are properly situated. I am merely finding fault with the expenditure on these sites, which I think might have been better chosen. To show that I was not selfish in the matter, I urged that stock routes should be put through my run, and I had a very great fight with the Department to get them proclaimed. Mr. Lewis and others had a notion that reserves every 7 or 8 miles, and several miles square, would suit better than stock routes.

1940. *Chairman.*] Do you think that it would be desirable that travelling stock routes should be wholly cut off from the leasehold area? No; I think it would be decidedly in the interests of most of the properties to allow things to remain as they are. In many cases stock routes follow creeks or rivers, and if they were taken from the runs the lessee would not have access to the water. It is a far better plan to have a give-and-take policy, by which the lessee may use the land and allow the public to use it when they require it.

1941. But where there are no permanent rivers and creeks, then do you not think it would be desirable that the stock routes should be fenced off from the leaseholds? I do not think so, because it is only very rarely that stock are annoyed or bothered on these routes. The cost of fencing would be very great, and no one would have control over these large areas of country. Now the stock have a large area to travel over, and are not confined; so that, in the interests of travelling stock, I do not think that this should be done.

1942. Of course you are aware that the lessees have to pay rent for these routes, although the land is used by travelling stock;—do you think that is fair? No; I think some allowance should be made in the rent for the fact that a stock route passes through a run.

1943. But you do not think that it would be desirable to fence off travelling stock reserves, because then the lessees would have no necessity to urge on the travelling stock the regular number of miles per day? I think all round that it is better the stock routes should be within the runs. Some few squatters may abuse their rights in connection with the stock route, by overstocking it, but generally this is not the case.

1944. Do you not think that these reserves, if taken off and fenced in, would retain very much more grass than at present for the use of travelling stock? No; I do not think so. In some places in South Australia, where the stock routes are fenced off, they are as bare as the floor of this room. I think the present arrangement works very well, if only some consideration is given to the holder: in fact, I think it would be disastrous to some runs if the stock routes were to be fenced off. Some of the stock would hang fire on the road, instead of travelling the requisite number of miles in a day. I think it would be better if some sort of partnership between lessees and the travelling public were established; let the lessees pay reduced rents. The conditions in Lower Riverina are different from those further back. I think the lessees in the back country deserve different treatment and consideration, more particularly where there are no large areas of purchased lands.

1945. *Mr. Woore.*] As a rule, does not the squatter get the lion's share of the grass on the stock route? Well, I would not say that; but they certainly get a large share. I have a stock route on my own run, and I get a good deal out of it.

E. Quin. 16 Feb., 1903.

1946. In some cases, do not the owners take care that no grass is left on these reserves? Yes, in some cases,—sufficiently so for me to say so; but generally it is not the case. There may be an odd squatter who keeps a lot of dogs to drive travellers away, but very few of them do it. It would be difficult in a 7 or 8 mile paddock to keep stock on the line of route. I have one paddock 16 miles square, and I should like to know how I could keep stock on that stock route and eat the grass off of it to a greater extent than off the adjoining land. The country is too poor to be subdivided in this way into small paddocks.
1947. *Chairman.*] Do you think it desirable, in the event of the Government excavating a tank on a public road, that the lessee should have the power to water his stock there? Yes; in the event of the place being one where a caretaker is not required. The lessee should be the caretaker, with the privilege of watering his own stock and looking after the watering of the travelling stock; but where the receipts from the tank will pay a caretaker's salary, I should certainly advise that the tank be kept in the hands of the Government. If only to avoid loss on the part of the Government, I would recommend such a course.
1948. In that case, the lessee would have no right to water his travelling stock? Certainly not. If a tank will pay a man ought to be kept there, and the work kept under the permanent charge of the Department. That is my opinion. No doubt I personally would like to avail myself of the Government tanks, and would use them if allowed to do so; but if the general public used it sufficiently to pay a caretaker's salary, I think the Department would be wrong to allow me to use it at all—that is, if the tank has been put down on a stock route for a specific purpose.
1949. Would not this system be possibly open to abuse—would not squatters have tanks put down for their own use rather than for the use of the public in the event of their becoming the caretakers themselves;—do you not think that it would lead to abuse of this kind, and that tanks would be made presumably for the use of the travelling public, but really for the squatters' own benefit? I do not think so; because I do not imagine for one moment that the Government would construct a tank merely on the recommendation of a squatter, and without the work having been examined and reported on by some responsible officer of their own, who certainly would not be fit to hold his position if he could not be trusted to report fairly on the necessity of a tank or not. I think that it is an absurdity to imagine that the Government would carry out works on a squatter's run on the squatter's recommendation. I know that there is a first-class officer in my district now who would not recommend a tank where it was not wanted. I would like to mention the name of Mr. Hanna, who is a first-class man. I can hardly think that the Government would construct a tank on my recommendation unless it were confirmed by some responsible officer.
1950. *Major Penrose.*] You speak of Mr. Hanna, an officer of the Roads Department;—would not the question of selection of sites of tanks be one for the Mines Department? I am speaking now of the competency of Mr. Hanna. None of the officers of the Mines Department have not been so good.
1951. You quote Mr. Hanna as being a man who would report the advisability, or otherwise, of a tank being placed in a particular position? If works were reported on by such a man as Mr. Hanna, who, I am quite certain, is fully competent to make such reports when called upon, there would be no danger of the squatter's recommendation being carried out unless it were a good one. To illustrate my meaning, the tank at Tarella is now finished excepting the supply tank, which is under the charge of the Works Department. A well 10 miles away is in charge of the Mines Department; but if any report is called for in regard to either it is possible that the two officers will make separate journeys to both works. For instance, Mr. Tully, the stock inspector for Wilcannia, may find it necessary to inspect the Mewanmurtie well; but no matter what little alteration the Tarella tank requires he has no control over it, although he is only 10 miles away.
1952. The Tarella tank, not being finished, has not been handed over to the Mines Department? Yes; and although there is a caretaker under the Works Department who has been in charge of it for two years.
1953. *Chairman.*] For what reason has this tank not been transferred to the Mines Department? Because the troughing is not completed. The tank is there, and the water also; but until the whole thing is finished the Mines Department will not take charge of it.
1954. Do you seem to think that there is a superabundance of officers in the Mines Department. Mr. Tully, being overseer, is quite competent to undertake all the duties of inspector of public watering places, as well as inspector of stock;—and if that be the case, why pay two highly salaried officers to do the work of one? I cannot understand it. I cannot understand why an inspector of public watering places should be appointed when there is another officer in the Mines Department—it may be said he is a stock inspector—whose business it is to travel from station to station and inspect these works. I think that with a small additional sum as salary he might undertake the duty of inspector of tanks and wells.
1955. Then you think the office of inspector of public watering places is a sinecure? I think it is unnecessary, and I believe that Mr. Tully could do the work without any serious difficulty. I think that Mr. Tully is quite as competent to go and report upon these works as any of the men they have.
1956. *Major Penrose.*] To report upon everything from start to finish—construction, maintenance, and supervision? I would not say that. He has put down tanks for me of 30,000 yards, and did the work well. He did it to my satisfaction, and to the satisfaction of many others at Momba. He is quite as competent a man as Low, or any other man that you could choose.
1957. *Chairman.*] Do you know anything about the Copago tank? A tank and dam was constructed at what is called Copago Lake, and it was generally thought that it would fill up with silt, and it has filled up.
1958. The works there are now utterly useless? Yes; the dam has been washed away, and the excavation is silted up.
1959. *Major Penrose.*] Do you know who selected that site? I think it was Mr. Cambridge; but I would not like to say for certain.
1960. *Chairman.*] Do you not think that it is exceedingly undesirable to put dams in this loose soil? Yes; from my experience I would say that it was. I should be very sorry now to put dams on Tarella Creek, now that I know the silting up is inevitable. We would have been very much better without dams. I found the waterholes in which no dams have been made have silted up too. The waterholes on my run have filled up as well as the dams.
1961. And during strong floods these dams were washed away? Yes; the creeks are too rapid and too savage. They come down with too great a rush. They rush up to their highest point and go down again within half an hour.

1962.

1962. The officer who selected this site might have only have done what the squatters themselves have done—put down dams which have proved a mistake? Yes; and they might not have calculated on a large body of water coming down there; but I think the officer might have known that the place would fill up, and should have observed that a great body of water would come down there. It is a badly chosen site, and unsuited to this particular class of country. I do not think that a squatter would have chosen such a site.

1963. *Major Penrose.*] Do you think that, as a rule, the tanks constructed by the Works Department are as well chosen and as well constructed as those made by the squatters? I would like to say a word or two on that. In many cases they are well selected, but not so well constructed. They are as carefully built tanks; but in some cases I consider that the slope of the tank is too steep. I may add that I think generally the sites are well chosen.

1964. *Chairman.*] The next question we have to consider is the faulty construction of these tanks. You have already stated your complaint that the batter is too steep? Yes; decidedly too steep.

1965. Do you mean that they are too steep to stand the action of the water, without reference to the watering of stock? Yes; there are some of them too steep for stock, and the wash of the water is so great that the banks wash away, although stock are not allowed into the tank at all. The wash of the water, when it is down 2 or 3 feet from the top, causes the sides to tumble in. The soil crumbles, and the water percolates through the friable ground, causing it to tumble in.

1966. Do you know what the usual batter is to Government tanks? No; I do not. I have never read the specifications for tanks; but I know that from having seen them, they are too steep.

1967. But, as a matter of fact, the batter of Government tanks is 2 to 1? Well, that is too steep.

1968. So that, if the specifications provide for a batter of 2 to 1, it is a mistake? Quite a mistake, I think. I do not know whether it would be in this particular country, or in particularly hard soil; although I am inclined to think that in all cases 2 to 1 is too steep a batter. Of course, we always make ours 3 to 1 and sometimes 4 to 1; and, even if the water was pumped out, we would do the same.

1969. *Chairman.*] Of course, in that dry country the amount of evaporation is very great, and the more you confine the water the less evaporation takes place? Yes; I am aware of that.

1970. Consequently, a long batter will lead to much more evaporation than a steep one? Yes, I know that is the case; but I think the disadvantages are greater than the advantages. Besides which, the Government are put to greater expense by having steep sides to their tanks. In the other tanks the stuff can be taken out anywhere with ploughs and scoops; but in a 2 to 1 tank this cannot be done, and consequently the cost of excavation would be increased. In some instances, where the soil is very hard, I think the batter could be made steeper—say 2 to 1—that is, if it were intended to pump out the water into troughs.

1971. Do you think it more desirable to pump the water out or to allow the stock to drink from the tank itself? I should say to pump the water out.

1972. In all cases? Yes; in all cases.

1973. Are you aware of more than one instance where the soil is very porous, and the effect of treading in the tanks makes it more firm, and improves it? I think all tanks would be improved if the stock were allowed to go in. I should let sheep in for two or three fillings, and then pump the water out afterwards, when the sides are solid. When the bank becomes retentive and will not allow the water to percolate, it is then preferable to pump the water out.

1974. *Major Penrose.*] Do you think that it would be detrimental to health to allow stock into a tank the water of which is used for human consumption? No; I have lived out there in that country for twenty years, and used the water all that time, more or less. In fact, we had no other water to use, and we felt no ill effects from it; but in some cases perhaps ill effects might arise. But I think if it had any such effects we would have heard of them.

1975. *Chairman.*] In certain localities, where the rainfall is fairly ample, you do not think there is the same necessity to conserve water or to use pumping machinery? Yes; and in illustration of what I say I may mention a tank in Lower Riverina which is not 10 feet deep, and this tank has never been dry for many years, although the stock have always been allowed into it.

1976. Now, are you aware that the Government pay very much more for the excavation of tanks than squatters? Yes; I am aware of that. In most cases the Government tanks are deeper than the squatter's tanks, and in other cases the specifications are much more severe than those under which squatters carry out their contracts. In some cases, indeed, the Government specifications are unnecessarily severe; they are too precise as to the batter and the distance as to which the earth has to be carted from the excavation. Then, I think, the system of progress payments is at fault; and it is very hard to get money from the Government, which deters a great many men from undertaking Government contracts. Contractors find very great difficulty sometimes in obtaining the concluding payment, having to wait for two or three months sometimes before they can get away. I know one working-man, having a large plant on his hands, who was anxious to go away and obtain another contract, and yet was unable to do so on account of the danger of disputes arising. I wrote about this to Mr. Bennett, and he at once made provision that Mr. Hanna, or some of his officers should make arrangements for examining the work, and after it was examined he telegraphed the money up to the contractor, which saved a great deal of delay; but even then the contractors had a long time to wait before the officers who examine the work can come round—perhaps once in three months. A man cannot run and get £10 or £20, as he could when doing station work. It would not pay him to go to Wilcannia or Hay to obtain such small sums.

1977. Consequently, it is only men with some means who can afford to tender for these works? Yes.

1978. And that necessarily lessens competition, then? Yes; I know some contractors who would not dream of tendering for Government work at all. I know some men who have done work for me at 1s. per cubic yard, and who, if they were tendering for the Government work, would charge 1s. 4d., for the reasons that I have stated; and even higher rates have been paid in some cases to my own knowledge.

1979. We have had it here in evidence that as much as 1s. 9d. per cubic yard has been paid? Yes; I have known 1s. 9d. to have been paid; and, owing to the severe conditions imposed upon him, I think the man was really entitled to demand a larger sum.

1980. Would not the distance from water increase the cost of the work? Yes; and in very many cases the contractors are bound to time, which, I think, also increases the cost. Very often, however, when the matter is fairly represented to the Commissioner for Roads, the contractor gets an extension of time.

E. Quin. 10 Feb., 1888.

But in taking a contract a man always has this point in view—that he may be compelled to complete the work within a certain time.

1981. One other matter. Sometimes, as you are aware, very hard strata is met with in sinking a tank that could not have been discovered by a trial shaft? Yes; I have known several shafts having been put down and still rock and cement were met with afterwards. I knew one case where an excavation was being carried out, and a rock like a pinnacle, or a column, was met with.

1982. The contractor, under the specifications adopted by the Government, would be compelled to excavate this at the same cost per yard as he would excavate earth? Yes.

1983. Had such a thing taken place on a squatter's station the squatter would make allowances—would he not? Yes; at Muntherangie—the station next to mine—Mr. Kennedy has paid 2s. 6d. for excavation of rock. This is a very stony part of the country, and rock is to be met with near the surface, so that unless he paid this high price he could not have got the work done at all. The squatter or his representative is always on the station, watching the work as it progresses, while the Government only send an officer at long intervals, so that some slight delay must of necessity take place; and then the severe conditions of the specifications rather frighten the men who are up there. In most cases, as I have said already, the Government tanks are much deeper than private tanks, and the finishing work required by them is very much nicer than the squatter exacts.

1984. Are there any other reasons for this increased cost? No; I think I might say that squatters, as a rule, allow their men to put the dirt around the slope, allowing it to form itself by the fall from the scoop; but the Government cause it to be battered and sloped, and the earth taken further away from the excavation; the top levelled, both inside and outside. The dirt must be perfectly sloped—which all means money, as in many cases it has to be finished with a tip dray. The squatter never exacts this. I must say that many of the Government works out there are splendidly done, though probably at a very much increased cost. Of course there are faults here and there in some of them; but many of them, as I have said, are splendidly executed.

1985. Now, as regards the expensive forms of machinery;—have you observed the kind of pumps used in lifting the water from these tanks? Yes; I have seen some of the pumps, both steam and horse power, used on several of these tanks. I think that unless they are used in raising the water over the embankments to pump water in, the steam pumps are unnecessary; but if the tank is in a good catching place, and the water has to be pumped out for the use of travelling stock only, I think hand pumps would meet all the requirements—say, with one or two men, when they were very busy, to help the caretaker. More particularly is this the case if there was a small reserve tank on top, of 10,000 or 20,000 gallons, to which the water could be pumped up in the caretaker's spare time.

1986. *Major Penrose.*] Is there not a service tank to be kept full? Sometimes the caretaker is there for weeks doing nothing.

1987. Then you think that steam pumps are not necessary? Yes; except where they can be used as a double pump, and in that case they are very necessary.

1988. *Chairman.*] Would the same objection apply to horse-power as to steam-power? The objection to horse-power is that in very bad times there is very little grass, and the feed has to be purchased, which in that dry country is very costly.

1989. But do not steam pumps involve the employment of a more intelligent and costly caretaker? Well, not always so. I know some very ordinary men who can work these pumps. The pumps are now so simple that with a few lessons any ordinary man can manage them.

1990. Then you would recommend that in all cases, except this you have mentioned, hand lifts should be used? Yes; I found the M'Connan pump a most useful machine, and I think it would be most useful for the purpose. Sometimes, if you had a sudden call upon it, it might be that it would take three or four men to get up a supply; but in such a case as that there would be a large number of men with the stock, and they could be made to help. Besides, the caretaker has sufficient time to keep his tanks full. I think, if necessary, it would be cheaper to have two men there if one man was not enough and sufficient men did not come with the cattle, than to have a steam pump.

1991. *Major Penrose.*] Did you ever make any representation to Mr. Bennett to that effect? No; but I told him that the machinery, unless there was a proper demand for it, would prove too costly. He said not; that he had some very simple pumps, which would be quite cheap. I remarked that what might suit the Government might not suit the squatters. Of course, in a very dry country, where a large number of stock had to be watered, an engine might be better than any other form of machinery; but where the thing is used only occasionally, and where a man is stationed as caretaker, I think that the hand pump would be ample, as in South Australia, where they use the tanks and wells ten months in the year. In that case steam pumps would be the cheapest, because of the large amount of work that had to be done.

1992. In using steam pumps you must have wood? Yes.

1993. Then the cost of supplying wood would be very considerable? We would try and collect a large amount of wood in good seasons; but, as a whole, I think that at the bulk of the watering places hand-power would be ample.

1994. For all requirements that are likely to arise for several years? I will not say that.

1995. These works are intended to be permanent, are they not? Yes; but hand pumps are very cheap, and might be replaced by-and-by, if another kind of machinery were required. What I mean to say is that it is not necessary in many cases to employ steam pumps.

1996. *Mr. Weore.*] But having steam pumps on these watering places now, you can see no object in removing them? No; except where fresh tanks have been sunk I should not employ them. In all cases, in wells steam machinery would be the best.

1997. *Chairman.*] We will now go on to the matter of fencing;—do you know of any fences that have been erected at too great a cost? No; I have never seen the specifications of the fences, but I have seen the fences themselves, and noticed them particularly.

1998. Do you think the fences round these tanks are unnecessarily expensive? Well, seeing that they are Government works, and that they have to last for a great number of years, I do not think so. They are very much dearer than the squatters' fences; but then they have a greater number of years to live. The posts are closer together than ours on runs, and in some cases they use more wires than we do; but then the pressure of travelling stock necessitates the erection of a strong fence.

1999.

1999. Would that apply to the fences round the caretaker's paddock, as well as to the fence which is put up as a protection round the tank? I think the fences round the caretaker's paddocks would do very well if they were lighter; but, as the tanks are there for all time, I think it is well that they should be protected by a good and substantial fence. A squatter has only a fifteen years' lease of his run; but the Government are there for all time.

2000. Do you not think that the gauge of the wire is unnecessarily large? Well, we have found that No. 8 is ample, and that it lasts a great number of years.

2001. You think then that the larger gauge is unnecessary? Yes; except for the top wire. I think that No. 6 is not too large for a top wire. There is a difference between the squatters' fence and the fence round the tank. Large mobs of cattle come down from Queensland to these tanks, and they would probably rush about a good deal and knock the fence about, whereas a stronger wire would offer them more resistance. It could not be knocked about so much, and it would resist the pressure better under such circumstances.

2002. You are also aware that if No. 4 wire happens to be broken, it is impossible for one man to mend it? Yes; No 4 wire is like bar iron, but I think No. 6 might be mended by one man.

2003. So that in every case you think that No. 4 wire was unnecessary? Yes.

2004. Are you aware that some of these fences have cost at the rate of £120 per mile? No; I was not aware of that.

2005. So that under no circumstances should the fencing round the caretakers' paddocks have cost so much per mile? I certainly think it was unnecessarily costly. I think that fencing up to £70 or £80 per mile may be made quite ample for all purposes. The majority of fences that I have seen round public watering places are very good ones.

2006. Now, have you observed the gates that have been put up by the Government on entering these caretakers' paddocks? I do not think I noticed them particularly.

2007. *Major Penrose.*] Have you ever noticed any defect in the construction of this fencing, with regard to having no straining posts? No; I cannot say that I noticed any fences without straining posts. On the 70-mile track there is some fencing which has fewer straining posts than I would have put down.

2008. We have had it in evidence here that sometimes there is considerable interference with caretakers and others. For instance, a road superintendent may see some work which he thinks should be done by the caretaker. He can, of course, only report to his own superior officer, and then the matter has to be referred to the Mines Department and so on? Yes; I know a tank on the Paroo where Mr. Tully, the stock inspector, recommended that the place should be moved. He wrote down to his Department, and his recommendation had to be forwarded to the Works before the officer of the Works Department could report on the matter; and he had to proceed to this tank some considerable distance out of Wilcannia—some 170 or 180 miles—in order to report upon the alteration. He reported on it, and the alteration was carried out and cost £3. I am speaking now from hearsay. I am of opinion that the expense and salary of an inspector could have been saved if Mr. Tully, who is quite competent, had been allowed to alter the fence. I think the expenses of the man who went to report on the fence must have been very considerable, because he had to pay two visits, which must have been rather expensive, apart from the time lost. When I heard this I went and told the Minister for Mines, and said to him that I wished he would inquire into the matter in the public interest. Afterwards he told me he had done so. I had no interest in the matter beyond seeing that this wasteful expenditure was stopped. I think that these stock inspectors should be allowed to see to any little repairs that might be required after the tanks are handed over.

2009. *Chairman.*] Then, not only does this cause a large and useless expenditure of public money, but it produced friction between the two Departments? Yes; I should imagine that it would produce great friction.

2010. Are you aware of any excessive prices having been given by the Government for work, and that afterwards it was being sublet to other contractors? I have no positive knowledge on the subject; I only heard it.

2011. Are you aware of any faulty construction of wells, and particularly do you know of wells where all the head gear—the whim, and so forth—had been erected before any proof was obtained that water was there, or that it was of any value? No; I cannot say that, except under certain conditions, when the head gear would be required to haul up stuff, and when it could not be got up in any other way. There are no cheap ways of getting up the stuff without erecting a whim, and if you do not erect a whim, it will cost a great deal of money.

2012. Then you think that in all cases a water auger should be used to test whether there is any water there or not? Yes; if you can get the augers that are reliable. My experience in many cases is that where water augers have been used you cannot proceed any further if a choke occurs in the bore and a fault occurs with the tools. I certainly think that if you can get a shaft down it is better than boring.

2013. That can be done at a very small cost; but we have heard here that it costs £1,000 to sink a well? I think that is altogether too expensive.

2014. Are you aware, again, why the Government pay extra rates for sinking wells, as compared with the rates paid by private individuals? No; except that they exact very careful work, and are very particular about the kind of timber used. They excise any timber showing gum veins, although a squatter would accept it, and the conditions generally are very much more stringent than the squatters'. I have seen very good timber rejected, which might have been used with advantage.

2015. Have the huts for caretakers ever come under your observation? Yes; I have seen them in many instances. I think the wood is unnecessarily heavy, and in many cases the increased cost must be very considerable, because they are some distance from water. The erection of these cottages must have been a considerable item. I have seen some of the huts, which were 10 feet square, made of enormous blocks of wood which had to be carted 80 or 90 miles.

2016. *Major Penrose.*] I will read for you the specifications for huts. [*Specifications read.—See Appendix.*]? In the huts I put up I never used any timber stronger than 4 x 2, excepting in the ground-plates, which we would make 4 x 3. The uprights were mortised into these plates.

2017. *Chairman.*] Have tanks with troughing come under your notice? No; all the troughing that I saw I thought was very good generally. The early troughing was faulty, but the later troughing was very good; but I do not think that there was any fault to be attached to the officers for the early troughing, because

E. Quin. 16 Feb., 1886.

because it was the usual troughing adopted by squatters at that time. Latterly, the troughing has been very good, as I have said. It is of plated iron, which I consider very good indeed; so much so, that if I were putting it down again, I would try and get the same thing.

2018. Is not composition sometimes put on this troughing? I think they paint it; but if it were galvanized I should think it would be better.

2019. Can you give us any reasons, except those already mentioned, why the apparent cost has been so great, and where the work has given so much dissatisfaction, although nothing is attributable to the officers of the Department who selected these sites. You know some of the gentlemen on the Works Department who have had the control of works in the interior? Yes.

2020. Was Mr. Wood one of them? No, he never had control; he was simply sent to select the site, and did it.

2021. Do you think that Mr. Wood is a competent person to undertake this duty? I would not like to say that. As to his competency, I think he is a professional man: but still I believe he has made mistakes.

2022. You think that a practical man would be very much preferable to select sites to a professional man? I should hardly like to say that, because a professional man should be very competent to select sites, take levels, and so forth; but I think that sufficient consideration has not been given to the opinions of local men. I think it would have been very much better had the officers asked the opinion of local men, and obtained a consensus of local information on the subject of sites for tanks. I really think it would have been better if the work were done, aided by two local men—no man to be consulted about work on his own run. With regard to progress payments, I think the managers of the runs adjacent to the work might be asked to measure it up, and I think that the Government might be fairly asked to pay it on their certificate. A great saving would thus be effected in the coach fares and salaries of inspectors, and so forth. Had I been asked to report whether a tank was 8 or 10 feet deep anywhere near my run, I could have sent down the information for a two-penny stamp. Outsiders there can help the Government considerably in the matter.

2023. *Major Penrose.*] Then, you think the fault is more in the system than in the individuals administering it? I certainly think so. An officer sent out there into that country by the head of his Department must do as he is instructed to do.

2024. *Chairman.*] Are there any other suggestions that you would wish to make, and which, in your opinion, might, if adopted, lessen the cost of these works to the country, and lessen the friction that has arisen between these two Departments? Well, I think one Department, if it could be done, ought to have control over these works. I do not mean to say that one should have the construction and maintenance; but in that case a good deal of expense might be saved, as in the instance I mentioned before, where the tanks and wells were in the same locality, and where two different officers were required to inspect and report on them before they were handed over to the Mines Department. Here was an instance of two officers having to go out and spend their time in examining watering places which were within 10 miles of each other.

2025. Consequently, in the event of one Department having the whole management of these works in its hands, no friction could arise in future? No; no friction at all. It could not happen. I know a case where a site selected by the officer of one Department was condemned by the officer of the other Department, and yet the tank was constructed. One said that the tank was not in a suitable site—that the water would not flow into it—and hence this great delay has occurred.

2026. Then I presume this had to be referred to some one else? Yes; to another Department. One Department recommends and constructs, and the other takes it over and maintains the works.

2027. Then, in the event of a disagreement, to whom is the matter referred? It is settled in Sydney in some way—how, I cannot say; but such a thing necessarily produces a great deal of friction, because each Department naturally defends its own officer.

2028. Have you any other suggestions to make? Only this: that a large number of cattle come down from Queensland, and these cattle, in conjunction with our own, use tanks which have been made at great cost. I think they might very fairly be called on to pay something for the advantages thus afforded to them when they get their permit to travel, whether they use the water or not. Stock-owners in this Colony have no such advantages in the other Colonies; they have to pay a stock tax. We have made this water for the stock, and even if the seasons are good we should not be asked to lose the interest on the money that has been expended on making these works. Cattle from the other Colonies use our grass for two or three months during the year, and drink our water, for which they do not pay a farthing. In fact, they get their grass and water for nothing, while residents of the Colony have to pay rent for the stock routes which these cattle graze over for nothing.

2029. *Major Penrose.*] Besides being taxed indirectly for the works themselves? Yes; I think it would be a very fair charge to make for stock coming in. In addition to that a small charge might be necessary on the runs of the Colony.

2030. *Chairman.*] Have you any other suggestions to make, or any information to give, especially in regard to excessive cost and what has been called red-tapeism? Well, I don't think that I have anything to add. I fancy that more use might be made of local help in the selection of sites. In Queensland, where I have a station, my manager is a member of the Divisional Board, and all such works are done by that body. There is no costly engineering skill needed at all. Four or five of these men construct all the tanks, the cost of which comes partly out of the Consolidated Revenue and partly out of taxation imposed on the station-owners themselves by the Divisional Board Act; so that care is taken that there is no wasteful expenditure of public money, and that tanks are only constructed where they are immediately required. As soon as new tanks are required they are constructed.

2031. So that you would hand the whole thing, the control, supervision, and construction, over to the local boards? Certainly, if we had a Local Government Bill. That is our experience in Queensland, and it has been found to work very well. Victoria can hardly be compared to this Colony, because it is much smaller in area; but New South Wales is capable of a very fair comparison with Queensland. All local works, such as tanks and wells for the passage of stock, a local body has to construct. In doing this work they are subsidised by the Government, and the arrangement has been found to work splendidly. I have to find my share in the taxation, under the Divisional Board system; but then I get a *quid pro quo* in the benefits received.

E. Quin. 16 Feb., 1888.

2032. *Major Pearson.*] Supposing the construction and maintenance of these public watering places were all vested in one Department, the change would not necessarily have any effect in decreasing the excessive cost of construction in the first instance? I think it would. You must, I think, take into consideration in each case what it costs the various officers to travel about to these tanks. I think a very considerable saving might be effected if you had one officer doing this work instead of two or three.
2033. Yes; but the road superintendents would be wanted there whether tanks were made or not, and a stock inspector would be required just the same? Yes; but my arrangement would reduce the travelling expenses. All payments to contractors might be very much expedited and progress payments made on the certificate of certain persons named for that purpose, instead of waiting for months for some person to come and inspect the works. This would reduce the cost very much. The contractors are sometimes reduced to destitution in waiting for their money, and the practice begets a feeling among the men that they will not be readily settled up with.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

Hugh Giffen M'Kinney called in and examined:—

H. G. M'Kinney. 16 Feb., 1888.

2034. *Mr. Weare.*] What are you? I am a civil engineer.
2035. Are you at present employed by the Mines Department? Yes.
2036. In connection with tanks and wells? No; I have nothing to do with tanks and wells. I am engaged in work connected with water conservation.
2037. Can you give us any information as to the faulty judgment in the selection of sites for tanks and wells: Are you aware of any tanks which are not properly situated? No; I am not. I have never seen one of the Government tanks at all, but I have seen plenty of those belonging to the squatters.
2038. Then the only thing you can give us evidence about is the question of divided control? Yes; that is about the only thing I can give evidence on.
2039. *Major Pearson.*] I would like to ask you some general questions in connection with the engineering part of tanks and wells, the specifications, and plans, before we proceed any further? I wish you would allow me to state at the outset that I have not given any special attention to the construction of tanks and wells. I have been employed all my lifetime in connection with works for water conservation and supply, but they have been all of a different kind.
2040. Complaint has been made with regard to the design of the Government tanks. In regard to the steepness of the batters and sizes of the tanks, it has been stated that the batters are a great deal too steep, and that they wash away through the action of the waves. The batter I am telling you of seems to be 2 to 1? With regard to that matter, the best way I should think would be to decide each case on its individual merits. I should not be disposed to lay down any general rule in dealing with such a matter.
2041. *Mr. Weare.*] You think that a hard and fast rule would not be advisable? No; I do not think so.
2042. And that each tank ought to be constructed in accordance with the nature of the ground in which it is to be put down? Yes; I think that in many cases a batter of 1½ to 1 would be amply sufficient. However, that is a matter which varies in every part of the country.
2043. *Major Pearson.*] Do you think that generally a slope of 2 to 1 would be sufficient for a batter to a tank where it is intended to pump the water out into troughs for the stock? Yes; in all parts of the country where I have been I think a 2 to 1 batter would stand very well—that is where stock are not allowed in the water; but I understand that the practice has been nearly, if not quite, given up—I mean the practice of watering the stock direct from the tank.
2044. Now, it has been said that the waves will wash away the banks;—would that not be likely to occur, even if the batter were 3 to 1? It would occur undoubtedly, though not to the same extent with a flat slope as with a steep one.
2045. Another point has struck me that, in any case, even supposing the batter is too steep, and that the height of water is at the average level, this washing away can make no practical difference, because the amount that falls into the bottom is gained at the top? That is quite correct to a certain extent; but a shallow tank loses more by evaporation than a deep one.
2046. But would the amount of stuff that would fall in from this cause materially reduce the depth of water in a tank in which there was a large excavation of, say, 20,000 yards? There are some cases in which it would. It is astonishing how quickly a tank silts up. I have heard of a tank filling up partly from silt and partly from the falling in of the banks so rapidly that when an experienced pastoralist expected to find 11 or 12 feet of water, he found only six.
2047. *Mr. Weare.*] Do you approve of the principle of making the batters of tanks as steep as the ground will allow, with the object of exposing as little of the surface of the water as possible to evaporation? In the main, that is a sound principle to go upon.
2048. And you think that generally a batter of 2 to 1 is not too much for most soils? Well, it would stand in most places that I have seen; but of course that is a thing which varies very greatly. I know that there is ground near Urana that would stand a batter of 1 in 1 very well; but this is stuff which the people in that locality call cement.
2049. Would making embankments round a tank so shelter it as to reduce the amount of evaporation to an appreciable extent;—would it not shelter the water from wind? I think on the whole that it would, if the banks were any considerable height, and the water was three or four feet beneath the surface of the ground. The banks being 10 feet high, that certainly would have some effect in diminishing the amount of evaporation.
2050. What have you to say with regard to the evil effects of this dual control and the friction which goes on, and how it may be obviated? I think it is a very objectionable thing on all grounds to have the matter of water conservation divided as it is at present. At present this question is more or less in charge of three Departments—the Harbours and Rivers Department, the Roads and Bridges Department, and the Mines Department. You will find in Mr. Bennett's evidence before the late Commission for the Conservation of Water that he said he had no control over water conservation except in regard to tanks and wells, while another Department had charge of the rivers and creeks, and a third Department—the Mines—had the management of the tanks and wells after they were constructed.

H. G. M'Kinney. 16 Feb., 1886.

2051. In what way has this misunderstanding or friction occurred;—from your observation, can you mention any instance of it? No; personally I have not been brought into contact with any friction at all, but I think it very objectionable to have this work divided.
2052. Can you suggest a remedy? Yes; I think such an arrangement as that in vogue in Victoria would be a better one than that which exists here. In the Government of this Colony we have no Department of Water Supply at all. As I have already pointed out, the matter is divided between three Departments in this Colony; and the subject is not considered as anything but a minor one in any of them. In Victoria they have not only got a separate Department of Water Supply, but they also have a Minister for Water Supply; and in addition to that they have elaborately divided the country into Water Trusts.
2053. *Major Penrose.*] Under a system of local government? Yes; they have local government there.
2054. Have you had any experience of that? Yes; I visited these Water Trusts in Victoria, and know the Engineer for Water Supply personally.
2055. How does the system work? It works very well indeed. The question of water supply and of water conservation is looked upon in Victoria as one of the greatest questions before the Colony, although Victoria requires the conservation of water less than we do here. Besides that, they have a very much smaller territory, having only 86,000 square miles, as compared with our 311,000 square miles.
2056. *Mr. Woore.*] And their rainfall is greater than ours? Taken on the whole, it is.
2057. Therefore, do you think that such a system of water conservation is even more necessary in New South Wales than in Victoria? Yes, it is.
2058. Can you explain the working of this system? In Victoria they have a small central staff which makes up what is called the Water Supply Department. That staff has chiefly to do with examining projects proposed by the different Water Trusts. When these projects are prepared, the Government Engineer for Water Supply decides upon whether they can be recommended to the Government or not. There is only one engineer, and if he decides in favour of the works proposed by the Water Trusts, the Government either lend the money or guarantees a loan to the Trusts for the construction of the works. In the case of large works, such as the weir on the Goulburn River, the Government take it up and deal with it, as what is considered a national work—a work which is beyond the scope of the Trusts. There is another project now being started, and that is the irrigation and water supply to the Western Wimmera district. The Engineer-in-charge sent me over a copy of his report recently, and from that I perceive that one portion of the work is to be dealt with as a national work, and the remainder is to be done by the Trust.
2059. *Major Penrose.*] Then, does each Trust employ civil engineers of its own? Yes; but the Government Engineer has supervision over them.
2060. And are these works in any way similar to the works carried out in this Colony? They go very much beyond our works. I think it is no exaggeration to say that Victoria is at least ten years ahead of us in the matter of water conservation and water supply. They have a very elaborate piece of legislation, which was passed in 1886, and which they admitted was to some extent founded on our Bill which appeared in the first report of the Water Conservation Commission, which was drafted by myself.
2061. *Mr. Woore.*] What is the title of that Act? So far as I can recollect, it is called the Water Supply and Irrigation Act of 1886. I am not sure that this is the exact title; but I believe it is.
2062. And from your experience you can say that this system works well in Victoria? Yes, it has worked very well, and has proved to be very satisfactory.
2063. And is economical—no waste of money? Economical, yes; and no chance of waste of public money; because the people for whose benefit the work is constructed have to pay rates on the money advanced to them.
2064. I presume these works bring in a revenue which covers the cost of construction and maintenance? Precisely.
2065. *Major Penrose.*] These Local Trusts see that the works pay? Yes, they do. In the case of that new work started in the Wimmera, I think the result shows very well how successful the previous works have been. Before the matter was brought forward, works had been carried out to the north of the Wimmera to the extent of £160,000 or £170,000, and the people to the south of the river have been so satisfied with what they saw done there that they guaranteed interest on about £340,000 to carry out works in their district.
2066. Are any non-professional men employed in the construction or supervision of these works, or are they entirely constructed by skilled engineers? They are planned and constructed by qualified engineers. In fact, they are not only designed by qualified engineers to the Trusts, but they have to be passed by the Government Engineer, who has the power to recommend any amendment, and the power to refuse to pass them at all if he considers that they are not suitable.
2067. *Mr. Woore.*] What sort of works have they constructed in Victoria for the supply of water to travelling stock;—are there any wells or tanks there? I know they have a number of tanks.
2068. Have you seen any of these tanks? No; but I have seen the designs. I went to inspect a number of their weirs on the Wimmera and other rivers, and also the channels for the distribution of the water. I was looking at the matter from a wider point of view, and did not go to see the tanks. Besides, some of them were in out-of-the-way places.
2069. Do you think the system adopted in Victoria would be a very proper one to adopt in this Colony generally? Generally speaking, it would be. I am not referring now to the supply of water to the travelling stock routes of this Colony. I doubt whether it would do to place our tanks and wells in charge of local bodies, because it is often to the interest of local authorities not to have water in their district for travelling stock. There may be a few men who do not wish to see travelling stock pass through their district.
2070. Can you suggest any system that you think would work better than the present one for watering our stock routes, and for the construction and control of these works;—do you think the Victorian system the best? The system would not work in that respect so well. The system they have in Victoria is to a large extent different, so that it is difficult to compare the two in detail. In the case of these works in the Wimmera district, they expect to be able to irrigate many thousands of acres of land. With them the watering of stock is merely a secondary matter; but with regard to the construction of tanks on our travelling stock routes, I really do not think that any professional skill is required in constructing them sufficiently well for all purposes. For instance, the manager of a pastoral station is always supposed to be

quite

quite skilled in the construction of tanks, and must be able to arrange for the construction of such improvements for the station. I fancy, therefore, that similar men should be well able to do the work here, and in a satisfactory manner. I know that in the Mines Department they have at least two such men who have had large station experience. H. G. M'Kinney. 16 Feb., 1888.

2071. Do you think that station watering places can be compared with Government work required for the watering of stock along these stock routes? Yes; I think so. The requirements in both cases are nearly the same; but, of course, in the matter of tanks and wells, I must speak with a certain amount of reservation, because I have no actual experience of them, and I have had nothing to do with their construction and maintenance.

2072. *Major Penrose.*] Are you aware that those who construct private tanks and wells very often make great mistakes as regards the sinking of wells unnecessarily? I believe they sometimes do.

2073. Do not their dams sometimes wash away? Yes; but on the other hand I know that I have frequently found the squatters could beat the Government in the matter of economical construction.

2074. It has been said to us here that correct knowledge in well-sinking has only been gained by bitter experience in some cases, and at the cost of large sums of money? No doubt mistakes have been made by private individuals as well as by the Government officers.

2075. And do you not think that non-professional men would be likely to make greater mistakes than professional men with local experience? Well, yes, that is true; but very often work in out-of-the-way districts has had to be entrusted to men who have had little experience in such matters, and who know very little about the requirements of the pastoralists and of people who have travelling stock passing. The men who are most likely to understand such matters best are the men who have been on stations themselves. With regard to that matter, I should say that non-professional men are more likely to make mistakes than professional men with experience; but in reality, I think, in reference to the construction of such tanks and wells as are required, there is very little professional knowledge wanted beyond what good station managers would necessarily possess.

2076. *Mr. Woore.*] Are there any other points on which you can give us information? I am really not aware that there are any others.

2077. *Major Penrose.*] Do you know anything about the Queensland Water Trusts? I have had no experience of those bodies; but I have seen the different Acts that have been passed relating to water supply there. Victoria is the only Colony besides this that I have inquired into fully, and the working of whose Department of Water Supply I have seen.

2078. We have been told that a great waste of money has taken place in connection with the construction of Hovell's dam by some officers of the Works Department. The dam was placed across a creek, and a by-wash cut through the solid rock. It has been said that this was quite unnecessary, as there was a natural by-wash that would have been sufficient? Well, if the statement given is correct that there is a good natural by-wash, I cannot understand why one should have been cut through the rock.

2079. Is not that a matter that could be determined only by carefully taking the levels on the spot? It could be determined only by careful levelling, and by an examination of the nature of the ground. It might be possible for somebody (if he had seen the site in high flood time) to have got a very good idea of the levels by the extent of water and the rate of flow. It certainly would endanger the dam unless the ground was very hard if there be a rapid fall in the natural by-wash of a large flow of water.

2080. Then you think that there might have been very good reasons for cutting that by-wash through the natural rock? If there was a fall of 6 feet in 20 chains, and the nature of the ground was not satisfactory, I can quite understand that there was reason for it.

2081. *Mr. Woore.*] Allowing the ground to be good, would not a large body of water coming down there be liable to scour away the end of this dam? A good deal depends upon whether the end of the dam is upon low or high ground. If the surface of the water just touched the end of the dam it might be quite safe. Unless the ground were rocky or something approaching to it, the water would scour it away if any large quantity of water passed out,—that is, assuming a fall of 6 feet in 20 chains. If only a small quantity passed it would not affect it in the same way.

2082. *Major Penrose.*] We have had it in evidence that the ground on one side is very flat, and if that be so, would not a great body of water be likely to get away? Yes; if that were the case; but these plans appear to be rather incomplete, as they do not give a cross-section of the natural bye-wash, nor afford any information as to the nature of the ground or the discharge of the creek.

FRIDAY, 17 *FEBRUARY*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

John Edward Kelly called in and examined:—

2083. *Chairman.*] Where do you reside? I live at Trangie, on the western line of railway. J. E. Kelly. 17 Feb., 1888.

2084. What are you? I am a grazier, miner, and employed at other things.

2085. You are a Member of Parliament? Yes; I represent the Electorate of the Bogan in the Legislative Assembly.

2086. You are aware of the objects of this Commission? I am aware that you are inquiring into the management and working of the public watering places of the Colony.

2087. You know that the construction and management of public watering places are not under the control of the same Department of Government? I have heard recently that they are not; but of my own knowledge I do not know it. I have simply heard of it.

2088. Has it ever come under your notice that tanks have been sunk in improper positions as regards catchment, and so forth? Yes; I should certainly say so

J. E. Kelly. 17 Feb., 1888.

2089. Can you name one or two of these tanks? Yes; the Nevertire tank, which was recently constructed, and which could, I think, have been put in a much better position. There are also one or two tanks between Nyngan and Cobar which are not properly situated, but I cannot remember their names at the present moment.

2090. *Major Penrose.*] Was one of them called Muriel? I would not know it by that name. I merely know by travelling along the road between Cobar and Nyngan that there are tanks not in their proper places.

2091. *Chairman.*] Just state your reasons for thinking so? Well, they are not put upon clay-pans, which are the best catchment grounds existing in that neighbourhood, and some of the tanks are sunk in alluvial formation. There are large clay-pans, as Mr. Woore knows, in that locality, which would form an excellent catching ground, whereas I have seen these tanks put down in alluvial flats, where it requires very heavy rain to fill them. Besides, the soil does not hold so well, and they are more apt to silt up, and generally to be more perishable than tanks put in other places. Catchment on the clay-pans is infinitely better than on these sloping alluvial places. I cannot remember any exact place at the present moment.

2092. *Mr. Woore.*] But you particularised one tank? Yes; the Nevertire tank; and every one who sees that will admit that it could be infinitely better placed nearer the clay-pan than it is?

2093. *Chairman.*] If it were so placed, would it have been on the stock route? Yes, it would, and near the railway. I am going greatly by the opinions of others who have seen the place when it was under water.

2094. Have you any wells in that neighbourhood? Yes, I have one.

2095. Does the same remark apply to wells? Yes; there was a well at Nevertire, sunk by the Railway Department.

2096. But no wells for stock? There are no wells in the neighbourhood of Nevertire or Trangie that come under this heading.

2097. Have you any fault to find with the construction of tanks and with the specifications? Yes; so far as I have seen in my whole life, the works constructed by the Government for the watering of stock are, in my opinion, all mistakes—in many instances I believe them to be a waste of public money.

2098. In what way? Speaking of the most recent job—I must term it that—which has come under my notice—the Nevertire tank—has cost an enormous sum of money.

2099. We will go into the matter of cost presently; we are now speaking of the formation? The batters are too steep, and will not hold water as well as a tank with a proper slope. I will explain my experience in these things. The batters of tanks which have been made by the Government are all too steep, and hence the water will escape from them. It will percolate through the soil; whereas, if the batter had a slope of 1 in 4, or 1 in 3½, the sediment from the water would choke the porous ground, and make these tanks hold like tanks with cemented bottoms. This is my experience and the experience of everybody who has done much tank sinking.

2100. Do you know what the specifications require with regard to the batter? I really do not; but I have seen all the tanks, and I can say that their batters are too steep.

2101. Would 2 to 1 be too steep? Most undoubtedly it would, for the simple reason that water that settled in a tank of 2 to 1 would allow its sediment to fall to the bottom instead of allowing it to go on to the sides, and fill up the porous soil in that part of the tank. It is a well known fact that the sediment in the muddy water will choke the porous ground. I am certain of this, because I tried the experiment last week in soil almost purely sand.

2102. That would apply in particular cases. Of course tanks are sometimes sunk in good retentive soil, and in that case would a sloping batter be required? Yes; even in good retentive soil. There is gypsum even in clay-pans, which runs in veins or seams through the soil below, and allows the water to pass through the sides. The sediment does not fall direct on these passages in steep slopes and choke it up, and any soil requires the sediment in the water to choke up the porous portions of it. Even clay will take in a certain amount of water if it is left in its natural state. It is very fine sediment (which falls from the water when the water is in a muddy condition) which makes them hold. This chokes almost any kind of ground if there is enough muddy water flowing into the tank—that is, if the batters are sufficiently sloping to catch the sediment. The very best tank and the soundest ground I ever saw leaked because there were a few roots of trees in the wall; but since they have been cut out and the ground puddled, the tank has been all right.

2103. This Nevertire tank—is it a tank from which the water is pumped into troughs, or is it one of those tanks into which the stock is allowed to go in and drink? I just now heard a gentleman who took some stock there that badly required watering, and which were going to be trucked to market, say that the stock went to the troughs and would not drink from them; so that, from the information I have gathered, I should say that the tank is one where there are troughs.

2104. You are not aware of your own knowledge whether stock go into this tank to drink or not? No; but I believe the water is pumped into troughs.

2105. From what you have just stated, do you think that where tanks are constructed for watering stock directly, or for pumping, that they require a sloping batter? Yes; a tank with a sloping batter will hold much better—of that I am positive—and admit also of stock watering in the natural way.

2106. *Major Penrose.*] Do you know of your own knowledge that any of these Government tanks do not hold water from the cause you have just specified? Of course I do. I know that they lose their water more quickly than another tank, and I attribute that loss to the cause I have stated. The tank which lasts longest, in my opinion, is a tank with a sloping batter, and not a steep one.

2107. But would not puddling by the stock have something to do with the holding power of the tank? Puddling may be a very good thing; but sediment is the secret of it. I have some small tanks myself in porous soil which have been rendered retentive by tailings from a battery, which choked the drift.

2108. Are you quite certain that sediment will not lie on a batter of 2 to 1? I am quite certain of it. I tried it only last week in a small way.

2109. *Chairman.*] Now, it is stated here in evidence that the cost of the construction of these tanks has been excessive. Are you aware that the cost of these Government tanks has been more than the cost of tanks put down by private individuals? For me to say that of my own knowledge is impossible; but I have seen figures proving that the cost is greater. I cannot; but if the prices which are notorious, and which the contractors say they have received for putting down these tanks, are the true prices, then I say that at least

least twice the value of these tanks is paid away for their construction. I will undertake myself to put down a similar tank to this one at Nevertire for one-half the money, and to make a better tank for all practical purposes. J. E. Kelly. 17 Feb., 1888

2110. What rate could you get the Nevertire tank done for? Sixpence per yard. I am getting tanks sunk within 10 or 12 miles of this place for 6d. per yard.

2111. *Mr. Moore.*] Do you know what the cost of the Nevertire tank was? No, I do not; only from hearsay; all I know is that I am getting tanks put down for much less money.

2112. *Chairman.*] In stating that Government tanks are too steep in their slope of 2 to 1, do you not think the slope would be ample in the case of troughing being employed? I think the fall is too much. I have known of one case where, in consequence of the sides being too steep, they fell in.

2113. Do you think the slope here in these plans is sufficient to allow the working of ploughs and scoops? Yes, I think so.

2114. *Major Penrose.*] And you think the slope here shown is sufficiently flat? Yes; even to allow ploughs and scoops to take the soil out; the plans, too, show too gentle a slope, in my opinion. I am positive that the tanks which I have seen have much steeper sides than are shown on the plan.

2115. *Chairman.*] I understand you to say that in your own tanks you always insisted on a slope of 1 to 3½? Yes; but the people who sink the Government tanks either do it wrongly or the plans before us are wrong.

2116. What do you mean by a slope of 1 in 3? I mean a 3 feet slope to 1 in depth; you descend 3 feet by slope to 1 foot perpendicularly. That plan shows too much slope for me, or else I do not understand it. I know what is termed 1 in 4 by practical men is a lesser slope than what is shown on that plan.

2117. Do you think that a slope of 2 to 1 or 1 in 2 mean the same thing? No, I do not think so; 2 to 1 does not mean the same thing as 1 in 2.

2118. Here is the specification of the Nevertire tank of which we are speaking, from which it appears that the slope is 2 to 1? I do know that if these works were carried out according to the sketch before us, which is said to be a slope of 2 to 1, it would be possible for sheep to water on a fall like that. But sheep cannot stand, nor can anything else, on the slope of the tanks made by the Government.

2119. You were speaking of the excessive cost of construction, and you stated that you could get work similar to that which was done at the Nevertire and other tanks performed for 6d. per yard. I see here that the excavation of this Nevertire tank cost 1s. 1½d. per cubic yard? Well, I am getting tanks sunk within 15 miles of Nevertire for 6d. per cubic yard. I am finding the men scoops and ploughs, and lend them a team of working bullocks, and this tank will answer all the purposes better than the Government tank at Nevertire.

2120. *Mr. Moore.*] But in this case you are supplying ploughs, and scoops, and cattle? Yes; but that is nothing at all to me.

2121. Nothing to you; but a good deal to the contractor? No; not much to him. It might be about 2d. per cubic yard more. Having the things, it is no loss to me to allow the contractor to use them; but they would bring the cost up to about 8d. per yard if they had to be found.

2122. *Chairman.*] Can you in any way account for the fact why the Government have to pay so much more than you? The thing is to be accounted for by the way in which the earth is removed, and from the fact that the stuff has to be taken out by one roadway and brought all round the tank. This, in my opinion, costs 2d. or 3d. per yard more than if the earth were removed from all sides of the tank, and were the whole batter a roadway. Any one can see that a horse can go up a batter such as is described, if driven sideways along the batter. I think a batter should be as steep as possible, so long as it allowed sheep to water on it.

2123. Are you aware whether Government tanks are, as a rule, deeper than private tanks? I believe they are.

2124. Would that add to the cost? It would.

2125. Then from the nice manner in which the trimming is required to be done in Government tanks do you not think the cost is increased? Yes; but to a very small extent. Of course all these little things make up.

2126. Would carrying earth 30 feet away from the top of the excavation increase the cost of the work? Well, very few people have their muck thrown less than 30 feet away. It would be taken down again by the sheep in going to water. I always make my people put the stuff from 30 to 40 feet away from the tank.

2127. Are there any other reasons why the Government should pay more money for their work than private individuals? Well, in most cases the contractors have, I believe, to supply themselves with water. They are asked to put down tanks in dry and isolated country, where, perhaps, there is no water with which they can make a start, and they have to go to considerable expense in putting down supply tanks for their own use before they can commence to work. Then they must wait until these supply tanks are full; when we know that the practice of the lessee, or squatter, or private individual is not to go to this cost, but have some preparation made for those who go to put down the tank. But the Government would have nothing to do with these preliminaries, which I think might reasonably be put down as being worth 1d. or 2d. per yard to be added to the cost. This would not occur at a place like Nevertire, where there is water in the immediate neighbourhood.

2128. When a squatter has a tank finished;—I presume when he measures it he pays his men right away? Yes.

2129. Was that done in the case of the Government tanks? No; I have often heard of men having to wait a considerable time for their money.

2130. Weeks or months? I have heard that they had to wait a long time, on account of the Department not having an officer to send to measure up the tank. I do not like to exaggerate anything, but I have heard that men have had to wait several months for their money. Then there is the possibility of disagreements taking place about the carrying out of the work, and in taking work from the Government men have to calculate this as a big item, and it is regarded as such by the contractors. The interference of inspectors, and the delays occasioned by the Government in making payments, is also regarded as another big item in taking Government contracts. Then, again, alterations have frequently to be made, so that contractors necessarily allow a margin for all these reasons. This is what I have heard from all sides; and this is what I complain mostly of, and not that the contractor is paid too much.

J. E. Kelly. 17 Feb., 1888.

2131. Consequently, it necessitates that men who undertake Government contracts shall be men of some capital? Yes, it takes men with some means, and also men who can find security for the proper performance of the work. Whereas with private individuals, who require excavations made, the doing of the work is regarded as being a sufficient security. They pay about 75 per cent. of their money before the work has been completed.
2132. Are you aware what the Government pay as progress payments? I am not aware of it.
2133. As a matter of fact it is 50 per cent. Then, as a necessary consequence, contractors for Government work being necessarily men of means, the number of tenders becomes reduced? Yes; the number of men who are able to do the work. It is only special men who have friends who can undertake Government contracts. Men who have friends who will guarantee the work shall be properly performed are the only men who can get contracts, and I have known instances where these contracts have been sublet—I am going outside the question of tanks now—for one-half the money which the original contractors have received from the Government. The men who actually do the work are the men who receive the reduced rates of pay.
2134. Have you ever noticed the kind of machinery used at these tanks for pumping water into the troughs? Yes.
2135. What kind of machinery have you seen there—horse-power or steam? I have not particularly examined the machinery, but I think they are the Tangye and Blake pumps. These are the two that I saw.
2136. Do you think they are desirable machines for their purpose? Certainly not. I have no fault to find with the pumps, but I find fault with the principle. In my opinion they are not necessary; but, on the contrary, a waste of public money.
2137. Would the same remark apply to horse whims? To everything.
2138. How, then, would you have the water raised? I would not have it raised at all.
2139. You are aware that these tanks are used, not only for the purpose of watering stock, but that they are also intended for the use of human beings who may be travelling along these stock routes? Yes.
2140. Would not allowing stock to water at these tanks pollute the water very much in periods of drought, and so make it unfit for human use? Well, it was never considered so in my time. We always got our water out of the tank that the stock watered at. It might be injurious to health, though.
2141. It never hurt you? Oh, no; it never hurt me; I have been drinking water of that sort nearly all my life. But it is possible to filter enough water for human use, or have it in a little drainage tank, and allow it to percolate through charcoal, to filter it or in some other way fit it for human use, if that point arises.
2142. Would not the continual treading of stock round these tanks tend to fill them up? No, not at all; especially not with the Government tanks.
2143. Are you aware that sometimes in hot weather sheep will plunge into the tank and swim about, carrying a great deal of the water away? I am aware that sheep are accused of doing that, but it is not true. I know that where a big flock of sheep are allowed to go of a rush to water at one time, one will shove the other into the water, and thus cause it to carry away a large quantity of water in its fleece, thus spoiling the wool and wasting the water. But if a proper number of sheep were allowed to water at one time, no sheep would do more than wet its ankles in taking a drink. That is to say—on only a surface of 400 feet no more than 500 sheep should be allowed to go to water at one time. No sheep will go into the water of its own accord; but when a thirsty flock is allowed to go to water at one time, the pressure of those behind will shove the leaders forward, and they will then be forced into the water; but sheep are very timid, and will not go into the water if they can help it. They will wet no more than their toes, keeping clear of the water if they can.
2144. Then, you think the tanks should all be open to the public, and that consequently they would not require caretakers? No; I do not say that; I think it would be well to have caretakers on these tanks who might be paid a small amount for looking after them, and be allowed to supplement their incomes by keeping a small store or a refreshment-room or something of that sort. But I certainly would not like to see these tanks placed at the mercy of a run-holder in a dry country. I would have a caretaker employed wherever there was sufficient income from a tank to pay the cost, whose income, as I have said, might be supplemented by a little store or refreshment room.
2145. Do you think the people specially appointed for that purpose—say, road-inspectors, travelling continuously—would be sufficient to prevent any damage to these particular works, and so save the expense of keeping a caretaker at every tank? I think the cure would be as bad as the disease. I think these ride-about gentlemen would cost as much as a caretaker, and we might want two after all. A good deal would depend upon the circumstances and the sort of men we would have. The safest thing to do would be to leave the caretakers where they are, make the water available, and charge a reasonable sum for it.
2146. What is the probable cost to the Government of keeping caretakers at each tank? Circumstances, I believe, alter cases; there are tanks which employ caretakers at salaries ranging from £60 a year, and I think that is all that is required myself. I know one man who pays £60 per year for the privilege of keeping a store at one of those Government tanks, so that it costs the Government sometimes £60 per year to get done what a private person pays £60 a year to be allowed to do. So that under such circumstances it is impossible to draw the line.
2147. *Major Pearson.*] When these tanks were originally made, was the system the same as at present;—were there not two separate tanks, one for drinking out of, the other being the main reservoir? Oh, I see now what you mean. If the level was the same in both tanks, which were connected by a pipe, the water in the tank in which the stock drank might be replenished from time to time from the other tank. That, no doubt, is the proper way: but you cannot water stock in the first instance out of troughs. Stock which never saw troughs before will not drink out of them. They must be taught to do it. It would be possible I think, to make very much better provision to water stock in the manner suggested by a second tank than out of troughs. I see now what you mean; of course it would be infinitely better than to have troughs.
2148. Well, it was deliberately given up, after experience, in favour of troughs? Well, but we do not know who gave it up; I have been through the country for the last 30 years, and have had tanks and wells myself, and I say that second tanks must be an improvement upon troughs; but even this is not needed.
2149. *Chairman.*] Do you know anything about the fences round the tanks and round the caretakers paddocks? Yes; there are fences round the paddocks.

2150. And do you think that these fences round the tanks to protect them from the travelling stock, and the fences round the caretakers' paddocks, are too costly or otherwise? Yes; like all other Government work they cost twice the money which should have been paid for them. J. E. Kelly. 17 Feb., 1888.
2151. Why do they cost too much? The work is too good, for one thing.
2152. Do you mean that the posts are too close together? Well, it is no more a lasting fence than a lighter fence. A lighter wire fence would do just as well, and would cost no more than a third of the money. The posts are too heavy and too close together, and the wire is too heavy. The whole thing seems to me to have cost double what fencing that would answer all purposes should have cost.
2153. Would that apply to fences round the caretakers' paddocks as well? Of course you would recommend a substantial fence round the tanks to protect them from stock? No; the fences are too costly. In every instance the fences are far too costly in their character, and are no more permanent than a lighter fence. Speaking of these fences round paddocks and tanks, I really think they answer one good purpose; that is, they help materially to keep the tank from silting up. Around station tanks the ground is cut up in the immediate neighbourhood into fine dust, and the first fall of rain carries the dust in the shape of mud into the tank. This leaves a great deal of sediment at the bottom of the tank. Of course I am now speaking of squatters' tanks.
2154. Is that not remedied by having a silt-tank? I do not think so, because the water comes in in a muddy condition, and brings in the sediment with it; besides some people have no silt-tank at all. I was pointing to the good done by the fencing round the caretakers' paddocks, because it does not allow the catchment to be cut up. This is a very great advantage, and saves the tank from silting up. So far as the injury done by stock walking on the batter, if they make a hill they make a hole which fills up again; thus they do not fill up any of the water space.
2155. Have you ever heard of any interference with caretakers and of overseers by officers of another Department? Have you ever had any interference reported to you of roads superintendents with caretakers? No; I did not know of it till recently. I did not know until then that the whole thing was not under one Department. I never heard of any squabbles between the officers of the two Departments until recently.
2156. Are there any Government wells in the neighbourhood that you have seen? I do not know one Government well that is used for the purpose of watering stock. I know of them, but not from personal knowledge.
2157. Has the hutting put up for caretakers ever come within your observation? No, I have seen nothing too costly in that. All the huts that I have seen left me under the impression that they were built by the caretakers themselves. They seem to me to be bark "humpys." I have not been in the back country for five or six years, but between Coonamble and Warren I noticed one man when I was there who appeared to be living in a bark "humpy."
2158. I heard you state just now that you did not approve of troughing. Will you give us some further reasons why you do not approve of troughing. Is there anything defective in the way the troughing was put down, or is the system, in your opinion, inherently wrong? My objection to the thing is that no troughing can be suitable for the watering of travelling stock, for the reason that travelling stock, in seventy-five cases out of one hundred, have been accustomed to water only at creeks and waterholes, and open tanks, in the natural way, and have never been accustomed to water at anything that is calculated to frighten them, or at anything that is unusual. In many cases the stock come up to these troughs in a maddened condition from want of water. They smell the thing they actually want, but are afraid to touch it. It is more difficult to get stock to go near troughs when they are in that half-maddened condition, than it would when they are not so thirsty. Hence sheep have often perished from want of water while water was in the troughs. Of course, where troughs exist on a station, the matter is different altogether. There sheep have become accustomed to drink out of the troughs, and they will of course go up and drink from these Government troughs when they are thirsty. But no sheep or cattle that have not been accustomed to drink at these troughs will go up at once and drink at them when they come to them. I have never yet heard of an instance where cattle from Queensland, for example, or stock that were not taught to water at troughs, went up and drank from them the first time. And I have known many sheep of my own knowledge to perish from want of water before they would drink it out of these troughs. I have known sheep smother by being rounded up before they would drink at troughs, and the water had to be poured out on the ground.
2159. These cattle from Queensland, having travelled for weeks and weeks, would surely learn to drink from the troughs in a few days? Yes, but while they were learning they would be dying. Going across, by the Cobar road, there are troughs, also on the other side of the Warrego: and there are troughs, I believe, between Warrego and Bourke; certainly no stock will water out of these troughs if they can get natural water on the road. If you wish to get stock to drink out of troughs, you will have to put them in stock yards, with stock to teach them which have been accustomed to drink in this way.
2160. *Major Penrose.*] Are not many of the squatters adopting this system of troughing? Yes, and that is what they ought to do to economise their water; but it is an expensive method.
2161. Then, if that is the case, will there not be a great many sheep educated into drinking out of these troughs? Yes, and in time all sheep will do it, if stockowners adopt troughing. But at the instance of some gentlemen who live in the Cobar and Bourke districts, I not long ago offered to the Department of Mines £1,000 if they would make a flock of sheep, that had been four days without water, drink out of troughs for the first time. Several gentlemen subscribed the money, and told me I was quite safe in offering the money to the officer who designed these troughs, and I offered the challenge in a letter to the Mines Department. When the sheep go at these troughs in a large body, they force some of their number that are in front into the troughs, spoiling the water by the yolk of the wool. They jump on one another, and in some cases sheep are smothered. I have heard of accidents of this kind from good authority.
2162. Would not the same remark apply to sheep going to a tank? No; and for this reason:—if tanks are properly managed, a mob of 20,000 sheep, which is more than is likely to be put into a yard, may be watered in batches of 400 to 500. This number might be allowed to run through into a watering place, and as soon as they were watered, another batch could be brought out of the yard, and the same thing repeated till all have watered. In this way the sheep can be satisfactorily watered, and will do no damage to themselves or to the tanks.
2163. *Mr. Moore.*] Cannot the same thing be done at the troughs? No, for the reason that sheep which have never drunk at troughs will never do it—that is, unless they previously had an idea of drinking out of the troughs. If they were allowed to go into too large a body they would smother. 2164.

J. E. Kelly. 17 Feb., 1888.

2164. Have you ever known sheep to die for want of water alongside of these troughs? Yes; some of Mr. Allison's sheep died near Colar. He lost 6,000 sheep between a well of mine and the Darling. Complaints have frequently reached me as a member of Parliament, particularly from people who know that I have some knowledge of the back country, to the effect that the caretakers have in some cases allowed greasy or hot water to remain in their troughs—water which sheep had been into and discoloured, and poisoned with yolk. They have allowed this water to become hot in the sun, and the sheep would not drink it. Numbers of sheep went to these troughs, but the water was actually stinking, and the sheep would not drink it. The caretakers refused money, as I am informed, to throw the hot and polluted water away, in order that the perishing sheep that had arrived might have an opportunity of drinking freshly-pumped water. And the sheep suffered because they had not had fair opportunity even of drinking, and the troughs in such cases have not had fair play. In some cases the sheep went to the troughs, but as they were filled with hot, polluted, and stinking water, they went past it. In other cases people have told me that their stock would have drank from the troughs even the first time had the water in the troughs been good—not as the troughs are now, but as they were built some time ago. These are written complaints which I have received, and told the names of the persons from whom I received them. I state them now in evidence, believing them to be true myself.

2165. *Chairman.*] Have you yourself made complaints at headquarters? Yes.

2166. What was the result? None at all, except that this Commission is the outcome of them. I have been complaining for some time, and I inquired and obtained papers in respect to these troughs, and told both the Minister for Mines and the Minister for Lands. I called for a committee, when the latter said he would do something better.

2167. Are you aware that there is an officer known as the Inspector of Public Watering Places, whose duty it is to go about and see that the caretakers attend to their work? Yes; I believe there is an officer of that kind.

2168. Did you ever complain to him? No; not to my knowledge. I may have done so, but it was at the instance of other people. But I cannot remember now. I don't know any such officer personally.

2169. Who is the Inspector of Public Watering Places in your district? I really do not know. I know none of the inspectors in the colony.

2170. Do you not ever see any of them going around your district? No; Mr. Wood, I think, is the only inspector, judging by the letters that I have received. I think he had something to do with the matter. I really do not know, but I thought this work fell upon the inspectors of stock. The only person I ever complained of was the overseer at Colar, because a drain at that place was left uncleared. I made no complaint of my own to anybody, but only for others on information received. I have written a good deal to the Department.

2171. Have you any views to offer in regard to the future management of tanks and wells? Nothing further than what I have said. I never see any of these fences, tanks, engines, &c., without my blood boiling to see the waste of public money that has taken place on them, so that I prefer to keep out of sight of them.

2172. *Major Penrose.*] Do you speak now of the construction or of the maintenance of these works? I speak in regard to both. I have sworn evidence to bear out what I have said. People require water, and although there is water at these places they cannot get it, but have to go and pay the squatter for it. I refer you to Mr. Smith, who has a station somewhere near Carcoar, who can give valuable information.

2173. Was this due to the troughing, or to what? Due to the troughing, which was badly constructed, and to the machinery, which was calculated to scare away the stock, and to the fact that the stock could not get down the batters to the water, even if they were allowed inside the fences.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

George William Townsend called in and further examined:—

G. W. Townsend. 17 Feb., 1888.

2174. *Chairman.*] I received a note from you, in which you express a desire to give some further evidence? Yes; there were several things I recollected since I was here the last time. I was in doubt when I gave my evidence about the 12-Mile tank as to whether it was in Burton Brothers' contract or not. Since then I have remembered that it was. I am not sure whether in my evidence I stated anything about the 26-Mile tank. Since I was here before I have remembered that the 26-Mile tank was not commenced when I was there, but the 26-Mile had long been known as a stock camp on account of water having generally been found there. The 35-Mile tank never to my knowledge had any water in it, although there was a tank within a mile of it, called 37-Mile, which was always to be depended on for a supply of water.

2175. What reason was there, do you think, for there being no water in the 35-Mile tank? I could not give any reason. I never examined the place sufficiently to be able to give a reason.

2176. *Major Penrose.*] What year was that in? I think it was in 1878 or 1879. I wish to ask when the blue print diagrams shown to me, were prepared, as the slopes shown do not correspond with the slopes of the tank that I remember, which I am confident were much steeper than 2 to 1, for you can stand easily on a 2 to 1 slope; and I am confident (for I have tried) that I could not stand on one of these slopes. I still believe that the slopes of all tanks on the 70-Mile track were 1 to 1, or nearly so. That is my belief.

2177. *Chairman.*] Is there any other evidence that you think it desirable to lay before the Commission? I cannot think of anything else. There was something passed in conversation about wells.

2178. *Major Penrose.*] I asked you what effect the baling of wells had on the water? I remember having written something about this some years ago. I brought a pamphlet with me, and have addressed it to the Commission, and will read an extract bearing on this point:—

It is frequently asserted in letters in the papers that we may reasonably hope for an unlimited supply of water in artesian wells through the Riverina country because of the great soakage from some of the rivers, and from swamps that are fed by the rivers. I greatly fear that we can in no way count on recovering any of this water in a state fit for use, even by stock, for the country that receives this soakage is full of water-bearing strata, the water in which is as salt as brine, and I think this occurrence is to be accounted for in this way: There can be no reasonable doubt that the whole of the lower portion of the watershed of the great Murray tributaries has been at one time an estuary or landlocked arm of the sea which has gradually become filled up and raised above present sea level in the manner already described. While through long ages this silting up process has been going on, many extensive, shallow, salt water lagoons would be formed; as these gradually silted up the water in them by evaporation, becoming intensely salt, would completely saturate the soil with brine. As the raising and silting up process continued the coast line would be forced further back, and these once

open

open, stagnant salt lakes would become covered with a greater or less depth of soil, and would give rise to the apparently strange phenomenon of runs of salt water high above sea level, while, wherever in sinking or boring we tap an old river bed that has retained unobstructed its drainage to the sea, we obtain fresh water by reason of all the saline matter being washed out by the constant run of fresh water draining along the sand or gravel forming the bed of such ancient water course. G. W. Townsend. 17 Feb., 1888.

The original bed of the estuary, on the other hand, will probably be found to contain fresh water throughout its whole area, for it would in every part retain along the sand and gravel forming the ancient bottom, uninterrupted drainage to the sea, by means of which the constant run of fresh water soaking in along the outcrop and draining through the porous layer to the sea, would dissolve out and carry with it all saline matter. This opinion of the origin of the many salt water accumulations that are found by wells being sunk, to exist throughout so large a portion of the Murray basin is in a measure borne out by the fact that by long continued baling or pumping (provided that the water raised is carried clear off, and not allowed to drain back into the well) the water generally becomes less salt, showing, I think, that the original accumulation, becoming exhausted, is replenished by drainage of fresh water from the surface, which doubtless in time, would dissolve out from the water-bearing layer or stratum, all saline matter; but this would be a very costly experiment, in that the immense volume of water that would need to be disposed of before the desired result could be attained on a scale sufficiently large to be of any practical value, would swamp miles upon miles of flat country, and destroy much valuable pasturage. I fear that once the water is allowed to run from the high ground, we must regard it as lost. So that, although we are perfectly justified in trying to get all the water we can from this source of supply, it will not, even when proved available over a large area (which it by no means is so far), in any way relieve the country of the responsibility of providing a water supply by the only reliable means, viz., that now advocated by means of open reservoirs formed by dams or weirs.

I have seen many acres flooded by attempts to bale water, without any practical result. Of course I believe that fresh water can be obtained, but then no use can be made of it. The expense involved in baling would be far greater than the expense attending an effort to get water in other ways. I know that boring has in many cases saved thousands of pounds.

2179. *Major Pearson.*] Is boring cheaper than sinking trial-shafts? Yes, very much cheaper.

2180. Have you any idea why there is so little boring done up to the present? It was not generally done, but there is no reason why it should not have been.

George Earngey called in and examined:—

2181. *Chairman.*] What is your present occupation? I am, at present, a contractor. G. Earngey. 17 Feb., 1888.

2182. You have had some experience in the construction of tanks and wells? I was road superintendent in the Roads and Bridges Department for six months in charge of tanks and wells in the Wilcannia district.

2183. Are you aware of the objects of this inquiry? Yes; so that the control of public watering places should be under one Department.

2184. Not altogether that; we have a number of allegations to inquire into to the effect that tanks have been sunk in a useless manner and in bad situations. Do you know anything about wrong sites having been chosen for tanks? Yes; when I took charge it was to replace a road superintendent named Henry Cambridge.

2185. And when you took his place, did you find that he had made mistakes in selecting sites for tanks? Yes; and I found that he had been guilty of large embezzlements.

2186. Did you find that he had been faulty in his judgment? Yes; he merely travelled by the coach and never left the road in looking for sites.

2187. What guided him in selecting these sites? The advice of publicans and drivers of coaches.

2188. This, of course, took place before you arrived there, and is only hearsay? Yes; but the sites of the tanks proved that hearsay was correct.

2189. Then I gather from you that the sites having been improperly placed would only have occurred to a man who was not conversant with the country? Yes.

2190. And probably took information from interested parties? Exactly so.

2191. Now, will you take one or two of these tanks that fairly represent what you state—take the most glaring cases that have come under your observation? Yes; I will take Seaville's tank, which is 9 miles north of Wilcannia, and the Cobham Lake tank, which is some 200 miles north-west of Wilcannia.

2192. Any other particularly glaring case, according to your opinion? These were the only two.

2193. Why do you find fault with Seaville's tank? It is within 7 miles of the river Darling, opposite a public-house kept by a man named Seaville.

2194. Was the ground at this point unsuitable, or was it merely that the distance from the Darling to the tank was too short? Yes; too short to warrant the expenditure of the money on a tank.

2195. What distance apart are watering places usually situated? They are constructed from 12 to 15 miles apart.

2196. Was that done only in the first instance to be afterwards subdivided, or was that considered a fair distance for travelling stock? Yes; these distances were regarded as rests.

2197. But sheep could never travel such a long distance as that in a day? No, I do not think so; but they do not construct tanks every 7 miles, which would be a fair distance for sheep. Sheep can travel through a dry country.

2198. Is there any other reason why you complain of the site of this tank at Seaville's, except that it is too near the river Darling? Yes; that is just the reason. The Darling affords permanent water, and this tank yields only a precarious supply.

2199. Why speak of it as a precarious supply—is it not a well constructed tank? The ground is so very flat and sandy there that it takes a very much larger rainfall than is usual about Wilcannia to keep up the supply.

2200. Is there a better site as regards catchment area further on? There is a better catchment area, but the ground would not be so retentive. This tank at Seaville's is placed where there is a cane grass swamp.

2201. You refer to clay pans? No; I refer to a cane-grass swamp. The grass that grows there is like large weeds.

2202. *Mr. Woore.*] Does not that cane-grass usually grow on clay pan ground? I do not think so. In dried up lakes and lagoons I have seen similar cane growing.

2203. Then, if this tank had not been sunk at Seaville's, where else could it have been placed? Further along the Parso road, about 15 miles from Wilcannia. There is a good site there.

2204. Although you say that this tank is within 7 miles of the river, is it not fully 9 miles from Wilcannia by the travelling stock route? Yes; 9 miles from the town, but only 7 miles from the river.

G. Farugey. 17 Feb., 1888.

2205. Is not the river off the travelling stock route from Wilcannia to the Paroo? Yes; but cattle would take the nearest water.
2206. Then the stock watering at Wilcannia would have to travel 3 miles before reaching Seaville's tank? Yes; but they could make the distance shorter.
2207. Is there a road to the river from Seaville's tank? Yes, there is a road.
2208. I mean from Seaville's tank to the nearest point to the river? I think the country is open, although there are runs along there.
2209. Is the country not fenced in? There is some of it fenced in up the river; but between the two places that I speak of, it is not fenced in.
2210. Must not travelling stock going up the Paroo go past Seaville's tank? Yes.
2211. If Seaville's tank were not constructed and stock had to travel up the river from Wilcannia on their way to the Paroo, and then to tanks constructed further on, would not that be a longer route from Wilcannia than that via Seaville's tank? Yes, it would.
2212. Now, about Cobham Lake tank, what do you know about that? This has a frontage to Cobham Lake. The fault here is in the watershed. Of course, in constructing a tank on the lake, the best watershed must be the deepest part of the lake. This is the place that will give the largest watershed.
2213. Is the tank then sunk on the edge of the lake, where there is a sandy belt, and is it deficient in catchment area? Yes; I do not think a reasonable rain could ever fill it.
2214. Is there a light coating of sand? No; there is a thick belt of sand there.
2215. I am speaking of the spot where the tank is sunk. Is there not a thin layer of sand on the top of the clay? I should think there are 2 or 3 feet of sand there.
2216. And below that, is it fair holding ground? Yes, it is fair holding ground—not pure clay, but loam.
2217. *Major Pearson.*] Was that tank finished when you got there? No; it was under construction then. The contractor could not get the men to work at that time.
2218. Are you aware that if this tank were placed in the bed of the lake, in what you call the deepest part when the lake is full, it would probably have some 40 feet of water over it? Yes; the water in the tank would then be the last to leave the lake.
2219. *Chairman.*] Are there any other cases of faulty judgment in the selection of sites that you met with in that part of the country? Yes; there was another tank at Tarella put down quite close to Mr. Quin's large dam, while I believe he told the officer of the Roads Department that he would allow the travelling stock to water at his tanks.
2220. And that was the reason why you think the expenditure was an unjustifiable one? Yes.
2221. But the public were only watering at these dams and tanks on sufferance? Yes.
2222. Consequently if Mr. Quin sold his station, and somebody else, who might not be so obliging, came there, he might prevent persons from watering their travelling stock? Yes.
2223. Would a tank then be necessary? Yes, and it could be constructed.
2224. You were in the Roads Department, and consequently had charge of the construction of tanks? Yes.
2225. Have you found by experience that when these tanks were constructed there was something faulty in the design? I was only there six months, and none of the tanks were completed while I was there.
2226. Would anything that you saw lead you to believe that the design was faulty? My own opinion was that wells would be preferable to tanks on account of the small rainfall in that district.
2227. Are you not aware that many wells are sunk, and that the result is salty water? Yes; but then the Mines Department test the wells practically, which the Roads Department does not. The Mines Department put down bores with the diamond drill, while the Roads Department put down shafts, and they cannot staunch back the salt water when sinking these shafts.
2228. So that in no instance should a well be sunk until it has been tested by an auger or a bore? Yes.
2229. To prove whether the water is there, and whether it is fit for use? Yes.
2230. Have you had reason to find fault with any of the plans or specifications of the Roads Department as being faulty, and not answering the purposes of construction? No.
2231. Have you ever found that the batter was too steep? None of the tanks were completed while I was there. The contractors used to complain of the batter embankments as being too steep.
2232. You knew what the batter was? Yes, 1 to 3. 1 to 3 on the outside, and 1 to 2 on the inside. Generally they were supposed to make their bullocks draw up their stuff along this 1 to 3.
2233. Are you aware of the Roads Department ever having made their batters steeper than they do now? No.
2234. How long were you in the Roads Department? Seventeen years; but only six months in charge of tanks and wells.
2235. And you do not remember any alteration in the specifications? I never had anything to do with these tanks and wells except for six months, and on account of an officer having committed an embezzlement I had to remain the greater part of that time at Wilcannia collecting evidence.
2236. You said that the contractors complained of the batters being too steep because they could not use their ploughs and scoops? Yes; on the back of the embankments.
2237. Did you write a letter to Mr. Gillist, Inspector of Public Watering Places during the latter part of last year? I did.
2238. And in that letter you make some very hard statements. You state here in one place that the most criminal management existed? Yes, the Road Superintendent, Mr. Cambridge, used to be in partnership with some of the contractors.
2239. Are you aware of this of your own knowledge? I reported it to the Commissioner.
2240. Was it proved? They did not attempt to collect evidence in the matter; they only took evidence in three cases. The charge was so large that the Roads Department did not attempt to deal with it.
2241. Do you think you are justified in making such statements as these unless you can prove them? I can prove them.
2242. But this only applies to one individual officer? That is all.
2243. It only applies to one individual officer; but in this letter you use the word in the plural sense—you say officers? It only alludes to Mr. Cambridge.

2244. Then this word "officers" was a mistake? It only applies to one.
2245. Now, another very serious charge which you make is this;—you say that the head of the Department (Mr. Bennett) tries to hush up these things when they are brought under his notice. Why do you make this statement? Because he always found fault with me for complaining.
2246. But did he find fault with you for complaining about the mismanagement of this man Cambridge? I believe he did. I do not know personally; but Mr. Stevenson, the member for the Wollombi, who is my father-in-law, whom I met when I arrived in Sydney to come here, said that Mr. Bennett was very wroth with me.
2247. I will draw your attention to another matter. You state that there have been dozens of officers guilty of fraud, and not one (with the exception of one only) has been prosecuted? Yes; that is true.
2248. Have you any grounds for making such a statement as this;—do you know of your own knowledge that such a thing has occurred, as it is a very serious statement to make? I know that dozens of officers have been guilty of fraud, and no action has been taken against any of them except against Cambridge.
2249. Has it come within your own knowledge that they have been guilty of fraud; and, if not, how do you know it? By dismissals from the service, and by the reasons why they were dismissed.
2250. But are not officers sometimes dismissed from the Department without being guilty of fraud? Yes.
2251. Then this is another very broad statement—made, perhaps, without due consideration. The fact of an officer being dismissed does not show that he has been guilty of fraud? Some are dismissed for fraud, some for insubordination, some for negligence, and some for incompetence.
2252. Yes; but you say that many dismissals take place because of fraud. An officer may be dismissed, as you say, because he is incompetent or insubordinate; but it is a serious thing to say that numbers of men have been dismissed for fraud. You make the first part of your letter apply only to Cambridge? Yes.
2253. Have you ever had any reason for feeling angry with Mr. Bennett when you were leaving his office? I never did agree with him during the whole 17 years that I was in the service.
2254. And do you entertain rather antagonistic feelings towards him on account of your dismissal? Yes.
2255. I presume you were not dismissed for fraud? No.
2256. You know that what you have said would lead us to think that there was something of that kind. You say that you can give any amount of such mismanagement, and we want to know what this is, because it is our duty to see that it is put a stop to in future;—can you mention any particular case? The greatest mismanagement takes place in exploring for sites.
2257. You say that you can give any amount of such mismanagement if it is desired? Yes; but that would be in connection with roads and bridges.
2258. Are you aware why it is that in many instances the Government have to pay very much larger sums for the work than private individuals? During the time I was up there they were paying 1s. 6d. per cubic yard; that was then considered a reasonable price.
2259. Were the squatters in the neighbourhood giving that price? No; they were giving something less, about 1s. 3d.; but still I think that at that time 1s. 6d. did not pay very well. There was very little grass and no water at that time. Another instance of mismanagement which I may mention is this, that the bunds were not taken at the tank side, and the contractors, notwithstanding their arrangement to sink 18 feet, would fill up the surface of the ground; that would of course give depth. The sites were chosen without any survey or levels having been taken, and the filling up of the ground would naturally give depth. The tanks were not 18 feet deep from the natural surface of the ground.
2260. But surely such an attempt at fraud as this could not possibly pass the inspection of officers sent to examine the work? But it did; the ground and the surroundings being somewhat similar, it would be very difficult to discover the fraud, and seeing that levels were not taken, it would not be easy to prove that such a thing took place.
2261. *Major Pearce.*] You mean that it was difficult to discern between the made ground and the other portion? Yes; when the bullocks worked over the place for some time you could hardly tell the difference between the virgin soil and the other portion.
2262. *Chairman.*] But any competent officer who was sent up there to measure the tanks could surely find out and detect such an attempt as this at fraud? Any officer that could level would find it out on inspection; but the made portion of the ground was so far apart from the other that no fraud could be detected unless previous levels had been taken. In my experience in that country I learned that Mr. Cambridge never used his own vehicle to travel in; he used to travel on the coach, which could only stop for a moment or two to allow him to chose the sites. In some instances I heard from the contractors that they could have defrauded the Government by raising the natural surface of the ground so as to make the excavation deeper than it really was. This has been done to the extent of 2 or 3 feet, and can be done everywhere, provided the sections are not taken. It is exceedingly difficult of detection unless a previous survey and sections have been taken.
2263. You think the apparent excessive price the Government gave was necessary for the carrying out of these works in that exceedingly dry country? Yes; I think the price was reasonable at the time.
2264. I presume a squatter would never have attempted to sink a tank under such circumstances as the Government put down some of theirs? I should think not.
2265. The Government were compelled to do it under pressure brought to bear on them—as, for instance, the construction of works out on the Barrier Ranges? Yes; and at Mount Browne. There was a very small population on the Barrier Ranges at that time.
2266. Are there any other reasons by which you can account for this apparent excessive price given by the Government? No; not concerning tanks and wells.
2267. These tanks were not finished when you left, and therefore you were not aware what kind of machinery was there? No.
2268. Have you seen any of the different forms of machinery used for pumping water from these tanks? No; there was an order sent down from Melbourne for some valves when I was up there. That is all the machinery I saw.
2269. Have you had anything to do with the fencing while you were up there? Do you mean the fencing of tanks or the caretakers' paddocks?
2270. Of either? No.
2271. Have you found during your experience up there any interference by the officers of one Department with those of another? Did you ever come into collision with any of them? I only know that Mr. A. P. Wood was unfriendly to Mr. Gilliat.

G. Earngey. 17 Feb., 1888.

2272. How did they come into collision? In what way could they interfere if their work was entirely different? I expect it was on account of Mr. Gilliat's dissatisfaction with the construction of tanks by the Roads Department?
2273. Do you know whether Mr. Gilliat really complained of the faulty construction of the tanks under Mr. Wood's care? No; but I heard ——
2274. That is not the question; that is not evidence. Are you aware whether contracts let at large prices were sublet at very much reduced rates to sub-contractors? No, I am not aware of that.
2275. Have you had anything to do with the construction of wells? No; although there was one well being sunk in the district when I was there. This well is between Wilcannia and Dry Lake.
2276. Do you think the site was a fairly good one? It was about 12 miles out of Wilcannia.
2277. But was it a fairly good site? It was a necessary site. I was at that well when it was being sunk, and when they met with the salty water.
2278. What expenditure has been incurred on that well approximately? A large expenditure has been gone to which might have been saved had they used the water auger. The name of this place is Mulga Valley.
2279. Do you think that this dual control, and the handing over of these tanks when completed, has been the cause of considerable friction? Yes; if an officer is dissatisfied with the site he would not take the same interest in the tank as if the site had been selected by himself.
2280. One Department would, I presume, say that the works were not in accordance with what was agreed upon, and another would say that whatever was wrong arose from the fault of the caretaker? Mr. Gilliat generally went over the route with the squatters, who were better acquainted with the country than the coach driver; the Roads officers, on the other hand, stuck to the roads, while Mr. Gilliat saw the country about.
2281. What officer do you speak of? Mr. A. P. Wood has generally been the officer who undertook this work.
2282. But the road superintendent is the only officer out there? Yes; Mr. Cambridge always travelled by coach, and so did Mr. A. P. Wood, who generally measured the tanks and wells in the district. His knowledge of the district was always confined to the road. As you know the physical features of the country may alter very much half a mile away from the road.
2283. Would any person travelling have to depend upon local knowledge? Yes; but it would be better to get local knowledge and see for yourself, and have a good look around.
2284. You can understand that in an enormous tract of country it would be impossible to know the best sites without getting local knowledge? Yes; but the local knowledge some of these men gained was from the publican and the coach drivers; they never used their own observation, because they did not like to leave the line of road.
2285. Then you think that the inspectors of public watering places have reason to complain that the best sites have not been chosen because the road superintendent was not acquainted with the country? Yes; and the road superintendents do not give time to explore the best sites.
2286. Would that be remedied if the sites so chosen were chosen by the inspectors, and the construction given to the roads superintendent, supposing the inspector of public watering places chose the sites? I think they should not only have the choosing of the sites, but the construction of the tanks.
2287. You think the whole work ought to go into the Mines Department, and not to be divided as it is now? I should think so.
2288. Would it not be the means of creating another Department and so adding to the charge upon the revenue? Would it not entail a new arrangement in the superintending and construction of these works? Yes; but then the present roads officers would not be required. If additional officers were appointed by the Mines Department the roads officers would not be wanted.
2289. But the roads officers would have to be retained in their present position irrespective of the duty which they have to do in looking after tanks and wells;—would it not be unnecessary, therefore, to create a new Department necessitating another set of officers? It would not create a new Department.
2290. But it would mean the employment of a large number of additional officers? Yes; it would require more officers.
2291. And unnecessarily entail considerable expense to the country? Slightly; and the work would be well done. The men who would be employed on the work by the Mines Department would have a knowledge of geology, which would assist them in the selection of sites; because the man who has a knowledge of geology is much more likely to pick out a good site for a watering place than a man without that knowledge.
2292. *Major Penrose.*] Do you think that because the Department is called the Mines Department that therefore its officers must have a knowledge of geology? Yes; because the men employed by it would have greater advantages in studying the subject, inasmuch as they would have an opportunity of seeing the minerals from all parts of the colony.
2293. *Chairman.*] Are you aware that many of these officers of the Mines Department live hundreds of miles from Sydney and perhaps would not see the Geological Museum once in twelve months; and if that were the case how could they study geology? It would evolve, nevertheless, an interest in it; while in the Roads Department the subject is never given a thought.
2294. But supposing, as was the case, that one of these gentlemen lived at Hay, another at Bourke, and others elsewhere, how could they study geology? Well, the Mines Department to a man will have some knowledge of mining.
2295. But it does not follow at all? All officers in the Mines Department would be supposed to have a knowledge of geology.
2296. You are aware that the Forest Department is under the Mines; what has that to do with geology? Well, it has something to do with botany and soil, and that even bears relation to the subject.

[The Commission adjourned.]

THURSDAY,

THURSDAY, 23 FEBRUARY, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

James Budd called in and examined:—

J. Budd. 23 Feb., 1888.

2297. *Chairman.*] What are you? I am a contractor. I have been a contractor in the vicinity of Cobar for the last twelve years. I have done considerable work for the squatters round there. I have been a contractor for twnety years altogether.

2298. For private individuals or for the Government? For both the Government and for private individuals.

2299. *Mr. Woore.*] For tanks? Yes.

2300. *Chairman.*] You have not been a contractor for fencing, then? No, not under the Government. I have done tanks only for the Government. In fact, I have done very little work lately except for the Government.

2301. What tanks have you excavated for the Government? The Hermitage tank, the Booroondarra tank, the Burra tank on the Hilston Road, Helman's tank, Kerrigundi and Nullamut tanks. I also constructed two supply tanks on the Wilcannia road; one of these is at Springfield, and the other at Barnato. I had to do the main tank at Springfield; it was transferred to me by another party, and was not done in my name.

2302. By whom was the work transferred? By Coates and Holly. They were the successful tenderers for two tanks; but they only wished to excavate one; and I, being very little above them in price, got the work from them.

2303. At what rate? At 1s. 2½d. per cubic yard. I was only a trifle above them in my tender, so I took up the work at their price. They had the preference of three tanks, and gave me the one they did not want themselves.

2304. You agreed to take the work and construct it for the Government at the same price fixed by them? Yes; but the contract stood in their name. I had to do the work at the same price, and in addition gave them a bonus of £10 to hand over the contract to me. They were entailed in a certain amount of expense in obtaining the contract; and, of course, I had to pay a certain sum to them to recoup them for their trouble.

2305. Have you ever sublet Government contracts that you have taken? No.

2306. And is this the only instance where you have taken a contract from another person? No; I had one transferred to me before. This was the Kerrigundi tank; but it was transferred to me, and carried out in my own name. That was first taken by a man named Webb; but he did not sign the bond for it, and the work was transferred to me.

2307. Were you also a tenderer for the Kerrigundi tank? Yes; but I did not get the work originally.

2308. What rate of pay did you receive for that work? I think it was 1s. 5½d. I am not certain about it just now; but it was somewhere about that sum.

2309. What price did you take it for? I remember that there was only a very little difference between myself and Webb; he was only a little higher. I think there was only a difference of 1d. or ½d. between us.

2310. Is it a fact that the Government have to pay higher rates for excavation and construction of tanks generally than private individuals? Yes.

2311. Can you give us any reasons why this should be so? The principal reason, in my opinion, is on account of the slopes being so steep that it is not possible to have a roadway to take the stuff out. We are not able to plough or to use scoops. Besides that, there is a great deal of delay in getting our money as the work progresses.

2312. This is owing, I presume, to the want of inspection of the work by some officer? Yes; sometimes months elapse without any reports having been made; and in one case I had four months to wait, and had to pay an agent £30 to collect the money. I had to employ an agent named Cummings to get this money for me.

2313. Did this delay take place after the work had been completed? Yes; and in another case I was six months waiting before I got the balance of my money. This occurred in connection with the work done at the Nullamut tank.

2314. Now, are there any other reasons besides these two why the work done in constructing Government watering places should be more expensive than those of private individuals? Yes; because the Government tanks are carried to a much greater depth than the squatters' tanks.

2315. And after tanks have got down to a depth of from 12 to 14 feet the expense of sinking, I presume, increases considerably? Yes; the stuff, too, generally gets harder after you get down 10 or 12 feet in fair ground, and then it is very much harder. I have tendered now for work on the Wilcannia road, and have increased the prices as the depths vary and as the ground becomes harder. I am also prepared to submit a tender at a very much reduced price if a concession be made that the slopes shall be 6 to 1. [*Witness hands in a tender for the excavation of a tank, 14 feet deep, for* 1s. 1½*d. per cubic yard; for a* 16 *feet tank,* 1s. 3*d. per cubic yard; and for an* 18 *feet tank,* 1s. 5½*d. per cubic yard.*]

2316. *Major Penrose.*] Does that cover the whole? Yes; that is the average price. It is the price charged per cubic yard for sinking a tank to the depths stated.

2317. *Chairman.*] If you go 18 feet deep, you charge for the whole excavation 1s. 5½d. per cubic yard? Yes.

2318. So that going the extra depth you have to charge 1s. 5½d. for the whole? Yes; on account of the rock that we had to go through.

2319. Do you not always put in a separate tender for rock? No; it is nearly always an average price for a tank at the different depths. I have always had one price in every tank that I have taken from the Government.

2320. Have you ever come across rock in sinking a tank that had not been shown by the trial shaft? Yes.

J. Budd. 23 Feb., 1898.

2321. Did you ever receive any allowance from the Government for that? No; but I have often come across more rock than was shown by the trial shaft.
2322. And the Government gave you no compensation? No; I never applied for anything.
2323. You asked an extra price from the Government on that account? Whenever rock showed in the trial hole I got rather bigger prices on that account; but still I lost money on account of some of the tanks.
2324. Do you remember what price you received when you lost money? Yes; I received 1s. 9d. per cubic yard, and I was out of pocket even at that price.
2325. *Major Pearce.*] Did you really lose money at the price stated by you? Yes; and I made money on excavations at 11d. per yard.
2326. *Chairman.*] Now, have you ever come upon rock in sinking a tank for private individuals;—would they not allow you something in the event of your striking rock? Yes; but it would depend greatly on the conditions of the contract. Squatters, as a rule, do not care in sinking for water to go through rock, and do not care to pay the increased prices which that would involve. They have never paid for it in my experience, and I have put down hundreds of tanks for them.
2327. Are there any other reasons why Government work is more expensive than private work? Well, the squatter always provides water and grass for his workmen. If a tank is to be placed in a spot where there is no grass he will take off his sheep and allow the ground to stand till the grass does come; whereas, in the case of the Government tank you have to buy feed for the horses, and the work is let without any consideration as to where grass and water are to be obtained. The contractor has to buy feed at whatever price he can get it.
2328. *Mr. Moore.*] In fact, in doing Government work you have to take your chance as regards contingencies? Yes; and another thing is this, that the squatters generally crowd in more sheep in the vicinity of the tank than they would otherwise do, because they are opposed to these Government watering places.
2329. Why are the squatters opposed to the Government watering places? The fact of a public watering place being made by the Government increases the liability of the squatter to trespass from travelling stock. Another thing which increases the expense is, that there is a great deal more stuff to be taken from the bottom of the Government tank than from private tanks. Steep batters necessitate a much greater amount of stuff being taken out on account of the greater depth required to make up the total number of cubic yards. The squatter always allows a roadway sloping into the tank, which enables the contractor to get the soil up without trouble. The weight of the soil lies near the top; in fact, when you get half way down in a squatter's tank you have a great deal more than half the excavation work done. The difference is very great when compared with the Government tanks.
2330. *Chairman.*] As a rule, tanks constructed by the Government are intended not to water stock directly, but to water them by means of troughing? Exactly.
2331. But this is not the rule with squatters? No; they prefer to allow the stock to water themselves. I know that, because I have sunk hundreds of tanks in the Cobar district for squatters about there.
2332. The Government are generally more particular in the finish of their tanks than are squatters? Yes, certainly; and especially in the finish of the banks. A squatter does not care much about the shape of the banks, provided they hold the water satisfactorily. The Government tanks, on the other hand, have their banks all dressed down to a certain slope, which entails a considerable amount of extra expense. Again, the trimming work, and so forth, all have to be done more particularly than the same work in connection with the squatter's tanks. There is a great deal of trouble with the embankments round the excavation, as compared with those made by the squatters.
2333. Then, again, in the Government tanks I understand that the bottom must be absolutely level? The specifications say so; but in actual practice they are not very particular. Sometimes the inequalities in the bottom are made up with loose earth, and no objection is taken if portions of the tank are a little deeper than others.
2334. In those Government tanks that you have constructed, do you recollect what the slope has been? In the last tank that I constructed the slope was 2 to 1; but all the others have been 1½ to 1. I really forget what the slope in the Nullamut tank is. It is a 10,000-yard excavation, and was constructed for the purpose of allowing stock to water without troughing.
2335. Consequently, the slopes are more gentle than in the case of the other tanks? Yes; the slopes were flatter than 1½ to 1, and roadways were allowed in it to cart the stuff out.
2336. Is it only quite recently that the Government officers have changed these slopes? It was only about Christmas, when I completed the last tank, that I heard of that alteration.
2337. What is the usual slope of the tanks that you have seen throughout the country? I should say about 1½ to 1. I am speaking now of the Government tanks. With the exception of two places that are being put down on the Wilcannia road, the slopes are all 2 to 1. One of these tanks is complete, and the other is in course of construction. One of the tanks that I have just mentioned will be useless. This is the Barnato tank. The water soaks out of the supply tank, undermines the sides, and goes away. There is good holding ground at the bottom; but, owing to the sides being made with a slope of 2 to 1, the water runs through them as it might run through a sieve. I proposed to construct that tank 3d. per yard less if the Government made a concession of making the slope less steep; but they would not do it.
2338. I find here in one of these specifications the following provisions:—"Should the Head Superintendent consider that the surface, or any other stratum passing through in the excavation is too porous, the contractor must adopt such steps to puddle the porous ground as the superintendent may direct; the cost of such work to be provided for by a price per cubic yard for puddle being quoted in the schedule of prices"? Yes; but that would not affect the surface in any way. Even if we got gravel we would have to fill it up; but that would not meet the case. It is like a bed of ashes; it washes away with the water and goes down. The soil where Barnato tank is sunk is so exceedingly porous and ash-like that it will not stand up, and the water disappears. As a matter of fact, the contractors had to cart the water the whole time during construction. The supply tank had been filled time after time.
2339. Now, do you not think that this very porous soil could have been observed from the surface, even by one who was not a great expert; and that it would then be discovered it was not a proper place to sink a tank? No: I have often been deceived in the matter myself, and I am considered a pretty good authority.
2340. So that you do not think any blame can be attached to the person who selected the site of the tank? No; because the tank would have been all right if the slopes had been made flatter.

2341.

2341. But I imagine anyone would have seen that the holding ground was not good? No; I do not think so. Had it been a squatter who was putting a tank down he would have made a flatter slope.
2342. I presume that you are of opinion no hard and fast rule should be adopted in respect to the putting down of tanks? No; it should not. In fact, the depth of tanks should also be considered. Where you get a flat locality you will most likely get good ground, so that I think a hard and fast rule should not be adopted at all. Of course there ought to be a great change in the specifications. They should be made to suit the localities for which they are framed. In hilly country, where there is a good catch, a shallow tank would be more advisable than a deep one, because very likely you will meet with a bad bottom. In that case, too, the slopes might be made fairly steep, and you could conserve more water on account of this steep formation. You can have a much steeper batter, but not so great a depth as in other parts of country. Then in open country and flat ground, where great depth is desirable for a tank, the batter should be more sloping; but everything depends upon the nature of the ground.
2343. Consequently, all tanks should be sunk in accordance with the nature of the soil and the locality? Yes, exactly.
2344. And variations might be made both in the slope of the batter and in the depth of the tank? Yes; because a hard and fast rule is not at all suitable.
2345. Have local engineers, in your opinion, sufficient discretion and ability that they might be allowed to make variations from the specifications? I do not think that a man requires to be an engineer at all to do this. Of course I can only speak of the men with whom I have had actually to do; and if I am asked about any particular one I can answer the question.
2346. But are they allowed to alter the specifications? No; certainly not. They have their plans drawn out for them and are obliged to work up to them. I have often suggested things to them, and they agreed with me that the alterations were advisable; but stated that they were unable to carry them out. When I tendered for the last tanks that were constructed on the Wilcannia road I offered to do these tanks for 3d. per cubic yard less if I were allowed a 6 to 1 roadway on one side. That would have meant a reduction in the price of the tank to about 1s 5d. per cubic yard; but I do not think that the matter was ever considered in Sydney. I could easily have done this if I had been allowed the concession. I do not know that my proposal was ever submitted to the authorities in Sydney, but I am not sure.
2347. Did you receive no reply? No: no other reply, except that the work must be done on the old lines—which, of course, I did.
2348. *Major Penrose.*] Have you ever been inconvenienced by delay in receiving payments for your work? Yes; I was compelled by this delay to borrow money at very high rates, and on one occasion I was obliged by it to go insolvent. This was in the case of the Nullamut tank. Fully six months elapsed before I was able to get the balance of my money, and I was obliged to go insolvent. As soon as I got my money I paid all my creditors.
2349. Can you state to whom all this delay is to be attributed? On that occasion I think the great delay was attributable to a mistake in making out the quantities. There is always a delay more or less; but in this case the delay was owing to a mistake.
2350. Is it due in any part to the want of prompt inspection of the work by Government officers? Yes; in a great measure it is, because sometimes they do not come out for three months.
2351. *Chairman.*] So that unless you happen to have money of your own you cannot well afford to compete for the construction of these tanks? Unless one has some money of his own, or that he is given credit. Fortunately for me, I had unlimited credit, and that was what stood to me; but I have to pay more for my goods to the people from whom I purchase than I would otherwise, on account of the long time that I am obliged to keep them out of their money. They know that they will have to wait a considerable time for their money, and consequently they charge me more for my supplies.
2352. And the result of this is, I presume, to lessen the number of contractors? Certainly; men have not the means or the credit to go into these works.
2353. *Major Penrose.*] Can you give us any idea of the difference which the supply of grass and water to contractors makes in the construction of a tank? I think on an average it would make at least 1d. per cubic yard difference if you had the water and the grass on the ground.
2354. But it might make a great deal more? Yes; in some instances it cost me what was equal to about 3d. per yard to feed my horses. If I started a tank on the presumption that I would have to buy feed all the time, I should put on 2d. or 2½d. per cubic yard extra to remunerate me for the extra expense involved. Cartage is very expensive, and the extra charge would depend greatly on the distance of the place from the railway.
2355. In excavating for private persons, what implements do you use? In some cases I used ploughs and scoops, and in others I employed drays. In shallow, small tanks, scoops are most suitable; and especially where there is a dam to be made. If you have a long tank to make, the best way to do it is by drays.
2356. What do you call shallow tanks? Tanks from 6 to 9 feet deep. After you take out with scoops, then it is cheaper to take the stuff out with drays.
2357. *Mr. Moore.*] Well, then, ploughs and scoops are of very little use in Government tanks? Very little. Even on the top they are of very little use. As a rule squatters' tanks are rather long and narrow, which makes it much more easy to use ploughs and scoops than if the tanks were of a different shape. I have found that as a rule squatters' tanks are not more than half the width on top of Government tanks.
2358. *Chairman.*] Have you made any calculation as to the difference in cost between work done with ploughs and scoops, and work done with picks, shovels, and carts? Yes; but I have not got that calculation here. I think, where the ground is suitable, and the tank is being made long and narrow, the difference would be about 2d. per cubic yard under the cost if the work were done by carts, because so many more men have to be employed in shovelling, driving, and so forth; while it only requires two men and a team of bullocks to work ploughs and scoops. On the other hand, it requires double that number of men to work the drays. Besides, in sinking tanks for the squatters, we generally make an arrangement with the squatter to obtain meat at a very cheap rate, while to the contractors for Government tanks the squatter charges an excessive price for the meat.
2359. And, of course, the squatter also takes into consideration the fact that he will not be paid for a very long time? Yes; that is a fact. I could not have paid them in many cases until I got my money, unless they put me "up a tree" again; and I do not think they would care to do that.

2360.

J. Budd. 23 Feb., 1888.

2360. Now, in your experience, with regard to the selection of sites, do you think that sites have generally been well selected as regards catchment area? No; I do not; though I cannot say that I have any fault to find with that. In every case I have seen the tanks filled.
2361. Do you know anything about those tanks out on the Wilcannia to Milparinka road, on the Darling? Nothing further than that I have heard from the contractors, who have been there, that the ground is much better for tank-sinking than the ground out our way. Of course I have not seen this country myself.
2362. You have never erected any fences for the Government? I think I have done some, but it was so very trifling that I do not remember any particulars about it.
2363. *Major Penrose.*] As a rule, are the batters of the tanks which you have constructed for the Government standing well? As a rule they are.
2364. Even at 1½ to 1? Yes; as far as I have seen they are standing pretty well. Yet they would be much better if they were flatter, although they would expose a larger surface to the wind.
2365. Do you think these tanks, if constructed as you state, would hold water better than now? I do believe they would.
2366. Do you think that a batter of 2 to 1 will be sufficient in most cases? Yes; but it would depend altogether on the nature of the ground. What would do for one case would not do for another. In some cases, if they were constructed 3 to 1 they would be better, but as a rule 2 to 1 is sufficient. In some cases, where the soil is firm, even 1 to 1 would be better, because there would be a less surface exposed to evaporation: but in other cases, where the soil is very friable, a batter of 3 or 4 to 1 would be advisable. As regards construction, in all cases there should be at least one roadway of 5 to 1. This would admit of a great reduction in the price. It is something extraordinary the difference it would make if this concession were granted.

[At this stage, the witness submitted a calculation, with the view of showing the very considerable saving that might be made in the construction of tanks. As near as he could estimate the amount of excavation to be 3,000 yards less. At the top side of the excavation of 300 feet there should be one batter of 5 to 1, and on the opposite side one of 2 to 1, to admit of ploughing. On the other sides the batter might be 2 to 1, or steeper, if necessary, if the soil would admit of it. This would reduce the cost of the excavation by about 3d. per yard, being a saving on 15,000 yards of £187 10s. There would also be 3,000 yards less of excavation at 1s. 6d., which would amount to £125, or a total saving of £412 10s. on the tank, the contents of the tank, as shown on the Government drawings, being 18,000 yards. This statement was merely approximate. He did not think that the extra 3,000 yards was worth £412 10s. In the event of the head-gear for pumping water into the troughs getting out of order, then the long slope would be advantageous in allowing the stock to water in the tank until the head gear was repaired. If this were done it might save the lives of stock and thousands of pounds of money.]

2367. Have you put these suggestions before the Department of Public Works? Yes; I mentioned it to Mr. Adams, our road superintendent, but he did not seem to embrace it. I think it would be very desirable, before the construction of a tank was commenced, that the paddock which now accompanies these tanks should be first of all fenced in, so that the grass might have time to grow for the use of the contractor's horses and bullocks, as the case might be. When the supply tank is put down, the fence should also be made, and by the time there was grass and water, the contractor would be there to construct the main tank. This would mean a great reduction, and would materially lessen the cost of construction, making, in some cases, fully 3d. per yard difference.
2368. *Chairman.*] Do you think that the contractors for these Government tanks, even at the apparently high rates charged, make more money out of them than they do out of the squatters' tanks? Well, for my part, I have made more money out of the squatters' tanks at reduced rates. The squatters give every facility for the carrying on of the works by the contractors, and the prices have varied from 9d. to 1s. 9d. The cheapest dray work that I have ever done was done for 11d. per cubic yard, and the cheapest with ploughs and scoops was 9d.; but I have received as much as 1s. 9d. per cubic yard.
2369. What special reason was there for this high charge? Well, we had further to cart water, and the tank was being sunk in cemented ground. I had to cart water in one case some 18 miles. This was to supply the tank in Sussex Station, about 30 miles from Cobar. I had to get a supply of water to sink the big tank there, and for this I got the extra price of 2s. 6d. per cubic yard.
2370. So that you think there may be circumstances under which Government would necessarily have to pay large prices for tank sinking, such as for tanks constructed a long distance from water? Yes.
2371. And there would be nothing unusual or out of the way in the Government doing it? No; the conveyance of water for long distances is a very big item in the construction.
2372. And, as a rule, a squatter does not put down his tanks in adverse seasons, when there is neither grass nor water? No; he does not generally do so, though in some extraordinary cases he might.
2373. But if the public insist upon a tank being put down, the Government are obliged to do it? Yes; and no excuse is admitted for their not doing it.
2374. Do you know of any instance where contractors have sublet their work at very much reduced rates? No; I cannot say that I do.
2375. Now, will you state to us what course you think would be most desirable to carry out these works more satisfactorily in the future? I think it is very undesirable indeed that all these works should be constructed and managed by different Departments. I think the whole thing should be placed under the control of one Department. I also think it would be very desirable that there should be some person who will give proper supervision to the construction of the work, and who will possess at the same time discretion to vary the specifications in accordance with the nature of the soil to be excavated. Even the sizes of tanks should be taken into consideration, because in many cases they are made larger than the requirements warrant.
2376. Do you not think that if these works were managed by some local body the arrangement would be a better one? I think if the matter was left in the hands of the local superintendent—if he is a really good and capable man—that you cannot do any better. In fact, I am certain that it does not require a civil engineer to be a practical conservator of water in that country. What is wanted is a man who has a practical knowledge of the interior.
2377. Do you think the road superintendents would be suitable persons to have the management and control of these works? So long as he is a thoroughly good and practical man it would not matter what he

was

was called. We require really good practical men, with local knowledge. He does not require to be a civil engineer; but his being a civil engineer is not in his way, if he has local knowledge.

2378. Have you any further suggestions to make whereby water might be better conserved? As regards contract work, I think all tenders should be opened before a Board rather than before one man in the country. I do not want to give any particular reasons for what I say on this point.

2379. You need not give the names, but you can surely give the reasons;—do you think there is collusion between the Government officers and the contractors? Yes; in some instances. In one case I myself was told that I need not tender for the excavation of tanks on the Wilcannia road. I asked the party who said this at the time, if he was not inviting tenders? He said yes; but that I need not put in a tender, as he thought there were plenty tendering already. I said to him, "You evidently do not want me to tender!" and he said "No." The person I refer to is a Government official in that part of the country. After this conversation I went to Mr. Barton, a storekeeper and a local Justice of the Peace, and told him what took place. He advised me to wire my prices down to head-quarters in Sydney, which I immediately did, and I ultimately obtained the contract. I had to go a good deal lower in order to get the work than I would otherwise have done. I lost money by the same thing; but then I got an insight into the construction of the big tanks.

2380. Are you aware that some of these Government officials have lost their situations by improperly dealing with contractors? I was not aware of it before. There is one case, however, which has come under my own experience lately; but I would rather not refer to it.

2381. All that is necessary is that the facts should be stated? Well, there are numbers of other contractors as well as I who hardly care to go and inspect work at the present time for which tenders have been called. They do not think it advisable to do so, especially if the work is any distance away. Unless it is somewhere convenient to us, we do not think it worth our while to go and look at it.

2382. Why? Well, of course, there is always some little hitch or other by which we are deprived of the work. Our tenders are always informal, or something happens by which other parties get the work. One instance that happened to myself I might as well relate. When contracts were called for the tanks on the Wilcannia road, about June or July last year, I tendered three times—in fact, we all had tenders in for this particular work.

2383. Why did you tender three times? Well, in the first place one of the conditions proposed was that we should engage a certain number of the Sydney unemployed, which, of course, caused high rates to be put in. Then tenders were called, leaving out that condition; and then we were told that the tenders were still too high, and that the work would not be done at all unless we cut down the prices finer.

2384. What was your tender at that time? I did not reduce mine but very little. The prices were given for different depths of tanks, so that I cannot exactly remember the prices. No one tank is a guide as to what another is worth, as you have to be guided altogether by the trial holes. My third tender was reduced just a mere fraction, but on that occasion we gave in open prices, the tenders not being enclosed in envelopes. Although I was told before that I need not tender for the work, I was then sent for to put one in, and I did put in my tender. Afterwards, when I saw other parties, I concluded that I would not get the work, and I offered to make a wager to that effect. I said that it would be found my tender was just a little over the estimate of the others. I told Mr. Barton about it when I put in the tender for the work, and when I went back I said I was sure I would not get it—that I would be a half-penny or a farthing too high, or something of that sort.

2385. And did the result justify your anticipations? Yes, very nearly. My prices were just slightly over those of another contractor, at whose prices I carried out the work some time ago.

2386. Those people were the lowest tenderers? Yes; the rates were sent into the office at Cobar, and Coats and Holly got the work. As they were not prepared to do both tanks, I offered to take one of them at their price; but the officer-in-charge refused to transfer it from Coats and Holly to me, telling me that he had wired to the Department in Sydney to know whether the next highest tenderer should not receive the contract. Eventually, after getting Mr. Barton's assistance, one of the tanks was transferred to me; but it was made out in the name of Coates and Holly, although I carried out the work. No answer was received from Sydney as to whether the second tenderer should receive the work or not. I finished my tank two months ago, but it will be some time before it is fenced in.

2387. You think that in this instance favoritism was shown by the Government officials? Decidedly it was. I should think that in future tenders should never be left to be opened by one official. I don't think that tenders should be opened up there at all. The local officer, after having received my open prices, went down to M'Donald, who had also put in a tender for Coates and Holly, and it was after that that I found out that my tender was a trifle too high. That is why I would like to see tenders opened down here in Sydney.

2388. Now, could not this be done—could not a board be appointed in the country districts to receive and open tenders for such work? That would be very much better, I think.

2389. And you think that what is now done by the local officer it would be desirable to hand over to some local body? Yes; the only object would be in regard to the tenders. The people up there all know each other, and I got into their bad graces by being pressed for money. In one case I had completed my contract some two or three months before I was able to get the road superintendent to measure up and pass it. When he came up to measure the work, he staked his horse accidentally, and he had to get another from Mr. Leslie, whose place we had to pass. Owing to this, we had to camp out, and in the morning we had some difficulty in catching the horse. The superintendent then said that if he knew he was going to be humbugged in this way, he would not have come up to measure the work at all; but I did not see that I was in any way to blame for his staking his horse.

2390. Do you know anything about fencing at Government tanks? Yes; I think that a less expensive fence would answer all the purposes of these watering places. They are too particular in this matter, and altogether the fencing is too expensive.

2391. Have you ever found any difficulty in watering stock at the troughs? I never watered any stock at the troughs myself, but I have heard a great many complaints; but from my own experience I can say nothing. Every horse that I drove to the troughs watered at them right enough.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

Mark

Mark James Curry Tully called in and examined:—

M. J. C. Tully. 23 Feb., 1888.

2392. *Chairman.*] What are you, Mr. Tully? I am an inspector of stock and overseer of public watering places.
2393. Which is your district? My district is the Wilcannia sheep district.
2394. How long have you been a resident of that neighbourhood? Twenty-one years.
2395. How long have you been an overseer, under the Mines Department, of public watering places? Nearly three years.
2396. Of course you are aware of the objects of this Commission? Yes, I know some of them.
2397. I may state briefly that it is an endeavour to find out the causes of the friction which has been shown to exist between the two Departments—the Works and the Mines—and also to examine into the allegations made by the Mines Department with regard to the excessive cost of public works carried out by the Government. Who is the inspector of public watering places for your district? Mr. John Low.
2398. The evidence that we desire to obtain we have arranged in a certain form, and we will take the points *seriatim*. The first thing we wish to take into consideration is the faults of judgment which have been made in the selection of sites for tanks and wells;—can you of your own knowledge say that the sites of any of the tanks that have been excavated are not suitable ones, or are improper and undesirable, and not selected with due consideration? Yes; I know of some cases of that kind. I know that the tank at the Peri Springs and the tank at Cobham Lake, and the Goomboolara tank on the Paroo are badly situated. These are some of the principal cases that I know of.
2399. Why do you consider the site of the Peri tank badly chosen? Because it is in close proximity to the springs.
2400. Do you think that the springs give sufficient water to meet all the requirements of travelling stock? I do.
2401. Are not the springs situated on the travelling stock reserve which is within the leasehold? Yes; but the travelling stock reserve has not been reserved or defined on that portion of the Paroo. I do not think the reserves have been defined lower down than Goomboolara.
2402. Has not this stock road since been surveyed? No; it has never been surveyed or defined.
2403. How far are the Peri Springs from the usual stock tracks? There are two tracks.
2404. But from the track most used? About 2 miles.
2405. Are you aware that this is beyond the usual width of travelling stock reserves? Yes.
2406. Then, any stock watering at the Peri Springs must have been trespassing on the leasehold of the squatter's run? I do not know whether it would be trespassing or not, seeing that there is a road up to the springs that is used for months and months every year. There is a road past the springs that has been used frequently by stock for years.
2407. But you have told us that the usual road is 2 miles away? Yes.
2408. Under these circumstances, do you not think that it would be a very proper thing to excavate a tank at a place where water could only be obtained on sufferance, and by applying to the lessee of the run? Yes; but the tank is in the very same position as the springs.
2409. How far away is the tank from the springs? A little more than 400 yards—I mean only about 400 yards further from the main road than the springs are. The springs are really nearer the main travelling stock road than the tank.
2410. *Mr. Woore.*] Were you in the district when the tank was made? No; I do not think I was in that district at the time. From the year 1880, up to 1881 and 1882, I was not in the district.
2411. Are you not aware that before the tank was made these Peri Springs were on a pastoral lease held by the lessees of Momba run? Yes; I believe they were.
2412. And were not the springs used as a place of refuge by the main body of stock belonging to that station during droughts? It was.
2413. And the lessees of the station—did not they make some little improvements, such as drains running from the springs, and dam up the water for their stock? Of my own knowledge I cannot say, but I believe that improvements had been made before the tank had been put down.
2414. If the Government had resumed these springs for a public watering place, would it not have been a very serious loss to the lessees of the run? I think it would have interfered with the run.
2415. You know that it was a refuge for the whole of the stock of the station in times of drought? That could not be disputed.
2416. *Chairman.*] Then you think that the tank in any event is in an improper position because it is still further from the main track than the springs? Yes; the tank is farther away from the main track than the springs.
2417. *Mr. Woore.*] Which was the main road for travelling stock at the time the tank was made? Stock in those times took what is called the right-hand track. The main track did not originally go along by the springs, but stock were always allowed to go up to the springs to water.
2418. *Chairman.*] Then, that is the only objection to the Peri Springs tank—that it was unnecessary, because the springs themselves gave plenty of water for travelling stock? Yes.
2419. *Mr. Woore.*] Is it a good site otherwise—a good site as to catchment area? Yes; it is a good catchment.
2420. Do you of your own knowledge know what number of sheep the lessees of the Momba run used to water at the Peri Springs during times of drought? I do not know the number of my own knowledge; but the present general manager, Mr. Hogarth, told me that he watered from 12,000 to 14,000 sheep there.
2421. Then, if the owners of the station watered from 12,000 to 14,000 sheep in times of drought at the springs, would there be any water left for travelling stock? That I cannot say.
2422. *Chairman.*] Have you any idea what is the average daily supply from these springs? I am not aware what the daily supply is, but I would gather from the fact of so many sheep having been watered there in a day that the supply would have been about 18,000 gallons per day.
2423. Then, in times of drought travelling stock might at any time go to the springs and find them dry? Very probably.
2424. Then, under these circumstances, do you still think that a tank was improperly sunk in the locality? Yes; because the springs and all were proclaimed a public watering place.
2425. Not at this time, I imagine? The tank was excavated on water reserve No. 630.

2426. *Mr. Moore.*] But at the time this tank was made there was no such thing as a public watering place, because the Act had not then come into force creating such places? Yes; but there were reserves set apart for the purpose—water reserves. M. J. C. Tully. 22 Feb., 1888.
2427. Do you know what these reserves were really made for? Yes; to prevent alienation of the land.
2428. They were reserves for water supply? Yes.
2429. To prevent the eyes of the country from being picked out by selectors? Yes.
2430. They were not made as reserves for public watering places? No; because the Act had not then come into force; but notwithstanding, I understood that they were for the purpose of conserving water for the use of travelling stock.
2431. I think you will find you are mistaken. Do you believe that all water reserves reserved from sale were made to conserve water for the travelling public? I mean that these spots were reserved so that they might be available for the purpose.
2432. But many of these reserves are off the stock routes altogether? Yes, that is so. [*Witness then explained on a chart the routes referred to, and pointed out the position of the tank and springs.*]
2433. Was not the only road chosen by the public before the tank was made along the eastern bank of the lake, past the springs, and then *via* Olepoloco Lake? Yes; for travelling stock, but not for the general traffic.
2434. *Chairman.*] The next tank that you mentioned as having taken objection to is that at Cobham Lake? Yes; all that class of ground is of a more friable nature, and not such good catching ground as the clay-pan country. All these lakes are liable to be filled up during heavy rains, although some of them have been dry for a very long time.
2435. Is there any objection to a tank being sunk in a lake which is dry? I think it is a useless expenditure, especially as there is sometimes natural water there; and I think that if these tanks were put in dry country they would be much better and more calculated to do good. If a tank is put where there is natural water it is not calculated to be very valuable.
2436. *Mr. Moore.*] Are you assuming that this lake affords a permanent supply of water? No; I am aware that it does not supply permanent water.
2437. Can you say how long the lake has been without water? I believe it has been for many years without water.
2438. Do you not know that the lake is subject to be dry for several years? Yes.
2439. *Chairman.*] Could you put a tank at Cobham Lake in a better position than that chosen? Yes; within 3 or 4 miles of that site there is a much better position.
2440. *Mr. Moore.*] Is that in clay-pan country? Yes; it is some 3 or 4 miles south-east of the lake.
2441. Is the soil in the lake loose, friable soil? Yes; until after going some distance down.
2442. Underneath the sand and drift there is clay? Yes.
2443. *Chairman.*] I presume that in loose soil the water would soak through the ground before reaching the tank; whereas, if a tank were excavated in clay-pan country, every shower would help to fill it? Yes.
2444. *Mr. Moore.*] Are there any good clay-pans in the place that you mention? Yes, excellent clay-pans, about 4 miles away among the sand-hills. It is perhaps less than 4 miles from the tank. I examined that spot recently.
2445. *Chairman.*] Are you aware who chose the site of these tanks at Peri Springs and Cobham Lake? No; I do not know the name of the officer who chose the sites.
2446. What is the name of the next tank you object to? This is Goomboolara, on the Paroo, just about 12 miles beyond Courimpo.
2447. What is your objection to the site of this tank? The tank is put on a neck of water running into the lagoon, which holds about 5 or 6 feet of water more than the site of the tank. The water to go into the lagoon must pass the tank. I have frequently seen water going into the lagoon without filling the tank.
2448. But is there not a drain intended to intercept the water which otherwise would spread out into the swamp and fill it? It may be intended for that, but it does not fulfil the purpose.
2449. Is there no local catchment for this tank? No, beyond what might be collected in the bed of the Paroo. It may be 200 yards wide at this place and is very much like a series of clay-pans.
2450. And then the tank cannot be filled unless the Paroo is running? No, not without.
2451. *Mr. Moore.*] Is there not a natural channel from the Paroo into the swamp by which this water passes? Yes.
2452. And this natural channel has been deepened, has it not? Yes.
2453. *Chairman.*] You say that this tank is in such a position that unless the Paroo runs it cannot be filled? Yes; the tank cannot fill unless the Paroo is running, and unless it runs pretty high it will fill the swamp, but will not fill the tank.
2454. *Mr. Moore.*] Then there is no local catchment? No; there might be local rains that would run the Paroo for some distance.
2455. Cannot this tank be made to fill by means of a local catchment? No; not without a dam is put right across the channel of the Paroo.
2456. I mean independent of the Paroo flood water—cannot the tank be made to fill from local catchment? No; I do not think it could. The tank might have been situated in the swamp or closer to the lagoon.
2457. *Chairman.*] You are not aware by whom the site of this tank was chosen? No; it was chosen before I entered into charge of that district.
2458. Do you know that this lagoon has been filled without any water being put into the tank? Yes; I have seen it full.
2459. *Major Pearson.*] Is there any water in the tank now? Yes; the Paroo has been running almost continuously for the last two years.
2460. *Chairman.*] Have you any fault to find with the construction of tanks—with faulty designs and so forth? No, with the exceptions of the steepness of the batters; otherwise the designs of the tanks appear to be correct.
2461. What do you find the batters to be in those tanks that have come under your own observation? The slope of the batters appears to me to be like 1 in 1 and 1 in 1½.
2462. And at that slope the bank sometimes falls in? Yes; but I would like to say that you could scarcely lay down a hard and fast rule as to the kind of batter to be used.

2463.

M. J. C. Tully. 23 Feb., 1886.

2463. You would have the slope of the latter fixed in accordance with the nature of the soil? Yes.
2464. Are you aware that the steep batters increase the cost of excavation? Yes, greatly.
2465. Are you aware that in that hot dry country it is very desirable to expose as little water as possible to the sun and to the wind? Yes; I am quite aware of that.
2466. Then, do you not think it is quite right that the batter of the tank should be as steep as possible? Yes; I believe the batter should be as steep as the nature of the soil will allow.
2467. Have any tanks been constructed with a more gentle slope than 1½ to 1? I think none of the older ones, constructed before the Mines Department took charge, had a greater slope than 1½ to 1.
2468. Do you know what that slope was? No; I do not know.
2469. Of course, in all these steep-slope tanks the intention is that the stock shall water at troughs? Yes.
2470. And if stock were to water direct from the tanks they would require a more gentle slope? Yes.
2471. Do you think it desirable or otherwise that stock should water direct from the tanks? Not usually; but in certain cases they should be allowed to water at the tanks.
2472. Where should these places be at which you think stock should not be watered by machinery? Wherever there is a large traffic I would have appliances for the watering of stock, but not on that sort of roads where the tanks are seldom used. On those latter places I would be inclined to admit stock to the tanks.
2473. Would that save the expenses of keeping a caretaker there? Yes, it would. I would deprecate any hard-and-fast rule in these specifications in regard to the slope. In every case the question of batter should be considered on its merits, and a greater or less slope adopted if the ground will admit.
2474. Are you aware whether the road superintendents who had the selection of sites and the control of the construction had any discretion in this matter? I was not aware that the road superintendents had any discretion in the construction of any of the works that are referred to here.
2475. Of course, a trial shaft is sunk in every case? Yes.
2476. Well, then, a road superintendent, in seeing these trial shafts put down, ought to be able to form an opinion as to the proper slope to be given to that particular tank? Yes; I think so.
2477. And if he recommends a slope that the nature of the soil will not bear he is to a certain extent reprehensible and guilty of a waste of public money? Yes, assuredly. There are several other places that I might refer to that have faulty sites. Another one is the Tarella tank, to which I would like to draw attention. With respect to this tank at Tarella, after the contractor had commenced the work he found that the plans did not agree, and that the inlet was placed down stream. In connection with the Tarella tank, when the contractor undertook the work he found that the opening was down instead of up. He came to me and asked me what he was to do, and I recommended him to see the superintendent before he went further with the work. Having understood matters, the superintendent altered the inlet to the tank.
2478. Who was the officer who selected this site? I believe the site was selected by the Assistant Engineer for Roads, Mr. A. P. Wood. I am not quite sure, but it was either Mr. Wood or Mr. Earngey. I cannot speak positively. The site of the tank was not a good one, because it was placed very near a watering-place on the Bunker Creek.
2479. *Mr. Moore.*] Then it is placed in the water-course? Yes.
2480. And in the creek? No, not in the main creek, but in the Billabong, and the first flood that went by washed around the end of the tank. This is 3 feet deeper than the inlet to the tank.
2481. *Chairman.*] In any event, being situated on a billabong or creek, the tank was liable to be silted up? Yes, or the banks washed away, or both.
2482. Was this a natural waterhole, or had the supply been increased by expenditure? It was dammed by lessees.
2483. In the event of the lessee refusing water to travelling stock, how would they obtain water? The stock could not have travelled.
2484. And do you still say that the tank was improperly placed, in the face of that fact? Yes.
2485. *Major Penrose.*] What state is that tank in now? It is just about to be completed and handed over to the Department of Mines.
2486. *Chairman.*] Could a better site have been selected in that neighbourhood? Yes; within a very short distance from the tank.
2487. In your opinion, do the road superintendents out there take any trouble to obtain local information as to the best position to put down these tanks in? I have heard it frequently stated that they do not inquire sufficiently or get the advice of the older residents there.
2488. *Mr. Moore.*] You have only heard that? That is all. All I know is that they did not come to me for information. Had they done so I would have given them every information in my power.
2489. And are you aware of any local people in the neighbourhood having been asked their opinions? No; I am not aware of it.
2490. Are you aware that in the early days mistakes were made by the squatters in constructing excavations for tanks, and in putting up dams that were washed away? Many mistakes were made in the early days. I know that some dams on Bunker Creek and other places were washed away.
2491. So that it could scarcely be expected that the Government officers should be infallible. If other men made mistakes, they were liable to do the same? Yes; mistakes were made all round.
2492. *Chairman.*] Are you aware that in some instances drains leading water into these tanks were improperly constructed, and that instead of leading the water in, had a contrary effect? No, not in my district, and it contains altogether twenty-two watering places—three of these being on the Hooligal to Wilcannia road. My district runs 150 miles up the Paroo. Previous to the beginning of this year it ran out to Tibbooburra.
2493. Is it your duty as overseer to visit these tanks? Yes; I have to visit these tanks once every two months; and unless there is some reason why, I do so. I am supposed to inspect and report on the tanks every two months.
2494. Now, with regard to excessive cost of construction, are you aware that the Government pay higher prices for excavation work than squatters and others? That has been well known.
2495. Can you give any reasons why that should be the case? I do not know all the reasons why. The only reason that I am aware of is the delay which the contractors have to contend with in obtaining payment for their work. That I take to be the principal reason, because it necessitates a man with a large plant and with considerable capital to enter into these Government contracts.

2496. What machinery have you in your district? We have got four steam pumps, three of which are under my control.
2497. Do you think that steam pumps are needlessly expensive? Except where the traffic is very heavy I think a steam pump is a needless expense.
2498. But you think that in some instances it is desirable to have steam power? Yes; where the traffic is heavy, and where other kinds of machinery might cause delay.
2499. How do you regard steam power as compared with horse-power? From what I have seen of the two I would prefer horse-power for the public watering places.
2500. For what reason? Because an ordinary man can deal with horse-pumps, and you must have a man of more than ordinary intelligence to make repairs if the steam machinery gets out of order.
2501. Of your own knowledge what is the greatest amount of water required in one day at one of these public watering places? I do not know what quantity would be required, though I say about 70,000 gallons. The public watering places in my district have had very few demands made on them lately on account of the seasons being wet.
2502. Do you think it is possible that with a hand-pump a caretaker could always keep the service tank full and available for traffic? I do not think he could. Wherever the traffic is at all heavy I do not think it is possible; but where, on the other hand, the traffic is light, I think he might keep the tank full and attend to his other work at the same time.
2503. *Mr. Moore.*] What is the greatest number of stock that you have known to water at the public watering places during one day? There might be a case of 40,000 sheep watering in one day.
2504. But what is the greatest number that you have known? I think about 26,000 sheep. That number watered at the 35-Mile tank in one day.
2505. And how much water would they each consume? I should say at the rate of a gallon and a-half each. I am under the impression that in this case the sheep were allowed to drink at the silt-tank, as it was about being cleaned out at that time.
2506. I want to find out whether it is possible for any one man with a hand pump to water the greatest number of sheep or cattle that would travel in one day? No; not on a regular road. I think a horse-power pump might do it, but a M'Comas hand pump could not.
2507. *Major Pearce.*] In the event of 40,000 sheep calling for water in one day, would not the water required be 100,000 gallons? Yes; 100,000 gallons might be wanted, but 80,000 gallons would be more like their real requirements.
2508. That would mean four times the water in the service tank? Yes.
2509. And in that case steam power would be required? Yes; but it would not be necessary to water such a number of sheep as that altogether.
2510. *Chairman.*] Then you think that discretion should be exercised in putting up machinery? Yes; wherever several roads converge and the traffic is heavy, steam pumps might be necessary. Expensive forms of machinery might be wanted in such case, but in every other instance I think a horse-pump would be sufficient.
2511. *Major Pearce.*] Have you made any calculation showing the cost of erection and maintenance of horse-power and of steam power? No; I have not.
2512. *Chairman.*] You are aware that the Government fence off paddocks in connection with these tanks for caretakers and their horses? Yes; at many places the caretakers are provided with paddocks. At others the land is set apart but is not fenced in in all cases. In some cases where the traffic is not large, I think the caretaker's services might be dispensed with; that is, if the tanks were constructed with slight slopes allowing the stock to water in them. What I say now only refers to outlying roads.
2513. *Major Pearce.*] Do you find that steam pumps are easily put in repair by your caretakers? No; although I find that they are very liable to get out of order. One of the first things that I have to do is to see to the repair of one of these when I get back to my district.
2514. In the event of accident what provision is made for travelling stock? At one place the stock can water at the tank, because it is on the side of rising ground and is constructed for that purpose. This is the 48-mile tank on the Booligal road.
2515. Do you think that this inability to make repairs arises from the incapacity of the caretaker or from the complicated character of the machinery? Any man who has to deal with the Tangye steam pump must possess something above the average information.
2516. And do not the caretakers know something about those steam pumps? Yes; in some cases, but in this instance the tank was let to Robinson & Wagner and they employed the caretaker. There is great risk to the travelling public in cases where incompetent men are employed. In that case the Department was not responsible because the man was employed by the lessees of the watering place.
2517. *Chairman.*] Now with regard to the fencing: are you aware of any faulty or expensive construction of the fencing of the caretakers' paddocks? I know that a great deal of expensive fencing has taken place, but I would not call it faulty, because its greatest fault is that it is too good.
2518. You mean that the posts are too close together, the wire too heavy, and so forth? Yes; and too many wires. Altogether the fencing is too expensive for the purpose.
2519. Do you know what some of these wire fences have cost per mile? I know that they have cost over £80 per mile in my district.
2520. What is the usual cost of squatters' fences? Fences of the same nature that would be required for a horse paddock would cost about £40 to £45 per mile at the present rate of wire.
2521. *Mr. Moore.*] What is the size of these paddocks? 640 acres usually, but some of them have 5 miles of fencing, according to the shape of the paddock. They are 2 miles long by ½ a mile wide; so that, to fence them, it takes more than is usually required.
2522. *Chairman.*] Now, have you found any trouble with regard to the dual control of these works. The Public Works Department, as you know, has charge of the construction, and then the works are handed over to the Mines? I have not had much trouble nor interference in my district because the local road superintendent has more discretionary power than are given to other superintendents in the Colony. He is not obliged to refer to head-quarters for every little thing that is wanted. In one case the Assistant Engineer laid a very strong complaint against one of the caretakers in my district. This was Mr. A. P. Wood; and the caretaker against whom the strong complaint was made was the man at the 48-Mile tank. The caretaker of the tank complained that the works that had been found fault with were not under

M. J. C. Tully. 23 Feb., 1888.

under our control; that they were in the hands of the Department of Works; but Mr. Woods, notwithstanding, blamed the caretaker of the Mines Department for the whole condition of the works.
2523. But I thought you said that that tank was in the hands of lessees? So it is at the present time, but it was not then in their hands. It was still under the control of the Works Department. It was only the watering appliances that were then being erected. The Works Department had made these improvements, but had not handed them over to us; and it was for not looking after them while under the Works that Mr. Wood found fault with the caretaker.
2524. *Major Penrose.*] I suppose that caretaker was an employee of the Mines Department? Yes; and he was in charge of the tank, but he was not in charge of the appliances. My instructions to the caretaker were to see to the watering of stock, but not to interfere with the appliances until the whole thing was handed over to the Department of Mines.
2525. *Chairman.*] Have you any knowledge of the letting of works by the original contractors to subcontractors? Nothing that I can speak positively about; I have heard of these things, but none of them have come under my notice.
2526. Have you any wells in your district? Yes.
2527. Have you any fault to find with the sites chosen for the construction of these wells? Only one well has been handed over to the Department of Mines. This is Meenamurtee well, which I always considered unnecessary, and the site of which I considered badly chosen.
2528. For what reason? Because the natural water of the creek might have been utilized at the Meenamurtee waterhole.
2529. Was it a very expensive well? No; I do not think it was very expensive, and the water obtained was very fair stock water.
2530. Do you not think it is desirable to have well-water as a stand-by in extreme droughts, during which tanks have been known to fail? Yes; but I would not put a well close to permanent water. As far as possible I would try to have it put down in dry country.
2531. Yes, but the water is not permanent sometimes, although it is thought to be so, and therefore is it not desirable to have a well close by? It is certainly a difficult matter to define what water is permanent in the western country.
2532. Do you think it is sometimes desirable to sink wells as a stand-by in a very long continuous drought? I do not think it would be advisable to do that until the country is better supplied with water in the unwatered portions of it.
2533. Have you had anything to do with the putting of caretakers in your district? Yes.
2534. There has been some considerable discussion between the two Departments in regard to this matter? I believe there has been, but none of it has come under my notice.
2535. Have you any huts in your district that have cost a large sum of money? No; the Department of Works have not put up any huts in my district lately. One has been put up by the Mines Department. The material was found by the Department, and the caretaker put up the hut, but not by contract. There were some engine-sheds put up in my district that were unnecessarily costly.
2536. In what way? They were very much too heavy. This was the principal item. It was contract work, and the contractor got £50 for putting them up.
2537. What do you think would have been a fair price for work equal to this? My estimate, which was sent in to the Department, was £19, and I think I could get them made for that.
2538. Have you any reason to find fault with the troughing that has been laid down at public watering places? Nearly all the troughing that has been laid down is the new steel troughing, and there is not much fault to be found with it. Of course, the top rail is too high. It shuts the cattle out, and allows the sheep to come in. The road superintendent in my district has tried the troughing without any top rail.
2539. Have you ever found that sheep got into the water? Yes.
2540. And do you not think, then, that it will be necessary to have a rail down the centre? It might. I have recommended the superintendent to try several kinds of rail, and see which will answer the best. I believe there is less fault to be found with the watering places in my district than with those in any other part of the Colony, because most of them have only recently been constructed.
2541. Now, can you give us any idea how best to meet the exigencies of the case—to lessen this unnecessary expenditure, and remove the friction that has arisen between the two Departments. Do you not think that if the whole matter were put into the hands of a local body it would be advantageous to the public, seeing that the men would have local knowledge and experience? If they were placed under local bodies it would be an immense advantage in saving expenses, and in securing efficiency. I think that the construction and maintenance of these works should all be in the hands of one Department.
2542. From your knowledge generally of this locality you think that Local Boards could be appointed, in whom the public would have confidence, to carry out these works in an economical manner? I am sure of it.
2543. And you do not think there would be any risk of favoritism? None, if the parties concerned would take sufficient interest in, and attend the meetings.

[The Commission adjourned.]

FRIDAY, 24 FEBRUARY, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOOBE, Esq.

Thomas Waddell called in and examined:—

T. Waddell. 24 Feb., 1888.

2544. *Chairman.*] You are a Member of the Legislative Assembly? Yes.
2545. I think you reside at Bourke? No; I live at Croydon, near Sydney.
2546. You are one of the Members for the Bourke Electorate? I am.
2547. I think it was at your instance that the papers in connection with this disagreement between the Mines and Works Departments were produced and printed? Yes; I first asked a question about the matter in the House, and afterwards I moved for the papers.

T. Weddell. 24 Feb., 1888.

2548. These papers have been presented to Parliament? Yes.
2549. What induced you to ask for these papers—had you heard anything that induced you to do so? Yes; it was owing to something that I had heard in my capacity as a representative of the district in Parliament.
2550. What were these matters that you refer to? Well, in urging the Mines Department on two or three different occasions to get tanks constructed in different parts of the interior where they are required, it appeared to me there was considerable difficulty in getting anything done, owing to the work being divided between two Departments. This came to my notice on several different occasions, and I had my attention repeatedly called to the delay caused by this dual control. I may also mention that I have been told by different persons who ought to know, that there has been considerable loss owing to this work being divided between two Departments.
2551. In what way was there a loss? I believe that large sums of money had been paid away for the making of inspections of work, and that these expenses were far greater than the work itself actually cost.
2552. I suppose the difficulty was caused by what is usually designated "red-tape"? Yes; that is it exactly. I may say, however, that I have had nothing to do personally with getting tanks constructed by the Government, and therefore I cannot say much more.
2553. Do you know any particular tank or well or piece of fencing with which fault might be found, and if so we will be glad to hear of it? I may mention to you now before going any further, that one of the strongest reasons that induced me to take action was—knowledge that any business-man would not have—that work divided between two Departments, as is the case here, could not be carried out in a proper manner. That was one of the things that induced me to bring the matter forward, and it seemed to me plain enough that the Works Department could in some cases get their works constructed if there had not been some antagonism between them and the Mines. The latter would find fault with the way that things were done, and demand that a certain alteration be made, which entailed cost and much loss of time; and, besides that, kept the public from having the advantage of the works.
2554. Now, have you any particular case that you can mention which would exemplify what you say? I think you will find that everything is contained in the papers which have been laid before Parliament. I do not know that there is any case that has come within my personal knowledge, but my reason for doing this was my own feeling that work carried on in this way could not be satisfactory. Representations were made to me by other persons to the same effect since I have been a member for the district.
2555. Having perused these papers, what conclusion did you arrive at with regard to the most desirable way of getting rid of this dual control? The conclusion that I have come to is that the wisest plan would be to put these works entirely into the hands of the Mines Department. I think that Mr. Bennett, the Commissioner for Roads, has so much to do that it is impossible for him to look after his work. I have the highest opinion of Mr. Bennett's ability, but I do not think that he has the time, nor have his officers the time either, to give proper supervision to his work, and that it could be better attended to by men who have more time and larger experience. I know Mr. Gillist personally, and I know that he is a thoroughly practical man.
2556. I gather from what you state now that a good practical man would be more desirable than a trained engineer? Yes; I have had very large experience in the construction of tanks and dams, and the conservation of water generally in the interior of this country, having had stations out there covering extensive areas; and I have noticed by personal observation that large sums of money were thrown away even by private persons in doing work planned by those possessing no knowledge of the country.
2557. But would not a trained engineer possess the requisite knowledge? It is only by local personal experience of the nature of the ground in the interior that any man can say whether a certain spot will hold water or not. I have known tanks of from 15,000 to 20,000 yards constructed by men who had no knowledge of the nature of the soil, and when they were made they would not hold water. The works were consequently useless and the money expended upon them was thrown away.
2558. I presume this occurred not through faulty design, but through want of local knowledge of the nature of the soil in which the tanks were being put down? Exactly. I may also mention one great fault that many men fall into in carrying out tanks in the interior;—engineers and others who have no personal knowledge of the locality often make what is called the batter of the tank very much too steep. The consequence of this is that the waves of water when disturbed by the wind undermine the banks and large quantities of earth fall in and fill it up, so that the tanks are now much shallower than they ought to be. This I have noticed particularly myself in tanks made under the Works Department.
2559. Do you know what the batter is of which you were speaking? Yes; I should say it was about 1 in 1, while it should be about 1 in 4.
2560. *Major Pearce.*] You mean for that particular soil? Yes, for the particular soil it was excavated in.
2561. *Chairman.*] I presume that some soils would stand a batter of 1 in 1? Yes, some soil would do that, but it is very seldom you will meet with ground of that nature.
2562. Consequently you think that any hard and fast rule in regard to specifications for tanks is altogether wrong? Yes, it is impracticable.
2563. Has it never occurred to you that the handing over of the control of these matters to local bodies would be very desirable, and be likely to result in cheaper construction and arrangement than under the present system? Yes, that would be the case if we had a proper system of local self-government. I believe the work could then be done very much cheaper than by having it looked after by some of the Departments in Sydney.
2564. You think the system of centralisation involves the unnecessary expenditure of a great deal of money and the waste of a great deal of time? Yes: I believe this is one of the greatest difficulties that the people of this colony have to contend with. That is the centralization of everything in connection with the carrying out of public works.
2565. Do you know much about Queensland? I do not.
2566. Do you know anything about the system in vogue there? No, not the system in vogue by the Government; but I have a very good knowledge of what is done by private individuals in the way of water conservation. I have no knowledge of works carried out by the Government.
2567. Are you aware that the Government of Queensland have created local bodies to carry out public works in that Colony? Yes, I think so. I believe they call them Divisional Boards.

T. Waddell. 24 Feb., 1888.

2568. You do not know of your own knowledge how these local bodies work? So far as I have seen, having travelled round to Normanton, and also travelled a good deal in south-western Queensland, and so far as I have heard, I think the arrangement in Queensland is a more satisfactory one than any I have yet heard of.

2569. *Major Penrose.*] Because, I presume, the people in constructing public works spend their own money? Yes; I think the rates collected on town and suburban properties are applied partly to these works, and that the Government also gives further assistance.

2570. In any big works the Government give assistance? Yes; in large public works I think they assist; but the local people, I believe, are obliged to assist as well.

2571. *Chairman.*] And you think it would be very desirable if such a system were established in New South Wales? Yes, or some similar system by which the people locally would have supervision over the work. I might mention that the present system of watering stock at tanks does not seem to work very well. Wild cattle do not like to drink out of the troughs. At the same time, I am not prepared to offer any opinion or to suggest anything better.

2572. *Mr. Moore.*] You cannot say anything about the manner in which these works are constructed in Queensland? No; I do not recollect how they are constructed.

2573. *Major Penrose.*] What particular tank do you refer to as having its batter too steep? I think it is called Mulga tank No. 5. I drove past the tank, I think, in January, 1887, and it was then almost completed. In fact I believe it was completed. Since then, I have learned on good authority—I have seen it in the local papers—that the tank has become available for use only a few weeks ago; so that it appears to be standing unused all this time owing to something of which I have no knowledge. The delay must have been caused by the bad management of some of the Departments. At all events, the consequence has been that the public who use this road very largely have been deprived of the water for their stock.

2574. Was the machinery up when you were there? No, not at that time, but the tank appeared to be ready then to have the water let in to fill it up. The silt-tank and shoots, &c., were then ready. The distance between Byrock and Gungolgan is about 40 miles, so that every one will see the hardships which stock, and even human beings, must have suffered in travelling that distance without water.

2575. Is that tank full now? I believe it is.

2576. *Chairman.*] Have you made any inquiry about this long delay? No; the matter was not brought under my notice until I saw it mentioned in one of the papers, which showed me plainly that the tank had only recently been completed.

2577. *Major Penrose.*] You could not have noticed the cutting away of the banks in that particular tank? I owned the country once, and have a good deal of knowledge of the nature of the soil, and from my acquaintance with it I should say it will happen that a good deal of the banks will be washed down into the tank and fill it up. But in that hot, dry district what we always like to have in our tanks is depth.

2578. Have you any reason to find fault with the sites selected for these tanks? Well, in some cases I do. For instance, the tank I mentioned between Bourke and the Warrego river, was not put in anything like the best place that could have been selected. It could have been put in a much better place. I think the gentleman who put this tank down, although a trained engineer, had no local knowledge, and could not be said to be a practical man.

2579. What was the objection to the site? There was not sufficient drainage to fill the tank quickly—not sufficient catchment area. It often happens that if a tank were made in one particular place half an inch of rain would fill the tank, while if it were placed a little further away, it would take 2 or 3 inches to fill it.

2580. Everything would depend upon the nature of the soil? Yes, and upon the catchment area.

2581. *Mr. Moore.*] Has this tank failed in consequence of the insufficient amount of water flowing? No, it has been very useful; but still a large amount of money has been spent on making drains into it when if it had been made a little further away it would have got the hard clay-pans, and about one-half of the drainage would have sufficed.

2582. *Chairman.*] Do you know the name of the road superintendent who selected that site? I think it was Mr. Postle who was at one time in the Works.

2583. Do you know of any tanks the construction of which you have reason to find fault with? Yes, I know tanks that have been constructed with too steep batters.

2584. *Major Penrose.*] A site of the nature such as that you have just spoken of, requires a great deal of drainage to collect the water. Would it collect more silt than a quicker catchment? I don't think it would. In this particular case, the tank was made close up under the hills; and in consequence of this, the drains would take a good deal of dirt into it, whereas if made with broad shallow drains, the water would run so slowly that it would not carry in much earth with it.

2585. Then this particular tank would collect a great deal of silt? Yes, I should think so.

2586. *Chairman.*] Are you aware that the works constructed by the Government have as a rule cost very much more than those constructed by private individuals? I think they generally do.

2587. Do you know any reasons for that? I think the principal cause of it is that the work is looked after by the Department in Sydney. I believe if the work could be done locally and that the people concerned had to pay part of the cost, work would be done very much cheaper than it is at present.

2588. Have you ever taken notice of the machinery in use in these places for lifting water? No, I have no knowledge of the machinery at all.

2589. Do you know anything about the fences that are constructed round these tanks and round the caretakers' paddocks? Yes; in connection with that I may mention that I know of one or two cases where £8 have been paid for making gates for which £3 would have been full value.

2590. *Mr. Moore.*] Can you name these places? Well, I would sooner not do so, as the information in both cases came to me in confidence. I know that tenders were accepted at £8 for the construction of gates that I reckon ought not to have cost more than £3 or at the most more than £4. I think £12 was given in one case where £4 or £5 would have been quite sufficient. The gates were put where slip-panels were used.

2591. *Chairman.*] Do you think any favoritism was shown in giving contracts to these parties? The work was generally done by tender, but complaints were made to me—I do not know on what grounds—that the system of letting contracts by tender is not a satisfactory one.

2592. From what you say, I imagine that you deprecate the opening of tenders by these local officers as being subject to comment? Yes, I think some other arrangement than the present one would be advisable.
2593. It is possible, of course, that these local officers may act in collusion with contractors, and that other undesirable things may happen? Yes, I think that is quite possible. I might suggest as a way that would be much more satisfactory, that the tenders should be opened before a bench of magistrates, consisting of at least two magistrates of the town where the tenders were received.
2594. Of course a local board would be still better as a substitute for the present system of opening tenders? Yes; some local body composed say of three persons.
2595. Have you ever observed any unnecessarily costly fencing to caretakers' paddocks in your journey through your electorate? No; I do not know that I have.
2596. *Mr. Moore.*] Do you think that in an outside district there would be any difficulty in local bodies having charge of the matter of water conservation. When people live a long distance apart, it might be difficult to get them together, in the same way as there is now sometimes a difficulty in getting meetings of the Stock Board? I do not think it would add to the difficulty. At present, I think the arrangement is this way—the Bourke road superintendent has tenders sent him for work say 100 miles away. He opens them there, and I do not see that it would add to the inconvenience if the Local Land Board were to open the tenders instead.
2597. *Chairman.*] The next matter is the alleged interference by the officers of one Department with those of another in the maintenance of these public watering places? No; I know nothing special about that.
2598. There is another important matter concerning which we would like information—that is, the subletting of contracts. Are you aware of contracts having been sublet at very much reduced prices? No; I have no knowledge of that. I have no personal knowledge of anything of that kind having been done.
2599. Can you give us any information with respect to alleged misconduct of Government officers in connection with any public works in your district? No; I have no personal knowledge of any misconduct, and I may also add that I have not heard anything to warrant me in supposing that there was any misconduct. I cannot speak with anything like certainty about this. I have only heard rumours that things have not been done in a satisfactory manner by the officers of the Works Department. But I have no reason whatever to come to the conclusion that these rumours are correct.
2600. Do you know that some officers have been discharged for misconduct? Yes; I believe that there have been some cases of that kind.
2601. Have you any knowledge of the public wells of your district? No; no knowledge about them.
2602. Have you heard anything about the erection of huts for caretakers? Nothing except what is disclosed in the papers. I may mention that I do not think that one of these huts should cost more than £30—not any this side of the Darling, at any rate.
2603. I think you mentioned something about troughing. Now do you think that the construction of the troughing has been defective? No; I cannot speak from personal knowledge, because I have not taken sufficient notice of it.
2604. Is there anything else that you would like to state? I do not think there is anything else except with regard to boring operations.
2605. Well, we shall be glad to hear it. Hitherto we have understood large expense had been incurred by the Government in connection with the sinking of trial-shafts, prior to the sinking of wells. Would not the boring, if properly carried out, very much lessen the expense and trouble involved in the putting down of trial-shafts? I think the best plan would be to bore in every instance, and not to sink a trial-shaft at all. The way in which boring operations have been carried out in the interior is I think a very unsatisfactory way, tending to very serious loss to the Government, and very great delay in carrying out the works.
2606. Which of the Departments has control of the boring? I think it is the Mines Department. During the last five years there have been boring operations going on on the road between Bourke and Wanaaring, on the Paroo. And I believe I am quite correct in saying that there must have been several thousands of pounds of public money thrown away, owing to the bad management of that branch.
2607. What bores have been used? I believe the Wright and Edwards, and the Tiffen bores have been used. What I would suggest in place of the present system of carrying out boring operations by the Government, would be that in all cases the work should be let by tender, at so much per foot, binding the successful tenderer to do the work within a given time.
2608. *Mr. Moore.*] And provide him with the plant? No, I would have nothing to do with plant or machinery in any way. There is a gentleman named Loughead in Queensland who often visits Sydney, and who is carrying on boring operations for the Government of that colony. He informed me on several occasions that if our Government wished it he would take contracts for boring for them, and charge so much per foot, guaranteeing to do the work within a few weeks. The works on the Wanaaring road, which have taken the Mines Department some two years to do, Mr. Loughead would undertake to do in a few weeks.
2609. *Major Pearse.*] At how much per foot? I think it would be £1 a foot up to 1,000 feet.
2610. And what did you say the boring under the Mines Department cost? I should imagine that most of the boring between Bourke and Wanaaring has cost—I think I am quite within the limit when I say it has cost—several hundred per cent. more than Mr. Loughead would require to do the work for.
2611. *Chairman.*] How many of these bores have turned out satisfactorily between Bourke and Wanaaring? Three of them have turned out satisfactorily, and I am of opinion that they will be an immense benefit to the public.
2612. And how many have turned out unsatisfactorily? Well, I think several have turned out useless. But the loss has been in the great delay which has taken place, and the money wasted in doing the work.
2613. *Mr. Moore.*] You do not mean to say that the boring carried out by the Mines Department has cost several hundred per cent. too much, but that the contingent expenses and delays have run it up to that? Yes; the loss incidental to the delays and the expenses in connection with the work, have run it up far above what it should have cost. It is only fair to the officers who are carrying out this work to say that

T. Waddell. 24 Feb., 1888.

that I believe one of the causes of the loss has been the bad machinery that was used. I think the machine of the new kind such as that which Mr. Lougheed is using would be much better, and the work could be done at a fraction of the cost.
2614. What kind of machinery is this gentleman in Queensland using? I do not remember the name of it just now.
2615. *Chairman.*] Then in any estimate of cost it would be necessary to include all incidental expenses? Yes. I do not think the Government could give the exact cost of the work.
2616. If the Government said that one of these bores cost over £2 or £3 per foot, would that include all the expenses and the delay in putting this work down? I do not think so.
2617. That could only be obtained by actually getting returns of the whole cost from the commencement to the completion of the particular work? Yes, the present system is involved in great difficulty; the machinery is bad and there is a difficulty in getting competent men. If the Government officers were allowed to pick out sites, and then let out work by tender, I am satisfied that it could be done at one-third of the present cost.

James Yeo called in and examined:—

J. Yeo. 24 Feb., 1888.

2618. *Chairman.*] You are an overseer under the Mines Department? I am late overseer of public watering places for the Ivanhoe District.
2619. What is your present employment? I am inspector of stock.
2620. We have understood up to the present that these terms are synonomous? Yes, so they are in some districts; but in my district now there are no public watering places, and consequently no overseer.
2621. For what district are you an inspector of stock? For Picton, Berrima, and Kiama districts.
2622. You are now then in the Metropolitan district? No.
2623. How many years were you living in the Ivanhoe district? About two years and six months.
2624. How long since? I left at the beginning of October last.
2625. Have you had any reason to find fault with the selection of sites for tanks? Yes, there are several places where tanks were put down in unsuitable situations.
2626. What is the reason of this? One was put in a swamp, and one is surrounded with water, and should have been put on the ground higher up.
2627. What is the name of that tank? That is the Clare tank.
2628. What objection is there to that tank being placed in low ground? Well, the service tank is endangered, and the water is all round the foundation. The troughing is under water, and it is impossible for any stock to get to the troughing. The embankments are affected a great deal by the continual whirl of the water all round.
2629. Could a better site have been selected in the neighbourhood? Yes, about 300 yards away.
2630. Has this swamp or lake often been filled? I do not think it has been filled for some years till eight or nine months ago.
2631. Then you think that the site was a fairly good one? Yes, it was a fair catch.
2632. If the lake had not been filled with water you would have no reason for objecting to the site? Well, I would not have put the tank into the swamp in any case.
2633. Why? Because the red ground is preferable, and does not take so much water to fill it as a tank put in swampy ground, where the water soaks away before it can get to the tank. One is hard soil, and the other porous.
2634. *Major Penrose.*] I suppose most of the catchment is on the hard ground outside the tank? Yes.
2635. So that you would have chosen the site nearer the hard ground, where the water would have run direct into the tank, filling it with a less rainfall? Yes.
2636. *Chairman.*] Are there any other tanks that you think fault may be found with? Yes, Gunarumby tank, on the Clare run.
2637. What is the situation of that tank? It is in a swamp. There is no water around it just now, but it would have been better if it had been placed on the red ground, because it would catch much quicker. I would also wish to point out the great difficulty in the way the water is carried into that tank. It is by the silt-tank on one side, and there is a head from that silt-tank around on top of the excavation to the other side, to be carried into the flume. Consequently, with the very loose open soil, the earth between the top of the excavation and drain is liable to be washed into the main tank. There was no protection to the sides or bottom until I had it made. I had a lot of gypsum stones collected, and made a gypsum flume all the way. I pointed out this at the time I was taking delivery from Mr. Wood and Mr. Stilwell. Mr. Wood snubbed me, and said I was not there to criticise the work, but to take delivery of it in the condition in which it stood.
2638. Was any reason given for the exceptional way of taking the water into the tank? No; no reason was given to me.
2639. I presume that is the only instance you know of where this extraordinary way of taking the water was adopted? That is all.
2640. Any other tanks? I think a better site could easily have been selected for the Ivanhoe tank. It is right in the centre of the township, and the drains to it run right alongside piggeries and Cobb & Co.'s stables; whereas the tank might have been put in another place on Government ground, where the stock, in order to get to the tank, would not have to pass through the township.
2641. Were not these stables and piggeries erected since the tank was put down there? No, before.
2642. Who chose the site of this tank that you have just been speaking about? I cannot say, because that work was started before I took charge of the district.
2643. But the Mines Department, as a rule, chose the sites for tanks? Yes, but they generally send an officer of the Works Department with them. I do not know that it was done in any of these cases. There was a site chosen and a lot of work done to it, but they only went down about 2 feet when it was given up.
2644. For what reason? I was informed that the station people, having found out where the tank was to be put down, went and selected the land, and since then they have put down a tank there, although the selection has been forfeited.
2645. Was the ground found to be suitable? Yes; it was very good holding ground.

J. Yeo.
24 Feb., 1909.

2646. And you do not know any reason why the site of the tank was shifted, except that it was selected by the lessees of the run? No; no other reason. The Ivanhoe tank, I may say, does not hold water well; the soil is very porous, and, in fact, for some time the water left it at the rate of 3 inches a day. When I left the district of Ivanhoe the water was leaving at the rate of an inch per day. There is a drain to the Ivanhoe tank that carries the water in an opposite direction instead of allowing it to run into the tank.
2647. *Major Pearose.*] Do you know who laid out that drain? I cannot say whether it was Mr. Stilwell or his assistant. A very excessive price was paid for it, too.
2648. With regard to the Ivanhoe tank, you have already written letters to your Department setting forth your objections to it? Yes.
2649. *Chairman.*] Do you know any other tanks that show great faults in selection of sites? Well, these are the chief ones in my district.
2650. And have you any fault to find with the construction and excavation of these tanks? Yes; in the first place the batters are all too steep.
2651. What are the batters? They are 1½ to 1 and 2 to 1. Of course, being so steep, in loose, open soil and the continual swelling of the water, the soil caves in, and large quantities go into the tank.
2652. Are there any other reasons for finding fault with the construction of these works? Well, the embankments are much too steep. They scour a great deal, and great complaint was made about the water getting off the embankment at Ivanhoe. A great amount of the embankment washed into the silt-tank.
2653. Could that happen if there was a drain all round the tank between the edge of the tank and the embankment? This that I am speaking about was on the top of the embankment. A syphon was sent up to take this water off, but it was not sufficiently large; consequently, I had to make application to have the angle-shoots put in to carry it off.
2654. *Major Pearose.*] Is this water off the dished top of the embankment? Yes.
2655. But the area of that would be very small? The top of the embankment is, I think, 30 feet wide.
2656. *Chairman.*] You have already mentioned that carelessness has been exhibited in laying out the drains of the Ivanhoe tank? Yes; any one can see that instead of bringing the water to the tank it leads the water in an opposite direction.
2657. I presume you think that no levels could have been taken? No; there could have been no levels taken.
2658. Now, about the excessive cost; how comes it? As a rule it has been alleged that the Government pay very much higher prices for the construction of their works than private individuals? Well, there is only one reason that I can give and that is the great length of time that contractors have to wait for their money. On that account the contractors insist on getting good prices for their work.
2659. Do you think that was sufficient reason to warrant the extra charges in every case? I think there is no reason why the Government should give more for their work than station owners. If contractors for the Government only received their money directly they finished their work, I see no reason why the work should not be done as cheaply.
2660. Is there no other reason you know of besides that? No.
2661. Would not a much steeper batter be more expensive? Of course it would; but I thought you were speaking of the drains just then. The batters are much too steep, and the making of them necessitates extra labour and a larger sum of money. Particularly steep batters necessarily cause great expense.
2662. And as a rule the Government sink their tanks some 2 or 3 feet deeper than squatters? Yes; as a rule they do.
2663. That would entail extra expense? Yes; and of course the deeper you go the more the tank will cost.
2664. Is there not sometimes considerable difficulty in inducing the officers to measure and pass the work while it is in progress? Yes; I think there is; in fact I am certain there is.
2665. Do you think that the very elaborate manner in which the Government insist upon all the earth being placed evenly around the tank, would add to the expense? Yes; undoubtedly; I think a great many of these things are not necessary.
2666. Then, taking all these matters into consideration, do you think that the alleged excessive finish required by the Government in their tanks warrants the tenderer in asking more money? Yes; but I should like to add something else to that. The tanks are made in an unnecessarily expensive manner. I think it is quite unnecessary to lay down a hard and fast rule as to what kind of tank should be constructed in these places. There should be no such rule, but a tank should be made so as to suit a locality in which it is placed.
2667. *Mr. Woore.*] You think there is no necessity for the delay in the payments? I think not; and if a competent man were appointed to look after the work, there should be no delay.
2668. *Major Pearose.*] To what do you attribute this delay in payment for work? In some instances I think it arises on account of not having the work passed immediately, but there is a great deal of delay apart from this for which I cannot account.
2669. Some of the delays, I presume, are due to the local officers, and others are departmental? I should imagine so, but I am not in a position to say.
2670. Are you quite sure that a delay has occurred? Yes; I know it has occurred in some cases.
2671. A delay in inspecting and measuring up the work? Yes.
2672. What forms of machinery are used for lifting water in your district? Some of them are horse-power pumps and others are steam pumps.
2673. *Chairman.*] You said something about the excessive cost of making the leading drains? Yes; 15s. per chain was paid at Ivanhoe.
2674. *Mr. Woore.*] What was the size of the drain? About 6 feet wide by 1 foot deep.
2675. *Major Pearose.*] What is the usual price for such work? From 3s. 6d. to 5s. per chain.
2676. *Chairman.*] And can you account for the excessive price paid in this instance? In this case no tenders were called for the drain.
2677. And was the party who made the contract the local road superintendent? Yes, the men who did the work I know perfectly well. They made an arrangement to ask 7s. 6d. per chain for it; and then one of them said: "No, it's Government work; we'll ask 15s. for it, and possibly we will get 12s. 6d." They asked the 15s.; there was no question about it, and they got the work.
2678. *Mr. Woore.*] Did you see these drains being constructed? Yes.
2679. And can you tell how much of that kind of drain a man can do in a day? The work was done with ploughs and scoops, and I should say that a tremendous lot of it might be done in a day.

2680.

J. Yee.
24 Feb., 1899.

2680. Do you believe that these men made a good profit on the work? Yes, an enormous profit: I am quite sure of that. The same men made drains in the same paddock, and the same kind of drain, for 3s. 6d. per chain.
2681. And how do you account for this excessive price having been given to them? I cannot say; all I know is, that it is a fact. I remember the incident perfectly well, because there was a row about it. Two of the men wanted to turn out the third man and they had a fight which I saw myself.
2682. *Chairman.*] It was then that you became aware of the fact? Yes.
2683. Do you think that any intended favoritism was shown in giving the contract to these men? I am not aware of it. I would like to read an extract from a letter which will confirm my statement.
2684. *Mr. Woore.*] Do you know who let this other work for 3s. 6d.? Yes, Mr. Brougham, of Tieehurst. The road crosses the drain of this tank in four places that have been stoned at a cost of £16 10s. or £17 each.
2685. What would have been a fair price for this work? I should think if they got £3 each it would have been sufficient.
2686. Is stone available in that neighbourhood? No, it is not very plentiful, but there is a good deal of stone there suitable for the purpose.
2687. Was this work also done without tendering? I cannot say; I have been informed by Mr. Williamson that he had drains almost similar put down for 5s. 6d. per chain.
2688. *Chairman.*] Now, do you think that the machinery that you have seen working at the tanks is of a more expensive character than is necessary? Well, I am not aware of the cost of the machinery. I have never had a chance to find out what the cost of it was.
2689. Do you think that hand pumps would be sufficient to keep the service tanks supplied without these expensive forms of machinery? I do not think so.
2690. Of course it would depend upon the particular road on which the particular watering place was situated? It would. I do not think a hand or M'Conan pump would be sufficient.
2691. Do you know how many gallons in a day could be pumped with one of these M'Conan pumps? I think one man would pump enough water with one of these pumps to water 8,000 sheep. This would be 8,000 or 10,000 gallons, or perhaps more.
2692. Could the caretaker do this? Yes; but he has other work to attend to as well.
2693. What is his other work? Cleaning the drains, and keeping the tank in proper order, and looking after his fencing.
2694. As a rule stock are not continuously on the roads? No; there might be two or three or four mobs of sheep along in one day, and sometimes none at all.
2695. *Mr. Woore.*] What is the greatest number of travelling sheep that you have known to water in one day? About 20,000 sheep.
2696. That would take about 80,000 gallons of water, including wash? They drink a lot of water.
2697. Would they empty a service tank containing 20,000 gallons twice? Yes.
2698. *Chairman.*] Consequently, one man could not provide for that large number? No.
2699. *Major Penrose.*] Is there a steam pump at Ivanhoe? Yes; and I think it is working well.
2700. You say that from practical experience you have found that a steam pump is dearer than a horse pump? Yes. The caretaker has given him 640 acres, which provides enough feed for his horse.
2701. And, therefore, as one man could not do the work, you do not think the machinery put up on these roads is unnecessary? No; I do not think so.
2702. Do you think the drovers in charge of travelling stock would be able, with the assistance of the caretaker, to raise enough water to supply the stock? Yes; but it would be very difficult to make them do it. They would not feel inclined to do that. They would be more inclined to rush the tank, and allow the stock to get into it.
2703. Do you know any particular tank where machinery is used, and where the traffic does not warrant the expenditure on the machinery? Since I have been in the Ivanhoe district the traffic on some of the stock routes certainly does not.
2704. *Chairman.*] So that in this matter, as in others, a great deal of discretion should be exercised by the Department? Yes.
2705. You know something about the fences round these caretakers' paddocks? Yes.
2706. Has it come under your observation that they have cost an excessive amount? Yes; very excessive.
2707. For what reason are the specifications unnecessarily strict? I have never seen the specifications, but I have no doubt that they are. For instance, the posts are too big and the wire is too heavy. It is almost impossible for a man, single-handed, to strain No. 4 wire. The posts of the fence round the Ivanhoe tank are splitting already on account of the way the wire is strained on them. There is no straining-posts put in—and in a great many places the posts are made of split pine.
2708. Could more durable timber for the work be found in the neighbourhood? Yes; they could have got plenty of belar: it is quite large enough.
2709. Are you aware what this fencing has cost per mile? The contractor for the Ivanhoe tank told me that he got £112 per mile for it, and that afterwards he sublet it to a man named Elliott.
2710. *Mr. Woore.*] Do you know this of your own knowledge? Yes; but I could not find the price that Elliott got from Bevan. Elliott sublet the erection of the fence to one Chas. Anderson, and the carting of the posts to Pat Gallagher at £5 per 100. Anderson was to get £18 per mile from Bevan—the latter to find the wire himself. I think you will find all this in the papers. The first contractor must have made a profit of £60 per mile on the transaction.
2711. Now, can you give me any reason why this enormous price was paid for the fence in the first instance? No; I cannot say.
2712. Do you know that it was let by tender? This particular fence was not let by tender.
2713. By whom was this contract made? By Mr. Stilwell.
2714. With this man Bevan? Yes; this information I got from Bevan himself. Bevan told me further that he had had several other works along the road; and Mr. Stilwell said to him that, seeing he had all these works, he (Mr. Stilwell) might as well give him this one, too.
2715. Have you had any difficulty in regard to interference by the road superintendents? Yes.
2716. In what way—will you mention any particular case that has come under your notice? In connection with my duties, do you mean?

2717.

J. Yeo.
24 Feb., 1888.

2717. Yes; the officers of one Department interfering with the officers of another? Yes; something occurred in connection with the Merri-Merriwa tank—with regard to the cleaning out of the silt-tank at that place. It is a part of the maintenance; and since I have been in charge of the district I know, from my own personal knowledge, the silt-tank has been cleaned out twice. The caretaker in this case was waiting until the tank was dry before he attempted to clean it out, because the work could not be done while the tank was full of water. In spite of this, a contract was let to clean out the tank by the Works Department.
2718. Was this before the tank became dry? Yes; before it became dry they let the contract to clean it out; but they had to wait until it was dry.
2719. Who was the road superintendent in this case? Mr. Adams, of Cobar.
2720. What business had he to interfere with the maintenance, so long as it was under the charge of the Mines Department? He had no right to interfere in the matter at all.
2721. Did he state as his reason that the tank was being neglected? No; I did not know that he had let the work until I got round on my usual inspection, and found that it was done.
2722. If the road superintendent found the caretaker neglecting his duties, would he have been justified in attending to the matter? Well, I think he should have reported it first, and then I could have called on the caretaker for an explanation as to why he did not attend to his duties.
2723. What was the result? The contract was let and the tank cleaned out by the contractor to whom the work had been let by the officer of the Works Department.
2724. *Chairman.*] At what cost? I cannot tell you.
2725. You think that in any case it was unnecessary, because it was the caretaker's duty to do the work? Yes; and he had done it twice before.
2726. Is there any other glaring instance where the caretakers have been interfered with by the officers of the Roads Department? In one case Mr. Stilwell reported negligence on the part of the Mines officer. It might have been myself, or the caretaker, as he merely said Mines officer, and did not mention names. It was the caretaker of the Mount Manara watering place, to whom Mr. Stilwell spoke of the state of the pump. The work was completed, and I received instructions to go and take delivery of it. On my arrival I found there was no water in the tank, and of course I would not take delivery of the works on that account, because I could not test them. It remained then for four or five months until rain fell, when there was about 3 feet of water in the tank. I met by appointment, to take delivery from Mr. A. P. Wood, the Assistant Engineer, and Mr. Stilwell, but the machinery had not been transferred to the Works Department previous to this by the contractor, who was to meet us there also in order to transfer the machinery. These works had been exposed to the weather during the whole time of their construction; consequently they were quite rusty and could not be started when steam was got up. The contractor did not arrive; so Mr. Wood and Mr. Stilwell set to work the whole of the day, and in the evening about five o'clock the pump commenced to work, but not in a satisfactory manner. Mr. Stilwell then said to me, "If you will take delivery of these works as they are, I will send my travelling mechanic at once to put them in thorough repair for you." I said to him that if he would do this I would have no objection, in order to save trouble and to save us from travelling the same distance over again for the same object, to accept the transfer from him on these conditions; but Mr. Stilwell did not visit the tank again until the following October (this was in June), and in the meantime no travelling mechanic had arrived. In spite of this, Mr. Stilwell reported the caretaker and myself for negligence, but I referred to what happened between Mr. Wood and myself, who was present to transfer the work. Mr. Stilwell alluded to the fact that the state which the machinery was in at that time was owing to the negligence of the Mines officer, although it got into that state before it was transferred. I am referring now to the Mount Manara tank, and it only shows Mr. Stilwell's own neglect in not sending up the travelling mechanic which he promised to do. He also told the caretaker not to interfere with the arrangements; that he would send up a travelling mechanic to put the works in order. Mr. Stilwell then did something to the work himself, and the machinery worked better after that.
2727. You say you refused to take charge of this work till the rain came? Yes.
2728. Now, supposing that the rain did not come for a year or two, who is to look after this work;—if it is completed and you refuse to take it over, what arrangements are made in regard to taking delivery? We take delivery of nothing until we can test it.
2729. Then, if rain did not come for two years you would not have taken delivery until the end of that time? No; the Works Department would have to keep some one there between the completion of the work and its being handed over to us. In this particular instance, I put on a caretaker after the work was finished, but we could do nothing with it until Mr. Stilwell came again, when he complained of my want of attention.
2730. *Major Pearson.*] Do the Mines Department, when taking over the works, take over with them the caretaker appointed by the Works Department? In some instances they do. If the man is a good reliable man he is taken over.
2731. *Chairman.*] Is there any other case where the caretakers have been glaringly interfered with? Yes; at Boorsoona tank.
2732. What was the nature of this? The pump did not throw the water fast enough; the horses had to go at a jog trot to draw the water to fill the pipe. I complained to Mr. Wood and Mr. Stilwell that it did not throw the water sufficiently fast to water stock. They appeared to think that it would be right to test it, and from Mr. Wood's test the service tank should have been filled in about six hours; whereas it takes most men about two days to fill it with the horse pump. On one of my own inspections I examined it and found that the leathers in the caretaker's pump had quite perished. I could not get out the plunger, although the caretaker and I pulled with all our might. The bearings were taken to pieces and covered over, and I reported the matter at once to Mr. Stilwell, saying that the work was out of order, and asking him to send a practical mechanic at once.
2733. *Major Pearson.*] Was the tank under your charge at this time? Yes. In connection with the machinery the Works Department took it upon themselves to put it into repair. They always kept a travelling mechanic going about for this purpose, and it appeared from what Mr. Stilwell said that the travelling mechanic was away at Deniliquin and could not come. I therefore directed the caretaker to put the works in order if he could do so; but he could not do it. Mr. Stilwell, the next time he came along, fixed it up and then reported the matter again.

J. Yeo. 24 Feb., 1899.

2734. But if this work could have been done by a travelling mechanic alone, how comes it that you require three men? Well, we could not get the plunger out otherwise. It was stuck very tight.
2735. Would you send many miles for a travelling mechanic to put in a piece of leather? No, I would not; but we were impressed not to interfere with the machinery internally, and on that account we expected the Works officers to come and make such repairs as were required.
2736. So that this little thing would necessitate the travelling mechanic coming several miles to attend to;—now, could it not be done by an ordinary man? Yes; but we are not allowed to interfere with the internal arrangements of the machinery at all.
2737. *Mr. Moore.*] If, with the assistance of the caretaker, you could have got the plunger out, would you not have set the pump in working order without troubling the Works Department at all? Yes, decidedly.
2738. Although it would not be your duty, or the caretaker's duty either? Yes; but Mr. Stilwell told some of our caretakers distinctly not to interfere with the machinery internally.
2739. But, notwithstanding this instruction, you would have made the repair if you could, in order to save trouble? Yes.
2740. And you spent the whole day in trying to do it? Yes.
2741. *Major Penrose.*] Were the public debarred from getting water all this time? No; it so happened that there was a lot of water in the swamp close by, otherwise it might have been very serious.
2742. There are no hand pumps to fall back upon in case of accident? No.
2743. *Chairman.*] Then this interference between the two Departments caused unnecessary delay, and leads up to what has been called friction? Yes; but I am sure I was never anxious to have this at all. I was always anxious to have things put in proper repair, which I think will be seen from the way in which I took delivery of the Mount Manara steam pump.
2744. Are there any wells in your district? Yes; there are two.
2745. Have you any reason to find fault with the construction of these wells or the sites selected for them? I consider that the Holy Box well should never have been put in that position. There was a splendid site there for a tank; in fact, a tank was sunk there down to about 3 feet and then abandoned.
2746. Do you know for what reason? It was put down before I took charge of the district. The only reason that I know of was that wells were thought more suitable at the time.
2747. Is this a good well? No; the water is very salt and brackish, and travellers who pass by will allow their stock to perish almost rather than allow them to drink there. The oldest drover on that road, John Clancy, who has been on the road for 25 years, would not think of letting his stock drink there. At the time Cobb & Co. leased it they had had to take their horses away or they would have died.
2748. *Major Penrose.*] Was that the well where the baling was going on? Yes.
2749. Did not the baling improve the water? Only very slightly. The caretaker does not use it even now, but carts his water from elsewhere.
2750. Then he is still baling the well? Yes, still baling.
2751. *Chairman.*] Will the public use the water? Very few. Any one who knows the road at all does not use it.
2752. *Major Penrose.*] Is it not true that a flock of 10,000 sheep watered there at one time? Not since I have had charge of the district.
2753. You think that it would have been much more satisfactory to have continued this tank than to have sunk a well? Decidedly it would.
2754. Are you aware that brackish or salt water is found in many of the wells sunk in that country? Yes; in a great many of them. And they have been abandoned and tanks substituted in their place.
2755. You do not complain that wells should be sunk in suitable localities if you can ensure fresh water being obtained? No; there would be no objection to it at all.
2756. For this reason, I presume that the tanks might go dry—while you can always rely on wells? Well, I think it will be a very long drought that will send some of these tanks dry.
2757. *Chairman.*] Have any wells been constructed in your district during your term of office? The Willandra well was in course of construction. They sunk a shaft and it caved in at the bottom. They got into sand drift.
2758. What about this Willandra well? It is put down in a place that would be very good for a tank. It has been abandoned by three or four different parties—some of them experienced men, too. They could not get through the drift.
2759. *Major Penrose.*] That could not have been foreseen when the site was chosen? I do not know whether they put down a trial shaft or not, but they could have seen a good site for a tank close by.
2760. *Chairman.*] Do you think that if they had put down a boring or a trial shaft that they would have found this out? Yes. I may say that I am informed that they are putting down a shaft alongside of the well now, which is ridiculous. A portion of the work was on the private property of the Kilfera Pastoral Company.
2761. *Major Penrose.*] Is the Willandra well also in Mr. Stilwell's district? Yes.
2762. *Chairman.*] Have you had anything to do with the erection of huts for caretakers? Very little; but I have seen some of the specifications.
2763. Have you any fault to find with the troughing supplied to these tanks and wells? Yes; the draught rail is too high. It prevents the cattle reaching the water.
2764. Is that now being obviated? Yes; it is in some cases.
2765. Could not the difficulty of animals reaching over the rails have arisen by the wearing away of the soil from underneath? No; because the troughs put down were generally too high from the first. In fact at the Ivanhoe tank the ground had to be raised directly the trough was erected.
2766. But the troughing is good as a rule? Yes; as a rule it is good; but it is the position of some of it which I object to.
2767. What do they use for the construction of the troughing? Galvanized iron for some of them.
2768. What protection would they require in your opinion? From fresh water I do not think galvanized iron requires any protection.
2769. Now, with well water, what do they use? They use tar and tallow. In hot weather it melts, forming a scum over the water, and the stock won't touch it. In one case the rails were taken down by a drover and he rushed the tank. I had him summoned and fined £10.

J. Yeo. 24 Feb., 1888.

2770. Since complaint has been made of this composition, has not the use of it been given up? Yes; in my district it has.
2771. Now, do you not think that if these works were given over to local bodies—to people living in the localities—that it would be greatly to the benefit of the community generally, and that it would lessen the cost of these works? Well, it is a difficult matter to get local men to attend to anything of this sort. As a stock inspector, I have had great difficulty in getting meetings of the Stock Board together to do business. They generally have other meetings which take up a great deal of their time; and besides most of them have a long distance to come to town.
2772. Do you think the Divisional Board system of Queensland would be a success here? Yes; but in any case they would have to rely upon the opinions of their stock inspectors.
2773. Do you not think it would get rid of the difficulty in regard to the payment of money? No; I think not. It would be just as well if the Inspectors under the Works Department were kept up to their work. The overseers should be bound to visit the tank once a month and measure it, so that the contractors could be able to obtain a certain percentage of their money. This would, I think, meet the difficulty.
2774. Then you think there would be difficulty in making this local system work? I think there would.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

James Cotton called in and examined:—

J. Cotton. 24 Feb., 1888.

2775. *Chairman.*] What are you? I am an inspector of stock and overseer of watering places for the district of Cobar.
2776. How long have you been in office? I have been in office for nearly six years.
2777. Have any of the tanks that have come under your observation been constructed in wrong positions, in your judgment? As a rule, in the Cobar district, the sites of the tanks have been fairly well selected. The sites have answered the purpose very well. I daresay sometimes a better site might have been found for one of these tanks a mile or two further on, but it would not have answered the purpose of a public watering place: because it would not have been at the proper distance between two other places. I have no particular fault to find, therefore, with the sites of public tanks.
2778. Do you know of any faulty sites in other districts than your own? Yes, there is one; but I can hardly say that it is within my district, although it is under my control. It has been handed over to me. I consider that the catchment area at this place is too small.
2779. What is the name of that tank? The Mulya tank. As a proof of what I say, I may mention that it has now only about 9 feet 8 inches of water in it, or it had that on my last inspection. It has been constructed for over two years, and on one occasion there was a rainfall of 8 inches within a week over that portion of the country, and yet this tank did not fill. I am opinion, therefore, that the catchment area of this tank is too small.
2780. Who chose that site? So far as I know it was chosen by the road superintendent at Bourke, Mr. Coleman.
2781. Is it not a fact that the road superintendent, in fixing the sites for tanks, has to act in conjunction with the overseer of public watering places? Well, this is what we are told by the Watering Places Branch; but, as a rule, the road superintendents never do consult us.
2782. Is this tank that you speak of near Gungolgan? No; I think it is about 14 miles from Louth, on the Louth to Cobar road.
2783. Could that faulty catchment area have been observed, in your opinion, by a man of ordinary intelligence? I think so, because it has been handed over now to another road superintendent, who has been to a great deal of trouble indeed in getting a mile more of drains into the tank. He told me that he had very great difficulty in getting ground and utilizing the catchment area, running his levels very low that they would be able to run the water in. By this means he said that he hoped to be able to get another mile of drains.
2784. And the fact remains that in this unusually wet season the tank would not fill? Just so.
2785. Then this very injudicious selection of the site has caused a large expenditure of money with very little good result? Yes.
2786. *Mr. Weare.*] Is there a better site in the immediate vicinity? I think a far better site might have been found. It is out of my district, but I was instructed a little while ago to go there and effect a transfer of the works from the Public Works Department to the Mines. I did so, but while there I had not sufficient time to go round and examine the country to see whether there was a better site. Yes; I am of opinion that a better site could have been chosen.
2787. Is the usual machinery erected at this place? Yes; a steam-pump.
2788. *Chairman.*] Are there any other cases of faulty sites? No; none that I have special knowlege of.
2789. The next question is as to the faulty catchment areas;—but, with respect to the construction of these tanks, do you notice anything faulty in the specifications? Yes; I think the specifications are for the most part wrong. I wrote a letter on this subject some time ago, which I would like to read.
2790. We would prefer taking your own statement? Well, in the first place, I consider that the construction of these watering places should be under the supervision of officers that are thoroughly acquainted with stock and all the requirements of stock, and who have had experience in conserving water in dry country for stock purposes. For these reasons it seems to me that one set form of tank to be constructed at each place should not be adopted; while these specifications have hardly ever been departed from, notwithstanding the variations in the nature of the soil.
2791. You mean that the Roads Department have applied a hard-and-fast rule? Yes; and this hard-and-fast rule will not answer for every place. Their slopes or batters are in every instance too steep; their watering appliances are expensive, and I think unnecessary. I may mention that in my opinion there are many places where the ground would stand a 2 to 1 batter or less, but there are other places where it would require as much as a 3 to 1 batter on account of the porous nature of the soil. In this friable soil the top of the tank has a tendency to fall in. Another fault in the construction of these tanks is that there is no roadway left to take the stuff out. Now, in my opinion, there ought to be a roadway left in each one of these tanks, and a roadway sufficiently wide and sufficiently

J. Cotton. 24 Feb., 1888.

sufficiently complete to allow the stock to water if necessary at the tanks, in the event of the machinery getting out of order. It is always possible for these steam pumps and horse-gear pumps to get out of order altogether. My district is a very dry country, and if it should happen to occur when the thermometer was at 118° in the shade, as it often is up there, stock would never reach the next tank alive. At these steep tanks of 1½ to 1 it is utterly impossible to water the stock. Certainly, you might get them in, but you would never get them out again; and this I consider a very great mistake indeed in the construction of the tanks. No practical man could have made such a mistake in the construction.

2792. Do you not think it desirable to have batters as steep as possible, so as to prevent the evaporation of the water? Well, I really think that the evaporation that takes place is not worth considering. I know for a fact that we had only some 7 inches of rain in 1884, and that year every tank was then full to the brim; so that I think that matter of evaporation is not worthy of a second thought. The Cobar district is an undulating country; and, as I say, in other districts a steeper slope might be possible—that is, where the catchment area was very slow, and where the storage of a large amount of water is required.

2793. The soil in your district is of a good, firm character? Yes; it is hard, and makes a good catchment.

2794. I presume 7 inches of rain per annum would never fill a tank in the black soil plains in the interior? No; it never would, indeed. That is why I say that no hard-and-fast rule can be applied in such matters.

2795. *Major Penrose.*] Was there much demand upon your tanks lately? No. In 1884 the stock were not able to travel. There was no grass whatever, and the stock could not get along. While all the sheep were dying throughout the district for want of feed, there was on the other hand, any amount of water.

2796. *Chairman.*] Are you aware that it has been alleged that the Government have to pay very much more for the construction of their works than private individuals? Yes.

2797. Can you give us the reason why? Well, one reason why is in the specifications which the contractors have to work under, compelling very steep slopes, and allowing no roadway to cart the last 4 or 5 feet of stuff out of the tank; this causes it to be very expensive to get out the bottom of the tanks. Another reason is the delay which ensues in the matter of payments. I have heard contractors complain very bitterly about the delay that they have experienced in getting their money.

2798. Is there not a Mr. Budd in your district, a contractor? Yes; he has put down a good many of the Government tanks.

2799. Are you aware that on one occasion he actually became insolvent by reason of the delay of the Government in paying him for his work? I am not aware of that, but I have heard that he and others complained about delayed payments. I know a man named Ryan, who put down the Mulya tank, who complained to me very bitterly two or three times about not getting paid. He appealed to me to assist him if I could, but I was unable to do anything in the matter. He said to me that he had finished his work, but he was unable to get it inspected by the Government officer. He was delayed for months and months; and although his creditors were pushing he could do nothing.

2800. *Major Penrose.*] To what do you attribute this delay? The delay was in the inspection of the work. Had it been inspected there is no doubt the contractor would have received his voucher.

2801. *Chairman.*] I presume the proper officer to do this is the local road superintendent? Yes.

2802. And was he not available? No; of course I do not know if he has much to do elsewhere or not. The superintendent, Mr. Coleman, has a very large district.

2803. Then you think generally the specifications for these Government tanks are altogether too strict, and that their strictness is the cause of the extra price which the Government are obliged to pay? Yes; and the delayed payments.

2804. You think that under these circumstances the prices asked for by the contractors are excessive? Not under the circumstances. Considering all these matters, I should say that the prices asked by the contractors are not excessive. Having to conform to all these requirements, I do not think that they asked too much.

2805. Then these alleged excessive prices are not really excessive? Under the existing circumstances, no; but if the circumstances were altered I should think that the contractors would then be able to do the work much more cheaply. I know, as a fact, that a fair price for squatters' tanks is 11d. per cubic yard.

2806. And what is the highest price that you have known to be given in your district? Well, I really know very little about the prices which have been paid for these Government tanks.

2807. But surely you must know something about it? I have only heard about them; I have had nothing actually to do with them.

2808. *Major Penrose.*] It is commonly reported, I presume, that the prices for Government work are very much higher? Yes; everybody knows that; but I can hardly say from memory what the Government pay.

2809. What was the highest price you have known to be given by squatters? I know one case where the squatter paid 2s. 6d. per cubic yard; but that was for going through solid rock. The usual price given by the squatters for ordinary work is from 11d. to 1s. 2d. per cubic yard.

2810. I suppose you have never heard of 1s. 9d. having been given? Oh, yes; I have already said that I have known squatters to give 2s. 6d. for the excavation of certain ground, but in the ordinary way the price is from 11d. to 1s. 2d.

2811. But, as a rule, the squatter has more choice in the selection of a site than the Government can possibly have? Yes; there is no doubt whatever about that.

2812. Then it might easily occur that the Government tanks cost a good deal more than private tanks, because the Government, in their choice of a site, are much more restricted than private individuals? Quite so.

2813. *Chairman.*] In your district, I presume, machinery is used for raising water? Yes.

2814. Do you think that this machinery is of too expensive a character? Yes. If I had been allowed to read the letter which I spoke of, I could easily show that. I feel very strong on that point, and have been writing about it for the last three years. I am of opinion that this machinery is not only too costly but is actually unnecessary.

2815. What is the largest number of stock that have been driven over a road at one time in your experience; how many sheep have you known to require water in one day? I think the maximum would be about 20,000; but as a rule not so many.

2816. How much water would these 20,000 sheep require? They would require 20,000 gallons. One gallon per sheep is perhaps slightly above the quantity that is drunk. I know that by personal experience, because I have been watering stock for many years in South Australia. A gallon per sheep is slightly over the amount required. I got my living for over twelve years as a drover on the roads. J. Cotton. 24 Feb., 1883.

2817. *Mr. Moore.*] By what means have you arrived at the conclusion that a travelling sheep will not drink more than a gallon of water in a day—by measurement or otherwise? By watering the sheep myself, and counting the number of buckets that were emptied. I have done this not only once but scores of times.

2818. *Chairman.*] Are you not also aware that thirsty sheep, by being allowed to go into the tank, not only consume a large quantity of water, but also take away a great deal? Yes.

2819. Would one gallon per sheep be sufficient for all that waste? No; not for the waste.

2820. Then, suppose the 20,000 sheep consume to-day all the water in the service tank and another 20,000 come along to-morrow, how is the second 20,000 to get water? What I suggest will pump the water every bit as quickly as the steam pump, and it would require an extreme case like this to upset the arrangement. By the Public Watering Places Act the caretakers should be empowered to call upon the drovers for one or two men if required. What I would suggest is Flood's lift of 1½ inches, by which one man is supposed to raise 40 gallons per minute from a depth of 24 feet. I take 40 gallons as the maximum, but I will divide that by two, and say that by this means a man can raise 20 gallons per minute. I reckon, therefore, that with this machine one man would be able to water 10,000 sheep per day without taking the service tank or troughs into consideration at all. The service tank and trough hold 20,000 gallons. The Flood's lift costs about £16, and there is nothing in it to break except a chain which can be mended by a piece of fencing wire; that can be done at any time. The depth a man can lift from is 24 feet; but as these tanks are nearly always full he would not have to raise the water more than 6 feet under ordinary circumstances. I am now speaking of circumstances when there would be only a little water in the tank, but even then he would be able to raise the amount of water I state from the bottom. In most cases these tanks are full to the brim; but no matter what happened, Flood's lift is quite ample. In fact, a 3-inch pipe through the embankment would, in some cases, fill the tanks in my district without the use of a pump at all.

2821. *Major Pearce.*] Is water conserved above the natural level of the ground in your district? Yes; in some cases it is; but it might be better if, instead of making these square embankments in a set form, wings had been carried out, which would in some cases have conserved water fully 6 feet above the natural surface of the earth.

2822. Then you do not conserve water inside the embankments by pumping it over? No.

2823. Of course, now you are only speaking of what is done in your own district. Are you not aware that in some outside districts, where they travel enormous mobs of sheep, it is possible to have 40,000 sheep watered at a tank in one day. Would it not be impossible to water these 40,000 sheep merely by the aid of human labour? Upon my word, I do not think that these steam pumps are at all required. I have thirteen of them in my district and five horse pumps out of a total of twenty two, and my impression is that, with Flood's lift, you can get the water up as fast as with a steam pump.

2824. And if one man was not able to do it I presume you would employ two pumps? Yes; two pumps or two men, if you like. It would be better than bringing these expensive things there that are of no use at present, and require skilled labour to keep in order.

2825. So that you think there is no necessity for these steam pumps? None whatever.

2826. Do you know what these steam pumps cost? I think I have heard that they cost £120 without carriage; but I really do not know the amount. It is only just hearsay.

2827. This includes the boiler? Yes.

2828. *Chairman.*] And you state that this Flood's pump only costs £16? Yes; it will scarcely ever get out of order, and may be worked if necessary by a blackfellow.

2829. You think that it is very desirable in every instance to have one sloping batter to allow the stock to water at the tanks in the event of the machinery meeting with an accident? That is just what I mean. If 40,000 sheep came along they could water at the tank itself, which would be available for any emergency, although such emergency might not occur once in five years. Still, it wants to be provided for.

2830. Do you know of any case where the public have suffered materially through the pumps going wrong? No, I do not. They have not had sufficient time yet; they have not been up long enough yet. Ever since stock have been able to travel since the drought there has not been very much demand on the Government tanks, as you can see from the returns.

2831. *Major Pearce.*] From what you state, I presume you think that many of the tanks are too large? Yes; in my letter I showed that in my district, a tank from 9,000 to 12,000 yards, according to the catchment, would be amply sufficient. There are more Government tanks in mine than in any other district in the Colony. Some of them have been made as large as 30,000 yards, which I consider entirely unnecessary.

2832. So that your testimony bears out what has been shown here already—that tanks should be sunk with reference to the special conditions of each locality? Yes.

2833. In a very dry country, and with a bad catchment area, you want a very large tank? Yes.

2834. And in your district, where the catchment is good, small tanks are ample? Yes.

2835. *Mr. Moore.*] Have you had any experience of a severe drought in your district? Yes, I have had. In the early part of 1884 I was obliged to pay 20s. a bushel for oats and 42s. per cwt. for chaff to keep my horses alive.

2836. And at the same time there was an abundance of water? Yes, any amount of water. It is hard ironstone country, and will run water like the roof of a house. And in these droughts, the barer the soil gets the more water it will run, because in getting bare it also gets very hard. I may say that I have no personal complaint to make of the officers of the Roads Department. Any differences that have occurred have been simply differences of opinion; and, in many instances, in little details as to the position of a gate or anything of that sort, the suggestions that I have made have often been acted upon; but it is this great principle of construction that I differ with them about. Our differences, therefore, have only been differences of opinion.

2837. *Chairman.*] Have you had any interference from the road superintendents? No; no trouble at all. As I have already said, all our differences are merely differences of opinion.

2838. Do you know anything about the subletting of contracts? No.

2839. Have you ever been aware of any favoritism having been shown to people in the Cobar district with regard to contracts? No; I cannot say that I know of any favoritism having been shown. 2840.

J. Cotton. 24 Feb., 1888.

2840. There are no wells in your district? No; no wells.
2841. Do you know anything about the fences round the caretaker's paddocks? Yes.
2842. Do you think that money has been spent unnecessarily on them? I think they have been too costly. In the first instance, the posts are 2 feet 6 inches in the ground, which is a most absurd thing. No practical man would ever expect posts to be put down to that depth, especially with 10-foot panels.
2843. And the wire is of too large a gauge, is it not? No; I do not object to the wire—indeed, I believe in a strong wire at the top. They have No. 4 wire at the top, which I thoroughly believe in. I believe this wire is better than any rail which you can put on a fence. Nothing, almost, can break it in the ordinary way; and if it is broken, in five minutes you can make the fence as good as ever it was.
2844. We have heard here that in case a No. 4 gauge wire is broken one man cannot mend it? I do not know that. I think the gauge of the remaining wire might be considerably reduced, but I believe in having a strong wire at the top.
2845. Have the fences in your district a top rail? Yes, a few; and I object to it for this reason—that if there is a rail broken at any time—I do not care how you repair it, or how nicely you put in a new rail—it is always a slip-rail from that time out. In one case that I have just been reporting upon, I notice that at some of the tanks in my district the fencing has cost as much as £70 per mile, while I am of opinion that a very good fence, and sufficient to meet all purposes, can be put up for £42 per mile.
2846. But, under the circumstances, do you think that the £70 per mile was an excessive price for the fence in this particular case? Well, I am not in a position to say; I never saw such a fence before.
2847. We want to find out whether the cost is greater than it should be, or whether the fence is of a better character than was required? Well, I really cannot say.
2848. We would now like to get your opinion on any other matter that we have not questioned you about; we shall be glad to hear anything further that you may have to say? I do not think there is anything else. Anything that I could tell would be in relation to some particular case, and would only bear out what I said before, that a hard-and-fast rule cannot be followed. I know a place where there is a tank going down now. This is the first lot of tanks that have been put down in my district of a slope of 2 to 1; all the rest are 1½ to 1, which is the regular slope of all tanks in my district. A little while ago there were three new tanks started on the Wilcannia road, with a slope of 2 to 1. The gentler-sloped tanks were only adopted in the Cobar district in July last.
2849. *Mr. Woore.*] Are you not of opinion that even a 2 to 1 is not a sufficient batter in some cases? Yes; in some cases. One of these tanks which is now being sunk has a 2 to 1 batter. The tank I refer to is the one at the 55-Mile post, on the Cobar to Wilcannia road—I think it is called Barneto. This is being put down in very loose soil, which melts like sugar as soon as the water goes on to it. I am of opinion that 2 to 1 is not a sufficient slope for this tank. If I were making it I should construct it with a batter of 3 to 1 on three sides, and 5 to 1 on the remaining side, to allow the silt to deposit itself on the batter, and then I would allow the sheep to go in and puddle it all round. My reason for saying this is that I have seen a supply tank which was put down there, and which was filled with rain-water three or four times, allow the water to get out through the sides, and then the sides fell in.
2850. *Major Penrose.*] Does not the engineer-in-charge see to this? Well, I suppose he does.
2851. *Chairman.*] When the contract is once entered into I suppose it must go on? Yes; I expect the road superintendent is like myself in many cases—he must do what he is told. We have to do a great many things that go against the grain.
2852. You think that great discretion should by exercised by these local officers? Yes; and I think these officers should be men who have a thorough knowledge of stock and the requirements of stock; for just a very slight mistake will render a watering place utterly useless. In one of the tanks that I have taken over I found an entrance gate for stock right on the point of a fence. Now, how could a man get a lot of wild Queensland cattle into a gate like that? Of course they would run down both sides of the fence. There can be no doubt that the gate was placed there owing to the want of practical knowledge on the part of the man who did it. I saw Mr. Adams about it, got him to shift the gate, and now the thing works very well.
2853. *Major Penrose.*] Do you think that the stock routes ought be fenced off? Well, that is a very difficult question to deal with. I have thought over this question as much as anybody, and still I cannot see how this is to be done. If you fence off, you must reserve the land from lease; and if you do that, the Government must destroy the rabbits on it.
2854. And it would be nobody's business to compel stock to travel a certain number of miles every day? Oh; yes, the stock inspector would see to that. I have talked to Mr. Bruce about it, and have asked him to make as few reserves from lease as possible in my district on account of the rabbits. Of course, if the river frontage were taken away by the stock routes being reserved from lease, it would ruin the squatter. It might be done in the Cobar district, or any place where there was water on the road. It would be a little awkward for the squatter to cut them off their tanks, but they could make provision if compelled to do so. The difficulty is in the rabbit question, and it is going to be a very big difficulty indeed.

[The Commission adjourned.]

THURSDAY, 1 MARCH, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E., | J. C. WOORE, Esq.

Peter Leslie called in and examined:—

P. Leslie. 1 Mar., 1888.

2855. *Chairman.*] You are a resident on the Parramatta river? Yes; I reside there just now, but I live at Amphitheatre station, near Cobar.
2856. Have you long resided in that neighbourhood? I have resided in that neighbourhood since 1881.
2857. What are you? I am a squatter: I am one of the lessees of Amphitheatre station
2858. Have you had much experience in the excavation of tanks upon runs? Yes; I have had a great deal of it.

2859. There are a considerable number of Government tanks in your neighbourhood, I presume? Yes, there are. P. Leslie. 1 Mar., 1889.

2860. Are you aware of the objects of this Commission—that this Commission is appointed to find out whether, in some instances, improper sites have been chosen for the excavation of tanks and wells? Yes; I believe that to be the object of the Commission.

2861. And to ascertain what truth there is in the allegations that construction of such works have been faulty and unnecessarily expensive? Yes; I believe that to be the case.

2862. Have you any fault to find with the sites for public tanks chosen in your district? Not with the sites, because I have never taken much notice of them; but I noticed that the construction of them was very expensively carried out. I never looked to see whether the sites could have been better or not.

2863. Then it is the construction that you find fault with? Yes; I believe that the majority of the tanks have been constructed on far too expensive a scale.

2864. Just state shortly your reasons for making that statement? Well, I believe that the tanks could be excavated for far less money if the batters had been lower, and if the contractors could have got a portion of their money while carrying out their contract. No contractor can work his team to advantage on the batter of Government tanks.

2865. Do you know what that batter is? It is 1½ to 1 and 2 to 1—that is the latest. I think there is only one in the district of 2 to 1 that I know of.

2866. Have you observed that these batters slip in with the action of the water? Yes; I have noticed it.

2867. In all cases? Not in all cases, but in most; unless in exceptionally hard ground.

2868. You therefore think that any hard-and-fast rule for excavation of tanks is undesirable? Most certainly.

2869. And every tank should have its particular batter, in accordance with the stability of the ground? Most certainly. I do not think any tanks should be excavated with a batter of 1½ to 1, no matter what the ground may be. It costs too much to take the stuff out, and all the extra water you can conserve on that account is of no great benefit. I have gone through two seasons—through the years 1883 and 1884—on my run with less than 16 inches of rain, and yet I was never short of water. All my large tanks are 3 to 1 on two sides, and 6 to 1 on the other sides; all my small tanks are 3 to 1 on three sides, and 6 to 1 on the other side. I allowed this batter that the contractors could get at their stuff from both sides of the large tanks and one side of the small. I have been short of grass, but never of water.

2870. Are you aware that with a sloping batter much more water is exposed to the wind and sun, causing a greater amount of evaporation? Yes, there is a little more exposure; but when the embankments are all round these tanks I do not think they can be more exposed than a tank with a 1½ to 1 batter. I really do not think they will suffer any more by evaporation than a tank with a shallow batter. If they were open they might, but with the banks that the Government put round their tanks I do not see that they can. The embankments break the wind.

2871. Do you think the tanks in your district are constructed on too large a scale? I think 10,000 cubic yards is sufficient for any tank. It all depends upon the catchment; and if you have a slow or porous catchment, of course you want a large tank; but it is a foolish thing to put down tanks in slow, porous soil.

2872. Then a good deal depends on the rainfall. You say you had under 16 inches and yet had plenty of water? Yes, under 16 inches for two years; that was in the years 1883-84.

2873. Are not the Government tanks of greater depth than tanks constructed by private individuals? I believe they are.

2874. If so, would not that add to the expense? No, I don't think it would. The depth does not make so much difference if the contractors can work their teams along the banks. Nearly all my tanks have been put down to a depth of 15 feet—they narrow at the bottom and become very small—and this stuff I had taken out at 11d. per cubic yard. In the last tanks I had made, the contractor offered to do the same work at 10d. per cubic yard if I gave him ten weeks to complete the work in. I wanted these two tanks cut out quickly so that they would be ready for the rain, and I bound him to do the work in six weeks, and got the work done for 11d.

2875. If you had these tanks put down in accordance with the specifications of the Government as to batter what would they probably have cost? Well, I hardly know. I think the tanks would have cost at least 3d. or 4d. per yard more—perhaps even more than that. A tank of 5,000 cubic yards would narrow very much as it gets to the bottom and be more difficult to excavate.

2876. *Major Penrose.*] With this very gentle batter to the Government tanks, you probably could not put the earth all round the tanks, because the areas would have so much increased? Yes, with a 10,000 cubic yards tank I could put it all round. I am sure it could be done. I put the earth round three sides of my tank, leaving the inlet open. I have one tank which will hold 12 feet above the natural surface of the ground, and in all my tanks I conserve water above the surface, more or less.

2877. Are the catchments there favourable to holding water over the surface? Yes, in most places.

2878. Well, in that case, embankments all the way round would seem not to be suitable for that district? I think so; but with an embankment all round the water could come into the tank by a pipe, and it would still remain behind the tank if wings were carried out to stop it.

2879. *Chairman.*] Are you aware as to what the ultimate object of the Government is in making embankments all round a tank? The ultimate object I take it is to utilize the embankments for the conservation of water. I concluded it was for that purpose the banks were made. All the Government tanks in the Cobar district have not had embankments put round them.

2880. Some of them were used for watering stock at the tanks without troughs? I do not know of any accessible in this way, except the one at the Cobar township. There were others at one time, but I think the tank at Cobar is the only one open now. At least it was open when I last watered stock there.

2881. Do you allow stock to water at all the tanks excavated on your run? Yes.

2882. If you intended to put pumps there you would have done the same? I would, and made the batters to my tanks 3 to 1 on three sides and the remaining side 6 to 1; but if I were going to pump the water out, and had to improve the country for that purpose, I would make all the embankments round my tanks square. I would stop all the water I could behind the banks by wings, and pump it into the main tank. If you run wings out you can stop a great body of water in most places.

2883. *Major Penrose.*] How would you pump the water over? With a movable engine—one that could be taken about.

P. Leslie. 1 Mar., 1889

2884. But would that suit the Government? I do not think so.
2885. *Chairman.*] Do you think it is desirable for the Government to allow stock to water at the tanks direct, instead of having machinery to pump the water into troughs? Certainly not; the Government have the travelling public to consider, and stock will spoil the water for human use. I do not see how water could be used for human purposes if stock were allowed continual access to the tanks.
2886. Of course you are aware, from your experience of your own tanks, that if stock are allowed invariably into the tank the water would be spoiled? Yes; the sheep will go in and swim in the water and spoil it. I have seen the water in some tanks turn quite green on this account. It may be right enough for stock to drink, but they should not be allowed in, except in extreme cases, where human beings have to use the tanks.
2887. Have you any reason to find fault with the flumes or drains for taking the water into the tanks in your district? No; they are all right, so far as I know.
2888. They could not make a mistake in your district on account of the hills? Not very well.
2889. Do you think that the machinery used by the Government for pumping is unnecessarily expensive? I do think so.
2890. What kind of machinery is this which is being used? Tangye's steam pumps.
2891. What would you suggest in lieu of these steam pumps? Well, I think the M'Comas lift would be better, or a double whip would answer admirably, as the water has to be lifted only a short distance.
2892. Would the caretaker be able with one of these pumps to supply all the demands made by travelling stock? I think so. It is done on stations where there are more stock than generally come to a Government tank in one day. It is done with double whips. The water is drawn straight up with a horse by means of two buckets, one coming up and the other going down. The horse travels outwards in drawing the bucket up. A whip is, I think, too slow, although it may be a very good thing for deep wells. I have seen a horse with a single bucket water 8,000 sheep in one afternoon. This was done with a single whip, the horse pulling right around with a wheel. The horse goes round and round, and when he gets straight out from the post the bucket is up. I have seen 8,000 sheep watered in this way without very much delay.
2893. Do you think it would be beyond the caretaker's capacity to keep the service tank filled with a M'Comas pump? I think it would be easy enough. That would not necessitate carting wood to burn or buying horse-feed. I think the M'Comas pump would be the best for the tanks, and would do away with a great deal of expense.
2894. I presume a M'Comas pump is so simple that any man could repair it in case anything went wrong? Yes, I think so.
2895. Have you observed that any very expensive fences have been put up around the caretaker's paddocks adjoining the tanks within your district? No; I did not notice particularly, but I fancy they are more expensive than I would think of putting up. I think a good fence could be put up for less money, and would answer the purpose just as well.
2896. Do you refer to the fences around the tanks? Yes, and around the paddocks, too. I think a top rail to a fence round a tank is a mistake, and besides that the wire is too strong. No. 8 wire is quite strong enough, and will go much further in a fence than the wire that is now being used. No. 8 wire will outlast the posts.
2897. Are you now referring to sheep or to cattle—in speaking of the fence? Both to cattle and sheep.
2898. Do you not think that a mob of Queensland cattle that have never seen a fence before in their lives would be likely to break this down after a long journey? They are just as likely to break a fence down with a strong wire as with a weak one.
2899. But I mean with a top rail? No; I don't think there is any danger. Cattle outside are not so apt to try to rush into a small enclosure as they would be to rush out of the enclosure if they were in it. There is one thing I would like to say—that in watering sheep at these troughs it is sometimes difficult to get them to drink, and some of them will not drink at all. I think the caretakers should be instructed to allow such sheep to water in the tank—that is, whenever they will not water from the troughs. I had a drover coming over from Nyngan to Cobar with some eight-tooth ewes, and the first tank belonging to the Government that they came to he was unable to get more than one-third of them to drink. A good deal of that was probably owing to the rail along the front of the troughs.
2900. Have you ever lost any sheep by reason of their refusal to drink at the troughs? No, not by refusing to drink at troughs; but I have lost sheep by their refusing to drink at an open tank on the Bourke road, where there was only one end open to drink at. I took 14,500 sheep there one day. The first flock puddled the water so much that the rest would not drink it. The caretaker would not allow me to let the sheep into the large tank, so that they could not get a good drink. He told me that I would have to water the stock at this narrow opening. It was a double tank, and the big tank was fenced off all round. The tank looked like a large supply or silt tank. The first lot of sheep got water, but puddled it so much that the others would not drink it.
2901. Your remark would not apply to one of the present tanks? No; if they had allowed me to get at the big tank my sheep would have had a good drink.
2902. That is not an answer to my question;—have you ever lost any sheep through their refusing to water at these troughs? No, never.
2903. *Major Penrose.*] That was not one of the later style of tanks? No; this was before the Department put down the troughing.
2904. Then you think the caretaker should have discretionary power to allow or not allow sheep in to drink at the tank? Certainly. Where the sheep will not drink at troughing, they will perhaps not live to reach another watering place. On stations, I have had sheep for three days trying to make them drink at troughs, but to no purpose. A lot of them would not drink after being kept there for three days.
2905. *Chairman.*] You said something about the rail? Yes; I think it is the rail alongside the troughing that prevents stock in some places from drinking. I believe they are doing away with that now, and putting a rail down the centre.
2906. That is a better plan? Yes: I suggested it two or three years ago.
2907. *Mr. Woore.*] Do you think that any sheep would drink at a trough with a rail down the centre? No; there are some sheep that will not drink the first time they are brought to troughs, and it is a very difficult thing to get weaners to drink. As I have said, I have kept sheep for three days and a lot of them would not drink then.

2908. But you speak of sheep on a station; I am referring to travelling sheep—would they drink out of the troughs? The first time weaners come to the troughs, even when they are travelling, they will not always drink; and you cannot get them all to drink the first time they are brought to troughs.
2909. *Chairman.*] The best way would be to get them to water at the troughs before they are weaned? Yes; but there are plenty of weaners travelling as well as other sheep during the year that could not be broken in to drink at troughs before they were weaned. It is not on every station that you have a chance of breaking in weaners alongside their mothers, because it is not on every station that you have to water at troughs.
2910. In the event of the pump going wrong it would, of course, be a terrible loss if the sheep could not get to the water? Yes; and in a case like that they should be allowed to water at the tank.
2911. *Major Penrose.*] Do you think it would be safe to allow sheep into a tank constructed with a batter of 1½ to 1? No; it would not be at all safe. The tanks at present in existence are very bad for watering sheep.
2912. But you said just now that tanks are for the benefit of the travelling public, and that sheep should not be allowed into them? It would not hurt the tanks if the sheep were only allowed in in extreme cases, but if they were always left open for stock it would certainly spoil the water.
2913. But if the caretaker were allowed to do this at all would there not be the danger of his allowing it in every case? Yes; there is something in that. There is no doubt there would be danger if the caretaker were allowed to let the sheep water at the tank; he might do so in every case in order to save himself the trouble of pumping.
2914. *Mr. Woore.*] Can you suggest any method of watering stock other than by troughing or allowing the stock into the tanks? Well, there are other ways, but I do not approve of them. I have known of people to cut out a long, narrow tank in the earth and pump the water into it.
2915. *Chairman.*] That would soon get destroyed? Yes. You cannot get any better way of watering stock than by troughing, and it must be stuck to at the Government tanks.
2916. *Major Penrose.*] Has it not also been largely introduced on stations? Yes; many stations have nothing else.
2917. *Chairman.*] Of course where stations are watered by wells troughing must be used? Yes; it is inevitable. Over a large part of Liverpool Plains the stock are watered from wells.
2918. You cannot make tanks there as a rule? No; it is a deep black soil, 10 or 12 feet deep, and silts up quickly.
2919. Do you know anything about the subletting of contracts. I may explain to you that it is stated contracts have been taken at very high prices and sublet at very much reduced prices? No; I do not know anything about that.
2920. There are no wells in your district? No; none near me.
2921. Do you know anything about the wells far out in the plain country? No; nothing about Government wells.
2922. Have you had particularly brought under your notice the huts lately erected for the caretakers? No; but I have seen some of them. I know nothing specially about them, but I think that under the circumstances they are necessary.
2923. Now, you are aware that a good deal of trouble has arisen in the construction and maintenance of these public works by their being under a sort of dual control. The Works Department construct the works and then hand them over to the Mines, which Department is charged with the maintenance. Are you not aware that friction has arisen in consequence of this dual control? No; I am not aware of it. In what way do you mean?
2924. Do not the road superintendents select the sites, and then, when the work is finished, hand it over to the Mines, complaint being sometimes made that things are not done properly? No: nothing of that sort has come under my notice. I have heard of such things, but I know nothing positively.
2925. Now, there is another matter. Are you aware that these Government works cost a good deal more to construct than the works put up by private individuals? Yes.
2926. Do you think that if this alleged faulty construction and delay in getting paid were done away with, that the expense of these works might be lessened. Do you not think that if these works were in the hands of local bodies, who have much more knowledge as to the best sites than the people who now have the management—do you not think that then they could be constructed more cheaply? I do think so.
2927. Do you think it would be quite possible to get a sufficient number of independent men in the various districts to give their attention to these works and see that they are properly carried out? Yes, I think so. I think it is possible to get a sufficient number of men to make specifications for the work to be done, and to have it done by the overseer of watering places, or whoever was in charge of the tanks in the locality. But I think that, unless they were paid, you could not expect them to do this work.
2928. But you know that in Queensland there are Divisional Boards who take these works into their own hands without any remuneration? Yes, I know they have boards there, but I think they must pay them. You can get plenty of men up-country to do the work if they are only paid for it.
2929. What I mean is this: we have now such bodies as municipalities, where gentlemen take upon themselves great public duties without any payment. Of course they have officials under them to carry out the works, but all control of public matters is in their hands. Now, do you think it would be possible for these works, which cost large sums of money, and which are surrounded by a great deal of red-tapeism and delay, to be better constructed and managed, were they placed in the hands of local bodies? Yes, I am sure of it. The work would be done far better and far cheaper.
2930. *Mr. Woore.*] Do you think the Stock Boards could undertake the construction and supervision of these works? Yes, I think it is quite possible. I am a member of one of the Boards, and I am always willing to do all that I can for the benefit of the district.
2931. Would it not have this good effect, that the Boards would take very good care that tanks were so constructed so as to suit the conditions of the locality? Yes.
2932. They would have the batters formed in such a way that they would not cave in? Certainly; I do not believe in steep batters at all.
2933. You think that on occasions sheep should be allowed to water at the tank themselves? No; only in extreme cases.

P. Leslie. 1 Mar., 1888.

2934. *Chairman.*] I suppose it is inevitable that there should be bad catchment areas selected in some cases on stock routes? Well, I have not taken much notice when going along the roads, and I cannot say, but it is certainly more difficult to pick a good catchment area on a stock route than on a run. A Government tank must be very close to the road, while a half mile or even a couple of miles do not matter to the squatter so long as he can get a good hard catch. On the Nyngan road I think the tanks have very good catchment.
2935. Have you any further information to give? No, I do not think there is anything else.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

Arthur Hastings Doudney called in and examined :—

A. H. Doudney. 1 Mar., 1888.

2936. *Chairman.*] Where do you reside? I am living in Sydney at the present time.
2937. You were formerly a contractor? Yes; a tank contractor.
2938. *Mr. Woore.*] For the Government? Yes.
2939. *Chairman.*] And I presume for private individuals as well? No; I never did any tanks for private individuals. I did some ploughing and that sort of thing for them.
2940. Have you constructed many tanks? Three.
2941. What are their names? Tinda, near Condobolin, Babinda, 15 miles from Nymagee, and Gilguys, 40 miles from Nyngan. They were 15,000, 16,000, and 20,000 yard tanks.
2942. And their depths? The first one was 18 feet, the second 16 feet; and the third 15 feet.
2943. What were the relative prices? I got 1s. 9d. per yard for the 18-feet tank, 1s. 4d. for the 16-feet tank, and 1s. 2d. for the 15-feet tank.
2944. What methods of excavation did you use? I used Fowler's steam scoop.
2945. Was the plant your own or did it belong to the Government? It was our own. I was then a partner with William Sloane and Co., now the Union Mortgage and Agency Co., Limited. I gave a good deal of time to these tanks, and spent about ten years in the back country.
2946. Now did you find it very difficult to work your plant under the Government specifications? Yes. I had very great difficulty indeed; the specifications were all dead against us.
2947. Just state why you had this difficulty? Well it was the high banks and the steep batters, and generally the tank conformity and the distance we had to place the dirt away from the tank. We got our plant to work but it was at a great loss. These are the only reasons.
2948. Of course the rate of excavations varies with the depth of the tank? Yes; just as I have already shown.
2949. So that if, as a rule, Government tanks were sunk 18 feet in depth they would necessarily cost more than the squatters' tanks? Yes; the difference in the price of Tinda and Gilguys was caused through allowing me to spread the dirt round roughly instead of exactly. I could do it even deeper than I did, and yet make good money where that was allowed. We did that tank in the quickest time on record. Eighteen weeks was the quickest time a tank had ever been done before, but we finished it in nine and a half weeks. We lost a great deal of money over the tank which we excavated at 1s. 9d.
2950. If the Government had allowed you to make the batter 1 in 5, would that have made any difference in the matter of cost? If that had been allowed we would have taken the work willingly at 1s., that is, if the slopes had been 5 in 1 on each batter all round, or even 4 in 1.
2951. What was the batter of those tanks that you constructed? The batter of the first one was 1½ to 1, the batter of the second tank, the Babinda, was 2¼ to 1, and, I think, the batter of the last was 2 to 1. I cannot recollect exactly now whether the batter was 3 to 1 on the second or not, but it is either 2¼ or 3.
2952. Did you observe many of those Government tanks sunk by other contractors in that neighbourhood? Yes; I have seen them all over the country round at Wilcannia and other places.
2953. What was the usual batter? 1½ to 1, and sometimes 2 to 1.
2954. Was the batter increased lately? It might have been. My knowledge only goes back to those that were 3 to 1.
2955. How did you come to have this modification made in your favour? Because we represented to the Department that we had bought a very expensive plant, and that it was utterly useless to us. We showed that we worked out a tank at such a loss of money and time that we had to have a greater slope, and we kept at Mr. Bennett until he had to allow us to alter the batter. As it was we lost four months in trying to get him to do it.
2956. We have heard a great deal about the delay which it is alleged exists in getting work measured and paid for? Yes, contractors have a lot of trouble in this matter.
2957. And in such cases as when the work is progressing and is not finally finished? Yes, that is true. In fact if I had not had a good firm to fall back on I would have been closed up before I finished the first contract—before I got half through with it.
2958. Then it consequently means that when these steep batters are insisted upon by Government, combined with the difficulty which contractors are said to have in obtaining their money, that no one but a man of considerable means can tender for these Government works? No; he always loses.
2959. And consequently poor men are shut out from tendering? Yes; and I should say that these contracts have ruined them, one after another. The only man that seemed to get along at all was Budd; but he made a lot of money from the squatters and lost it on the Government works. I do not think he made money, certainly; but the other contractors were shut up all round and lost their money.
2960. You are not aware that any other contractors have had this modification made in their favour? I think there is a tank called the Limestone tank, near Nymagee, which was also made with a batter of 3 to 1. The contractors made it to a depth of 15 feet instead of 18 feet, which was allowed on account of the rock they met with.
2961. Did you ever meet with rock in your excavations? Yes, in the Babinda tank we reckoned on 1,500 yards of rock or sandstone. It was not cemented gravel which we got at the Gilguys, but with the steam ploughs it does not matter. This was all the rock that we found.
2962. Did you make any application for compensation for this rock? No; I never made any written application, because the matter did not worry me much, and I was anxious to see how we would get on with the Government. I did ask Mr. Adams about it, but he said we would not get anything.

2963. *Major Penrose.*] Did you put down any trial-shafts in that case? No; the rock comes right up to the centre. I would have made application for compensation for the rock but I was anxious to get more contracts from the Government, and I did not push them for it. I thought by taking out the rock in this way I would have got more work from them.
2964. Have you lately made any contracts with the Government? No; I knocked off contracting three years ago, and the plant was sold for a mere song.
2965. Taking into consideration the first cost of the plant, did you find it more efficacious than the use of bullocks? I would sooner have the bullocks and scoops in a good season, such as the present one, because there is no worry, and there is not the continual strain of breakages which may occur with the other appliances. But if I were tank-sinking again, I would have two small engines and a plough with the bullocks and scoops to follow, and drays to finish. One steam plough would keep a hundred drays going easily.
2966. Did you never see any of these patent earth excavators? I have seen them all at work, and brought some from Melbourne some years ago, having taken the contract for the Ivanhoe and other tanks, which I afterwards threw up, and which were let to others. I then bought ploughs and scoops.
2967. Were you the contractor for the Mount Manara and Ivanhoe tanks? Yes; but the Department let me throw up the contracts, so that I did not start the work.
2968. I suppose that when you had a contract at 1s. 9d. per yard you expected to make money out of it? Yes; we expected to make a great deal of money indeed.
2969. It is considered a large price? Yes, a very large price; but when you come to do the trimming, and all that sort of thing, you will find that no man can make it pay and go to the bottom.
2970. What was the cause of your tendering at so high a figure? Because we showed that we had bought this very expensive plant, and that similar plants had done good work for Sir Thomas Elder, and that if this tank was a success for the Government we could put down tanks very quickly. This was before the drought, and when the Government could not get the contractors to leave the squatters at the ordinary rate of 1s. per yard.
2971. *Chairman.*] Give us the reason for that? Because it is much better to work for a squatter than to work for the Government at any price.
2972. For the reasons you have stated? Yes; and for other reasons. If you are working for a squatter your water is secure, and he will arrange to give you meat, provisions, &c. Besides that, you know that your money is safe and easily obtained; you also know that the squatter is himself always watching the work, and that if you do a fair thing for him he will be satisfied. That is to say, you are not left for a month or six weeks doing work in a certain way, and then finding out that it is condemned when the inspector comes round.
2973. *Major Penrose.*] In that particular case were there difficulties in the supply of water and feed? Yes; there was no grass within 6 miles of the place, and we had to carry water from the tank, about 5 miles away; and nobody could do that except by steam, the engines required so much. The tank next to this one was let for 1s. 9d. A man named Bull did the work. I think it is the Moonbil tank, on the Wangeribone Creek. That was done at 1s. 9d. per cubic yard, and the contractor "went broke" over it.
2974. *Chairman.*] For what reasons did they make it 1s. 9d.? They had a horse plant, and there was no grass. They had to pay large prices for water and for provisions and horse-feed. For instance, they paid 1s. 3d. for a sheep that would not make a meal for ten men. The sheep had been fed on scrub, and had not seen grass for two years. The leg of one of these sheep would not make a fair-sized chop, and then there was no nourishment in it. This was in 1883; about the middle of the drought.
2975. Were many squatter's tanks being sunk during that year? Very few, and afterwards they stopped altogether.
2976. *Major Penrose.*] I suppose it was absolutely necessary that some Government tank should be put down there? Well, no. I think that all these tanks were too late. Had they been put down there ten or fifteen years before they would have been most useful. It seems to me that the Government do not look far enough ahead. Stock go upon a road, and reports are sent down to Sydney that tanks must be constructed, and while all this red-tapeism is being gone through, the real push and the real necessity for the tank passes away, and the road is no longer used, because trucking is so much better than droving that the squatter always goes straight for the railway.
2977. Now, from your experience in working for the Government, do you think that it would facilitate and cheapen these works if they were handed over to local bodies? Yes, certainly; and that is the only way they can be made to pay or to be put upon a proper commercial basis. The only way that this can be done is by fencing in the travelling stock routes, and then by making the drovers pay a certain amount for the sheep whether they used the public watering places or not. The routes could be divided into sections, the drover to pay for each section of 50 miles a certain sum. One ranger could be appointed for a section, and it would be his duty to ride up and down, and stop at the tank at night. That would do away with the expense of a caretaker.
2978. *Chairman.*] And would do away with the objection to the stock remaining longer on the road than they had a right to remain? Yes; and the ranger could also keep the squatter's sheep from the water. At present if there is a sign of grass on the travelling stock route the squatter sends all the stock on to it and eats it down.
2979. Now would you not like to modify your remarks applying to the river frontages in the dry country? Yes; that would never do in certain cases.
2980. So that you now say each case would have to be dealt with according to the circumstances? Quite so. It would not do even to have lanes leading through.
2981. All these matters require so much local knowledge and local experience that they should be dealt with by local bodies who have a good knowledge of the country? Yes, certainly; but besides these you want a man such as Mr. A. P. Wood to be in charge of the construction. Everything should go through his hands. He is the most practical man that I know of.
2982. Have you ever been in Queensland? Yes; all over Queensland.
2983. Do you know how those things have been managed in that Colony? No; I have been mostly along the coast, and have no experience of their system of water conservation. The country is sufficiently well watered up there.

A. H. Doudney. 1 Mar., 1888.

2984. Do you consider that a fairly correct judgment has been exercised in the selection of sites for public tanks—that is, considering the distances along the roads at which these tanks had to be placed, and the catchment area? Yes; I think so. I think that every where the sites of the tanks have been chosen well. It is a thing that many people are often greatly deceived in. In regard to one tank which I constructed I was under the impression that we were working on the top of a hill, but notwithstanding this impression, the tank became full when the rain came. There is one tank on the 70-Mile track to Wilcannia which, I admit, was put in a bad place and never filled, but that is the only one that I know of.
2985. Do you know of a tank on the road between Louth and Cobar which has never yet filled? I have never been on that road at all.
2986. Has machinery been put up on those tanks that you are acquainted with? Yes.
2987. What kind of machinery? Tangye's steam pumps. I forget the names of the others.
2988. Do you think that this form of machinery is desirable or necessary? If you want to have good, clear water in the troughs, this machinery is better than horse-power.
2989. Do you think that the caretaker himself would be well able to keep the service tank full with the M'Comas pump? A great deal would depend on the road, and upon the number of stock that were travelling.
2990. But in that part of the country you are most acquainted with, do you think the number of travelling stock is so great that the men could not meet the requirements? I think any man might have met the requirements on any road that I have been on, except the Booligal to Wilcannia road.
2991. So that you think it was an unnecessary expense to put up these Tangye pumps in every instance? Yes; except on very large stock routes.
2992. Do you know the capacity of a M'Comas pump when worked by hand labour? I cannot say that I know it exactly, but you can do a tremendous lot of work with a M'Comas pump. I think there has been a great amount of dissatisfaction with it, simply on account of the want of labour in the back country. If there is any hard work to be done you cannot get people to do it.
2993. But these caretakers have nothing else to do? Then that is all they are good for; a ranger could attend to all their duties; and could, when required, go ahead of the stock and pump all the water that was wanted.
2994. *Major Penrose.*] It has been suggested that the drovers should be compelled to render some assistance? They will not do it for you.
2995. *Chairman.*] Another thing I would like to ask you;—do you think it necessary that caretakers should be placed at these tanks, because the number is now quite alarming;—do you think that every tank should have a caretaker? There is this difficulty in doing away with them: A caretaker might not be the slightest advantage at a tank for twelve months, and yet in one day, in consequence of a flood, his presence there might result in a saving of much property from destruction; so that the Government would be amply compensated by keeping these men there. But if you had the roads properly fenced in, of course you would not require a caretaker.
2996. *Major Penrose.*] Under present circumstances I suppose the caretakers are necessary to prevent squatters from watering their sheep at the tanks? Yes; it is in bad seasons that these tanks are unprofitable. In bad seasons the squatter trucks his sheep, if there is a railway handy.
2997. And yet you consider that these tanks are necessary? Yes; there is no doubt about that.
2998. To carry out your ideas fully every man would have to pay a certain water tax? Yes; and I think they would be only too glad to do it. The advantage of having a road fenced in is, that you have grass and water all the way. At present there is no certainty that you will have grass. As soon as there is any grass on the stock routes, the squatter himself puts his sheep on it and eats it down. The squatter does not wish sheep to travel through his run, because it necessitates his sending his men with them to shepherd them through his property, making them travel the specified number of miles per day. If the road gets bad, from want of grass or any other cause, the travelling stock will not use it, and will have to travel by some other route. I do not blame the squatters. I have seen as many as ten men belonging to one station shepherding travelling stock over the Kilfera run, and were kept at it for three or four days. This is a very large stock route, and it gives any amount of trouble to the station owners. I think it is some 97 miles through the run. Large numbers of cattle and sheep go along that road.
2999. *Mr. Woore.*] I suppose there are nearly always travelling stock on the run? Yes.
3000. *Chairman.*] Have you taken contracts and sublet them? Only drains; and in one case only.
3001. As regards drains, what price did you get from the Government, and what sum did you sublet them for? I think I got from the Government about £1 per chain for 12-feet drains, 9 inches deep, and with 3 to 1 batter. I sublet the work for 17s. 6d. per chain. I then got, I think it was 10s. per chain, for the 10-feet drains. I cannot be at all certain, because it is a long time since I did the work. The only reason I sublet this was that I had done with the tank. At Tinda tank there was a tremendous catchment, and I dare not put drains in for fear of destroying the engines. I had great trouble with labour, and it was on that account that I sublet the drains to a man who was living close by.
3002. Do you know of any wells? No; I only know of old wells. They were all sunk before I went there.
3003. What is the nature of the well water generally? The water in the Jumping Sand-hill is occasionally rather brackish for humam consumption. Then the Holy Box well was abandoned, and Mr. Wood put a man on to bale the water out, and they got good water at the last report. The well at Mount Manara was abandoned before they had gone to a very great depth. One well further away from the Mount Manara—one about half a mile away—supplies magnificent water, but it is private property.
3004. Have you ever put up any fencing? No; I would never touch woodwork.
3005. *Major Penrose.*] Are any of these tanks constructed so that they will conserve water above the natural level of the ground? No; unless the water is pumped over the embankments from the silt-tank. The only advantage of the banks is that they act as a break-wind.
3006. *Mr. Woore.*] A violent wind blowing would drive the water against the sides of the tank, and bring the earth down? Yes; and I do not believe that any batter of 1½ to 1 gives much resistance.
3007. These banks which are put round the tanks, although they may not conserve water above the natural level, tend to conserve the water within the excavation by sheltering it from the wind? Yes; they do that, but all that means money. You can shelter a tank with a brushwood fence which would cost only about 2s per cubic yard, or less. I have noticed in these banks with a steep batter that the waves will cut not only the earth, but will cause it to fall in. I have a letter here that I would like to read. It is addressed to a member of the late Water Conservation Commission, Mr. Franklin. [*See Appendix.*]

3008. *Chairman.*] You said you had fault to find with the management of the tanks under the Mines Department? No; I did not exactly say that because I have no particular case to bring forward, and no particular fault to find; but it seems to me that the whole thing is mismanaged. I have seen for years back good tanks unattended to; the drains were not cleaned out and then the tanks silted up and became utterly useless. There was the Boonoona tank, for instance. It was more than half full of sludge; and although I admit it was very bad country, still they ought to have kept their drains clean, which is the chief thing. A. H. Doudney. 1 Mar., 1888.

3009. Is there a silt-tank there? Yes; but it disappeared long ago.

3010. *Major Penrose.*] Is there a caretaker there? I do not remember that there is any caretaker there now. There was a caretaker there at one time, but he never did anything. I think he did more in shifting the horses for Cobb & Co., than ever he did for the Government.

3011. *Chairman.*] So through the negligence of this caretaker this valuable work was allowed to fill up and become useless? Yes: and not only that, but the tank was in such a position that a tremendous fall of rain would fill the swamp all round it. I do not know what Department it was under at the time, but nothing whatever was done. They quietly stood by and took no notice while the squatter who leased the Kilfera run, and who had a tank in the same swamp, filled his tank brimming full, while the Government tank remained empty. Not only did they take no steps to fill the Government tank, but they did nothing towards blocking the station owner from doing this.

3012. *Mr. Woore.*] Do you know under whose charge this tank was at the time? I cannot say.

3013. You do not know whether there was a caretaker there or not, or whether the tank had been leased? I have no knowledge whatever of that.

3014. Do you remember in what year this incident occurred? I think it was in 1882 or 1883. But that is only one instance. Of course I look upon it in this way—that these tanks ought to be made to return something, just as well as the railways and the roads return something. The railways of this Colony are most expensive, and our tanks, which are magnificent tanks, are also the most expensive in the world; but if you adopted this system of tollage, there can be no doubt that they would bring in a large revenue.

3015. *Chairman.*] Now I want to get this further information. Is it a fact that the case of this Boonoona tank is pretty generally the case of all the tanks that are under caretakers? Yes; all the tanks that I have any knowledge of. I do not wish to cast any reflections on the Department.

3016. You will only state facts? I mean to say that the whole affair is so gigantic and is spread over so enormous an area of country, that there is a great difficulty in getting reliable men. In any case until the thing is put upon a proper basis, it never can be satisfactorily worked.

3017. You think that local bodies should have the management and control? Yes; the only way is by local bodies with an inspecting engineer over them all.

3018. *Major Penrose.*] You state in the letter which you have read to us that in measuring up the tank the contractor can get round the Government officer. I should think that the measurement would be a very simple affair? Yes; it would be, no doubt, if the Government officer had a staff with him; but when he comes alone into the enemy's camp—as it were—he is bound to be "got at" in all directions. If he is at the top of the bank with a rope in his hand, the man at the bottom gets at him in the depth; and if he goes to the bottom the man at the top is getting at him with the level, because he makes the inspecting officer push up. If the Government officer measures round the side with the tape, the man at the other end grasps 18 inches or 2 feet of it in his hand, and the inspector, unless he is very sharp-sighted, cannot possibly tell. Indeed, I know of one short-sighted officer who has been imposed on in this way by the man at the other side taking 2 feet of the tape in his hands.

3019. *Chairman.*] Is there not another way of misleading the Government officer by making up the soil so that you cannot tell the new ground from the old? Yes; I believe that has been done repeatedly.

3020. *Major Penrose.*] And could not the contractors cheat the squatter in a similar manner? No; because the squatter is continually on the ground, and besides that the squatters are too practical in their knowledge, and know too much to be cheated by the contractors. In one instance, in sinking a tank, I, myself, came upon what is usually called cement. The road superintendent happened to visit the tank at the time, and told me not to go any deeper, as I should probably lose the water, as the water would pass through what he thought was gravel, which exactly suited me. Although Mr. Wood has been very hard indeed upon me, I believe him to be a good man, but he is terribly embarrassed by the incapacity of the men under him. I know a great number of tank contractors, but not one who has made money. There never has been a rush for the Government tanks, and had the squatters continued their improvements a few years ago the Government would not have one-half their tanks down now, because men would not dream of looking at them. Had it not been for the continual drought and the passing of the present law, which prevents squatters from going on with their improvements, the Government would have had extraordinary difficulty in getting tenders for their tanks at all. I know that at the beginning of the drought, when I tendered for Ivanhoe and Mount Manara, they kept on advertising, but nobody would have the work, and Mr. Wood himself was sent up to offer all sorts of inducements to men to take the work. Years ago I believe that Burton Brothers made a lot of money out of tank-sinking, but it was in the days when everybody was making money, and when there was an abundance of grass and water.

[The Commission adjourned.]

THURSDAY, 15 *MARCH*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E., | J. C. WOORE, Esq.

William Christopher Bennett called in and examined:—

3021. *Chairman.*] What is your position, Mr. Bennett? I am Commissioner and Engineer-in-Chief for Roads and Bridges. W. C. Bennett. 15 Mar., 1888.

3022. Of course, Mr Bennett, you have read over these printed documents that have been printed and placed before Parliament, containing various letters and complaints from the Mines Department as to works performed under your management? Yes. 3023.

W.C.Bennett. 3023. And the various allegations that are made in those papers? Yes; and I have written a letter protesting against the question being put before the House and the Commission in this one-sided way.

15 Mar., 1888. 3024. As soon as these printed documents reached you? Yes; and I requested that the paper should be forwarded to the Commission. If you have not received it I will provide the Commission with another copy.

3025. The Mines Department have formulated their allegations under ten different headings, but of course you have seen all this? Yes; I am conversant with the documents.

3026. To enable us to refer to these matters more conveniently, we have asked each witness questions under these headings, *seriatim*. You have been supplied hitherto with a copy of the evidence taken? Yes; I have.

3027. You think it would be preferable if you would give us your evidence without going through the form of asking questions. First of all, you might speak in connection with the selection of sites for tanks and wells, referring in your statement to the most salient points—those cases which have been said to be the most glaring ones? I was preparing my statement in the form of a paper, but I was not able to complete it by the time of meeting of the Commission. The evidence is very voluminous, but I have gone through it and marked everything to which I wish to refer to particularly. But I wished to have the views of the Commission before I present a document of that sort to them, because it would be equivalent to a speech of counsel on evidence; and I thought the Commission might consider the position I was in, and allow me to justify myself by a formal defence in reference to the evidence.

3028. I am quite prepared to admit such a statement, having already done so in the case of other witnesses. (*Witness then said that he would hand to the Commission a written statement replying fully to the various allegations that had been made, with a view to lessen the labours of the Commission, and would give his views in defence.*)

3029. How many years have you been in the Public Service? I have been 34 years in the Public Service in New South Wales, and 10 years before that in the Imperial Service—on a service of a collateral character—which my connection with the Imperial Service led to.

3030. In what capacity? In the capacity of engineer-in-charge of works or surveys.

3031. When did you commence to take charge of tanks and wells in New South Wales—when did you first commence constructing them? In 1869.

3032. And, speaking approximately, how many tanks have you excavated, and how many wells have you sunk since then? Well I think that altogether there are 165 public tanks, wells and dams in the colony.

3033. Since when have complaints been made in regard to faults of construction and with respect to badly chosen sites for tanks and wells? Ever since the Mines Department got charge.

3034. Were no complaints made by private individuals prior to that time? I have no recollection of complaints having been made. There were criticisms and suggestions by private individuals, but no complaints.

3035. Before you selected a site for a tank or well, as the case may be—by whom where you moved? In the first instance—in the earlier stages—a sum of money was generally placed on the estimates at the instance of a member of the House: and I was directed to inquire where tanks were necessary on a certain road, and provide them. The first thing I did was to send Mr. Wood, the assistant engineer, up to bore in the country between Hay and the Darling. Mr. Wood provided a full boring plant at the expense of the Government. He was an old officer of the Department and then made a great many borings between Hay and the Darling. Some time during that period Mr. Wood reported that he found it cheaper to sink prospecting holes or trial-shafts than to bore. Sums of money were placed on the estimates occasionally, on the motion of members of the House, in an arbitrary way; and sometimes on our advice. We constructed a number of wells between the Lachlan and the Darling as well as tanks, as Mr. Wood reported most advisable.

3036. Was Mr. Wood instructed to avail himself of local knowledge where possible? Yes; we have been in the habit of consulting local people in every work we have undertaken. Of course it is not for us to follow exactly the dictum of local people, because they may be swayed by motives opposed to those which we are told to act on. After these works were completed the question of occupancy and revenue arises. We found that we, as a Department, had no local powers whatever to lease the works or compel payment of tollage; and we were told that these powers rested with the Crown Lands Occupation Branch; and the wells and tanks were then handed over to the Lands Department.

3037. *Major Penrose.*] About what time was this? It commenced in 1869 and went on to about 1872 or 1873. Then we were from time to time ordered to make repairs, which in some cases amounted to restoration, the works having in the meantime fallen into decay from want of superintendence and care. After the repairs were completed the works would be again handed over to the Lands Department. This restoration of some of the works occurred more than twice.

3038. Do you mean that the works were handed back to you for repair? Yes; the works were allowed to get into disrepair by one Department, and then taken over by us and reconstructed, after which they were again handed over to the Lands Department. During this period the M'Comas pump was used; but in one or two instances open tanks were made which the stock might drink from.

3039. *Chairman.*] Who used these M'Comas pumps? They were used on our works. Some of these works were leased by the Lands Department and the pumps were used by the lessees. We leased some of them, also, but we found that we had no power—or at least no power to compel the lessees to pay anything.

3040. *Mr. Woore.*] Some of these places were leased to the lessees of the runs on which they were situated? Yes; when the lessees tendered for the work. At that time it was held to be very objectionable to allow the lessees to lease the works, because it was said the lessees would use the tanks to suit their own purposes.

3041. *Chairman.*] We would like if you would detail the whole history of this matter in your own way? At different times sums of money were placed on the estimates to water other roads. There were some tanks made between Hay and Deniliquin.

3042. These were chiefly stock routes? Yes; stock routes. And on the opening of the Western line of railway to Nyngan there was great pressure put upon the Department to get the road to Cobar, and then the road from Cobar to Bourke, watered. On the road from Cobar to Bourke, the tanks at that time were all small open tanks. Between Cobar and Nyngan a larger and better style of tank had to be constructed. About the time of the completion of these tanks—my memory is rather vague on the matter—the Mines Department got charge. For some time there was no Chief Inspector, and Mr. A. Bruce,

Bruce, the Chief Inspector of Stock, recommended generally where tanks should be put down, and we fixed the sites locally—that is, within a mile or two of the place indicated by Mr. Bruce. Mr. Bruce wished to carry out a number of innovations, and suggested a great number of improvements. So far as was practicable I adopted some of Mr. Bruce's suggestions; but there were others which I did not think it desirable to adopt. There was a good deal of discussion about drinking tanks, and generally Mr. Bruce wanted more accommodation for stock, fences, &c., than were hitherto thought necessary. Then Mr. Gilliat got charge and made some tours of inspection; and, in many cases, in a rather arbitrary way, directed that alterations should be made by the caretakers without reference to the Roads Department at all. He condemned several works—notably wells, the water of which he condemned. I should say that Mr. Bruce recommended that the Mines Department should have a hydraulic engineer of their own, do their own work, and have a separate Department of their own. Then some years afterwards Mr. Harrie Wood, the Under Secretary for Mines, recommended Mr. Abbott, the then Minister, to have a hydraulic engineer. Mr. Abbott thought it was unnecessary, and said that he knew me very well, and knew what experience I had had, &c. Then from that day—for the last five or six years—there has been nothing but a continual fire of letters and complaints.

3043. *Mr. Woore.*] By whom? From the Mines people, through their Minister, to the Works Department. The complaints were in most cases about trivial things, but the reiteration of these trivial things must have made an impression.

3044. *Chairman.*] Carrying on this line of statement, how does the friction arise between the two Departments;—had you any control over these works after giving them up to the Mines Department, or had your road superintendents any control over them? Yes; there was a minute giving us charge of repairs, and I always objected to hand over the works, as previously, when they had been handed over to the Lands Department; they had been allowed to get into disrepair. I have always feared that a similar state of things would ensue if the works were left entirely to the mercy of the Mines officers.

3045. *Major Penrose.*] You mean to say that you objected to giving up control over these works altogether? Yes; they were my children, as it were; and I wanted to see that they got fair play.

3046. *Chairman.*] Had your officers directions to see to the works after they had left your hands? Yes; that was a perfectly understood thing.

3047. Will you state what was the nature of these directions? That they were to do all repairs and report to me every time they went round to inspect the works. Besides that, they were to do the urgent repairs, as it would not do to wait on their report to the office. They were given the fullest freedom of action in reference to repairs, because in most of the men, particularly at this epoch, I had very great confidence.

3048. Did the repairs you speak of include minor repairs? There was a limit of £10, but it was a very hard thing to draw the line.

3049. *Mr. Woore.*] Who suggested the limit? The Mines Department. A valve or something else in a pump, the cost of which would not be more than 6d., was frequently a cause of complaint and of delay in giving water. Necessarily our officers, when they saw this, made reports.

3050. *Chairman.*] Did these caretakers receive any instructions not to meddle with the pumps? No: no general instructions. I believe that in some cases when the officers found the men in charge so unfit for any duty of the sort, they have told the caretakers verbally, "If anything goes wrong do not touch the pump, but let me know."

3051. We have it in evidence that they would not do the smallest job, because they had received instructions not to touch the works? In some cases they did not receive instructions, but of course no officer would complain of a man not doing work which he himself had instructed him not to do.

3052. *Major Penrose.*] You had no power to lease these works or to take them over after construction? No.

3053. And do you think it was a good thing that these two Departments should have something to do with the works? I thought it was a mistake then. I think instead of giving over to a new Department this power, it would have been much better to have conferred the power on the Works Department by a short act.

3054. Did you suggest that? No, I did not.

3055. *Mr. Woore.*] Who was it that first suggested this handing over of your works to the Mines Department? It arose entirely out of our inability to lease.

3056. And were you unwilling to hand over these works to any other Department? I saw that the law positively did not allow us to lease—that it was a privilege or a duty of the Lands Department, and then it was not so easy to get the law altered as it is now. And I never thought of waiting for the alteration of the law, but quietly handed over the works as I was told.

3057. *Chairman.*] Did you foresee any complications from this dual control of the works? No, I did not. The whole thing was in a rather embryo state at the time, and had not assumed the very large proportions which it has assumed since. These works were merely made as aids to the travelling public without any idea of getting revenue from them. The matter of revenue was an afterthought altogether.

3058. Did you ever anticipate that these works would be taken over by some responsible body outside the Government? In the year 1865 I recommended the decentralization of the Department so far as the roads and bridges were concerned; and in every report I have written since I have most strongly urged that matter. There is a paper of mine in the blue book (produced) which contains some minutes that I have written. But I must confess that I never anticipated local government in these localities, because the material for local government did not exist there in these days. It is only very lately that it can be said to have existed at all, and if such machinery can be found I would strongly advocate that the control of these works should be placed in the hands of properly constituted bodies.

3059. You think it would tend to satisfy public requirements and also, I presume, secure economy in the construction and administration of these works? I think so.

3060. Local bodies must necessarily know better the requirements of the district than an officer coming from Sydney? Yes, and they would sympathise with the contractors and other persons employed on the work, and it is now said that the contrary is the case.

3061. We have it in evidence that it is so? I would wish to add something with reference to what I have said with regard to handing these works over to local bodies. There should be some control over the local bodies in order that they might not be allowed to stop a road, because a local body from motives of injudicious

W.C. Bennett. 15 Mar., 1888.

injudicious economy or for some other reason might neglect works which would inconvenience the travelling stock. That has to be considered, so that rather more supervision would be required over these tanks and wells than over the ordinary road and bridge works of the colony, which it is so desirable to decentralize.

3062. You mean this, that local bodies must not be too local, and that they must not be allowed to take a too narrow view of their responsibilities? Yes, and particularly if the Government should agree to any scheme to subsidise them. There should then be a central authority to see that the subsidy was properly disposed of.

3063. *Mr. Woore.*] You mean that they ought not to be entirely free from the supervision of a Government Department? No.

3064. *Chairman.*] You know that there are Divisional Boards in Queensland that have control over works in that Colony? Yes, I know that they have control of the roads; but I do not know that they have charge of tanks and wells. Persons who know both frontiers perfectly are best satisfied with the result under the roads and bridges system of New South Wales. They are better; but, notwithstanding the evils of centralization are so great that it would be better to put up with inferior roads and bridges, if it were a consequence necessary to the control by local bodies—though I do not think it would be—than to keep up this system of centralization. In the year 1865 I recommended this, and I have never since then had reason to change my opinions. I said then that it might be that the works would not be so well done, but that the general results would be more satisfactory.

3065. *Mr. Woore.*] It appears from the evidence given before us that some tanks and wells constructed by your Department have been placed near waters conserved by the lessees of runs—was that done with your knowledge? Not with my knowledge at the time.

3066. But what I want to know is, were not these waters, adjacent to which works were constructed, conserved by the lessees at their own expense? Yes; but the works were not put there at the time with my knowledge. Mr. Wood was sent up there owing to the great rush to Mount Brown. The papers teemed with extracts relating the sufferings of persons who had perished with thirst.

3067. You say that these works were not put down with your knowledge? No, but I endorsed everything that Mr. Wood did.

3068. It was done by Mr. Wood, who had great power vested in him? Yes, he had plenary powers to construct such works as were necessary to save life.

3069. But do you think it was a good principle to go upon,—to put these works for watering stock upon stock routes near squatters' improvements, or do you think that the squatters' improvements might have been availed of for the purpose of meeting the public requirements? Well, we were told to prepare for a great rush to a new gold-field.

3070. I am now speaking generally? In that particular case I have stated we were told to prepare for a great rush, and, as has occurred during the previous rushes, we know how very valuable these private waters of the squatters would become. A squatter might refuse to allow the people to enter, and then we ran the risk of having suffering, because there was no tank at a certain place. Or, on the other hand, we must have been compelled to purchase the squatters' works at a very large price, or again, the waters conserved by the squatters might have given out. If it had not been for the great rush, the works would have been designed and carried out with more deliberation.

3071. But do you think it was a proper principle to go upon—not to depend upon squatters' improvements for watering these roads? In that case, certainly.

3072. And also in fairness to the squatters—not to throw the public upon them for water? I think so.

3073. The waters having been conserved at their own expense? Yes, we are obliged to pay great deference to private rights in this country,—much more so than I found necessary at home.

3074. Therefore if a public watering place were required in a position on a stock route where water had been already conserved at the expense of the lessee, you think it is necessary for the Government to construct their works, notwithstanding that the squatter had already conserved water for his own use? Yes, I do.

3075. *Chairman.*] This is one of your specifications for tanks? Yes. (*See Appendix.*)

3076. Is this the same specification you have always adopted? No; this is the most recent one.

3077. You did not always adopt this specification? No; in the previous one a blank was left for the slopes, which blank was to be filled in by the officers.

3078. In the earlier specifications were the slopes usually steeper than the slopes in the later specifications? Yes.

3079. What was the steepest slope you have put in a tank? 1 to 1; but this was in the beginning.

3080. Was that slope universally adopted at that particular time? No. Many works then done had that slope, but few of them came under my own immediate attention. That was a good many years ago—nearly twenty years—and we had then only a very slight knowledge either of the rainfall or of the demands likely to be made upon these tanks. There were no squatters' tanks at all like them, and we were anxious to make our works most durable, so that they would hold out in any drought. And we then considered a 1 to 1 slope as the most economical.

3081. You must secure by this slope less evaporation than by a gentler slope? Yes. I have had a table made out showing the per centage. I hand this in as showing how I arrived at this conclusion. I came to that conclusion by practical experience, and this table has since been formulated. We knew that the local evaporation was very great, but we did not know what duration of drought we would have to provide for. In fact the whole thing was tentative. This is the table I referred to:—

Comparison of tanks 18 feet deep with varying slopes.

	1 to 1.	1½ to 1.	2 to 1.	3 to 1	4 to 1.
Capacity	22·153 c. y.	22·486 c. y.	22·614 c. y.	23·712 c. y.	22·275 c. y.
Mean depth	14· 95 ft.	13· 77 ft.	12· 73 ft.	11· 1 ft.	9· 0 ft.
Evaporative surface	40·000 s. f.	44·100 s. f.	49·284 s. f.	57·600 s. f.	62·500 s. f.
Decrease in mean depth	.....	8 per cent.	14·8 per cent.	21·6 per cent.	33·7 per cent.
Increase in evaporation area	.....	10 ,,	23·2 ,,	44 ,,	55·5 ,,

3082.

3082. You never went into this question of evaporation closely? For years I have been endeavouring to arrive at a conclusion regarding evaporation, and my opinion now is that evaporation causes a loss of between 4 and 5 feet of water per annum. I consulted friends of mine in India and other places during the time the late Sydney Water Commission sat, and this was the result.
3083. It was in consequence of trying to get depth of water with as little surface exposure as possible that you adopted this 1 to 1 slope in the batter? Yes.
3084. Did you never find in these days the necessity of making provision as to the nature of the soil? Well, yes; there was provision made, and each case was considered by itself. Mr. Wood was the man on the ground at the time.
3085. Of course you are aware that in some grounds a 1 to 1 batter would stand very well? I have considered that subject very carefully.
3086. But in other places where there is loose soil a batter of 1 to 1 would not possibly stand? It would slip in the first time anything touched it? Yes.
3087. Then were you sufficiently careful to consider the nature of the soil when sinking these tanks, and so modify the specifications to make a gentler slope where the soil was loose and friable; or did you have a hard and fast rule? It was left to Mr. Wood to a great extent, he being then the officer in charge. The officer who had the laying out of these works used his own discretion with regard to what the slopes should be. The officers I refer to are the road superintendents under Mr. Wood. They filled in the specifications in accordance with what they saw of the soil in the trial shafts.
3088. So that in the event of any batter being found to be too steep it was an error of judgment on the part of the officer who filled in the specifications? Yes; but at the same time I do not shrink from the responsibility myself, because there were the plans which the officers had to follow. They were drawn 1½ to 1, and that was the lead which was to guide the local officer.
3089. *Mr. Woore.*] But subject to modification by the local officer if he thought desirable? Yes.
3090. *Chairman.*] As a matter of fact, I suppose most of the early tanks were sunk with these very steep slopes? Yes, most of these on the Wilcannia road.
3091. *Mr. Woore.*] And do you and your Department know now from experience that that was a mistake. Of course everything was new then, and experience had to be gained? We found that the droughts, which were the principal causes in making us construct steep slopes, were not so great in their operation as we had anticipated; and we also found that the slopes did not stand so well, and we modified them accordingly.
3092. *Major Penrose.*] Practically have these banks fallen in very much? No, not very much. Most of the slopes stand very well; but Mr. Wood will be able to give you evidence on that point.
3093. *Chairman.*] Are you aware in some instances that these steep slopes that you have insisted upon for public tanks have cost more money for excavation than they would were the slope a gentler one—would the excavation have not cost less had there been a long slope say of 4 to 1 on one side of the tank? I think it is quite impossible that a tank of 1 to 1 could have fallen in to that extent. But if any particular case is cited I will take the trouble to have cross-sections made, if the gentleman making such a statement will name the tank or tanks he refers to. I will have these cross-sections made and laid before the Commission to show you to what extent this slope takes place. There are two other reasons that I want recorded, justifying these steep slopes. One reason is that the same area of bottom would not be given in the flatter-sloped tanks. A flat-sloped tank would give much larger excavation on top, which would cost more money, being of greater cubic contents. I imagine that a great deal of this harm is caused by the small waves washing against the sides, but if there was a larger surface necessarily you would have larger waves.
3094. Have you found in practice that the original steep slopes were too great, and have you modified them by a more recent specification of two to one? Yes: 1½ to 1 first, and then 2 to 1.
3095. Have you found that the present specification of slope of 2 to 1 is sufficient? We think so.
3096. And has not your attention been drawn to the fact that this has slipped in? No; but we have had complaints, and I believe we should still have complaints if we made the batter 6 to 1.
3097. *Major Penrose.*] I see that some of them have 3 to 1 slopes? Yes; this was done merely to allow the use of Mr. Doudney's excavating plant. We tried to meet them in every way, so that the prices for the work might be reduced.
3098. *Chairman.*] You have not had any valid complaints that these batters are still too steep? No.
3099. Of course these tanks with these steep batters were never intended to allow stock to water directly at them? Never. Some tanks were intended to allow stock to water at them, but in these cases there is a batter of 1 in 6 to allow the stock to go down on one side.
3100. But latterly all tanks have been excavated with the idea of putting machinery down to lift the water into troughs? Yes; and not to allow the stock into the troughs. That was done on the Hay and Wilcannia road, and in some of the tanks first put down.
3101. You mentioned just now one tank which had been damaged by the water lapping and so forth on the sides? Yes.
3102. In excavating you have to put the soil from the tank all round some distance from the excavation—we presume for the purpose of protecting it from the winds? That was one reason. The other reason was that which was acted upon in one of the earliest tanks, Boonoo Boonoo, for the purpose of making the excavation hold water above the natural surface of the soil. We made staging and flumes to carry water from the high land across the flat, so that the storage might be utilized to the fullest extent above the natural surface of the ground. That staging was allowed to get into disrepair and it became useless.
3103. Have you ever used machinery to pump water outside the tank into these embankments and increase the capacity of the tank? We never had machinery powerful enough to do so to any extent, and we never required it.
3104. *Mr. Woore.*] In many cases the embankments are now left open? Where there is any possibility of accumulating water above the level of the ground we have closed the embankments and put a flap sluice in to prevent the egress of the water after the tank is filled up with heavy rains,
3105. *Major Penrose.*] How much water can you conserve above the natural level of the ground in that way? It depends upon the slope of the ground.
3106. *Mr. Woore.*] But in most of these instances where the embankments are put around it would be quite possible to pump outside water into the tanks? Yes; if you had machinery powerful enough.

W.C. Bennett. 15 Mar., 1888.

3107. *Chairman.*] You make these embankments solely for the purpose of protecting the water from the winds? Not wholly; many of them impound the water above the surface.
3108. *Major Penrose.*] Have any of the contractors ever represented to you that they could make tanks much more cheaply if they were allowed certain concessions in regard to one or two batters of the tanks? No proposition of that sort was ever made to me. The only proposition made to me was one from Mr. Greig, of Fowler & Co., the proprietors of the steam excavating plant; and he wanted me to modify the batters to meet his views, but he did not modify his price. We thought he could do the work at a lower price if he were given this concession, but he did not make the price a bit lower. Therefore there was no reason for modifying the batters in the ordinary tanks unless they could be done cheaper. We called for tenders in every possible way, giving the contractors the advantage of this alteration, but we got no reduction in price.
3109. You tried to see whether the price could not be lessened by introducing a gentler slope where possible? Yes; and Mr. Doudney, who managed the plant, and Mr. Kilgour, could not afford to tender any less than they did under the other circumstances.
3110. Was the 3 to 1 batter your limit? Had they asked for more we should have given it.
3111. Would you be prepared to give it now to any other contractor? Decidedly; if we could get from them a reduction corresponding to the advantage which we give them.
3112. Would you accept a contract at 3d. per yard less on that account? No; because if you go into the question of evaporation and mean depth you will find that the loss would be greater than the saving.
3113. It has been stated in evidence that the steep batters are not such a gain as would appear, and that the loss from evaporation is not to be compared with the loss by soakage through the sides? Well, the loss through the sides is an additional argument for the steep batters.
3114. No, because on the gentler batters a fine suspended clay falls, and this is said to lie very well and stanch the tank? Well, that is a minor matter; because we find in the very worst tanks, such as that at Ivanhoe, if they are filled once or twice the steep banks become quite retentive. I have evidently misunderstood your question. There is a greater surface exposed to evaporation by capillary attraction with the gentler-sloped tanks than with the steep tanks.
3115. There is a much greater area of warm water? Yes; the main depth gives evidence of that, though not to its full intensity.
3116. *Chairman.*] The tanks that you are in the habit of constructing are about 18 feet in depth? Yes.
3117. Are you aware that this is a much greater depth than squatters are in the habit of sinking their tanks? Yes, it is.
3118. But you adopted that because it was considered very desirable to have great depth, and to have so much absolute capacity in the tank, which makes the water so much cooler? Yes; and it is an element in the evaporation. We wanted to have the duration of our tanks to continue to the very utmost period of the drought, because the drying up of one tank might neutralize the others. If a squatter's tank dries up he can send his stock to any other part of his run; but if our tanks were to give out travelling stock are deprived of all resource.
3119. Now we have also had it before us that the Government have gone to unnecessary expense in sinking wells in the neighbourhood of tanks? That is entirely a misapprehension. I do not know a single instance of it.
3120. We have had it in evidence here—and you must have read it—of wells having been sunk in close proximity to tanks in one or two instances? Yes; wells have been sunk in close proximity to water-holes, but not to tanks.
3121. Were the officers who had charge of these works told in every case that they must judge of the nature and formation of the soil in laying out the work? In the first instance we had to trust to the officers altogether, because the whole thing was tentative. It was impossible to make regulations, but the officers were told to do the best they could, and they had the benefit of many years of experience. It was a question I took the greatest interest in, and I gave them fully all the knowledge that I possessed. I told them to be most careful, and that the permanence of water in these public watering places was a most important thing; so that if we have erred at all in reference to the slopes it has been on the side of caution.
3122. And of course it may now happen that faults can be found, because since these works have been constructed you have been profiting by experience? Yes; and I think it would be very hard if the complaints about these faults came from persons whose experience has been acquired on our works. When our officers first went out there that country was a perfect *terra incognita*.
3123. And you admit freely that there exist things in connection with some of the works which have been constructed which your present knowledge might have obviated? Yes; I have stated in writing before that the whole thing was tentative, and that we were improving as fast as we could.
3124. *Major Penrose.*] The complaint is that with all this experience which has been gained, you are still going on constructing tanks in an expensive manner, and without taking advantage of the experience gained by squatters and other practical men? I think not.
3125. I am merely stating that that is the charge? Well, we will be able to disprove it. We will be able to prove that we have utilized all *bona fide* good experience. You no doubt have seen that a variety of opinions were put before the Commission.
3126. *Chairman.*] We have also heard that drains have been carelessly constructed, and that, in one instance, the water, instead of running into the tank, runs away from it? That was explained to me by Mr. Stilwell. In one place the drains crossed a flat or depression in the ground where there was a bank made for confining the water. A big flood came and washed away the bank. It was not replaced, and consequently the water runs back from the tank solely through the neglect of the caretaker.
3127. You say that a fluming was made to carry the water over the depression and on to higher ground, so as to utilize the full capacity of the tank, and that this fluming was allowed to get out of order? Yes; it was destroyed. I think it occurred in more than one case, but I am certain of this one.
3128. What has been called the defective system of fluming has been spoken of? That has reference to the fluming leading into the tank and within the tank itself.
3129. Of course the inlet pipes should be of stone rather than of wood, it being exceedingly difficult to get wood and soil to work together? Yes; but then we have to bring the stone 300 miles. If these works were continued in my hands and more money had been voted for them, I would have substituted concrete; and if there was no stone or wood about we would make the fluming of concrete, of cement, and of burnt clay.

3130.

3130. Is not this soil exceedingly friable? Yes; it melts away like sugar. There is one other thing that strikes me. In making the original tanks we were rather limited in the matter of money. A certain sum was voted for watering a particular road, and we wished that that money should go as far as possible; and that was another reason for having steep slopes. Economy was more imperative then than now, though whether that economy was judicious or not is open to question; but at that time it appeared to us that economy was imperative.
3131. You have sent us the list showing us the cost of the whole of these works that have been handed over? Yes; a large number.
3132. Showing the cost of excavation as ranging from 10½d. to 1s. 9d. per cubic yard? Yes.
3133. In no instance did the cost of excavation exceed 1s. 9d. per cubic yard, except where rock or cement was met with? No.
3134. When the Government were giving 1s. 9d. per cubic yard for excavation, were you aware that the squatters were getting their tanks sunk for a very much less sum? Yes.
3135. Are you aware that as much as 2s. 6d. per cubic yard was given in some cases for excavation? I am aware that it is said that somebody said that somebody had told somebody else that another person had got the contract at 2s. 6d. per cubic yard and had sub-let it to somebody else for a less sum.
3136. *Mr. Woore.*] That is not true in any case? It is not, because we have the receipted vouchers and can produce them.
3137. Are you aware that at the time the Government were paying 1s. 9d. per cubic yard for excavating tanks squatters were getting their tanks sunk in some localities as low as 1s? That may have been the case.
3138. *Chairman.*] That being so can you account for the difference? Yes.
3139. Then we will ask you to go fully into that point? In the first place, the depth of our Government tanks is considerably greater than that of private tanks. That is valued at 2d. Then the increased finish—though I do not admit it—I say it is equal to 2d. Then the squatters give the contractors water, which I find is valued at 1d. Then there is the question of feed for the bullocks, which is equal to 3d.; that makes 8d.; and then there is the meat, and all the other accommodations that squatters can give their own men, and which we are unable to give them. I notice that great stress has been laid on alleged delays in payments. Well, no other Government Department has ever done what we have done in the prompt payment of money. This applies to within the last five or six years, since the pressure began. When an officer goes on to the ground and measures the work, he is instructed to give a cheque to the contractor for one-half the amount of the work measured. At the nearest telegraph office, he telegraphs the amount of the cheque, which is at once placed to his credit in the office in Sydney. Then he sends a voucher for 30 per cent. of the work, so that 80 per cent. of the value of the work done is paid for. The officer pays one-half of that 80 per cent. on the spot, and a voucher is sent down for the remainder. The only amount kept back is 20 per cent.; and the only delays that take place in payment are those delays which are necessary in checking the accounts of the contractor and the officer.
3140. When is the original 50 per cent. paid? Immediately when the officer measures. It is a payment on account for the amount of work done then.
3141. *Mr. Woore.*] Is there not sometimes unavoidable delay in inspection by the officers? Yes; but the officers cannot be ubiquitous; and had we more officers than we at present have, there is no doubt that that too would be made a charge against us.
3142. *Major Penrose.*] Do you think that the estimate of 8d. per cubic yard, which is said to be the advantage to be gained by dealing with squatters, on account of their supplying grass, water, meat, and so forth, can be justified? I think these particular items should be taken *cum grano*; but there are other reasons besides those furnished by the contractors, which may account for the difference between the prices the Government pay and those the squatters pay.
3143. *Chairman.*] Will you kindly state those reasons? One great reason is that these tanks have to be pushed on regardless of the nature of the season, while in all probability the squatter selects his own time.
3144. The distance from water would also add to the cost? It would.
3145. *Mr. Woore.*] And besides that, the number of persons who would tender for these works is rather limited? Yes; but there is no reason why the number should be limited. There were times when we had the most extraordinary difficulty to get contractors to take the work up at all.
3146. What I mean is that, as these contractors are thrown largely on their own resources, those who take Government contracts must have considerable means to carry the work on? Yes, that is so. That fact limits the number of contractors.
3147. *Chairman.*] There is another reason given also, and it is this, that the contractors are quite certain that the Government will always accept the lowest tender; however high the tenders generally may be? I am prepared to show that in many instances we have declined to accept the lowest tender; and in one very hard case brought against us here, we absolutely declined to do so. We called for fresh tenders, and ultimately we were obliged to accept some of those prices which are now objected to.
3148. On account of the pressure brought to bear on the Deartment to have the works constructed? Yes; pressure was brought to bear on us to construct works to save life, and to allow the country to be opened up so that stock from other colonies might pass through. All these arguments were adduced.
3149. As a rule you are aware that the Government are looked upon in a certain sense by people as an institution which may be fleeced? Yes; unfortunately.
3150. And a contractor invariably asks a higher price from the Government—other things being equal—than he would ask from the squatter? The condition of other things being equal is in this case almost an impossibility.
3151. But I am only putting a suppositious case—do not contractors think that the Government is fair game to be fleeced? A contractor will get as much as he can from everybody, and he is only restrained from asking a high price because he fears that he will not get the job; and that if he did ask a very high price he would get no more work. I think it is all a matter of freetrade. There is a great deal more made of this than there should be. Contractors have a great desire to get the work.
3152. It is said that there is a sort of conspiracy amongst these people to keep up the prices for work? I do not think so. We frequently rejected tenders, and we did so in the very case complained of in the evidence given by Mr. Budd. Delays often arose from our calling for fresh tenders, but this man attributes all sorts of impropriеties to the local officer. I should like to refer to one statement which is given in the evidence of Mr. Budd. The statement was to the effect that favoritism was shown.
3153. Do you think it is possible that favoritism could be shown in the acceptance of tenders? No.

W.C. Bennett. 15 Mar., 1888.

Instructions to the local officers are issued to open all tenders in the presence of the Police Magistrate, or in case he is absent, in the presence of the Clerk of Petty Sessions, or the senior magistrate on the Bench, or the highest-ranked officer of the Mines Department in the district. The amounts of the tenders are put in schedule form with the officer's recommendations and sent to Sydney for approval, and are submitted to the Minister.

3154. Not only contractors but squatters have stated as their opinion that the cost of constructing all these tanks with the steep batters is not compensated for by the lessening of the soakage and evaporation. They state that the extra cost which these batters necessitate is not compensated for. I suppose that is a matter of calculation. You know what the increased cost is, and we will take that as a basis to go upon? It will entail 3d. per cubic yard more, which is 25 per cent. more, taking the normal price as 1s. per cubic yard. This list is made up from the past to some extent. It deals with the dearest work we did, but I think 1s. per yard is not too high a price to put down now as the normal cost of a tank.

3155. It is said that the Government pay 1s. 9d. per cubic yard, and out of this 3d. is paid on account of the steep slopes. If a squatter's tank had a slope of 1 in 3 or 1 in 4 could it be done at 1s. per cubic yard, or would not the extra 3d. be fairly spent by lessening the evaporation which a steeper batter would effect? I think so. Threepence is 25 per cent. on 1s., and I suppose evaporation is in proportion to the surface exposed. That will, I think, be granted. Now the surface evaporation in a 3 to 1 tank——.

3156. It would not be 3 to 1 all round? Well, then, we will go roughly to work and say a-half, as I have calculated here. Everything being the same with a 3 to 1 tank, the evaporative surface, and, of course, the evaporation, would be 44 per cent. more, the half of which would be 22 per cent. And, in addition, the mean depth of the tank would be 3 feet 9 inches less, or 21½ per cent., adding to the evaporation and decreasing the duration of the tank.

3157. The question is whether a tank of such a character would withstand lengthened drought such as we know has occurred in this country? Yes.

3158. We have had droughts for say three years, during which very little rain has fallen? Yes; but I think that the tanks as they are constructed, with careful administration of the water by pumping it into troughs, would enable the water to last over a three years' drought; but if, as suggested, they would not do so, then if 3 feet 9 inches were taken off the depth (together with the greater amount of exposure) the tank would not last three years.

3159. *Major Penrose.*] Then you do not consider that in certain districts, where the catchment is very quick, the size of the tanks might be reduced? Well, if there was an elaborate engineering survey made all over the catchment, and the whole thing gone into as thoroughly as it is possible with a full knowledge of the rainfall, it is possible that a smaller-sized tank might be found advantageous. But we had no opportunity of doing all these things. The whole thing was a rough-and-ready arrangement. We had to do the work first, and what I told the officers was that they were to get the water first and we would defend the matter afterwards. My instructions were, first get the water and I will fight it out afterwards. If we had time to obtain reports and surveys of each catchment, there is no doubt that a variation of the size of the tank might be made.

3160. We have had it in evidence here that in the Cobar district the size of the tanks might have been reduced to 10,000 yards, as the catchment in that locality is very hard and quick? I do not think so. As an instance of this, I may state that there was great suffering in Cobar because the tank there very nearly gave out. I will grant that what is said was true, if we had had time to examine the catchment in each case. But I would point out that this assertion neutralizes the statement that the sites of the tanks have been badly selected. At the initiation of these works, we had had no experience of what the rainfall was in these localities, and even now it is a very capricious element. You may have a thunderstorm in one place and for years you will have no rain in the same locality, while the rainfall may extend over ten months or ten hours.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

The witness handed in, and read the following documents:—

DEPARTMENT OF ROADS AND BRIDGES, NEW SOUTH WALES,

Supplementary General Instructions—Wells and Tanks.

THE works that have up to the present time been carried out by this Department, in providing for water supply on the different stock routes, have necessarily been of a desultory and intermittent character, on account of the smallness and irregularity of the votes granted for such works; but the large expenditure now proposed, together with the rapidly increasing importance of this question, necessitate a more uniform system and course of action on the part of those officers who will be charged with the construction of tanks and wells.

In dealing with these works they will in future be guided in their *general* action by the following instructions:—

1. The sites for proposed works, and the nature of the work to be carried out—whether tank or well—is to be decided by the officers of the Mining Department; but, should it be considered that a more advantageous site than that chosen can be obtained in the same locality, or that a well would be preferable to a tank, or the contrary, the facts of the case must be at once reported to this office with sufficient data to enable a definite conclusion to be arrived at, and if necessary, a recommendation made to have the nature of the work altered.

2. In forming an opinion as to the sites suitable for tanks, great attention must be paid to the following leading points:—

1. Area of watershed.
2. Nature of surface, whether porous and absorbent, or the reverse.
3. Fall of ground, which if considerable, will to a great extent counteract its absorbent nature, and *vice versa*.
4. Nature of ground in which excavation is to be carried out. On this point great judgment must be exercised, as many strata which, when first opened, appear too porous puddle themselves under the action of the water. Originally porous ground is often made perfectly water-tight by the deposit of silt from the waters collected off the shed, and the nature of the throwing surface must, therefore, be considered. Strict scrutiny will be necessary to detect the existence of drift veins should any be cut in the course of excavation, and great care taken to puddle the exposed faces of such veins, as an otherwise water-tight tank might be rendered valueless by neglect of this precaution.

3. In forming an opinion as to the sites for wells, the only safe guide is positive information. Any opinion likely to be formed from the geological features of the locality, is at the present time not to be relied on. Actual test of the underlying strata, or careful comparisons of the results attained by the Crown lessees in any wells sunk under similar conditions in the locality, offer the best guides. Of these two courses, the former is decidedly preferable as giving an absolute knowledge of the depth and nature of the supply. The latter course is not always to be relied on with the imperfect data obtainable.

4.

4. In practically testing any locality for underground water it will be found that sinking trial-shafts is preferable to boring at any depth from which water can be economically raised. In such shallow, or comparatively shallow works, the cost of transporting boring plant, and the cost of the preliminary arrangements on the site, are so great that sinking proves more economical than boring. In addition to this, a trial-shaft has the further great advantage of enabling a reliable opinion to be formed as to the quantity and quality of the supply. W.C. Bennett. 15 Mar., 1888.

5. Type drawings and specifications, for two classes of tanks, and for top-works for wells, have been prepared; but it must be noted that in selecting the character of the works to be constructed for conserving surface water, it is not intended to insist on a slavish adherence to the standard plans. Cases will arise where, both from a constructive and economical point of view, a departure from the type will be advisable.

When such a course appears to be necessary, plans and sections of the site should be forwarded to this office with the necessary data and suggestions to enable a definite opinion to be arrived at. It must, however, be borne in mind that, as far as is practically possible, under such altered conditions, the general principles shown in the type drawings must be adhered to.

The conserving tank, as shown in drawings, is suitable for sites where there is an open shed, and where the water will have to be drawn to the tank by feed drains; but where the rainfall is concentrated in a well-defined channel it will probably be better to widen and deepen the bed, and construct an embankment at one or both ends according to circumstances.

In cases where there is a considerable fall, it might be found advisable to carry the dam some feet above the level of the banks of the creek, and extend the embankment on each side of the channel until, carried on a level, it cuts the natural surface.

In all cases where creek works are carried out great care must be taken to provide a sufficient by-wash to carry off all surplus or flood waters.

Whenever embankments are necessary, the greatest attention must be paid to the proper grafting of the new material with the old surface of the ground, and if necessary, on account of the too porous character of the surface soil, to the construction of an efficient puddle wall.

In situations where a rising bank offers the necessary conditions as to level and drainage, attention should be given to the advisability of feeding the tank from two levels—from the natural surface through the inlet pipe, and over the top of the embankment by fluming brought from the rising ground so as to utilize the area contained within the embankments for the storage of water.

When underground water of good quality is obtainable at a depth of 18 feet, or less, the type of tank shown in "A" drawing should be adopted.

It is, however, impossible to lay down instructions to suit every case, and the officer in charge of the works must use his own judgment, and when he thinks alterations advisable, forward a full report accompanied with plans and sections.

6. As soon as sites have been finally determined for either tanks or wells, the local officer will furnish a tracing showing the positions of same, so that they may be charted on the maps in this office, and steps taken to ascertain if the necessary reserves have been proclaimed.

7. From time to time, as other duties permit, information on the following points should be collected and forwarded to this office:—

1. Approximate positions of wells sunk by the Crown lessees, giving level of surface, depth of shaft, and the rise, quality, and the probable quantity of water.
2. Information as to any change that may have taken place in the quantity or quality of water since well was first sunk.
3. Information as to any change that has taken, or may take place, in the level of water in wells during long-continued periods of wet or dry weather.
4. Evaporation of water in tanks, noting depth of water, general shape of tank, conditions as to exposure to prevailing winds, and the general character of the surrounding features.
5. Approximate flood contour lines of rivers, and of waters spreading from outflows of rivers, such as the Willandra, &c.

Roads Department, Sydney, 19 June, 1882.

3161. *Chairman.*] Now this is something so utterly opposed to the evidence which we have had here that it is desirable we should have a little more information on the subject? Well, our first essay in this matter was to send Mr. Wood down to bore between the Lachlan and the Darling. He had a full equipment, and after putting down a great many holes he found that between smith's work and also the delays which occurred, that prospecting shafts were infinitely better for the depths that we had to deal with than boring.

3162. What were these depths? Up to 200 feet.

3163. *Mr. Woore.*] What drill did you use? The ordinary instrument used by boring parties—this is before the Wright and Edwards' borer came into use. It was the ordinary boring apparatus in use in engineering works, but there was no particular name for it.

3164. Would the experience obtained by Mr. Wood apply if more modern instruments were used? Not if you went systematically to work to do a great many bores in the same locality. But in these days transport was very expensive, and one of the chief difficulties a party would have to contend with was the transport of the water.

3165. Could not these augers be used without water? No; water was required for the men and the cattle. I would not hold this objection as applying in the case of the Pennsylvania boring apparatus, but it applied then, and that was our experience. We gave the matter a very good trial and this was the result.

3166. You are not sure that that objection would apply now? I am not certain that it would apply at the present time.

3167. Because that quite upsets my notion? The country is now opened up and there are facilities for transport which did not exist then.

3168. We would like to obtain the figures as to what the work cost? Mr. Wood will supply the figures. I have not the slightest idea of them, because it is fifteen or sixteen or more years ago, and one cannot recollect figures. I can have the figures supplied as an addendum to the evidence. Mr. Wood will give you full particulars of them. Sometimes deception is practised, and in one instance I know of, there was a bottle of water produced as from a certain shaft to deceive the officer. This occurred in the case of a man named Gordon, who was for a short time in the service at Hay.

3169. *Major Penrose.*] Do you know what well that was? Gunbar was one, but I do not remember the other case.

3170. *Chairman.*] Well, on that subject we might inquire further. We have been told here by one witness that the Government are always liable to be swindled. For instance, a road surveyor goes to measure a tank. He has no help, and must get one of the tank-sinker's men to assist him in measuring, and whether the officer is at the top or the bottom of the tank he is liable to be swindled and deceived? If the officer is worth anything he can prevent that. That is a worn-out trick of the contractors, and an officer with the slightest sharpness will prevent its being carried out. It is an old story, but as you

are

W.C.Bennett. are on that particular point I may mention it is stated that they sometimes bank up 2 or 3 feet of earth from the point where the 18 feet is measured. Here is a circular which I sent out to the surveyors, to

15 Mar., 1888. enable them to detect that :—

Circular, copied from Tanks and Wells Letter Book, page 172, book from June, 1882, to June, 1883.

Roads Office, Sydney, 19 April, 1883.

MEMO.

When laying out tank works you must in all cases fix the levels of the four corner pegs of the excavation in reference to a BM situated near the site ; and the levels of the corners must be checked when the final measurement is made.

In the case of works now in hand you must, when making the final measurement, carefully examine the cess between the excavation and the embankment, and satisfy yourself that the then level is that of the original surface of the ground.

ARTHUR P. WOOD,
(For Commissioner).

3171. You see how an inexperienced man could be taken in. When a tank is sunk with bullocks the original surface of the ground is worn away, and we have been given to understand that some of the more clever hands among the contractors would take care to throw on the top soil in the immediate vicinity new soil, which would give the appearance desired, and so bring up the levels? If the instructions given in my circular are adhered to that cannot be done.

3172. Can they not remove the bench marks? A man will have a separate mark outside the nearest fence, or on a stump or something else, and these four things would show the original level, so that the contractor would be "bowled out". Supposing that there was a bench mark it is impossible that a rude navvy could put the pegs down to the exact level of the tank. I do not mean to say that such a thing has not been done, but it has not been done since this circular was issued in 1883.

3173. Now here is a curious thing told us of one of your officers who had been sent up to measure the tank:—We have been told that he asked, "Where is this 20,000-gallon tank," when, as a matter of fact, the tank was a 20,000-yard tank. Apparently he was not aware of the difference. Now this is what was told us as a fact of a young fellow who was sent up to measure the tank? I do not think that any officer of mine ever could have done that.

3174. Do you nominate all your own officers? No, but I would nominate any man who was sent out there to measure tanks. If such a thing occurred at all the man must have been very inexperienced ; and you will see all the officers here.

3175. Another matter which we heard was this:—A contractor had sunk four trial-shafts in four corners, with a view of putting down a tank, but in getting into the centre he came upon cement ; you know what cement is? Yes.

3176. Then this contractor says, that having sunk the four trial-shafts he had given himself no protection in the event of his coming on cement. He said he should lose money if he went on with his work ; but luckily for him, the road superintendent came up to the camp. The contractor told the road superintendent that he had come to sandy bottom,—to drift, that would not hold water. He said that he had gone down about another foot and got into a seam of drift, but instead of that it was this exceedingly hard soil. The road superintendent said it was a very bad case, and allowed the contractor to desist. They covered the bottom all over with clay, and thus the contractor was saved the heavy loss of sinking in hard ground ;—now will you tell us is this a fact? Well, if this place were named I could have the matter investigated. I can very easily see if any of the tanks constructed were stopped after sinking the trial-shaft.

3177. Now, with regard to the expensive forms of machinery for lifting water, we have had a great deal of evidence, and we would now wish to obtain your reasons for adopting this expensive form of machinery? Well, the two forms of machinery that have been used are pumps. One is a horse-pump and the other a steam-pump. Originally we had the M'Comas lift, and the Mines Department proposed what was called a double whip. At first, from the description, I gave approval to this double whip, but I said I would not give a final decision until we had the drawing (which I now produce). In the M'Comas lift we had something similar to this, and it was continually getting out of order. The worst of this was that, when the thing was most required, and when there was plenty of water in the tank, we could not get it, and there was no end of trouble and expense. The whole thing was silted up, so I determined that our tanks should be perfectly square without any projections or hollows on the sides. This enables us to make repairs at any time, but under other circumstances we could not make repairs without emptying the tank or making a coffer dam. There is nothing now in the tanks that cannot be removed when required. That is my great objection to this machinery. There was a tunnel in the tank, and the sides were fixed up with slabs. Our experience was that, just at the very time the water was most required and there was plenty of it in the tank, the whole thing might be upset by something going wrong. Then I found it was most desirable to avoid anything in the shape of corners in the tank, because a great amount of silt always collect round them. Besides that we wished to keep our tanks in such a way that there would be no impediment to the working of the scraper or scoop to clear the silt out at any future time.

3178. Have you found out the extent of this deposit that remains floating in the water—the water you know retains a large amount of clay? No ; I do not know the amount of clay which the water holds in suspension, but I know it is very large.

3179. Do you think that the steam pump and the horse-whim are necessary in a very large number of instances ;—would not the M'Comas lift answer all purposes at very much less expense to the country? I think that the steam or horse-pump is necessary in most cases. The Department has tried the M'Comas lift, and it was condemned. It got out of order, and was neglected in several cases where it was tried—on the Hay to Wilcannia road. But the most objectionable part of the M'Comas lift is the position in which you have to put it, and the leads necessary to bring the water to it. You have to make an excavation in the side of the tank and line it with slabs and piles, so that the thing is continnally getting out of order.

3180. *Major Penrose.*] Could you not pump the water from the top? We have never tried ; we consider the other much simpler. I do not think you could do this advantageously ; you would want a lead for the main pipes, which would come as expensive as the steam-pump or the horse-pump. The M'Comas pump was tried, found wanting, and condemned. I pointed out that the most objectionable feature was the amount of woodwork necessary to make the lead to the water below.

3181. *Chairman.*] What is the expense of the Tangye pumps? The following gives the information required :—

Memoranda—Cost of pumps, &c.

Tangye "Special," 4 in. x 3 in. complete in Sydney, capacity about 2,500 gallons an hour	...	£87 10s.
"Holman," 4 in., with horse-gear complete, capacity about 2,500 gallons an hour	...	£49 0s.
"Amos," steam complete in Sydney, capacity about 2,500 gallons an hour	...	£124 0s.
"Amos," horse-gear complete in Sydney, capacity about 2,500 gallons an hour	...	£54 0s.
"Appleby," steam complete in Sydney, capacity about 4,000 gallons an hour	...	£128 0s.
"Hot air" engine, complete in Sydney, capacity about 1,200 gallons an hour	...	£75 0s.

3182. Now, you mentioned that in dry seasons it is difficult to get horse-power to do the necessary work; would not the same thing apply to firewood for the steam-engine? The caretakers ought to have a stock of firewood on hand to anticipate any such thing.
3183. Then the cost of this blocking and so forth for the M'Comas lift was really something enormous;—why should it be so expensive? Because a great amount of timber is required below the water, and you have a long distance to bring the timber.
3184. Could not iron be substituted, and the expense in that way very materially reduced? Iron would be still more expensive than timber, and be quite as perishable below water. If you had iron piles to support the staging it would be very expensive.
3185. I should imagine that something in the nature of telegraph posts would be quite sufficient? Quite so; but four telegraph posts would be rather expensive. I think that four telegraph posts, delivered up at one of these distant places, would cost a considerable sum of money.
3186. We have had a number of witnesses who say that these steam pumps are needless, except where there is a large amount of traffic, or in the event of their being situated near some inland town? To show that we have been anxious to economise I may mention this: On some of these roads—for instance the road from Cobar to Bourke—we objected to put any appliances up, but to allow the stock to water at the double tanks that were there. The Mines Department insisted on our putting water appliances up, and they are put up now. We then provided, as in all other cases, these steam pumps; because we considered that it was impossible to predict in this country when a road may or may not be extensively used, and we felt ourselves obliged to provide for the maximum wants of the future traffic.
3187. But when the seasons become so very bad that stock cannot travel, owing to the absence of grass, this traffic ceases? Well, we were told to provide for any possible drought. This is what we were instructed to do. We were not told that at any time traffic was to cease; and even in the case of the Mount Browne gold-field that would not apply. We had to provide for the maximum traffic.
3188. *Major Penrose.*] You also had to provide for human beings in all weathers? Yes.
3189. *Chairman.*] Are you aware that since the opening of the railway there is not the same demand for water on certain stock routes as was originally the case? I think—and I have found it to be true in similar cases—that the railway necessitates greater accommodation being provided, except on lines parallel to the railway itself. But, on lines running at right angles to the railway, water is still as necessary as ever. For instance, if a man beyond Cobar wanted to truck his cattle, and there was no water between Cobar and Nyngan, he would not be able to get his stock through to the railway. What I have said applies to this road, because we have had a great cry out for watering places on routes running at right angles to the railway.
3190. But is not the road between Cobar and Bourke nearly parallel to the railway? Yes.
3191. And are you not aware that since the railway has been opened, traffic has to a certain extent ceased on certain stock routes? That shows that our proposal to economise in the matter of pumping appliances on the Cobar to Bourke road was correct, but it was overruled by the Mines Department, and we were peremptorily ordered to put down the tank appliances and pumps.
3192. Now another question with regard to the machinery, which is the most vexed question we have had to inquire into. Has your attention been drawn to the necessity in some cases of allowing stock to water at tanks rather than compelling them to go to the troughs, at which some of them have not been accustomed to water? If you want tanks to withstand the extreme droughts to which this country is subjected they must be fenced in, and I have already given the reasons for the steep slopes, which are incompatible with the stock being allowed to go down into the tanks. But I will meet the case of the "weaners" that you put, and which was never put before. It is possible that a silt-tank or some similar tank might be utilized, having been filled with water by the pump, and "weaners" might drink in this way. The number of "weaners" travelling cannot be very large. In any case they could be divided into small flocks and taken a few at a time. But there is plenty of evidence that allowing them to go into the tanks pollutes the water and renders it unfit for any purpose. Not only do they waste and take away a great deal of water, but they pollute that which remains.
3193. Do you think it would be advisable to give discretionary power to these caretakers to afford in certain cases to stock perishing from thirst access to the tanks. It is giving as you know very great powers to the caretakers? I fear that this privilege would be very much abused.
3194. Then we have had some gentlemen here who assert that the whole system of caretakers is a complete mistake. They think that the care necessary for the due attention to these works might be given by travelling superintendents who would be continually going backwards and forwards along these routes. Such a superintendent would know when certain stock were passing, and would see that they passed without undue delay. This would not necessitate the employment of caretakers, and would save a large amount of money? That opens up a very large subject. The first subject it opens up is the propriety of charging for water at tanks at all, or whether it would not be advisable to adopt a mode of collection which was suggested years ago by our Department, and by one or two witnesses in this case. That question is whether it would not be better to make the travelling stock, when they got their permit or register to travel, pay for the water whether they used it or not. The reason that these works were constructed is that there should be water for the stock in dry times. But so long as the present traffic arrangements are in existence you probably will require caretakers. The question is whether the office of caretaker might not be amalgamated with some other office. I know it was a very objectionable thing, and Mr. Fosbery, the Inspector of Police, objected to it very much; but it was once proposed to have the maintenance men along the roads amalgamated with the police force, as is done in Prussia. It might be possible to concentrate the duties of a stock inspector and a policeman, and a number of offices of that sort, and those of a caretaker might be added to it. He would know when large flocks of sheep were coming to his tank, and he could be there to give them water. There is no doubt about it, it is a very great expense to the country to keep these men, and this expense ought to be reduced as much as possible.
3195. *Mr. Woore.*] How could a man attend to his police duties and attend to his tank at the same time, supposing he had a warrant to execute 20 miles away? An officer in my Department discussed this question eight or nine years ago and foresaw more clearly than I did the possible extent of this watering of stock in the interior. The name of that officer was Higman, and he suggested that the drovers should be made to pay for the water whether the stock used it or not.

[The Commission adjourned.]

FRIDAY.

FRIDAY, 16 *MARCH*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

J. C. WOORE, Esq.

William Christopher Bennett called in and further examined:—

W. C. Bennett 16 Mar., 1888.

3196. *Chairman.*] Have you anything further to say with regard to the expensive forms of machinery? No; except what I intend to say in remarks on the evidence and the general question, which I intend to put before the Commission. I wish to add that these horse and steam pumps, if not required at the place where they are originally put up, can be removed to another place. No such thing as that can be done in the case of the appurtenances of the M'Comas lift.

3197. Consequently on routes that have now been somewhat interfered with by the railway, these pumps can be removed from these localities and taken to others where there are more stock passing? Precisely. All the appliances of the M'Comas pump—the leads, and so forth, except the iron staging—would be irremovable and would add to the loss if they were required elsewhere.

3198. To carry on that matter further, will you say that the M'Comas pump, although costing originally a very small sum, becomes rather expensive on account of the fittings and appliances, and so forth? Yes; a large amount of money is sunk in a particular place. A great part of this staging is below the water and is impossible of access when the tank is full, so that when anything gets out of order the repairs are very expensive. Our experience of that was (particularly after the Mines came to manage the works) what I have stated, and we determined to have something that was impregnable. We determined to have tanks in which the silt could not accumulate, and which could be cleaned out with the scoop. With water in the tanks and the steam pumps on the surface they would be accessible at any time, and would be easily removed in case of being more required elsewhere.

3199. How much do these M'Comas pumps cost? About £15 or £16.

3200. And all the appliances to put them in position—the staging and retaining walls—would need about how much? Mr. Wood's paper gave the cost at from £150 to £300.

3201. Consequently, although the M'Comas pump costs comparatively little at first, by the time it is up it will cost more than a steam pump? Yes, and be less effective and more liable to get out of order.

3202. You have seen all the papers which have been printed and presented to Parliament by the Mines Department? Yes.

3203. Do they contain all the evidence and correspondence in connection with the two Departments? No.

3204. What letters are chiefly left out of the printed reports? Papers recorded in the Roads Department, which consist to a great extent of reports of our officers bearing out the views of the Roads Department.

3205. And to a large extent these would rebut many of the allegations contained in the published papers? Yes.

3206. *Mr. Woore.*] Do I understand you to mean that those papers, which have been printed by the Mines Department, are papers which have been drafted out by them, presenting their own view of the question? I would not say that, but the papers in the Mines Department and issued by them contain a large number of papers conveying their own views.

3207. These papers according to your account present in fact only one view of the question? Yes, one view.

3208. *Chairman.*] Then hearing from you that a large amount of correspondence that has not been made public is contained in your Department, I will request you to produce it and such portions of it as you may think revelent to be placed in the appendix to the report of the Commission? Very well. I have the papers all here, but it might be injudicious of me to make a hurried selection. Now I have a report here on this subject of machinery for tanks and wells which I would like to put in evidence. It is as follows:—

M'Comas and Flood Lifts and Douglas Pumps.

Department of Public Works, Sydney, 2 December, 1884.

I MOST willingly comply with the request of the Hon. Secretary for Mines.

The M'Comas lift referred to herein and stated to be nearly identical with the Flood lift, also referred to, is the appliance which was supplied in the first instance with several of the tanks constructed by this Department before the Mines had anything to say to them.

It was in common with most other of the arrangements of this Department then in existence condemned—as it was called in the printed reports—and disused. It is satisfactory to note that the officers of the Mines Department now see they were wrong in such condemnation, and I hope that after a little more experience they will find that the horse and steam pumps supplied to the works—now being handed over and being supplied to the others as rapidly as time will admit—will not with proper care break down so often as they anticipate: and that it will be unnecessary to revert to the simple and primitive appliances supplied in the first instance by this Department with a view to economy, and then condemned by the Mines officers in favour of the double whip, which was not adopted as involving, according to the plan supplied, complex and perishable timber work.

The Douglas-pump is the ordinary hand-pump in use in every house; the steam and horse-pumps supplied are equally simple and as little liable to get out of order if properly taken care of.

W.C.B.

Under Secretary, Mines.

3209. Is it a fact that the Mines Department have at any time given approval to the new form of machinery for lifting water rather than the old and now disused forms? Yes; Mr. Gilliat in a letter on page 174 of the printed papers (the Mines Blue-book) has done so. This is the paragraph:—

BUT as I have stated in my minute to Mr. Overseer Jones' report, *re* fencing (minute and sketch herewith), I consider the present fencing a very good one, if proper attention is paid to the height of the rails in proportion to the position of the troughing upon the ground; and I think a little energy, combined with a desire to make the best of what I think are substantially good, although not perhaps perfect improvements, yet certainly far in advance of anything done for the convenience and comfort of travelling stock, as far as my experience goes, in any part of the world I have visited, would enable the overseer, with the labour of the caretaker, to remedy the defects that exist in the height of the rail. This depends to a great extent upon the formation of the ground, and may not be the same along the length of the troughing. The sketch submitted will show the plan I think may preferably be adopted.

There

There is another opinion of Mr. Gilliat's given before the Water Conservation Commission, in which he expresses unqualified approval of the tanks and everything else. He says at page 137 and 130 of the first report of the Commission referred to :— W.C. Bennett. 16 Mar., 1888.

Chairman.] The other form of batter could be given by the steam appliances in use? There I agree with Mr. Bennett, so far as steam-power has yet been used. We got very low slopes, and there is consequently an increased tendency for the water to splash up round the edges of the bank, and this especially in hot and windy weather.

Is that pump (the Tangye pump) effective? Yes; it is an excellent pump. With occasional repacking it will stand very well, and is sufficiently strong to bear the rough treatment of the men we employ.

Here are the papers going back to 1875, in which Mr. Bruce advocates the same thing that is advocated now—that a man could work these pumps, which we have disproved by experience.

3210. A considerable amount of correspondence appears to have taken place between Mr. Gilliat and your Department with reference to the double whips? Yes.

3211. The double whip was very strongly advocated by Mr. Gilliat? Yes; very strongly advocated.

3212. Did he give you the cost; because I do not see it in this paper? He may have done so, but from the drawing the cost would have been more than the M'Comas pump, it necessitated such a large amount of wood work.

3213. And is more liable to get out of order? Yes; more liable to get out of order than any contrivance I have ever seen.

3214. And was condemned wholly by your Department? Yes.

3215. Have any such whips been erected? Not by our Department.

3216. Are you aware that any have been erected by the Mines Department? Not to my knowledge. It is simply an application of the ordinary gold-fields whip.

3217. And for drawing water up out of a well is a good idea? Yes; a shallow well. I would now like to hand in the opinion of Mr. Hanna, in reference to the M'Comas pump.

Tallywalka, 10 September, 1885.

Sir,

Having when in Sydney recommended M'Comas lifts (hand power) for some of the tanks in this district, I took an opportunity recently to inspect one, and am satisfied from what I have seen that they would not be suitable for supplying the service tanks from main reservoirs.

The one referred to was lifting the water about 15 feet, and the work at this height was quite enough for one man.

It might be necessary at times to raise the water almost from bottom of tank to at least 6 feet above the surface, in which case I do not think two men would be equal to the task.

I have not before had any practical experience in the working of these water-lifts, and was led to believe from reports, &c., that they were much more easily worked.

I would therefore recommend that horse-gear pumps of the design, now being used, be ordered for the following tanks:—Tarella, Maxwell's, The Peak, Waratta, and Coalley Dam.

Maxwell's and Tarella are good positions for wind mills if considered reliable.

Shall advise as to transit after making inquiry. Have heard there is a light draught steamer at Bourke waiting for rise; if so, and not fully loaded, that will be the quickest and best route.

I have, &c.

W. J. HANNA.

Engineer-in-Chief for Roads, Sydney.

3218. Have you ever had any conversation with Mr. Hanna as to the relative merits of horse gear and steam-pumps? Yes; I think I have had some conversation with Mr. Hanna on the subject; but he will be here himself.

3219. I was going to ask whether he had not changed his mind in reference to the horse gear? Yes; even where there is timber to be had, my experience of the pump was sufficient to condemn it—not the lift *per se*, but rather the mode of appliances attached to it. The Tangye steam-pump cost only £87 in Sydney.

3220. But would not the weathershed and the cost of transmission and erection so raise the price as to make the cost greater than the cost of the M'Comas pump in the first instance? Yes; it would, very nearly so. I would be very glad to show you the Tangye pump, which is at work at the Centennial Park. I wish also to state that all the appliances of the Tangye pump—piping, connections, &c.—are all made of iron, and are far less perishable than the wooden appliances of the M'Comas.

3221. *Mr. Woore.*] A great portion of the woodwork of the M'Comas pump would be continually under water? Yes; except when the tank was dry.

3222. But we have been assuming that the tanks are never dry? Sometimes they would be nearly dry; but then the woodwork is exposed to the sun, and it is in the worst possible position for the duration of the appliances.

3223. Would you recommend an expensive Tangye steam-pump at all tanks, or that some simple form of hand pump should be substituted on stock routes which are not very much frequented? Well, where the importance of a stock route justifies so large an expenditure as is necessary on the normal style of tank, I think the difference in cost between the pumps and working them is inconsiderable—not worthy of consideration—having regard to the large outlay on the tank. If certain stock routes were selected, and we were told that they were only of second-rate importance, then we might have second-rate tanks and second-rate appliances; but our orders from the Mines Department were always of a most peremptory character, and whenever we suggested that there might be a saving, as in the case of Cobar to Bourke road, we were overruled.

3224. *Chairman.*] In some localities where tanks are required to be only very small, would not a simpler form of machinery—like the Californian pump—be suitable? It possibly might meet the requirements of the public, but it would be incompatible with a large expenditure on the tank. If there were any small or less used stock routes that it is necessary to supply with water, as I have said, second-rate accommodation ought to be provided for them.

3225. And in this case very inexpensive pumps might be used? Yes.

3226. *Mr. Woore.*] Are not these Californian pumps very apt to get out of order? These forms that have been suggested would scarcely be effective if the water in the tanks was very low. The most important thing is that they should be able to raise water when the tanks were low, and the country dry.

3227. Have you seen any simpler appliances for raising the water where the water has not to be raised to any great height? Yes; there is a number of simple appliances for raising water used in India and in Egypt.

3228. *Chairman.*] The next matter is the excessive cost of fencing. We have been given to understand that

W.C. Bennett. 16 Mar., 1888.

that the fences round the caretakers' paddocks are altogether too expensive; that very much heavier timber than is necessary was used, and also a much stronger gauge of wire? Well, in the one case brought against us—Bevan's case—we called for tenders three times over.
3229. I am speaking now as to the specifications generally? Of course fencing is not a matter with which I am intimately acquainted, but it appears to me that the general fault-finding with the heaviness of our fences is caused by contrasting them with the fencing on sheep runs which are only intended to keep sheep apart, while our fences are intended to resist wild cattle. And we have amongst our papers the approval of Mr. Bruce as to the character of the fencing generally, and insisting on the use of a top rail, which we have omitted in some cases.
3230. Upon whom do you rely to give you information about the fencing? Mr. Wood and the local officers, who necessarily must have acquired considerable local knowledge. Mr. Wood has had 28 years' experience out of doors in the Department, and must have acquired a good knowledge of pastoral appliances; and then we have had Mr. Bruce's general approval to this style of fencing.
3231. Are you aware of the cost of some of this fencing per mile? Yes; but I think the most expensive fence was that of Bevan's, which cost £112 per mile.
3232. A fence of a similar kind put up by a squatter would, you think, cost as much? I am not aware what the cost of fencing such as ours would be, but I know that the squatters' fences cost from £30 to £60 and £70 per mile.
3233. Then, admitting that it was very desirable to put up a strong fence to protect the tanks from the inroads of wild cattle, was it necessary to put up the same expensive kind of fencing round the caretaker's paddocks—these paddocks which were a mile square and which necessitated 4 miles of fencing? Well, I am not prepared to answer that.
3234. Taking it for granted that it requires very strong and expensive fencing to protect the tank, is it necessary to put up the same expensive fences round the caretaker's paddocks, involving some 4 miles of fencing? I should say that the usual style of fences for roadways only would be necessary.
3235. Has your attention been drawn to the fact that these useless expenses have not been incurred by squatters and others who hold country in the vicinity of these tanks? I do not think so.
3236. Your attention has never been directed to the unnecessary cost of this fencing? Not directed to the difference between the two styles of fencing.
3237. I suppose you are aware that much has been made of these charges by the Mines Department? Yes. I would wish to say here that there is one gentleman to whom I am greatly indebted for all sorts of valuable information about the interior—that is Mr. Edward Quin, who always gave us sensible and practical information.
3238. We have also had complaints that the fencing is unnecessarily expensive because the posts are put into the ground much too deep for the ordinary wire fence? Well, that is a matter of detail that I can hardly speak of. It strikes me, though, that the posts of a road fence in that part of the country are not too deep at 2 feet 6 inches. However, that is a matter of practice.
3239. Now, as to the reported interference with the caretakers by the officers of your Department, what have you to say? Well, the chief man that has been complained of as interfering with the caretaker is Mr. Stilwell, and he will appear before the Commission himself. I wish to say that Mr. Stilwell is one of our best officers, and whatever he has done comes not from any defect, but may be attributed to his very great anxiety for the protection of the works.
3240. Are the road superintendents, who have had the construction of these works under their supervision, instructed to report to you if they see anything going wrong with the works after they have been handed over to the Mines Department? Yes; not only to report, but to remedy it at once. That has always been an understood thing.
3241. To whom are the officers to report? To me.
3242. They would not report to the Mines officer who had charge of the work? No; each officer reports to his own Department. It is utterly impossible to have officers, especially technical officers, reporting to any other Department than their own.
3243. This matter has evidently caused a great deal of friction, because it has been said that needless reports have been sent down to the head office in Sydney, when they might have been made to the overseers of watering places, who would have attended to them at once? That very action on the part of the Mines Department has formed a large source of complaint in the Works Department. It seems to me that needless and frivolous reports were sent in by the Mines officers with a view of disparaging the works and the officers of the Roads Department, and to create an impression that it was absolutely necessary to take the works out of our hands.
3244. We have been informed by a minute of the Minister that the officers of the Mines Department have a right to make any repairs in cases where these repairs will not cost more than £10? Yes.
3245. Have you been informed of that minute? Yes.
3246. But the limit of £10 might be a very arbitrary amount, and difficult to ascertain:—did it not cause a good deal of friction between the two Departments? It ought not. Friction has chiefly arisen concerning matters which could be attended to by the caretakers themselves without any expenditure whatever; so that the £10 limit could hardly be said to have operated in this matter.
3247. Of course, in respect to this friction you only know it from your own officers? Yes.
3248. It has been said that you are so anxious to uphold the action of your own officers that, in some instances, very unworthy men in your Department have abused the trust that you have reposed in them, and that you have not taken sufficient steps to secure the public interest? Only one case of this sort can be brought up. I am wrong: there is a second. But there is only one case of absolute robbery, and the man concerned in that was imprisoned for the offence. With regard to the second part of your question, as to his going about fixing sites, the chief ground for that assertion, or opinion, seems to be in the statement of Mr. Earngey, an officer of our Department, whose services were dispensed with, because he became so impracticable as really to be unfit to be trusted. My own opinion of him is stated in the papers, wherein I recommended his retirement on a pension. These papers, together with an absurd pamphlet, which proves the state of this man's mind, were I think forwarded to the Commission. As to the statement that Cambridge selected certain sites, I may state that the sites of the works referred to by Mr. Earngey were selected by Mr. Wood himself with Mr. Cambridge, and the surveyor of the district, who now lives at Tumut. They had two buggies and they drove round to select the sites of most of those works.

W.C. Bennett. 16 Mar., 1888.

works. Mr. Wood will be in a position to give full particulars so far as Mr. Earngey's random statements have gone. With regard to another statement made by Earngey that Mr. Stevenson, the member for the Wollombi, had told him that I was very angry with him (Earngey) when he came back from that expedition because he had exposed Cambridge's improprieties, I have spoken to Mr. Stevenson on the matter. Mr. Stevenson said that not alone did he never make such a statement, but he proved that it was impossible, because I had not seen him for several years before, and not for three or four years after this time.

3249. I do not think it is necessary for you to make any elaborate statement concerning Earngey's evidence, because he has been here? Mr. Higman, Cambridge's predecessor in the same district, was removed from the service for having dealings with Mr. Burton, a contractor. There was nothing to justify a prosecution; he was dismissed, and has since died. I think that Burton built him a house, or something of that sort.

3250. Referring to this same matter further, I may tell you that some curious instances have come before us in these papers. This is the case of proposed alteration, the cost of which would be exactly £3, but which through a system of red tape has cost nearly £50? That is an exaggeration. It assumes that the officers went for no other purpose but this, whereas they travelled not only to inspect this work, but for general purposes. This may have been the motive of going up, but they inspected generally both when going up and coming back; so that this is really one of those statements that contain a small grain of truth and a large amount of embellishment.

3251. Instead of your wishing to keep up this system of red tapeism, you have always been an advocate of local government? Yes, and I would have been very happy at any time to have handed these works over to the Mines Department. I got no fee or reward for my work in connection with them, but when the Mines Department took charge it evidently was with a fixed determination to get all these works out of my hands not merely because they wished to relieve me of the duty, but because they wished to make it appear that we were unequal to the proper carrying out of the works.

3252. It has been complained also that you have departed from the proper departmental rules not to write to the newspapers in justification of your conduct? Well, I have the approval not only of my own Minister—the Minister for Works—but of the Premier as well, to whom I showed the letter before it went into the paper. I think it is much less harm to write in a paper over one's own name than to attack people in paragraphs which are evidently inspired. I have always made it a rule of my life to be in a position to go into Court and swear that I never directly or indirectly was the cause of any paragraph appearing in the newspapers except I signed my own name to it; and I have done this on only two or three occasions.

3253. I would like to draw you attention to a statement made in the *précis* furnished to us. It is No. 4, and has reference to a document dealing with the dual control question, which document has since been lost. Can you give us any information about it? I have written a reply to that statement which was sent to the Minister and mislaid, but it was returned to me a few days since. I shall obtain it and forward it to the Commission.

3254. Complaint has been made also that you have used improper composition for the coating of supply tanks rendering the water undrinkable by stock? This composition was put on in three cases, in only one of which was any complaint made about it. The mixture is one not new to the Department; but it was suggested in a report by Mr. M'Kinney, Engineer to the Mines Department, as having been used with the greatest success in Victoria. This is what Mr. M'Kinney says at page 26 of the second report of the Water Conservation Commission:—

> While the works are, as a rule, of well known types, the flume shown in the accompanying plan presents some unusual features. This work consists of a trapezoidal flume of sheet iron of No. 12 gauge, that is of the thickness of less than one-ninth of an inch, supported in a framework of timber. It has been seven years in use, and has given entire satisfaction. It is laid with a fall of 8 feet per mile, or 1 in 00; its length it 920 feet, and its total cost was £1,500. The ironwork is cleaned annually, and coated with a mixture, prepared in the proportion of 2 lb. of tallow and 2 lb. of resin to 1 gallon of tar. This is put on in hot weather, and at a time when the channel is not in use. It is found that the mixture applied assumes a glossy surface, and does not affect the taste of the water. The erection of this flume was simply and expeditiously done, by making it in sections above its bed, lowering the sections by screws, and rivetting them together in position. The Ballarat Water Commission owns 2,300 acres of land outside the limits of the catchment area of the present works.

3255. We understand that you relinquished the use of this composition when you found it was bad? No; we stopped using it because the Mines Department complained; but it has realized the end required, and it is now like a sort of varnish on the ironwork, just the same as it has become in Victoria.

3256. We were given to understand that you had abandoned this composition on discovering that it was improper stuff to use? We only gave it up because we desired to give the Mines Department as little reason for complaint as possible.

3257. Although it was recommended by their own officer? Yes. I do not say that it was used entirely on his recommendation, because the mixture was known to our Department long before.

3258. *Mr. Woore.*] Was the mixture removed from this tank when it was complained of? No; it is now on the tank and does not affect the water in any way. It affected the water a little at the first when it was put on, a slight scum having arisen.

3259. But it is now a success? Yes; and the man who used it will be here to give evidence before the Commission.

3260. *Chairman.*] I must ask you to look at the 15th charge in the *précis*, the clearing out of the silt tank at Merri Merriwa. The report says:—"This work is one of the Mines caretaker's duties. Papers show this had not been neglected; but at the time, owing to rain and water in silt-tank, caretaker could not perform the work. The Works Department officer conceives this to be a case of neglect by Mines caretaker, and lets a contract for this work; but the contractor also has to wait till silt tank dries before commencing work. A case of unnecessary expenditure. *Re* also paper re caretaker by Mr. Bennett." We do not want to go into the case of any particular well; but it was stated here generally that in the sinking of wells you have made contracts for the erection of head works, which the contractor, as a rule, has put up before sinking the well, helping him in the excavation, without knowing whether there was any water underneath or not, or whether the water will be fit for use if it is got? No contract for well sinking has ever been made without a prospecting shaft, where possible, having been put down, and, in some instances, boring. In two cases we had reason to doubt the genuineness of the samples of water produced; in all other cases fair stock water was obtained in the trial holes that we put down. The two cases where it was not possible

W.C. Bennett. 16 Mar., 1888.

possible to put down trial holes were the Normanstone and Baloola wells, which are in basalt. With respect to the lifting appliances, frequently the contractors have been allowed to put up the head gear; in fact, we were obliged to make them do so where the wells were beyond the ordinary depth.

3261. Why go to the expense of putting this well in basalt without knowing what the result would be, whether good water could be had, or any water at all? Mr. Gilliat himself selected the site, and yet he now states that the wells are not on the sites he selected; but we have been assured by a gentleman who was with Mr. Gilliat at the time the sites were selected—Mr. Kelly, manager for Sir Patrick Jennings—that the wells are practically on the sites chosen by Mr. Gilliat.

3262. Why did you go to the enormous expense of sinking a well through basaltic rock merely on the *ipse dixit* of Mr. Gilliat, and against your own better judgment? The matter was not practically brought before me in detail. Perhaps, if I had been fully aware of it, I would not have allowed it to be done. It was one of those things that Mr. Wood was in charge of, and I think he did all the necessary work relating to it.

3263. *Mr. Woore.*] Was your Department aware when these wells were being sunk that they were going through basalt? I was not aware of it.

3264. There were two instances, you said, in which you doubted the genuineness of the samples of water. Can you give us any information in regard to them? The Old Gunbar was one; but I cannot tell you the name of the other just now.

3265. Is basaltic formation as promising for obtaining water as other formations? Yes; it is, if you can get through it.

3266. *Chairman.*] In what way were you doubtful about the water that came from the Old Gunbar well? We doubted whether the water came from the well at all or not, because the water produced was good, as reported by the superintendent, Mr. Gordon, a man who was only a short time there; but, since then, we have found that it is not so.

3267. The water in the Old Gunbar well was so salt as to be unfit for use? Yes.

3268. Although in the trial shaft you were under the impression that it was good? We were under the impression that it was good water; but then, I think, this was a false sample. The sample produced to me was good water; but I now believe that it could not have been genuine. This water came from the bore.

3269. We have also heard that there has been an enormous expenditure on these wells—over £10 per foot? I think that is an exaggeration. In many of these cases the cost includes the whole works, and embraces restoration and repairs.

3270. I would like you to turn to No. 17 of the *précis*—the case of the Holy Box well—concerning which it is stated:—"This well was sunk, and a small supply of fresh water tapped, followed by a great flow of salt water, which, when twice analysed, was declared unfit for use. Evidence as to the saltness was submitted. Well was abandoned and tank commenced. Works officer stopped work at tank when about 3 feet deep, declaring well water good. Well again handed to Mines, and constant baling insisted upon to improve quality of water. This done without result. Cost of well and price referred to—94 feet deep—cost over £1,000. Mines has to bear cost of maintenance and employ caretaker to bail and protect headworks. There is no prospect of leasing salt wells. Caretaker has carted drinking water 17 miles. Whim, service tank, and troughs erected before quality of water decided suitable. Iron in troughs destroyed by action of salt. Well almost useless for stock, and quite unfit for travelling public." Do you see that the sinking of 94 feet costs over £1,000? Yes, that is possible.

3271. *Mr. Woore.*] Does that include the cost of erecting headworks and troughings, &c.? Yes; it includes fencing and everything connected with the well. Besides, the well was sunk in dear times. It very likely includes also some additional repairs; but we can produce the original vouchers. I will reply to this in the evidence I am about to furnish.

3272. *Chairman.*] Now are not you aware that in most instances wells at this depth have turned out to be salty? The results of boring, exploring for water in these countries, particularly in the country between the Murrumbidgee and the Darling, are so very fluctuating that it is almost impossible to say where water was to be obtained; whether the water would be salty or fresh, or whether there would be any water at all. The difference in the cost between a well and a tank was so great that the inducement to sink a well was considerable. Of late years I think most of the well sites have been decided on by the Mines officers. This is my impression.

3273. With the appliances which we now have for sinking, and the knowledge that we can get artesian water, would you now sink wells? No; I wish to explain to the Commission that when this thing was first started there was but £1,000 put on the Estimates, at the instance of Mr. W. H. Suttor, for artesian water boring in the country. And I myself pointed out that it was a duty which the geological knowledge in the Mines Department best fitted that Department to undertake.

3274. And under that Department boring is now being carried on? Yes; artesian boring is being carried on entirely by them.

3275. In connection with this, of course all tanks may become dry during a long drought? Well, if there was a drought for a long period, I think that it is likely some of our tanks would become dry; but certainly they would not go dry during any drought known to the present inhabitants of this country.

3276. But to make proper provision for such a catastrophe it would be advisable to sink wells occasionally? Yes; artesian wells. Objection is now made to the large cost of these works, but I hardly think Government would be justified in adding this additional cost to meet contingencies which might not occur during the existence of a tank or a well either. Of the superiority of wells over tanks, if you can get good water, I am firmly convinced. The best proof of this is that the first steps taken by the Department to provide water for the country between the Murrumbidgee and the Darling were to send out a boring party in the year 1869, under Mr. Wood.

3277. Can you give us any information about this costly hutting for caretakers? We were told to provide huts for the caretakers, and I all along thought that the adjuncts to these works were too expensive. The first works were simply water-holes; then we were urged from one thing to another. A sum of money was put on the Estimates, at the instance of the Mines Department, for cottages for caretakers, Mr. Bruce's estimate being £100 for each. Mr. Gilliat's figures were the same. We made out a drawing and called for tenders.

3278. Will you state what the accommodation was? I have the specification here, which I will hand in. [*See Appendix.*] One room was to be 8 feet by 12 feet, and one 12 feet by 12 feet, and one

8 feet 6 inches by 8 feet, to be built of timber, with galvanized iron roof. Iron chimney and iron tank with pipes to provide for fresh water. We received tenders from £80 to £100. Our plans were suited to the amount which was voted by Parliament. Before we incurred such a large outlay I thought it was necessary to have the approval of the Mines Department before I accepted any tender. The papers were sent on to the Mines Office, and the reply we got was that they could get the work done very much cheaper. W.C. Bennett. 16 Mar., 1888.

3279. *Mr. Woore.*] Was it the same class of hutting? They said they would supply the material and get the caretaker to work up the building himself—to make a number of piecemeal arrangements which we were not in a position to do, even if we considered it advantageous. So far as I can learn the houses built by them have not the accommodation which we proposed, and are not of equivalent stability or duration. I considered the difference between the two in quality is much more than equivalent to the difference in the price. Still, I am not fully informed of what the Mines Department have paid for the work.

3280. Then the Mines Department stated that they could get caretakers' huts put up for one-half of the price, without stating what the accommodation was? Yes; and I think that this was calculated to mislead both the Minister and the public.

3281. *Chairman.*] No doubt, a hut built altogether of iron would be very inexpensive? Very.

3282. But would it be at all suitable for people to live in? It would be uninhabitable.

3283. And it would be cruelty to the people to ask them to live in such a place? Yes; and no man in his senses would live in it. If I were asked I know that I should prefer to live outside. The tenders for these houses were forwarded to the Mines Department merely for the purpose of ascertaining whether they thought it desirable to go to such an expense, which, in the aggregate, would be very considerable. The policy of putting up these huts was not an engineering question at all, and before it was decided finally I wished to give them an opportunity of expressing an opinion on the subject, and that was why the tenders were forwarded to the Mines Department.

3284. What steps would you take to avoid this dual control in the future? Pending the establishment of Local Boards, I think the maintenance of public watering places should remain with the Works Department, and that the collection of rates, inspection, and so forth, should be with the stock inspectors. If the Mines Department were given clearly to understand that under no circumstances would they get the control or construction of these works, much of the friction would disappear. I have already stated what is equivalent to this in the report to the Minister for Works.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

Arthur Pepys Wood called in and examined:—

A. P. Wood. 16 Mar., 1888.

3285. *Chairman.*] What is your position in the Public Service? Assistant Engineer in the Roads Department.

3286. You have had considerable experience in the construction of tanks and wells under this Department? Yes.

3287. How many years have you been engaged in this particular work? It is about 20 years since I first started; but then there was an interregnum of about ten years.

3288. What was the cause of it? I was engaged on other work in the Department—not engaged on this work specially.

3289. *Mr. Woore.*] So that I suppose altogether you have had about ten years' experience of tanks and wells? Yes; about ten years' experience.

3290. *Chairman.*] A large portion of the duty of selecting sites for tanks and wells has fallen to your share? No; not entirely. I have selected the sites for a good many tanks on certain lines, but to a great extent the duty has been carried out by the local officers. My duty has been more particularly to inspect the various works during construction, and see that they are properly completed before being finally passed. I might perhaps be allowed to make a remark just here, as it is only due to those officers who have been acting under me. I see that Mr. Doudney, one of the witnesses who has given evidence, has stated that I have been handicapped by the inefficiency of the officers under me; and I wish to give a most decided and emphatic denial to that statement. I consider some of the officers under me to be the most efficient in the Department that I belong to.

3291. It has been said that some of your officers who were charged with the duty of selecting sites for tanks and wells have merely sat on the box of one of Cobb & Co.'s coaches, and selected the sites from that position, consulting no one but the driver and occasionally the publican at whose house they stopped, forming their conclusions from the very limited amount of knowledge gained in this way? The statement was made in regard to myself as well as in regard to others, and I now wish to give it my most emphatic denial.

3292. Has it been your object to obtain all the local information possible in order to guide you in the selection of sites for these works? Yes; it has been my object. I do not mean to say, however, that in obtaining this local information I consulted all the residents who were scattered sparsely over the different districts, but I examined each locality to get the best position within reasonable distance for a tank for the benefit of the travelling public.

3293. And you can answer for it, as far as you know, that your officers have been actuated by the same sense of public duty and have not been swayed by the opinions of other parties—I mean by the opinions of drivers and publicans? I am as certain of it—with one exception—as that I am answering your question. The officers have not been swayed by any person in the selection of sites. I admit that there is one unfortunate case that came within our knowledge; but there is no necessity to touch upon it.

3294. That officer has since been dismissed? Yes.

3295. We thought it advisable that you might give such rebutting evidence as in your opinion it was necessary to tender without going through the whole case, about which you may or may not know very much. You might give us whatever information you possess with regard to the allegations that have been made by the officers of the Mines Department. We shall be very glad to get such evidence from you, and your evidence can be taken down without the necessity of our putting questions. Perhaps it will be as well to take what may be regarded as one of the most material cases first, that of the Roto well, which is

A. P. Wood
16 Mar., 1888.

is first on the list? It has been said of the Roto Well that "it is in close proximity to a water-hole in the Willandra Creek." In reference to that I may state that the site was selected by me when I made an inspection of the line. A report on the matter was submitted to the Commissioner, and by him forwarded to the Mines Department, and the sites mentioned by me in the report referred to were approved of by that Department, this site of Roto Well being one of them. It is now objected that this well has entailed a great waste of money, on account of its proximity to permanent water in the creek. In the statement made in this book (the *précis*) over Mr. Gilliat's signature—I do not remember the fact of having seen the statement anywhere in Mr. Gilliat's handwriting——

3296. Everything that comes from the Mines Office bears Mr. Gilliat's endorsement? At page 102 of the Mines papers we have Mr. Keighran, Overseer of Public Watering Places, summoning a lessee for neglecting the condition of his lease; and Mr. Gilliat, in a minute upon Mr. Keighran's report, traverses the decision of the bench in the case and states:—"The conditions were the same as when he executed his lease, except that the Willandra Creek was then empty." I mention this as simply showing that there was no permanent water there at all, and that, practically, there is no permanent water in the creek; inasmuch as the water comes down there when the Lachlan is about two-thirds full, and would then run to waste if it were not for certain efforts made by the lessees; but even by these efforts, permanent water has not been made in the creek. The next case is the Cobham Lake Tank; it is objected to on account of the uncompleted works being submerged. Well, I consider the fact of these works being submerged as being rather an argument in favour of the selection which has been made of the site, inasmuch as it proves the spot selected was the natural conserving ground, while the data that have been collected and obtained in regard to the filling of this lake, prove that is only at long intervals that the lake itself can be relied on for any comparatively permanent supply.

3297. Are you aware that though some of these lakes have been dry for many years, after they have once become filled, that the water, resting for some time, eventually becomes so salty that it cannot be used? Yes.

3298. Would not that apply to Cobham Lake tank? No; because the water would be prevented from resting to the extent which would allow it to become salty. The water in the body of the lake, when the lake is full, is quite fit for human consumption; and the water is actually conserved within the boundaries of the embankments within the lake.

3299. When the water rests, the last water which remained in the lake would go into the tank, and would become so impregnated with salt that it would not be fit for use? I do not think so; the conditions that existed at the time this tank was made do not exist now. The water will be admitted into this tank by an inlet pipe, and the consequence is that we can shut it off if we find it necessary to do so. Consequently, we can have the water in a state of greater purity in the tank than it would be if it were allowed outside in the bed of the lake, exposed and absorbing saline matter for a long time.

3300. Are not the beds of some of these so-called lakes of very porous soil, and undesirable places as sites for tanks? There are some cases, I admit, where you will find drift in the lake beds. In fact, in this case towards the northern end, there is a salt shallow drift; but in this particular spot where the tank has been placed, we have not come upon any drift in the excavation so far as it has been carried out.

3301. *Mr. Woore.*] Whereabouts is the tank situated in the lake? It is towards the south-eastern end, I think.

3302. *Chairman.*] It has been suggested that in making tanks on the edge of these lakes you do not get good hard firm soil; and although the catchment may be easy, it is contended that it is an error in the choice of sites not to sink in good hard soil? The site of this tank was not selected by me; and the tank has been constructed partly since I have been up here. I cannot swear to this, but Mr. Hanna will be here and he will tell you positively that the tank was constructed on the edge of the lake. But I do not know of any case where works have been constructed on the edge of these cane-grass swamps; and certainly no case where a tank has been constructed in them. As to the Dry Lake tank, the same argument has been advanced against it—that it is submerged; but that particular site, although not recommended by Mr. Gilliat, for the immediate construction of a tank—of course it is understood that Mr. Gilliat is an officer of the Mines Department—was named by him as being a place that would make a splendid site for a tank. One reason for constructing a tank there was that at the time of my visit special instructions were given to arrange for works along the road. The only watering place in the locality was in the hands of a private owner—a man by the name of Smith—and this man had the command of the water. I thought it a rather injudicious thing that the public should be at the mercy of a man who, although he made professions that he would supply water at reasonable rates, still had the power in bad seasons to demand any rate that he thought fit, or to refuse the water altogether. That tank, I may say, has been completely submerged—the embankments and everything else being out of sight; a state of things which according to the evidence of the residents in the district was never known before. Scavillo's tank was a similar case, and the same argument was urged against that. In that case I must leave the statement to the local officer, as I never saw the site of the tank. Then there is the Booroorban tank, on the road from Deniliquin to Hay. The objection to that is its proximity to a water-hole. That work was recommended by Mr. Gilliat in one of his annual returns and in his recommendations for works in 1882.

3303. Mr. Gilliat, I think, says that he generally recommended sites to be adopted within certain limitations. He might chose a particular site, but perhaps you would not sink the tank within a mile or a quarter of a mile of it; and he states that that is where the discrepancy arose? If Mr. Gilliat meant that we should sink a tank in the creek, then I admit that it is not sunk there; but it is sunk on the overflow from the creek, and within about 100 yards of the creek itself.

3304. Are you aware that Mr. Gilliat has objected to the rejoinder made by the Works Department that when he selected a site that site was not adhered to, and therefore the remark about the injudicious selection of sites did not apply, because his selections were departed from to a certain extent by the Works Department? The actual spot where these works were placed was chosen, I will admit, by the Works officers themselves, on the recommendations of the Mines officers as to the necessity of water in the vicinity.

3305. The next case is that of the Peri Springs? I have never been up the road, so cannot say anything about that; but I have seen the Tarella tank since it was started: the site of this I fixed myself. The objection to this tank is presumably that there is permanent water close by.

3306. *Mr. Woore.*] So that the Works officers were responsible for the actual spot chosen? Yes; the Works

A. P. Wood. 16 Mar., 1886.

Works officers were responsible for all constructive details, which includes the selection of the best and most efficient catchment within a reasonable distance from the point necessary to properly divide the stages of the stock route. The objection to the J.K. well is exactly the same; that it was placed in proximity to permanent water. At the time I selected the site I did not consider that it was desirable to interfere with the water that had been conserved by the Crown lessees, more particularly in a district where water was more valuable than in any other part of Riverina. The lessee of the Wannaminta run offered to improve the works for the conservation of water at that particular spot to allow travelling stock to water there, on condition that he should be paid 6d. per cubic yard for the earthworks involved in carrying out these improvements. It was decided or recommended by the Works Department that, in the interest of the travelling public, an independent watering place should be provided, and the decision was endorsed by the then Minister for Mines, Mr. J. P. Abbott, in the following minute, bearing date 3/7/84:—"I think tenders should be accepted for a well, as by this means a more permanent water supply is likely to be had, and entirely independent of the lessee." The same remark applies, as I have said, to the Tarella tank.

3307. Does the minute of Mr. Abbott apply to that particular case, or does it apply generally? It applies to that particular case, but the principle was applied generally—that principle has been a guide to the Department in all subsequent cases. It covered our action. But there are no other cases except this at which it occurred at the time, with the exception of the Roto well. But I have proved by Mr. Gilliat's own statement that the creek was dry at the time the work was handed over to the lessees.

3308. *Chairman.*] Have you had anything to do with the sinking of the Old Gunbar well? In 1882 I was instructed to examine the road from Carrathool to Hillston and select sites for watering places. I made certain alternative recommendations, and from the evidence which I obtained during my trip I recommended that wells should be constructed, because I thought there was a very reasonable chance of obtaining good stock water, as these reports show:—

Hillston, 29 March, 1882.

Sir,

I have to forward the following report, on my examination of the road from Carrathool to Hillston, with a view to the selection of sites for tanks on this line:—

14 miles from Carrathool.—The "Dry Lake" is a very suitable situation for conserving water, and a tank here would, if the ground prove retentive, provide permanent water. The local drainage from the plains is very considerable, and in wet seasons when the Merool is full this swamp is fed by back water from the creek.

2 miles from Carrathool.—About 1 mile south of the "Corner" the Merool Creek crosses this road. This would be a very good site for a tank. The local drainage is not as good here as at Dry Lake, and the supply would be more dependent on waters brought down the creek. The Merool in this locality is more distinguishable by the belt of timber along its course than by any marked depression. There is however a considerable width of waterway here in wet seasons, about 1,600 yards. Very good water has been obtained on this creek in a shallow well about half a mile from the road, and it is very probable that similar water could be obtained at the Dry Lake.

36 miles from Carrathool.—The Burnt Stump, or Gunbar Swamp, is crossed by this road, and is a very good site for a tank, as there is a very good local drainage, which in wet seasons would be supplemented by water flowing from a watershed extending some 2 or 3 miles. In ordinary seasons this is collected by a chain of swamps, but in more favourable times they overflow, and then our proposed tank would, if not otherwise filled, have the benefit. Between this site and the previous one good water has been obtained in several places at about 15 feet. The supply is generally very good, and the water suitable for human consumption.

At Gunbar Hotel, one of these wells has watered 300 head of horses and cattle during the drought, and on a selection 2 or 3 miles south of it a similar shallow well has yielded 10,000 gallons a day.

I am informed that the level of the water in these wells, which is about 11 feet below the surface, has been but little affected by the long continuance of dry weather.

39 miles from Carrathool.—About a mile and a half north of Old Gunbar station there is another swamp, which offers a most favourable site for a tank. This is also a promising locality for a shallow well.

52 miles from Carrathool.—M'Kinlay's. At the public-house here a well has been sunk in which a strong supply of good water was obtained at a depth of 120 feet—the water rising between 20 and 30 feet.

58 miles from Carrathool.—6 miles from M'Kinlay's there is a very favourable site for a tank in a swamp near the Crow's Nest. Watermarks are visible on the trees growing in this basin which prove that from 2 to 3 feet of water collects in the wet seasons, and as the area is very considerable this would give an ample supply for storage.

72 miles from Carrathool.—The Lachlan River is touched about 6 miles below Hillston, which is distant about 78 miles from Carrathool, and 80 miles from the Murrumbidgee.

After careful observation and inquiry, I have to make the following recommendations for your consideration, involving, as they do, a departure from Mr. Gilliat's proposal for watering this line.

Before any works are let I would strongly recommend trial holes being sunk at the following places:—

Dry lake, 14 miles from Carathool.
29 " "
25 " "
Swamp 58 " "

In the event of water being obtained at the usual shallow depth of from 15 to 18 feet, I would recommend tanks being sunk to tap the drift—to be 30 yards by 3 yards in the bottom, with batter of 1½ to 1. This will expose a large area of drift, and will I feel assured give a supply that will prove fully equal to the demands made on it by travelling stock. I would also recommend that the water be lifted into service tanks of similar construction to those built by this Department for the wells on the Booligal and Wilcannia road. Stock to be watered from troughing fed from this service tank.

In cases where a supply does not exist near the surface good water is found at depths ranging from 50 to 120 feet, and this being the case I am of opinion that wells will, in this district, be equally serviceable as tanks, and at the same time more economical.

If you do not approve of either of these proposals, I have to recommend tanks at Dry Lake, at Gunbar Swamp, and at the swamp near the Crow's Nest.

These works will divide the distance from the Murrumbidgee to the Lachlan into four stages, as follows:—

1st. To Dry Lake	16 miles.
2nd. To Gunbar Swamp	22 "
3rd. To Crow's Nest Swamp	22 "
4th. To Lachlan River	14 "

In the event of your favouring any proposals for wells, either shallow or deep, Mr. Gordon, who has accompanied me over the line, should be instructed to at once let the sinking of trial shafts, and if you decide on constructing tanks, he should at once call for tenders for excavating them.

Three contractors accompanied me as far as Gunbar; there two of them left, and I cannot recommend the acceptance of any of the offers made. I attach the tenders for your information. I am strongly of opinion that the shallow-seated drift I have drawn your attention to can be most successfully utilized, if a sufficient area of it is exposed.

I would also call your attention to the possibility of making these drifts still more valuable by assisting nature, and sinking soakage shafts in suitable sites to more fully allow the surface waters flowing into them during storms and wet seasons. In many localities dry drifts are to be found near the surface, underlaid and overlaid by impermeable clay-beds, and I think it well worth, not only consideration, but practical trial, whether by such soakage pits water cannot be stored near to, but below, the surface.

In

A. P. Wood. 16 Mar., 1898.

In lifting water from our wells I do not think we have sufficiently considered the importance of wind power as an agent. This, with other questions bearing on our policy in this country, will be treated on in my general report.

I have, &c.,
ARTHUR P. WOOD,
Assistant Engineer.

The Commissioner for Roads, Sydney.

Hillston, 30 March, 1882.

Sir,

I closed my report of yesterday's date without giving any estimate of probable cost of proposed works. This information is given below :—

Tanks.			
1. Dry Lake	£1,500	0	0
2. Gunbar Swamp	1,500	0	0
3. Crow's Nest Swamp	1,500	0	0
	£4,500	0	0
Wells.			
1. Dry Lake	£800	0	0
2. Gunbar Swamp	800	0	0
3. Crow's Nest Swamp	800	0	0
	£2,400	0	0
Tanks supplied under ground.			
1. Dry Lake	£700	0	0
2. 28 miles from Carrathool	700	0	0
3. 42 miles from Carrathool	700	0	0
4. 58 miles from Carrathool	700	0	0
	£2,800	0	0

This last system will, I think, be found practicable at three of the above places—where not practicable, wells are almost a certainty, and that with water fit for human consumption.

If tanks are decided on, the question of type might be left for consideration, as at present I am still in favour of lifting the water; and on this point my views are borne out by those of parties I have spoken to on the matter.

Tenders might be invited for excavating the storage tank, and for running the earth to bank at a distance of 11 yards in the clear from top of excavation to the edge of bank. This bank is not necessarily for use to increase storage, but forms a most valuable check on evaporation. While the work of excavation is in progress the other details might be under consideration.

ARTHUR P. WOOD,
10/5/82.

The Commissioner for Roads, Sydney.

Works on Road from Carrathool to Hillston.

I have given Mr. Wood's valuable report on the different classes of works for water supply between Carrathool and Hillston most careful consideration.

In making his recommendation, Mr. Wood's remarks, "that they involve a departure from Mr. Gilliat's proposals." The matter is not of great importance, perhaps, but I may say that it was not until after my schedule of works for the current year was prepared that the urgent necessity of these works was pressed for consideration on the Department, and that my recommendation of tanks (which is what I presume Mr. Wood alludes to) was made before the road had been examined; of course subject to the information I should subsequently obtain.

Since then I have had an opportunity of seeing a portion of the road and obtaining the opinion of gentlemen well acquainted with the country and of one resident upon it, and have ascertained that, in his opinion, good water, in a very fair supply, may be counted on at a depth of from 60 to 100 feet. From pressure of other work I have been unable to give this question earlier consideration and had proposed deferring it until I had made a personal examination of the road. But as the Commissioner and Engineer for Roads and Bridges pressed for immediate action, and I am deeply impressed with the importance of this Department causing no delay in the operations of the Department of Public Works, I beg leave to submit at once the following remarks for the consideration of the Hon. the Secretary for Mines :—

Mr. Wood suggests three plans for watering this line of road,—two with tanks, and one with wells.

In my report of 1880 I stated that "where an ample supply of good water can be obtained at a moderate depth, wells with proper whims, troughing, &c., are probably the cheapest and most reliable form of work for water supply."

The information I have obtained agrees with that of Mr. Wood's—that sufficient supply can be gained at a moderate depth. I should hesitate about depending on the supply from a shallow shaft, but would urge that in each case the shaft should be sunk until the stronger supply is struck at from 60 to 100 feet.

The sites named by Mr. Wood had all been mentioned to me as suitable, and are as follows :—

Carrathool to Dry Lake, 14 miles	14
" Burnt Stump Swamp, 58 miles	22
" Crow's Nest, 58 miles	22
" Lachlan, 72 miles	14

I would, therefore, submit that the request of the Commissioner—that the sites for these works be approved of—should be complied with, and that steps should at once be taken to secure the reserves at the points named.

HARRY GILLIAT, 10/5/82.

3309. *Chairman.*] You came to the conclusion, after travelling that road, that wells would be better at Dry Lake, Gunbar, or Burnt Stump and Crow's Nest? Yes; the sites of these works having been referred to the Mines Department were approved of by Mr. Gilliat in his report of 10/5/82.

3310. Then Mr. Gilliat also came to the conclusion that the sites were proper ones, and that wells were suitable, and that water might be obtained at depths from 60 to 100 feet? Yes; the local officer had a trial shaft put down at the Burnt Stump or Old Gunbar, and a sample of water was forwarded to the office. The trial shaft was put down to a depth, I think, of 95 feet—I will not be certain as to the exact depth—and the water was approved of. It was never referred to the Mines Department, but the water was so good that I would not object to drink it myself, and on the strength of the sample the main shaft was sunk.

3311. How far away was the main shaft from the trial shaft? Well, to the best of my recollection I think it was about 100 feet, and the water we then obtained is, as we admitted, unfit for stock.

3312. How do you account for this discrepancy between the two samples of water obtained—one from the trial shaft and the other from the main shaft? It is certainly very difficult to account for; but it is an extraordinary fact that in the country I speak of you may put down a shaft in one place and get water utterly unfit for stock, while you may go 100 yards away and obtain water that is fit, not only for stock, but for human beings as well.

3313. And in this instance you only went 50 yards away? Yes. I know another case at Teryaweynia, where there was an accommodation house. The owner sunk in front of his house, and obtained water which was utterly unfit for human consumption, while in a shaft put down not quite 100 yards distant at the back, he obtained very good water indeed.

3314. Another suggestion that has been made is, that the contractors are so anxious to obtain this work that they will substitute good water for bad water in order to be allowed to put down a well at some particular place? Such a thing would, I admit, be quite possible.

3315.

3315. *Mr. Woore.*] But, at any rate, you were misled by being told that this water came from the bottom of the trial-shaft? I do not admit even that, because it is quite possible that good water may have been obtained in the trial-shaft, and that the main shaft may have given bad water.
3316. But, at all events, you were misled into sinking a main shaft by the fact of your being told that good water had been obtained in the trial-shaft? Yes.
3317. *Chairman.*] In those other wells that have the reputation of being too salty even for stock, how were they sunk;—does the same remark apply to them as to the Old Gunbar or Burnt Stump well? I do not admit the fact at all, Mr. Chairman; at the Holy Box well a trial-shaft was put down—I am speaking now from reports—I was not present, and cannot speak from my own direct knowledge—a trial-shaft was put down, and fair stock water obtained. The main shaft was then put down, and similar quality of water obtained. After transfer to the Mines Department, the well was condemned as being unfit for consumption by stock; and after the lapse of some time the Works Department started to put a tank down in the immediate vicinity to supply the public wants at that particular stage. After we had started the work we applied to the Mines Department to be allowed to use the material in the top works to effect a saving in the construction of the works then in hand. When the well was handed back to the Works Department I instructed the contractor for the tank to have it thoroughly baled out in order to test the quality of the water. This was done, and on my reaching Wilcannia about a week afterwards I received a telegram from the contractor and from the local road superintendent to the effect that the stock then passing had been successfully watered there. On the strength of this report the tank works were stopped; the well was further tested; further equally favourable reports were received, and ultimately the tank works were abandoned. Since then there has been a conflict of opinion between the two Departments as to whether the water is or is not fit for the use of stock.
3318. *Mr. Woore.*] Of your own knowledge can you say that the water has since been used for stock purposes almost continuously? No, not continuously. It has been used, though. There has been a man left in charge of the place, and the water has been ready for anyone to use; but I cannot say that it has been continuously used.
3319. Have travelling stock watered there just the same as at any other public watering place? I cannot say that of my own knowledge.
3320. *Chairman.*] Is it a fact that the water is so salty that it destroys the iron troughing? I cannot say that of my own knowledge, either; but, in fact, any water, unless it is absolutely filtered, will destroy ordinary galvanized iron if you give it time. I am not speaking in that restricted sense; of course all water contains minerals which will destroy iron in time.
3321. *Mr. Woore.*] It is alleged that a lot of salt could be scooped up in the troughs? Yes; I saw it in the main tank, presumably where water had been left for some time and evaporated, and there was a lot of salt in the bottom of it. We could furnish you with a sample of the water taken from the Holy Box well, which was taken out in the presence of one of our officers. It is now in Mr. Bennett's office, and I have drunk it myself, and have lived for many a long day on worse water. In my opinion it is equally as good as the water at the Jumping Sand Hill, and that was always considered good water.
3322. *Chairman.*] What about the Dolmoreve and Willandra wells? I will take the Dolmoreve well by itself. I do not know where the line is to be drawn between what is good stock water and what is utterly bad stock water. I will simply instance the report made by one of the overseers of public watering places, who said:—"I boiled some of the water, and tasted it after it became cold; also made tea of it. In each of these cases it was quite undrinkable. With constant baling, however, I cannot understand why it should be unsuitable for stock. I gave this as my opinion to Mr. Lindsay, the manager of Til Til station, who informed me that some of the wells that their sheep watered at were no better, if even as good, as the Dolmoreve; and that if the Government would let him water his stock at it, instead of baling and letting the water run to waste, he would gladly avail himself of it, and would not be afraid of his sheep being injured in any way from drinking the water. It is now nineteen years since I first went to the Kilfera back-blocks, were I remained for about two years, and was at the sinking of several wells, the water being quite as brackish as Dolmoreve well, and decidedly more worse-smelling, yet the sheep drank freely of the water, and without any ill effects; in fact, some of this description of water at the homestead well (Kilfera) was condensed at the well by a condenser, and turned out quite drinkable for human beings, thus saving long cartage of water. In reference to the Dolmoreve well, I would respectfully suggest that if the water as at present drawn is not considered by the general stock-travelling public to be sufficiently good for watering purposes, that the well should be constantly baled dry, and boring rods used to deepen the present shaft, on the chance of striking fresher water. Should the new supply turn out no better than the old, I would then respectfully suggest that trial bores be sunk in the vicinity of the Dolmoreve well, so that, if successful in securing better water, the whole of the Dolmoreve whim, plant, may come in, with short distance carting for the new well." Of course, I do not pretend to be an expert with regard to stock.
3323. Then about the Willandra well? Remarks have been made about this well before it has been finished. Objection is now taken to the site.
3324. They state that this well was not asked for by the Mines Department? The well has not yet been completed, nor handed over, and therefore the Mines Department have not any right to say anything about it. We have had a lot of trouble with this well on account of the drift, &c. As to the other charges in connection with this well, I think I can disprove them under another heading. It was stated by Mr. Gilliat in his evidence that only one work was recommended between Clare and Balranald. He says:—"On the road from Balranald to Ivanhoe the water supply is required chiefly for carriers and their teams, and the works do not need to be on so large a scale, or so close to each other, as upon roads more frequently used by travelling stock. I am of opinion that, if the proposed tank at Clare is completed, one other, half way from Clare to Ivanhoe, will be sufficient." The statement is repeated on page 27 of the blue book before the Commission; yet in Mr. Gilliat's recommendations for works for 1884, which guided us in constructing these watering places, he recommends two works, both of 20,000 cubic yards capacity. One of these is 9 miles north of Clare, and another 10 miles south of Kilfera. [The witness then put in evidence the following]:—

Pumps for Tanks.

Department of Public Works.

(83,383 A.)

I submit for the consideration of the Commissioner the following memoranda bearing on the application of pumping gear to the tanks now being constructed by this Department.

The designs lately prepared for these works provide for a M'Comas water lift or chain pump—this is to be fixed in a timbered shaft, communicating by a timbered adit with the main reservoir. Tenders

A. P. Wood. 16 Mar., 1888.

Tenders having been invited for some of the proposed works, it has been found that the cost of the timber-work required ranges from £150 to £300.

Apart from the cost, there can be no doubt that so much timber-work in this submerged work is an element of weakness.

This has never been disputed, but it was considered that other descriptions of pumps which would have obviated the necessity for all this timber-work would have been more liable to damage—would have required skilled labour to repair them, and would possibly be out of order at the very time they were most required.

Further consideration of the question, and also the further development of the country, the railway extensions rendering transport of such appliances easier, and the increase in traffic and settlement, facilitating repair, and making the works more necessary, has led to the conclusion that the risks of failure in the timbered shaft and adit, combined with the great cost of same, balance or more than balance the objections to the use of higher class pumping gear.

The decision as to the class of pump to be employed must be guided by the varying conditions surrounding each work.

Where timber is readily obtained, it might be advisable to employ steam, which has the advantage of compact power, and of being available in the worst seasons, when it might be impossible to keep horses to do the work.

If steam power is used it would be well to consider whether under certain conditions its employment should not be extended, and the water collected outside the embankments, pumped over them. This course would require the use of more powerful pumps, but would be a source of very considerable economy, and would reduce the cost of storing the water by 40 to 50 per cent. In addition it would make these works more reliable during long-continued dry seasons.

This plan could be adopted in cases where tanks were constructed in shallow swamps and hollows, where the banks of the basin are not of sufficient height to admit of water being collected by catch drains before reaching swamp, and brought by gravitation over the embankments.

The same pump, could, if required, be used to supply service tank, but as long as water was stored in main tank above the ground level, there would be no necessity for this, as the troughing could be fed by gravitation.

When pumps are used for the purpose, a small centrifugal will probably be found most suitable for the work.

Where the natural features of the ground do not favour the necessary storage of water outside the tank embankments to pump into the tank, or where they are favourable for filling the tank by gravitation over the embankments, then a large size pump will be unnecessary, and a small "special" to deliver two or three thousand gallons an hour will be sufficient, and will prove best adapted for the work of supplying the service tank and troughing.

Where timber is not available within a reasonable distance steam power is out of the question, and either wind or horse-power must be utilized for lifting the water.

Wind-power should prove the most economical in its action, and in open plain country where timber for steaming cannot be obtained, the most favourable conditions exist for steady and constant winds.

Should it be decided to employ wind-power in any of the many cases where it could be applied, larger service tanks than those needed when steam or animal power is used would have to be constructed, so that a sufficient quantity of water could be stored for feeding the troughing to meet the demands of travelling stock when wind was wanting, or of too little force.

This drawback would not so much affect windmills employed for pumping water into main tanks.

The use of horse-power must for practical reasons be more limited than either steam or wind, and could not be successfully employed for aiding in the storage of water, as the number of horses required would be too great, and the conditions surrounding their maintenance of a very uncertain character.

For the limited pumping required for supplying stock with water drawn from the storage tank, horse-power can be successfully applied, though as previously remarked they might when most wanted be found too weak for their work, or possibly be lost.

The use of pumps in connection with our wells is also worth consideration, and a trial should be made to test the advantages attached to them.

The cost of sinking a shaft for a pump would be much less, and existing top-works (whim and poppets) could be dispensed with. This would go a considerable way towards meeting the cost of pumping gear, which it cannot be denied should be a great improvement on the primitive whim.

Mr. M'Donald might be instructed to assist in the selection of suitable machinery and in preparing estimates of probable cost of all or any of the schemes submitted, embracing the application of steam, wind, and horse-power.

ARTHUR P. WOOD.

The Commissioner for Roads, Sydney.

Mr. M'Donald to assist as far as possible; but as I have already instructed, I think we should first try a horse or wind pump and a steam special pump at a suitable place, and as waiting to design windmill may delay, Messrs. Wood and M'Donald should carry out the verbal instructions already given to find out the most suitable pump and horse gear, and the most suitable boiler and special pump now available in Sydney. Let me know price, and I will get Minister's authority to purchase. When both have been worked under the conditions required, we will be in a better position to decide. In the meantime that need not prevent the further consideration of the subject in offices, as the preparation of designs for alternative windmill or horse gear.

W. C. B., 6/10/82.

Mr. Wood to consider the best place to send each machine.

[The Commission adjourned.]

THURSDAY, 22 *MARCH*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOOKE, ESQ.

Arthur Pepys Wood called in and further examined:—

A. P. Wood. 22 Mar., 1888.

3325. *Chairman.*] You mentioned on Friday last that some of the other witnesses will probably be in a position to say more about the Willandra well than you? Yes; and also in reference to the works on the Balranald to Ivanhoe road, and the Paroo works.

3326. The next two wells which are referred to are the Normanstone and Baloola, and they are found fault with because they are sunk in basalt? Yes; I believe that that is the reason.

3327. Do you think that there is any validity in such an objection as that? I do not. I know many wells that have been sunk through basalt rock, and they have proved very good water-yielding wells indeed. I can instance another well upon the same road, at Mannum, and there are several also in the Liverpool Plains district, but I do not know their names; but on Garrawilla Station there are some where a plentiful supply of water has been obtained in basalt. There is another point in connection with this. Mr. Gilliat states that we did not put the wells on the sites recommended by him.

3328. Of course there are places where you will not get water in basalt because the basalt sometimes overlies dry country? Yes; and it did so in those two cases of Normanstone and Baloola. Mr. Gilliat says that tanks were recommended there, yet here is his own report in which he recommends wells as against the recommendations of his officers for tanks:—"The first site recommended by Messrs. Mackie and Dowe is for a well at the junction of the Mannum and Burloo Creeks, parish of Mannum, county of White, 15 miles from Coonabarabran. The site is well selected, and the indications are good for a large supply of water. The site and position of reserve I have marked in red upon the annexed tracing. I may say,

A. P. Woore. 22 Mar., 1886.

say, in conclusion, that tanks of the size suggested by Messrs. Mackie and Dowe, say of 4,000 cubic yards, are of no use in keeping open traffic. There is every reason to believe that water can be obtained by sinking at a moderate depth, and wells are at once a cheaper and more durable source of supply. I have therefore to recommend that these works be approved for construction." [*Witness produces tracings of Baloola and Normanstone Wells, to show that the actual sites adopted were within short distances of the sites pointed out by the Mines Department.*]

3329. *Mr. Woore.*] Does this report of Mr. Gilliat's apply to those wells? Yes; what I quoted just now applies. To the best of my recollection Mr. Gilliat says in his evidence, given before this Commission, that his Department recommended tanks at these places.

3330. *Chairman.*] I notice that at page 154 of the Mines blue book, Mr. Gilliat says of this Baloola well:—

Baloola Well.—I examined the site of this well on the 17th June, 1884, but, as the works not being completed, reserved my report. I find from my journal at that date: The position chosen is about a quarter of a mile from where I would have put it. The shaft has been sunk on the shoulder of the hill, and is now down 94 feet; 9 feet of stiff clay, 5 feet of sandstone, the remainder basalt; no water. On the flat below, in the black soil, water is usually obtained at from 80 to 100 feet. The station, I think, has a well in the neighbourhood.

Normanstone Well.—This shaft has been sunk 4 miles from the site selected by me on Basin Plain.

——? Instead of being 4 miles from the spot chosen it is only a few chains. I think you will find a statement similar to that in the evidence.

3331. Has water been since found in either Baloola or Normanstone wells? No; not in Baloola. In the Normanstone well we have a very small supply—only about 200 gallons per hour—and we are now proposing to drive at the level of the inflow.

3332. Did you get through the basaltic formation? Yes.

3333. And in regard to the Baloola well? In regard to that I may say that we have got down to 200 feet, and it is practically dry, but boring operations are now going on.

3334. What have you got into? We have got into a sort of shale, not solid rock. I think it belongs to the carboniferous formation.

3335. You know that other wells sunk in the neighbourhood have given an abundant supply of water? Yes.

3336. *Major Penrose.*] I see here that Mr. Gilliat asks for a tracing of which there is no record in his Department; this is not the tracing referred to by Mr. Gillint here? It cannot be. These are the original instructions sent to Mr. Wilson:—

Mr. Wilson will prepare plans and specifications (copies herewith) and invite tenders for wells at the undermentioned places on the road from Coonabarabran to Gunnedah:—

1. Near the junction of the Mannum and Burloo Creeks, about 15 miles from Coonabarabran.
2. 13 miles from Rocky Glen, and 34 from Coonabarabran.
3. About 55 miles from Coonabarabran, and about 43 from Melally.

Attached is a sketch showing the approximate positions of these proposed works. Mr. Wilson will report on the necessity for extending the reserves round the wells, and forward a sketch showing any alienation interfering with such extensions.

The specifications will provide for sinking 100 feet, and intending tenderers must be instructed to give a schedule rate at which reductions from, or additions to, this depth can be valued. Tenderers must also give a separate price for service tank and for troughing.

Mr. Wilson will examine this line of country, and if he thinks any slight alteration in the sites advisable, report same to the office, giving his reasons for same; he will not, however, delay calling for tenders on this account.

3337. *Chairman.*] Do you know the Liverpool Plains country? I do to a certain extent. I have gone over the roads there on several occasions.

3338. The soil of that country is loose black soil? Yes.

3339. And quite unsuitable, in most instances, in you opinion, for tanks? As a rule it is.

3340. Wells, generally speaking, having been successful in the locality, you thought they were infinitely preferable to tanks? Well, I certainly agree with the recommendation of Mr. Gilliat himself in that respect. He recommended that in the papers which came to our Department from the Mines Office.

3341. The next case is the Milparinka well, which is said to have been put down in vertical slate formation? It is in alluvial, not rock at all. But assuming that it has been put down in vertical slate formation, as we have obtained a good supply of water, I do not think there is any reason to find fault.

3342. *Mr. Woore.*] Has this Milparinka well been handed over? I would not like to say that without reference to the papers; but I am under the impression that it has not been handed over.

3343. Then probably this comment was made before the water was struck? I cannot find out in the papers where this statement has been made. I remember now that the well has not been handed over.

3344. *Major Penrose.*] You will be able to hand it over all right? Yes.

3345. Is it good water? Yes; fairly good water—water that could be used at a pinch by human beings. It is a little brackish, but only very slightly.

3346. *Chairman.*] What about the Menamurtee well? There was no distinct sanction obtained for this well, but I think it is fairly covered by the decision of the Minister for Mines in the case of the J.K. well. You will notice on page 217 of the Mines blue book a minute from Mr. J. P. Abbott, then Minister for Mines, in these terms:—"I think tenders should be accepted for a well, as by this means a more permanent water supply is likely to be had, and entirely independent of the lessee." There are one or two other cases that I would like to draw attention to; they are mentioned in the evidence. The Ivanhoe case was one of those referred to by the Mines officers.

3347. *Major Penrose.*] Apparently there were altogether three sites selected for that tank? Yes.

3348. *Chairman.*] You wrote here at the beginning of March, 1885, recorded at page 66 of the Mines blue book, referring to the Ivanhoe case:—

When works for watering stock routes were first undertaken in 1870 a well was sunk at Ivanhoe, which yielded a plentiful supply of good water. This well was subsequently handed over to the Mining Department, fell into disrepair, and was ultimately condemned by its officers.

In 1882 application was made for a tank at this place, but in view of the fact that good water has been proved to exist under ground, a well was strongly recommended by the Department, both on the score of economy and certainty of supply. This proposal was strongly opposed, and tenders were then invited for constructing a tank on the Balranald road, about 1 mile west from the township; but owing to the seasons, no reasonable tenders were received, or, when accepted, were not taken up. This occurred time after time, until a change took place in the season, and tenders were again invited, and Casey's tender accepted, for constructing a tank at the site already mentioned. This being settled, the lessees of Kilfera run, in conjunction with some of the townspeople, brought pressure to bear, and the site was removed to the Box Swamp, about 1 mile east of the town, on Ticehurst run. Here the contractor was served with a notice by the lessee that he was trespassing, and it was then discovered that the land was selected a few weeks before.

The question of site was ultimately settled by constructing the tank on the village reserve, which pleases Kilfera, Ticehurst, and the residents of the township.

Just

. Wood. Just give the facts in connection with the sinking of the well? At the first onset the Department wished
to put down a new well in place of the abandoned well sunk in 1871. This course they proposed following
ar., 1888. on account of the known quality of the water in that well. But as the townspeople wished to use the
water for drinking purposes, a good deal of pressure was brought to bear to have a tank sunk in lieu of
a well. This desire was eventually acceded to, and a site chosen on the Ivanhoe to Balranald road,
about a mile to the west of the town. Then the townspeople, in connection with the owners of the
Kilfera pastoral holding, on which the site of the tank was situated, brought pressure to bear to have the
site again altered.

3349. *Major Penrose.*] After the work of sinking had been commenced? No; we had not commenced the work. Mr. Williamson, the leading townsman of Ivanhoe, was very anxious that we should have the site in his paddock, which he offered to part with to the Government on condition that he was allowed a much larger area—I forget the proportion—adjoining his ground to the northward, in addition to a certain sum to be fixed as the purchase money for the 50 acres to be taken for the tank site. We then selected a site about a mile to the east of the town; trial holes were put down, and the contract for the construction of the tank let.

3350. Without further reference to the Mines Department? Yes, I think so; but I am under the impression that the papers would show that the Mines Department knew of it. Between the time of sinking the trial holes and the arrival of the contractor on the ground, the lessees of the Ticehurst run selected the site that we had chosen; and when the contractor arrived he was ordered off the place. After some little delay, and after further political pressure from the members for the district and local people, the site was fixed where the tank is now constructed. And, in my letter, on page 66 of the Mines blue book, which was referred to the Mines Department, this site was mentioned; and, in a minute on the same page, signed by Mr. H. Gilliat, it is stated:—"The exception taken by this Department to a well at Ivanhoe has always been based on the ground that the subterranean water, while good stock water, was too brackish for domestic purposes; second, that any watering place constructed here would be required for the use of the township, as well as for stock purposes. It was therefore submitted the watering place should be a tank, and within a convenient distance of the township. These conditions are, I think, fully met with in the site Mr. Wood has selected." I do not think there is anything else necessary. It has been stated by some witnesses who have been examined before the Commission that this particular site catches all the town drainage, and renders the water unfit for human consumption. There was a drain there which I objected to during one of my trips; but more on account of its destroying the allotments that were to be put up for auction than on account of any evil effects that the drain is likely to have upon the water. The site recommended by Mr. Gilliat in Mr. Williamson's paddock carries the drainage of nearly the entire township, which must go there owing to its position. And, therefore, I think, from that point of view, the site which we have selected, and which has been approved of by the Mines Department, is much preferable to the site in Mr. Williamson's paddock.

3351. Then you were in a manner forced to put the tank where you did eventually place it? Yes; it was owing to the pressure which was brought to bear, and from which, I am sorry to say, no public Department is completely free.

3352. *Chairman.*] Will you turn to page 68 of the Mines blue book, and observe the diagram showing the way the water runs. The road from Booligal to Wilcannia runs through the township. Are these drains which are above it the drains which convey the water into the tank? Yes.

3353. Consequently, the water, instead of flowing from the tank when full, flows towards the township of Ivanhoe? Yes; it is in a sort of valley.

3354. *Major Penrose.*] You mean to say that the tank is higher than the major part of the town? No; I do not mean that.

3355. *Chairman.*] According to the diagram shown here it would appear that the drains which conduct the water into the tank are above the township? Yes, with the exception of Cobb & Co.'s stables: and even these are below the drain that formerly assisted to fill the tank. But this drain has since been closed up. But in addition to the stables there is a public-house and a few other buildings.

3356. But no water from these buildings can flow into the tank? No; at least not by the drains, though it is possible that it might come down by an indirect course.

3357. *Major Penrose.*] Mr. Low, one of the Inspectors of Public Watering Places, says in his evidence about this tank:—"*Drains.*—These are badly constructed, evidently with no intention of leading water to main tank, much of them running from instead of to the main tank. Two of those drain water from the tank, the other runs parallel to the main road, overflows silt-tank, and fills a private tank belonging to Elliot?" As regards the state of the works at the time Mr. Yeo took charge of the tank, it is correct. But I am now giving evidence which it would be better for you to obtain from Mr. Stilwell, Assistant Engineer in that district. You will find when you have examined him that it will be very easily accounted for.

3358. *Chairman.*] The site was objected to on account of the character of the soil? Our local officers objected to it.

3359. Then why was the tank sunk in such a place when the soil was so unsuitable? On account of the opinion given by Mr. Webb, one of the owners of Kilfera station, who said that he had tanks in similar ground, and that they held well; and also because this statement of Mr. Webb was supplemented by a guarantee to the extent of £500 to puddle the Ivanhoe tank in the event of his opinion being wrong. This was why the site was adopted.

3360. In any instance in connection with the drains leading to this tank, does the water run from the tank instead of towards it? I cannot say from my own knowledge, but I should say from what I know of the conformation of the country that such a thing is extremely improbable.

3361. Then it is not a fact that the drains supposed to lead water to the tank, lead water from it? From my own knowledge of the ground and of the works, I should say most decidedly not, so far as I could judge by the eye. Of course I did not see the water running when I was there.

3362. There is another tank that is mentioned as having an injudiciously selected site—Gunaramby. It is referred to in the evidence, as follows:—

Gunaramby Tank.—This has been excavated in rotten copai ground, which, owing to steepness of batters, has fallen in to a very large extent. A good site for a tank could easily have been secured near to this. Drains.—These are badly laid out, and the system of leading water round excavation inside of embankments in ground such as this must lead to to damage and washing in of batters.

—— ? Copai is found in the best ground. 3363.

3363. *Major Penrose.*] But apart from that fact, is it rotten ground? This ground, when the water is not upon it, dries up, and when exposed to the sun cracks up into little sections. It is friable to that extent; but it is not friable ground as I understand the term.
3364. Does the tank stand well? I have not seen it since it has been filled with water. I believe it is full now—at least this is the effect of the last report we had from our local officer.
3365. Are there any other tanks that we have omitted to ask you about, and which you would like to refer to? In reference to this Gunaramby tank, it has been complained that we have put it in a wrong site, in a swamp, instead of high ground that was near the swamp, and that we have bad feeds to this tank. It is put on the edge of a swamp, where the rising ground commences, that rising ground being used as one of the four enclosed sides. It is fed from the swamp level through an inlet pipe with a valve, and from the upper level, from the higher ground, through a shoot; so that, when the water rises to the level of the swamp, we close the valve, and you get a good supply of water by gravitation to fill the tank above the natural level of the swamp itself.
3366. Is it not a fact that the soil of this swamp is very open and porous, full of cracks, and that it is very difficult to collect water in it, except after very heavy rains? In some swamps I will admit that this is the case; but in others, it is just the reverse. The cane grass swamps form splendid catching ground.
3367. But is it not a fact that these swamps are generally in very friable ground, which cracks very much in dry weather, and so requires a very heavy rainfall to make the water run? Only some swamps. Some of our best holding tanks are in these situations, and, in this case, we used both the hard edge of the swamp as well as the swamp itself as a catchment area. There is one point you have taken exception to—the way in which drains are cut on the berm; Mr. Low, in his evidence, states that in one case he was frightened the whole berm would be washed away.
3368. The objection that has been taken is this: that instead of the water flowing directly into the main tank from the silt-tank, it is conducted round the top of the excavation, by an open drain, before it is allowed to flow into the main tank. Why is this done? To save the expense of an extra shoot. There would have been a second shoot necessary if the water had been conveyed direct. Instructions were given by Mr. Stilwell, in my presence, that this drain was to be protected with copai, and when that has been done, or if it has been done, I do not think there is much danger of any evil resulting from it. At the same time, as a matter of economy, a second shoot would have been preferable. Then there is the Polygonum Ifut well, referred to in the evidence given by the Mines officers. It is said, in the first place, that the water from this well is unfit for stock, if I remember aright. Well, the water in this well is not only fit for stock, but it is very fair water for human consumption. It is stated, also, that there is a swamp close by, whereby a grip or drain might be made for £5, which would be sufficient to conserve a quantity of water that would meet all the requirements of the travelling public. In reference to the last statement, I must say that I put down a bore at this particular spot in 1869, and camped on the ground where it is stated a permanent supply could be obtained by storage.
3369. I think the word used is "whip," not "grip." The statement is that a whip, costing £5, could be put up instead of a windmill? I think the statement must have been made in another portion of the printed document, because it is distinctly stated that a well is unnecessary. I am aware that some remark is also made about a whip costing £5, by which water could be drawn.
3370. *Mr. Woore.*] Is not this the case in which it is said that the water evaporates as fast as it is drawn? Yes, this is the case so referred to; but it is not a fact that the water evaporates as fast as it is drawn. As soon as a certain quantity of water is brought up, and the tank filled, the windmill should be thrown out of gear.
3371. We were given to understand that the windmill would not draw more water than would go off in evaporation? That is not the case. Had it been the case we could never have filled the tank; because in addition to the evaporation the soakage there was tremendous.
3372. *Chairman.*] During his evidence Mr. Low made the following statement about windmills:—"I would not like to object to windmills as a method of lifting water, but I should object to them where there is only one man stationed because if anything goes wrong a man cannot put it right without assistance." You have heard the last statement from Mr. Low about the use of windmills? What have you to say in regard to them? I consider if the conditions are favourable that it is the most economical way to raise water. It is the only windmill which we have tried. This is on an open plain where scarcely a day passes but there is a fairly strong wind blowing to keep the mill at work; and we find that the duration of these winds is ample to allow of a sufficient quantity of water being pumped into the service tank to provide for any consumption that may be called on. We have to make larger service tanks to meet such a contingency as calm weather.
3373. *Mr. Woore.*] What part of the country is this in? It is about 15 or 16 miles south of Mossgiel.
3374. *Major Penrose.*] Reference has also been made here to the Mulya tank. It has been said that this tank has been constructed for about five years and yet there is no water in it? I am not sure that that tank has yet been handed over to the Mines Department. If it has been handed over it has occurred within the last month or two. I admit that it is not a good site, but in that locality it is impossible to get a really good site. To divide the stage between the Darling and the next tank at Kerrigundi, this was the best site obtainable. We were hampered to a very large extent in fixing the sites by the necessity of dividing the routes into stages with equal distances between.
3375. *Chairman.*] Now with respect to faulty design and defective construction a great deal has been said here. In the first place we have been told that the batters of all these tanks are altogether too steep? There is a good deal of conflicting evidence about that. I have read the evidence through and there seems to be as many witnesses in favour of the steep batters as against them. The general opinion seems to favour the steepest batter consistent with the nature of the soil, and this is what we have endeavoured to carry out. I readily admit that in some of the older tanks—notably those in the Liverpool Plains at Galathera and Boggy Creek on the road between Narrabri and Moree—the batters (which are 1 to 1) were far too steep for the nature of the soil. But I am not aware of any other cases where tanks have suffered to any extent from the slopes that have been adopted.
3376. That is a batter of 2 to 1? Well, the batters vary from 2 to 1, to 1½ to 1, and on the Wilcannia and Mount Brown roads we adopted a 3 to 1 batter.
3377. Then who has the discretion of fixing what the slopes shall be? The local officer. He is particularly instructed not to adhere slavishly to the specifications in regard to this matter.

A. P. Wood. 22 Mar., 1888.

3378. And after sinking the trial-shaft has he the discretionary power to order a certain slope which from experience he believes to be desirable? Yes.
3379. *Mr. Woore.*] So that no hard and fast rule is carried out in regard to the batters of the tanks? No.
3380. And never has been? No; never has been.
3381. *Chairman.*] You are aware that all these tanks with comparatively steep slopes are not intended for the direct watering of stock? No; not for open watering of stock.
3382. Consequently the steepest possible slope or batter consistent with the soil has always been adopted? I will not say has always been adopted, because in one or two cases we have adopted more gentle slopes in order to cheapen the cost of the work.
3383. Now is it a fact that the tanks excavated by the Government cost very much more than tanks sunk by private individuals? Yes; I believe that is a fact.
3384. Will you explain the reasons why? Well there are many reasons why? In the first place the very question that you have just touched on includes one reason—the steepness of the slopes.
3385. Precluding the use, I presume, of ploughs and scoops? No; the contractors do use the scoops still to a very large extent. The contractor roughs out the tanks with the ploughs and scoops.
3386. *Major Penrose.*] You have known all along, I presume, that the Government tanks cost more than private tanks—that is to say from their construction they must necessarily be dearer? Yes.
3387. We have been given to understand that it is impossible to use ploughs and scoops on one of these steep batters? It would be impossible to finish the work with ploughs and scoops, but a portion of the earthwork can be taken out with them.
3388. Are ploughs and scoops universally used? No; I will not say that, because there are some contractors who prefer tip-drays to ploughs and scoops. Mr. Gleeson, a man who has constructed a great many tanks in Southern Riverina, used to say that he could do the work cheaper by means of tip drays.
3389. We have been told that if the Government would allow the slopes of these tanks to be made longer that it would cheapen the work? There can be no doubt but that it would lessen the cost to some extent.
3390. Do you know to what extent it would lessen the cost? It was stated, I think, in a communication from Mr. Budd. He is the only contractor who ever made an alternative offer to the Department. I have gone into the question once or twice myself, and I think that with a couple of flat slopes the cost ought to be lessened by 2d. or 3d. per cubic yard.
3391. Now would that lessened cost be commensurate with the lessened efficiency of the tanks so constructed—I mean taking into consideration the greater amount of surface which would be exposed to evaporation and to capillary attraction? No; the main depth of the water would be reduced to a great extent, and there would be a larger evaporation area.
3392. And a much larger soakage area? Yes; but that would not be a very large element.
3393. *Chairman.*] Have you ever worked the problem out? Yes.
3394. And what conclusion have you come to? Taking the tanks with 1½ to 1 slopes and the tanks with 4 to 1 slopes, there would appear to be a difference of 50 per cent in the main depth and 30 per cent in the evaporation area, with an additional 30 per cent in the soakage area.
3395. *Mr. Woore.*] That is, tanks with equal slopes all round? Yes; I have not taken the estimate with merely the end slopes at 4 to 1.
3396. *Major Penrose.*] The comparison is between tanks of equal capacity? Yes; and of similar maximum depth.
3397. *Chairman.*] Consequently the Government tanks, which it was presumed would last through a considerable drought, must necessarily cost a great deal more than private tanks, and would justify the expenditure? Well, that is the opinion the Department has arrived at, and it is the opinion which has actuated us in the construction of the works. I might mention that the station owners have to adopt these flat slopes on account of the open watering of the stock, but according to the evidence given before the Royal Commission on the Conservation of Water it seems that a large number of station owners were of opinion that their tanks never would have lasted a drought through. The flat slopes and open watering are to a very great extent, in my opinion, the cause of the non-permanency of the water.
3398. Then you think there are other reasons still why the Government tanks should cost more than those put down by private individuals? Yes, there are other reasons. In the first place a contractor who works for a station owner has every facility given him for carrying out the works—water, grass, supplies of every kind are available. And then there is another most important feature of the case, that the squatter generally constructs his tanks at a time when there is plenty of grass and water in the immediate neighbourhood of the site selected; while the Government are obliged to construct their works whether the season is dry or not, and without the option of selecting sites where grass and water can be obtained.
3399. With regard to delay in payments—we have been given to understand that this is one of the reasons why contractors ask large prices from the Government? I am inclined to doubt that that can be any reason. There have been no delays in payment except in one or two trivial cases where final payment involving only small amounts have been concerned; and where there has been a hitch between the contractor and the local officer, necessitating correspondence and a certain delay consequent thereon.
3400. Well, we have had it in evidence that one man was obliged to go through the Insolvent Court on account of the difficulty which he experienced in obtaining the balance of the money that was owing to him? I am very sorry to say that a great many of the contractors have become insolvent, but not from that cause. Neither can it be from the reason mentioned by the officers of the Mines Department that the contractors received too much money for the work which they performed for the Government.
3401. *Mr. Woore.*] Do you know that many of the contractors have gone insolvent? Yes.
3402. *Chairman.*] Thus showing that they did not as a rule make money out of the work performed by them for the Government? Presumably they did not make money. It is a very strange thing that as a general rule the contractors will take work from the squatter where the work is available, when they will not take it from the Government. I think this clearly shows that the Government do not give excessive prices for the character of the work performed. We may be paying more than the squatters pay, but there is not a large profit attached to it—that is, allowing for the conditions under which the work is taken

taken from the Department—in regard to feed and rations. To show that we did everything that we could to accelerate payments to our contractors in the back country I would like to put in evidence this circular issued to our officers as far back as 1883:— A. P. Wood. 22 Mar., 1898.

Department of Public Works. Office of Commissioner and Engineer for Roads, Sydney, 5 February, 1883.

(Circular.)

With the view of as far as possible assisting contractors for tanks, you are authorized to make payments in future as under, subject to the following regulations.

1. That when a measurement is made for an advance, 50 per cent. of the value of the work done can be paid at the time, the remaining 30 per cent. to be returned for as a further advance on a separate voucher which will be paid immediately upon receipt at head office, and officer advised by telegram. It must, however, be accompanied by receipted voucher for amount paid in advance.

2. That no payments in excess of 75 per cent. of the amount of officers' guarantee policy to be made to any other contractor (unless total is within that sum) until E. T. advice of lodgment to officer's credit of prior payment is made.

3. Receipt, stamped and witnessed must be obtained on the regular form at the time of making the payment.

4. Telegraphic advice of such payment having been made must be at once forwarded to head office.

(Signed) P. H. FLYNN,
For Commissioner and Engineer for Roads.

3403. There has been a general concensus of opinion that great delays occur in making these payments? All I can say is that the delays which take place are delays necessary to any Department having large disbursements of public money. The checking of accounts of course necessitates delay to some extent, but as soon as a man's account is passed for payment it goes to the Treasury, is returned to us and is paid after being examined, and having been placed to our credit. Certainly all this means delay, but there must be delay if you are to have a proper check over public expenditure.

3404. *Mr. Woore.*] Is there not a considerable delay sometimes in inspection? Well, the best answer I can give to that is that I have driven over most of these roads while the major portion of the works were in course of construction, and I never heard any complaint from the contractors on that ground. And I may say that if contractors have any cause of complaint they are generally very ready to make it. That is my experience of them.

3405. In the event of a tank being filled before the inspector comes round what is done then? I have only known two cases where that has occurred. The tank is measured afterwards by sounding. I believe the Purnamoota tank was one of those which was filled that way.

3406. *Major Penrose.*] I should think that would be a very good way of measuring? Yes; because you have a good level to work from.

3407. *Chairman.*] Is it a fact that the Department is so strict, that although the tanks may be the full depth, if there are any inequalities on the bottom the work will not be passed unless the contractors smooth it over? No; that is not a fact. I can say emphatically that it is not a fact.

3408. Again it is said that the Government are very particular in having the tanks dressed down with such nicety that this in itself causes a large expenditure? No; that is not a fact. So long as the spirit of the contract is fulfilled we are not particular as to the letter, and you will not have much difficulty in finding in this evidence statements which are rather contradictory on this point. Some of the Mines officers said themselves that the banks were not neatly trimmed.

3409. It has also been said most distinctly that unless men have considerable means, they are unable in consequence of these delays to tender for Government works—hence the paucity of tenderers in comparison with the number of tenderers for private tanks? I do not see that the work in connection with these tanks require contractors that have any particularly large amount of capital. A man with a plant, ploughs, and scoops, and bullocks, is in just as good a position if he has enough money to last him for a month, as the man who had £1,000 at his back.

3410. But whenever a tank-sinker is working for a squatter, he can go to the squatter and get a percentage of his money. On the other hand it may not be convenient for the road superintendent to inspect the works, and he may not come round for weeks after the work has been finished. The contractor wants money and has to pay for everything he gets from outside, the consequence being that he is in a worse position than the tank-sinker who is working for private individuals? There is a certain amount of reason in that statement of the case, but it has only a limited application. I think you will find that as a rule all these men have had payments at intervals of about a month, and a man ought to be able to pay the wages of his employees for that time. If not I think he had better leave contracting alone, and work some time longer and save a little more money. Assuming that a man was kept three months out of his money, I am certain that it must have been an exceptional case, and it is scarcely fair to bring an exceptional case to prove a rule.

3411. Yet it is exceptional cases which weigh with contractors, because they know what is going on, and what happens to one may occur to another? I am only assuming that such a case exists, because I really do not think that there has been any great delay.

3412. What has been the longest delay that you have known? I would not like to answer that from memory. There was one case in which a man named Bell was concerned, and in which a small amount of money only was involved, but it hardly comes within the scope of your question. There was a delay of some months in this case, but it was owing to a dispute between the local officer and the man. After the final payment for the work that had been actually made, this Mr. Bell entered claims for extras which the local officer had presumed were included in the first payments, and when the matter was gone into it was found that the contractor was entitled to a portion of the amount which he claimed.

3413. It has been said that 2s. 6d. per cubic yard has been given for excavation work—is that true? Not to my knowledge.

3414. But would you know it if it were true? Yes; a paper has been sent you in reference to the completion of one or two of these works. It is possible that such a price has been given by the Railway Department, but 1s. 9d. per cubic yard is the highest price that we have paid.

3415. *Major Penrose.*] One of the charges made is that you have adopted a certain size of tank without reference to the formation of the soil, and it is stated that this is especially true with regard to the Cobar district? We have been guided by instructions. When we received instructions from the Mines Department to carry out certain works the site of the tanks required was generally fixed by them.

3416. We have had witnesses here who stated that in part of the Cobar district 10,000-yard tanks would be ample for all purposes. Mr. Cotton, an official of the Mines Department, said so, and I believe Mr. Chesney gave evidence to the same effect? These tanks were carried out under the Mines recommendation that they should be 20,000-yard tanks. I put in recommendation. [*See Appendix.*]

A. P. Wood. 22 Mar., 1888.

3417. *Chairman.*] I asked Mr. Bennett a similar question about the Walla Walla tank, and Mr. Bennett said that he was not responsible—that he was obliged to carry out the works according to the size fixed by the Mines Department? In that case I do not think the Mines Department mentioned the size of the tank. We only received general instructions to carry it out.
3418. The allegation is that the Walla Walla tank is a very expensive one, and that it was needless because the water would only be used by a number of selectors in the vicinity? We do not maintain that the work is at all necessary. We have nothing at all to do with that question. Certain works are recommended by the Stock Branch of the Mines Department, and our duty is simply to carry them out. We have to do this without any reference to the question as to whether such works are going to offer an equivalent benefit to the public or not.
3419. *Mr. Woore.*] This point as to the necessity for the works has to be decided by the Mines Department? Yes, we simply construct.
3420. *Major Penrose.*] Another allegation made with regard to these tanks is that square embankments have been put round when they might have been run out as wings to the hill side? Wherever such features were obtainable we ran out the embankments as wings to the high ground.
3421. *Chairman.*] We find that instead of having tanks of 860,000 gallons capacity we have tanks of three million gallons capacity? There would be no use in putting down tanks of 5,000 yards capacity. If you carried that down to 18 feet it would be almost practically speaking an inverted pyramid. And without you go to 18 feet deep you cannot have permanent water.
3422. That all depends upon the nature of the rainfall. In the Albury district they have a rainfall of 24 inches? To a certain extent it depends upon the rainfall, but it also depends upon the catchment. They suffered for two years down there from the drought, and there was not a drop of water to be had.
3423. Then if the Mines Department make this recommendation for a small tank why does the Works Department go out of its way to construct these very expensive works? There are two reasons. In the first place we had other tanks recommended by the Mines Department in that district of 15,000 yards capacity, and in the second place it was better to be on the safe side and err in the matter of storage, especially as the cost of extra excavation bears but a small proportion to the cost of the appliances. You would have the same expensive appliances with a small as with a large tank.
3424. *Major Penrose.*] A 5,000-yard tank is a very small one in your opinion? Yes, very small, and perfectly useless.
3425. *Chairman.*] As this Walla Walla tank was put there apparently for the use of the ordinary traffic was it not sufficient, seeing that it was not on a stock route, as this was not very urgent work, and the rainfall much larger and less uncertain than at other places. I am inclined to think the allegation that unnecessary expense was incurred here was somewhat borne out? Well, the tank we were recommended to construct was 15,000 yards. I would like to put these documents in evidence, as they show that the tank was not constructed at our instance:—

Public Tank at Walla Walla.—I was under the impression, from my knowledge of the district for which the tank is asked, that a considerable amount of both stock and ordinary traffic passes through the proposed site. I requested the local inspector, Mr. Mackay, to report as to this and also to the other places at which water is to be obtained on the road from Albury to Doodle Cooma (one of the cross-country roads from the Murray to the Murrumbidgee) in the dry season of the year, Mr. Gilliat's report not having touched fully on these points. Mr. Mackay reports that there is a large amount of general traffic on this road, but is unable (having only lately been appointed) to state the extent of the stock traffic, and he further says that there is no water in dry seasons available to the public, except by sufferance, on this stretch of road, which is about 45 miles in length. It would seem, therefore, that the work applied for should be carried out, especially as it would also meet the requirements of the settlers who sign the memorial, and I would suggest that it be considered in the same class as the other works asked for on the road from the Murray to the Murrumbidgee, the construction of which, however, should, I think with Mr. Gilliat, give place, in the meantime, to the more urgent works in the outlying waterless portions of the Colony, where the rainfall is much more uncertain and very much less.

If this be approved, Mr. Day, M.P., might, perhaps, be informed, and the papers forwarded to the Department of Works.—A. B.

Stock Branch, 24/10/82. The Under Secretary for Mines.

I do not see that any action can be taken by this Department in this case. The Jindera papers, which were given to the Mines some time ago, are now required in this office.—W.C.B., 13/11/82.

(82-342)

Stock Office, Albury, 12 June, 1882.

Sir,

I have the honor to report that, having visited Walla Walla, and inspected reserve No. 730, I would recommend that a tank of say not less than 5,000 yards be excavated in the south bank of Petrie's Creek at one or two eligible sites between the Walla Walla road and the swamp, and that the earth taken from the tank be used to form two dams across the creek, one to throw the water into the tank, and the other to dam the water in the creek a few hundred yards lower down, where the bed of the creek is wider and deeper.

I would also recommend that the tank be enclosed with a secure sheep and cattle-proof fence, and that pumps and troughing be fixed for watering stock, as if they are allowed access to the water it would soon become unfit for household use.

I have, &c.,

Alexander Bruce, Esq., Sydney.

GEO. E. MACKAY.

I am unable to offer an opinion upon these papers before personally inspecting. I would recommend that the decision with regard to this application be suspended until my return from the west, when I could in three days visit the site proposed, and ascertain the amount and character of the traffic to be supplied; and if it then appears desirable, the work could then be included in the schedule of new works for 1883.—H.G., 16/6/82.

Stock Office, Albury, N.S.W., 18 October, 1882.

Sir,

I have the honor to acknowledge the receipt of your B.C. 12/10/82, attached to Mr. Gilliat's report on the application for a public tank at Walla Walla. I regret that I am quite unable to state what amount of stock travel by the route mentioned; but there is a large amount of ordinary traffic, and the Billabong Creek is the only point between Albury and Doodle Cooma where travellers can obtain water in summer-time without being dependent on the owners of the adjoining freehold lands. And now the Billabong does not afford sufficient water for any considerable number of stock when accessible from the road in an ordinarily dry season.

I have, &c.,

Alexander Bruce, Esq., Chief Inspector of Stock, Sydney.

GEO. E. MACKAY.

3426. *Mr. Woore.*] What is the cubic measurement of this tank? It contains about 3,000,000 gallons. I will find out the cubic contents of the tank itself.
3427. *Chairman.*] It would be about 15,000 yards? Well, that is what they said. Lowesdale and Daysdale were the other works. They were on the road from Urana to Corowa; at Corce and Daysdale there were 15,000-yard tanks also.
3428. Consequently the Walla Walla tank was constructed with the same capacity? Yes; in accordance with the general recommendation.

3429.

3429. And Mr. Mackay's very simple request was not confirmed by the heads of his own Department? No. The recommendations of the Mines Department always guide us in regard to the size of these tanks.
3430. *Major Penrose.*] During the early history of these public works you constructed them much smaller than now? Yes; we then had double tanks; but Boonoona, which is one of the early works, was 18,000 yards capacity.
3431. *Chairman.*] Referring to the published papers from the Mines Department, we see a letter here from Mr. Gilliat, stating that the Walla Walla tank was unnecessary. He says, in a report bearing date 9th October, 1882:—"Bearing in mind the large expenditure required in the dry districts of the Colony, the comparatively good rainfall here, and the trifling expense at which water can be conserved by the settlers themselves, and the fact that the construction of a tank here would be taken as a precedent, and be followed by numbers of applications for similar works, which would be convenient, but not absolutely necessary for the well-being of the settlers, I am not prepared to grant this application."? I know that in a letter from Mr. Bruce, dated 24th October, 1882, Mr. Bruce recommends the Works Department to carry out this work on the same plan as the others in the Murrumbidgee district.
3432. *Major Penrose.*] Then, is this published correspondence with reference to the Walla Walla tank misleading and incomplete? Yes; inasmuch as Mr. Bruce's letter does not appear in it. On page 141 of the Mines blue book, two or three works are mentioned as having been begun, without reference to the Mines Department. All these cases are easily explained. The Black Swamp tank on the road from Deniliquin to Hay is an error. It is a mistake for them to say that this tank was constructed without reference to the Mines Department. That is one of the works upon their list. As to the Nymagee tank, between Cobar and Condobolin, that tank was constructed under the authority of the Minister for Works. We have the papers if you should wish to see them. The work was undertaken on a petition from the residents of Nymagee, and the object was to give a supply of water to the town.
3433. There were sufficient grounds for the construction of a tank apart from the supply of water for stock? Yes; the Jindera case is a similar one to that of Nymagee, action having been taken by direction of the Minister for Works. The Galathera tank, between Narrabri and Moree, was constructed before the works were taken over by the Mines Department in 1878. A special vote of £3,000 was set apart for tanks and wells in the Liverpool Plains district at the instance, I think, of the local member, and it was with a portion of this money that the Galathera tank was constructed.
3434. Mr. Chesney states that the fourth bank is unnecessary, and his evidence would lead us to infer that Government tanks have been in nearly all cases built with four embankments, and that no provision has been made by running out embankments as wings to conserve the water above the natural surface? All the tanks on the road from Cobar to Bourke, with the exception of the one at Helman's, are constructed with three embankments abutting on natural rising ground, and this has been done as far as the features of the country will allow. Then on the Cobar to Louth road, at Cuttygullyaroo and at Kerrigundi, the water is conserved above the surface, but at the other two sites the features of the country do not allow of this being done.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

3435. *Chairman.*] The next thing we would wish to go into is this charge of using expensive material; it has been urged that your Department has spent a good deal of money on machinery where a much simpler style of pump would have answered all purposes;—what have you to say in regard to that? Well, in the first place, it is simply a matter of opinion. I think I can advance other opinions against those advanced against us.
3436. Do you not think that is a matter of pounds, shillings, and pence rather than a matter of opinion? No; I think it is to a very great extent a matter of opinion. But even, as a matter of pounds, shillings, and pence, what the Mines Department have proposed is more expensive than what we have adopted. The original machinery that was used in the Department was a M'Comas water lift, which involved a great amount of timber-work and submerged timber-work. And so far as these early works were concerned the cost of supplying M'Comas lifts was very much greater than the cost of the new types of pump that we have adopted for our works since 1882. What was recommended by the Mines Department was a double whip. Well, I went into that and I found that the cost amounted to something like £200, involving a great amount of submerged timber-work, and in addition necessitated the use of horses. We were recommended to apply this form of lifting gear to the tanks already constructed, as well as to those projected, and as most of the tanks then constructed were full or partly full of water it would have been a matter of impossibility, without the use of divers, to have carried out the work. I submit tracings of the double whip from the Mines Department. The two kinds of pumps that we have since adopted are horse-gear and steam.
3437. In all the evidence so far the steam-pumps have been called the Tangye pumps? Well, they are not all Tangye's. The horse-gear pumps are the Holman and the Amos & Smith. The latter has been adopted latterly as being simpler than the former. The steam-pumps that we have principally adopted are the Tangye, which is called the "special" on account of its simplicity. But we have also some of the Amos & Smith type, and two direct-acting pumps from Appleby & Co., which do not belong to any recognized type.
3438. What is the relative cost of these pumps? The Holman pump, with the horse-gear, is £49, delivered in Sydney. The cost of the special Tangye steam-pump is £87 10s., with the boiler. One of these pumps is now at work at the Centennial Park, and may be seen by the Commission. The Amos & Smith pump and horse gear costs £52 or £53, and the steam-pump £120. The cost of the Appleby pump is about £125.
3439. Then the cost of erection of these horse-gear pumps would be very considerable? With the Holman pump it would be a very considerable item, because we would have to put the pump in a timbered well.
3440. The same remark would apply to the scheme submitted by the Mines Department? No, not exactly.
3441. Will you just state what would be the relative cost of these horse-gear pumps and steam-pumps in the matter of erection? The steam-pumps are about the most cheaply erected of the lot, because they only require sleepers to carry the bed-plate.

A. P. Wood. 23 Mar., 1888.

3442. So that with the cost of erection thrown in, the expense of the horse-gear pumps would be about equal to the cost of the steam-pumps? Nearly so; with the exception of the Amos & Smith, which does not require the same expensive timbering.
3443. *Mr. Woore.*] Then there is the cost of horse, harness, feed, and so forth? Yes; we have found that in the timbered districts, where we only erect steam-pumps, in regard to cost the steam-pumps are cheaper than the horse-pumps. The Mines Department are paying—and we have had to do the same—their caretakers as much as 10s. per day, while the men who take charge of the steam-pumps only receive from 7s. to 7s. 6d. per day.
3444. *Chairman.*] And there would be added to that, I presume, the cost of firewood? Yes; that is obtained by the caretaker, and is brought in, or should be brought in, by him in good seasons, while as with the horse-gear pump, the expense of working in the seasons would be very heavy.
3445. *Major Penrose.*] Could not the M'Comas pump have been put up in a cheaper manner by erecting it further out on staging? Not with the big pumps that were used originally. We used a 4-inch M'Comas; but if we were to put it further in the tank, some very heavy staging would be required to meet the strain. Besides, there would be 79 feet of bolting from the point to the horse-walk.
3446. But we are speaking of the M'Comas hand-lift? The thing is utterly impracticable.
3447. *Chairman.*] Why? For the simple reason that no man could possibly raise the amount of water required. Of course in erecting a pump you must provide for the maximum depth from which the water must be lifted; that is, to lift a sufficient supply from the greatest depth of the tank, to meet the requirements of travelling stock in dry seasons. The maximum depth from which water would require to be lifted is about 27 feet.
3448. How much water could a man lift 27 feet in a day? A man's work at a winch would be about 2,600 foot pounds per minute. A gallon of water weighs 10 lb., and reckoning the height from which the water has to be lifted at 26 feet, a man would lift 10 gallons per minute, which is 600 gallons an hour, and at eight hours a day would be 4,800 gallons. This would be the total result of eight hours steady work in a blazing sun. Of course caretakers may be exceptional men, but in my opinion they are not.
3449. You are speaking now of the maximum amount of work that would be required? Yes.
3450. But in an ordinary season it would not be more than half that? Well, if you will fix the level of the water I will be able to answer it.
3451. Well, say that the caretaker had only to pump half the depth you speak of? Then the caretaker could pump 10,000 gallons per day of eight hours working continuously.
3452. *Major Penrose.*] Do you think that a man could keep up that rate of work, 2,600 foot pounds per minute, for eight hours, in that climate? Well, he would be supposed to. This is the result of a long series of observations that have been made on the subject. There is one thing that has not been allowed for in that result, and that is the friction, which in the M'Comas is a very important factor.
3453. We have had it in evidence from some of the witnesses that they have known of men to water 10,000 sheep per day with one of Flood's lifts? Well, I believe it is possible with a short lift, because it is stated there that the drovers sometimes assist the caretakers; but then that is no question of one man's work.
3454. One witness said that this could be done from a 20-foot lift? I am certain that it cannot be done. Of course if you keep a gang of men, each taking a five minutes' turn, they can put in a great deal more energy into their work than they could if each man worked continuously for eight hours. Professor Rankin says as the result of experiments, that one man turning a crank or winch is equal to the following work:—

Effort in lb.	Velocity ft. per sec.	Hours work pr. day.	Ft. lb. per sec.
12·5	5·0	8	62·5
18·0	2·5	8	45·0
20·0	14·4	2 min.	288·0

But of course you have to deduct friction from this result, and with the M'Comas I should say that the friction would be at least 20 per cent.
3455. *Chairman.*] Then it is said that it is desirable to give more work to these caretakers? It is indeed; there is no doubt about that.
3456. Then why not utilize their labour instead of employing expensive machinery? Well, it does not appear that they can do the work which they are really paid for, judging from the reports which we receive from our field officers as to the state in which the works are kept; and if they are given the excuse of having to attend to additional duties apart from those they are now supposed to attend to, I should say that the result would not be a satisfactory one.
3457. *Mr. Woore.*] You think that the care of the tank and the drains, and the watering of stock, and such duties are sufficient to keep the caretaker employed? Certainly not—not at all sufficient to keep an active man in work.
3458. Of course, sometimes everything being in good repair, and no stock watering at the tank, he would not be employed? Quite so; he has nothing whatever to do at times except to read the *Gazette*.
3459. How would you suggest profitably employing a caretaker's labour during slack times? The caretaker could not be employed raising water, because during these slack times there is no demand for water. When the service tank was full there would be no necessity for any further labour.
3460. But the caretaker is a necessity? Yes.
3461. Would you be in favour of a caretaker looking after two or three tanks? No; that would be quite out of the question, because it is quite possible that sheep might be travelling in different directions at the same time.
3462. Then there is nothing for it but to allow the caretaker to retain his easy billet? No; nothing. There is no doubt that if a man could himself raise and store enough water to meet the requirements of 50,000 or 100,000 sheep, the difficulty would be got over, because he would put in all his spare time at the winch.
3463. Admitting that these men have a great deal of idle time on their hands, does not their presence at these tanks in times of flood sometimes save the works from damage to such an extent as would pay their wages for the whole year? Yes.
3464. Is it necessary, then, that someone should be there whether there is anything to do or not? Yes; for

A. P. Wood. 22 Mar., 1888.

for, supposing a drain is foul by brushwood coming down, causing the water to go in another direction, if the caretaker is present he will remove the difficulty, and the water will go into the tank. So that a caretaker may save great loss of water and the tank from great damage.

3465. *Chairman.*] Is it not a fact that at all these public watering places paddocks are fenced in for the use of the caretakers? Yes; at most of the watering places paddocks are fenced in for the use of the caretaker or the lessee.

3466. Consequently if the caretaker or lessee chooses to allow horses or cattle in, the owners must pay an agistment rate? Yes.

3467. Can you suggest any means of employing these men by which this army of caretakers may be made to earn their wages? Taking the average of the men they are really earning their wages now.

3468. In what way? Although a man may not have enough work to keep him constantly going during the whole time he is stationed at a tank, yet he has to be constantly on the watch. There is no necessity to employ young and active men. What these tanks want are men who are about half fit to go into the benevolent asylum—not men who are blind, but men who can dodge about like our maintenance men, patching up little things here and there. These are men who are past their prime, and are yet well able to do the work allotted to them. They could go about cleaning drains and filling ruts in the embankments, and fettling up the work, cleaning out the silt tank is also a part of the caretaker's duty; and then in times of heavy rain they are on the spot, and if they are only watchful they can save, perhaps in an hour or two, what might be the value of their wages for the entire year. I believe, although we are blamed for sticking to a hard and fast rule, if the Mines Department had not stuck to another hard and fast rule in regard to these lease areas, that they could have done a great deal better with the fencing. Originally it was intended that only 200 acres should be fenced in, and regulations were made out giving the caretakers certain rights. What I now understand is that the conditions have never been altered, and that, although 640 acres have now been fenced in, there is no greater inducement given to the caretaker or lessee than when the area was only 200 acres.

3469. If it were possible to lease these tanks, it would of course get rid of a great deal of the expenditure? Some of the greatest complaints that have been made have been made concerning the tanks which were leased. More particularly those which were leased to Messrs. Cobb & Co., the coach proprietors.

3470. *Mr. Woore.*] Do the men now employed as caretakers keep the tanks in proper order? Well, judging by the reports which we have received from our officers, and from what I see on some of my inspections, I should say that some of the caretakers do not keep the tanks in proper order.

3471. And the caretakers in most instances are able-bodied young men? Yes.

3472. That being the case, would the tanks fare better, when even able-bodied men do not keep them in proper order, if they were in the hands of old men? Yes; because an able-bodied man is more independent than an old man. An old man would work to be kept in his situation. These young men are rather fresh, and when they get a few pounds together, it is a matter of perfect indifference to them whether they leave or whether they remain on duty.

3473. *Chairman.*] What is your conclusion as to the best forms of machinery to use on these tanks for lifting water? The conclusion that I have arrived at is, that where timber is available, the special steam pump is the simplest and most effective machine you can use. I repeat again that this is true where timber is available, but where it is not available, the Amos & Smith horse-gear pump is the best—that is, of the type that I am acquainted with. There may be some better ones.

3474. Have you had anything to do with fencing? Yes.

3475. We have had various complaints from the Mines Department, and from independent witnesses also, that your fencing is excessively costly? Will you excuse me for one moment before we drop the other subject. I would draw your attention to Mr. Gilliat's approval of the type of pump that we used. In his evidence before the Royal Commission for the Conservation of Water he stated that the Tangye pump was one of the most simple and effective pumps he had ever seen, and that with a few renewals in the shape of bucket leathers, it was such a pump as could be worked by any ordinary bush hand.

3476. Now with regard to the excessive cost of fencing we have been told that these fences of yours have cost as much as £120 per mile? They have.

3477. And we have been informed by various witnesses that squatters pay about £45 per mile for their fences? That I do not know, but I do know that there is a wonderful difference in the class of fence. Our instructions for these fences came originally from the Mines Department. Mr. Bruce, who was then in charge of this particular branch, recommended fences with six wires and a top rail for the tanks in the leasehold areas. [*Recommendation produced. See Appendix.*]

3478. For the caretakers' paddocks as well as the tanks? Yes; for the lease areas. Mr. Gilliat, in a letter of the 16th October, 1883, recommends that the fences should be of a substantial character and sheep proof; the posts to be not more than 8 feet 6 inches from centre to centre, five wires and a top rail where timber is plentiful.

3479. Then why did you extend these very expensive fences round the caretakers' paddocks when they were only intended to protect the main works? But Mr. Gilliat recommends it for the caretakers' paddocks as well. We have adopted it except in two or three cases, but then we have lessened the expense by omitting the top rail.

3480. During the erection of these fences were representations ever made to you by the Mines Department that you were spending too much money on them? No, never.

3481. When did the first complaint appear; when did you first hear the complaints about this excessive cost of fencing? About the time that Mr. Gilliat recommended the transfer of the whole thing over from one Department to the other.

3482. *Mr. Woore.*] Was it the duty of the Public Works Department to decide what sort of fencing you were to put up, or did you act as in the case of the tanks, merely to carry out the suggestions of the Mines Department? We acted to the best of our judgment on general lines. We were instructed to enclose certain areas of land. We had a certain type of fence recommended to us by the Mines Department, and finding that type too expensive, we adopted another that was less expensive, and I think equally serviceable.

3483. *Major Penrose.*] In Mr. Low's evidence the case of the Boonoona tank was mentioned, and he stated that the fence round the tank cost £120 per mile? He is very nearly correct. It cost £112 per mile.

A. P. Wood. 23 Mar., 1888.

3484. Mr. Low says:—"The erection of this fence, in comparison with the prices paid by station owners in this district, I consider to not be worth more than £26 per mile, inclusive of wire, and in this opinion I am borne out by Mr. Webb, of Kilfera, who has had much fencing in this locality, and who, after inspecting this fence, values it at £26 per mile, exclusive of wire;"—how much would the wire be worth there? Well, I have not made an estimate just now.

3485. Mr Low says, in another place in his evidence, that he would estimate the wire at £30 per mile, and the posts and so forth at £26 per mile, which would make the cost just £56 per mile, and just exactly half what was given by the Works Department? It is a funny think that Mr. Low—yes, he is the gentleman—in 1887, fared no better than we did. I think he called for tenders for a fence at Ivanhoe, in connection with a lease area there, and for a similar style of fencing to that which we erected. The tender he received was £100 per mile. He received another tender for £75 per mile, but that involved a modification of the design of the specification.

3486. Was the gauge of wire used suggested by Mr. Bruce? No. Mr. Bruce suggested a top rail, but that was merely round the main works. The top rail was also recommended by Mr. Gilliat.

3487. *Chairman.*] Mr. Bruce did not then recommend this heavy gauge of wire? No; the gauge we picked ourselves. Objection has been taken I believe to the No. 4 gauge as a top wire.

3488. *Major Penrose.*] With regard to the fence at the tank at Ivanhoe—that was the same contract? Yes; the same as Boonoona.

3489. Mr. Low makes a calculation about the fence at Ivanhoe in which he makes it appear that, by sub-letting, the cost of the fence was only £82 per mile, and that the first contractor gained a clear £33 11s. per mile—that is on the supposition that the Government paid £120? He is wrong in that. It was only £112 per mile.

3490. The calculation was evidently made on the supposition that the cost was £120 per mile; how was this contract let? Tenders were invited for the different works. We invited tenders three different times, and this was the lowest tender received on the last occasion, and lower than any previously received.

3491. Was the work pressing? Well, we were urged by the Mines Department to get it done, but whether it was pressing or not is another question. As I have said we called for tenders three times for it.

3492. *Chairman.*] Why did you use this excessively heavy wire for the caretakers' paddocks as well as for the tanks? Simply because the fence was required for cattle as well as for sheep. We thought a top wire would offer a greater resistance, and would be a better safeguard. With a fine wire, cattle would not be baulked in the same way as they would with a No. 4.

3493. Do squatters in fencing public stock routes and roads use such heavy wire? No; I am not aware that they do; but I think there is a great difference between the two cases. In one case you have a station paddock—supposing the stock route is fenced—and in a bad season station paddocks are very little better than the stock routes. In the other case, you have a special lease area where the caretaker is only allowed to put in a very limited number of stock, and where in all probability there is far better feed than on the stock route. Again, these fences are in close proximity to the watering places, and when cattle are being watered they rush about—perhaps being drafted—and consequently a stronger fence is required than would be needed under ordinary conditions. There is one extraordinary thing that I would like to point out—that as far back as 1883, when I travelled with Mr. Gilliat to hand over some of these works to him, he expressed himself as perfectly satisfied with all the appliances, and in fact with everything pertaining to the tanks. And in the presence of Mr. Cronin, the local officer at Deniliquin, he stated that nothing could be more perfect. Now we have to deal with an altered view altogether.

3494. You think that Gilliat has grown wiser as he has grown older? It is possible.

3495. There is another very grave charge made against your Department; and it is this, that you spent enormous sums of money in putting up gates that were utterly beyond the requirements—gates, for instance, to caretakers' paddocks to which there is neither ingress nor egress except by the caretaker's own horse. Why was this done? We have simply acted, as I have said before, under instructions. Some of the local officers will prove that Mr. Gilliat on the very trip that I am alluding to, referred to this very question, and recommended—I think at Cuttygullyaroo, if I remember aright—that a gate should be put in. But there is nothing particularly expensive about this style of gate.

3496. It cost £15? Yes; but these gates were not let singly, and you cannot pick them out of a tender. Supposing a contractor put in a lower tender for fencing and a higher one for gates, although his price is excessive for the gate still he is lower for the whole work, and therefore the gate has to be taken in connection with the whole work.

3497. But why specify such an expensive form of gate when a more primitive one would have answered all requirements? My impression is that where cattle are constantly passing through these gates, the gates require to be strongly constructed. On the stock routes the station gates, which are simply and cheaply constructed, are generally found to be utterly wanting, and are hanging up alongside the fence.

3498. I think one witness mentioned that the gates are only used by the caretaker's horse going through? I believe it is true in one case, but that is a purely exceptional case. I know it was mentioned as having taken place in the Albury district, but the local officer will give you evidence about that.

3199. Now the next question is one that has caused a great deal of ill-feeling between the two Departments—that is, the interference by the road superintendents with the caretakers? I have seen a good deal of neglect on the part of the caretakers, and when you are going into the matter of wasteful expenditure I would like to speak about the cottages.

3500. *Mr. Woore.*] Will you give us some information about this interference? I know there has been a good deal of ill-feeling, particularly in the Hay district, in consequence of the reports that Mr. Stilwell, in the course of his duty, has been obliged to send in, in regard to the neglect of the men employed under the Mines Department.

3501. Do you know anything of your own knowledge about this interference? Not of actual interference, but I know a great deal about the neglect of the caretakers.

3502. Great complaint has been made to us of interference by your road superintendents with the officers of the Mines? Well, I cannot say anything about that; but their neglect has called for action by our officers.

3503. Can you mention any case of gross neglect by caretakers which, in your opinion, would justify the so-called

so-called interference? On my last visit to the Hay district I had to report on the neglect of the caretakers at Tom's Lake, Boonoona, Ward's tank, and 48-mile tank, on the road from Booligal to Wilcannia, and in regard to the caretakers at several of the tanks on the road from Ivanhoe to Balranald. I think this carelessness would fully warrant our local officer in writing as strongly as he has done on previous and subsequent occasions to the head office in Sydney.

3504. Is that all you have to say on the subject? Well, I think that is the only district where this so-called friction with the field officer has been complained of.

3505. *Major Penrose.*] What did you find fault with? With the utter neglect of public works. The drains were fouled and silted up, the pumping machinery was neglected and worked without oil, and all the appurtenances neglected.

3506. Was it the duty of the caretaker as a rule to clean out the silt tank, because there is a great deal of correspondence here about the cleaning out of the silt tank at Merri Merriwa? Yes; that is at page 167 of the Mines blue book. Mr. Gilliat writes a minute on a paper to this effect:—"The cleaning out of these works will, I suppose, have to rest with the Works Department, no further action can be taken by this Department." This was in 1886, yet in 1887, when we cleaned out this silt tank, Mr. Gilliat states:—"It is of course very probable, owing to the wet season, that the caretaker has been obliged to wait until the tank is dry enough to clean it; but it will be observed on 87-1,648 that the contractor engaged by the Works Department is compelled to do the same. But the main point, which does not appear to occur to the officers of the Works Department, is that any proven neglect on the part of the caretaker can hardly be regarded as a justification for expending public money on a contract to do work that should properly be performed by a public servant, and that a due regard for the public service would have led them to show to this Department that the caretaker's duties were neglected."

3507. Then he says, "Since writing the above, my attention has been called to the minute of Mr. Bennett, which is written as a minute on the report of the road superintendent, that the embankments of the tank are kept in good order:—'I think this should go to the Mines. We report bad men; a good man should have the benefit of the favourable report so far as it may weigh with the authorities of the Mines.—W.C.B., 14/8/86. Under Secretary for transmission to Mines.'" That is all to the credit of the caretaker for the way in which the tank was maintained. That was a flattering minute which the Commissioner wrote, thinking that it was only right to let a man see that he recognized when work was well done. I think that is a sufficient reply to the accusation of the Mines Department in regard to our clearing out the Merri Merriwa tank.

3508. Apparently you still considered it the duty of the caretaker to clean out the silt tank? Yes, we did; and then we got this minute from Mr. Gilliat that the work properly devolved on our Department.

3509. But when it became a large job, would you still expect the caretaker to do it? Yes; it is the caretaker's proper work, and he ought never to allow the silt tank to become full.

3510. *Mr. Woore.*] Ought he not to clean out the silt tank whenever opportunity offers and keep it clean? Most decidedly; it is his duty to do so.

3511. There has been some complaint made about the greasing of service tanks—that a certain substance has been used which has so affected the water that the stock will not drink it? I may state that the composition which we used was a mixture of tar, pitch, and tallow, in the proportion of 1 gallon of tar to 1lb. of pitch, and 2lb. of tallow. This composition was recommended to me when I met Mr. M'Kinney, the engineer to the Water Conservation Commission, down at Hay, some time ago. He stated that the composition was a very serviceable one for the purpose, and on the strength of his recommendation we tried it. For the first few days it did produce a film upon the water, but the second water that ran into the tank has never been deteriorated in the slightest degree, as the composition became hard on the tank.

3512. Then it makes a hard cement-like covering? Yes; but I am speaking from Mr. Stilwell's report.

3513. Notwithstanding the complaints that have been made about this substance having been employed, you still believe that it was a good thing to use? From the reports that I have received I do most decidedly think it was a good thing to use.

3514. Then its effect on the water was only temporary? That is all.

3515. I suppose you are aware that in the case of a cement tank the first water that goes in cannot be used? Yes; I am aware of that.

3516. On these complaints being made, did you consult the Mines Department and give up the use of the composition? Yes; we stayed this work on account of the objection of the Mines Department, and the works having been handed over to them, we did not feel warranted in persevering in its use.

3517. It was not a case of failure? No; they made a great deal about our having paid a man £6 per week to do this work. Well, this man makes periodical trips up the stock route, putting the horse-gear and other pumps into working order. He is a travelling mechanic employed by us, and as he was passing along he was instructed by the local officer to put this composition on the tank. There is no doubt that this man was paid £6 per week for his work, but considering that he only took a day to do the work, it was really much cheaper than specially sending a lower-wage man a long distance to do it.

3518. Then a man was not sent specially to do this work, but performed it while on his tour? Yes; just so. I would like to put these papers here in evidence. (*See Appendix*).

3519. *Major Penrose.*] In this matter of putting composition on the tanks were the officers of your Department within their proper sphere? We considered that we were within our proper sphere, because there had been a great many conflicting opinions expressed as to where the line of demarcation was drawn between the two departments. We had been called in on so many occasions to effect trivial repairs that ought to have been carried out by the caretakers themselves, that we felt perfectly justified in adopting this course to protect public property; but when the Mines Department raised a distinct opposition, the local officer was instructed not to proceed any further.

3520. Do you think that if this painting of the tanks had been a success—and admitted by the Mines Department to be a success—that you would have heard anything about this question of alleged interference? Had they admitted that it was a success I do not suppose there would have been any talk about interference.

3521. Although the interference—if it were interference—would have existed just the same? Yes.

3522. *Mr. Woore.*] Are there any other cases that you can call to mind of alleged interference? Not any of which I have personal knowledge. 3523.

A. P. Wood. 22 Mar., 1888.

3523. *Major Penrose.*] Have you ever had complaints sent in by your road superintendents that you had reason to believe were unfounded? No; I have the greatest faith in the officers. They are some of the best men we have in the department.
3524. You thought that the road superintendents had been merely doing their duty? Simply that, and nothing else.
3525. And that they had not been vexatious in their complaints? No; I am certain of it.
3526. *Mr. Woore.*] And they have not been actuated by an unfriendly feeling? No, I would not like to say that, because such feeling must be only natural under the circumstances.
3527. But you do not think that this feeling induced them to exaggerate their reports in any way? No; I do not believe that; they are men of too much integrity to allow their public actions to be influenced by any personal feeling.

[The Commission adjourned.]

FRIDAY, 23 *MARCH*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, ESQ.

Arthur Pepys Wood called in and further examined:—

A. P. Wood. 23 Mar., 1888.

3528. *Mr. Woore.*] I see by the evidence of one witness here that the contractors can make up the surface of the ground, and so add to the apparent depth of the tank? I do not think that is possible under our present arrangements. But supposing that the ground were made up to the higher level, the overflow of water through this open shoot from the outside to the inside would of itself prove the existence of such a fraud.
3529. *Chairman.*] But this is done in the measuring up of the work and before the tank is tested? Well, even the very lay of the shoot would at once expose it. In passing from the natural level of the ground outside the tank to the level of the berm within the embankment, any such error in levels would be discovered in the laying of the shoot. I may say that I had heard of such things being done in 1883, and I produce a circular which was written to the officers, instructing them to fix a peg in each corner of the tank, and have a bench mark so as to get the level of each peg with the bench mark, and then when finally measuring up to take these levels again.
3530. *Mr. Woore.*] It was stated in evidence by Mr. Earngey, that by raising the surface of the ground the excavation could be made to appear deeper than it really was, and that this has been done to the extent of 2 or 3 feet? Well, I maintain that it is utterly impossible to do any such thing without its being at once discovered. It is quite possible that a few inches might be put on or added accidentally, but it cannot be done on any scale at all worth considering.
3531. *Chairman.*] Then with regard to want of attention that has been implied in laying out these works. It has been the custom in some instances, it would appear, for the officer in charge to go up and down in the coach, and all the information he could obtain would be that which was procurable from Cobb & Co.'s coachman or the local publican, at whose house the officer stopped. It has been further said that he never learned anything of the local requirements from any person more interested? I think I have given that statement my most emphatic eniadl before. The only occasion on which Mr. Earngey could possibly have formed an opinion was that on which he went up to take charge of the district on Mr. Cambridge's removal. Mr. Earngey ought to have been aware that on that occasion I travelled in a buggy or waggonette with Mr. Barlow, the district surveyor, and Mr. Cambridge, who was to hand the district over to him, and with whom Mr. Earngey himself came back from Tibbooburra. So that Mr. Earngey has been swearing what he must know to be absolutely false. I know that the officers of the various districts, Mr. Cronin, of Deniliquin; Mr. Stilwell, of Hay; Mr. Coleman, of Bourke; Mr. Adam, of Cobar; and Mr. Adams, of Walgett, all invariably travel in buggies.
3532. Then another way in which it is said the Department is swindled is this. An officer is usually alone when he is proceeding to measure up these works, and the consequence is that he has to employ the contractor's men to assist him in using the measuring tape; and it has been said that whether the man is at the top or the bottom of the tank the swindle can be perpetrated with equal facility? It is possible if you have a very short-sighted man at one end of the tape that this may be done, but I do not believe from the character of the officers we have in the field connected with these works that such a swindle as this could be perpetrated on them. I think they are too keen. I admit the possibility of this thing being done if a man is really inattentive to his duties, but many things which are said to have been done never took place at all. The contractor sometimes thinks that he stands better amongst his workmen than other contractors if he pretends that he has been able to swindle the Government.
3533. *Mr. Woore.*] You were asked yesterday about delay in payments. Now here is a rather prominent case which it may be well to bring under your notice. Mr. Budd, in his evidence, makes the following statement. The questions are:—

> 2312. *Chairman.*] This is owing, I presume, to the want of the inspection of the work by some officer? Yes; sometimes months elapse without any reports having been made, and in one case I had four months to wait, and had to pay an agent £50 to collect the money. I had to employ an agent named Cummings to get this money for me.
> 2313. Did this delay take place after the work had been completed? Yes, and in another case I was six months waiting before I got the balance of my money? This occurred in connection with the work done at the Nullamut tank.

——? I know nothing of this alleged delay. In the first place, it was before I took charge; but still I can easily find out whether such a delay occurred, and what was the cause of it.
3534. *Major Penrose.*] In connection with these charges of interference by the Works officers and the overseers, can you state to the Commission the exact facts of the case as they appear from the papers in your possession? I may state that some considerable time back—in July, 1883—there was a disagreement as

A. P. Wood. 23 Mar., 1888.

as to which Department should undertake the repairs of these works after their being transferred to the Mines Department, and it was then decided that the Works Department should have the repairs, but that the Department of Mines should be allowed, in any case of great emergency, to spend a sum not exceeding £10 upon any repairs that might be required. About twelve months afterwards it was also decided in a minute from the Mines Department that the caretakers and lessees of these works should, in view of any repairs being required, place themselves in immediate communication with the officers of the Works Department in order that these repairs might be effected. In connection with this matter I desire to put in the following documents as evidence :—

Public Tanks and Wells.—Departmental Arrangements.

As doubts have arisen as to which portions of the business relating to the several classes of public watering places should be conducted by the Department of Public Works, and which by the Department of Mines, the following statement of the different classes of works, and of the principal action called for with regard to these works is submitted, with the view of its being definitely settled which Department shall take the action as the necessity arises. The public watering places may be divided into three classes—A, B, and C.

Class A are those works which are situated at a distance from any town or village, and solely for the use of travellers, teamsters, and travelling stock.

Class B are those which are partly for the use of travellers, teamsters, and travelling stock, and partly for that of the inhabitants of towns and villages near which the works are situated, and—

Class C are those which are almost entirely for the use of the inhabitants of towns and villages, and of course also of ordinary travellers and of teamsters, but only to a small extent of travelling stock.

The principal steps again to be taken with respect to these works are the following :—

1. To decide as to the necessity for the construction of a watering place on any particular line of road, or in any particular locality.
2. To decide as to the exact site.
3. To decide as to the description of the work, i.e., whether it is to be a tank, well, or dam.
4. To determine its dimensions and capacity.
5. To settle the form of construction.
6. To determine the sort of watering appliances.
7. To decide as to the extent and description of the fencing.
8. To determine the area of land to be let.
9. To the supervision and management after construction.
10. The carrying out of repairs and alterations.

With regard to works of Class A, I believe it is definitely arranged that steps (1) shall be taken by the Department of Mines, (2) by the Works, (3) by the two Departments jointly, (4) by the Mines, (5) by the Works, (6) by the two Departments, and (7), (8), and (9) by the Mines, and (10) by the Works.

As to Class B and C, nothing definite has I believe as yet been decided into which Department shall take the steps here mentioned, and it is principally with a view to this being settled that this memo. is now submitted.

A.B., 22/2/83.

The Under Secretary for Mines.

I shall be glad if the Commissioner for Roads will favour me with his views upon this matter, as it will be well to have these several matters settled. For Minister for Works.—J. P. Abbott, 26/8/83.

Class B might be dealt with as Class A, and No. 4 should be decided jointly by the two Departments—practically it has up to this been decided by the Works. Class C, which is being dealt with by Harbours and Rivers, should be together under the Works.—W.C.B., 3/4/83.

The recommendation of the Engineer-in-Chief for Roads, &c., may be approved.—H.W., 6/4/83. Approved.—J. P. Abbott, 7/4/83.

I would refer this to the Minister for Works with a view to the recommendation of Mr. Bennett as to Class C being at once carried out. It seems to me ridiculous that three departments should be dealing with these tanks, &c.—J. P. Abbott, 7/4/83.

Departmental Arrangements re Tanks and Wells.

Department of Mines, Sydney, 24 April, 1883.

Sir,

Referring to my B.C. communication numbered as per margin 83-286, Tanks and Wells, and forwarded to you on the 9th inst., I have the honor to request that I may be informed if the Minister for Works has given his decision thereon, and if so, that the papers might be returned to this Department.

I have, &c.,

HARRIE WOOD,

Under Secretary for Mines.

The Under Secretary, Public Works, Sydney.

Papers were returned by me.—W.C.B., 28/4/83. Mr. Bennett for further report.—F.A.W., 5/6/83.

As the repairs and alterations called for on existing works are very extensive and now of a character which calls for professional knowledge, I would beg leave to withdraw the recommendation made by me in the accompanying memo.—that these repairs and alterations should be made by this Department, and to suggest that they be carried out by the Department of Works.—A.B., 6/7/83. The Under Secretary for Mines.

For the Commissioner for Roads.—J. P. Abbott, 7/7/83.

Before resuming charge of the maintenance of these works I would point out that this is the second or third time they have been handed to us to maintain. On the previous occasions the repairs required almost amounted to reconstruction, but as I have always thought that the maintenance should be retained by this Department, I will endeavour to carry out the instructions of the Minister. As there are no funds at my disposal for this purpose it would be advisable to transfer the balance of vote obtained last session by Mines to the credit of Works at the Treasury. It would also be useful if a list of repairs or alterations proposed by Mines Department was supplied. I presume it will be necessary to supply drinking arrangements to all the tanks.—W.C.B., 15/7/83.

Tanks and Wells.—Transfer of Maintenance and Alterations to the Department of Public Works.

Sydney, 12 July, 1883.

As the Department of Mines has determined to hand over the alterations to and maintenance of tanks and wells to this Department, information should be furnished as to the amount still available for this service, and steps taken to transfer the existing balance. A list should also be furnished giving the names of and wages received by the different caretakers.

Steps will be at once taken to provide the necessary watering appliances for the earlier works constructed, when the difficulties surrounding the question necessitated the adoption of a system that, though at the time best suited to meet the case, is now capable of considerable modification and improvement.

It must be borne in mind that this Department has had no control over any of these works since they have been constructed, and that from sundry causes much will require to be done to bring them up to the same standard of efficiency possessed by our more recent works.

A.P.W.

Tanks and Wells, Stock Branch.

Department of Mines, 31/8/83.

As the Commissioner for Roads is prepared to carry out any repairs or alterations to the public watering places which the Minister for Mines may deem necessary—the only question to be settled seems to be the proposal that the Department of Mines should, on an emergency in order to keep its works serviceable, effect repairs which floods or accidents rendered necessary to the extent of £50 ; and as the Works Department will, as a rule, have some of its staff on the line of road on which the watering places are situated, the proposal might perhaps after all (seeing there are objections to it) be withdrawn, and the arrangement which has otherwise been agreed to, finally settled between the departments.

The proposal that urgent repairs to the extent of £50 might be carried out by the Department of Mines was made in the interests of the public, and to save the Works Department the trouble and inconvenience entailed by having to send hands to do slight but urgent repairs, which might be at once carried out under the directions of the Inspector of Public Tanks and Wells, or one of the overseers on the spot.

Mr.

A. P. Wood. 21 Mar., 1888.

Mr. Bennett estimates that £12,000 will be required for repairs and alterations. I do not think that amount would be available, but £10,000 might be so after setting aside, say £6,000, for boring and expense of Public Tanks and Wells branch; from the balance of the vote of £23,027 taken by this Department for public tanks and wells, which amounts at this date to £16,490 1s. 3d.

A.B., 29/8/83.

The Under Secretary for Mines.

Stock Branch, Department of Mines, 27 July, 1883.

With a view of preventing any future misapprehension of the extent of the duties of each of the Departments, I may suggest that it does not appear to have been the intention of the Chief Inspector of Stock, in his memo. herewith, to convey that this Department desired to resign the maintenance of the tanks and wells; as it seems to appear from the minute of the Commissioner and Engineer of Roads and Bridges he has understood the proposal.

The intention (if I rightly understand it) is that repairs, other than such as devolve on the lessees, or of such description as can be performed by the caretakers under the direction of the overseer—or in cases of emergency where the inspector may think it advisable to undertake a certain outlay to meet some immediate requirements—should, on the approval of the Hon. the Secretary for Mines, be forwarded to the Roads and Bridges for execution, that branch of the Department of Public Works having the necessary staff.

A list of the repairs considered urgent has been furnished to this Department, with special reports on the Boonoona, Quondong, and One Tree Tanks. Although the latter would come appropriately under class C, in which case the control would not rest with this Department if the proposed arrangement is carried into effect.

H.G., 24/7/83.

The list of papers will follow in a day or two.—H.G., 24/7/83.

The explanation of the Inspector of Tanks might be forwarded to the Works, and it might perhaps be desirable to limit the repairs to be done by this Department to such as would not exceed, say, £50.—H.W., 1/8/83.

Approved.—J. P. Abbott. The Under Secretary for Public Works, 3rd August, 1883.

I am prepared to carry out zealously all instructions that I receive, but it is rather bewildering to have contradictory suggestions to act on. I have already dealt with the Narrabri and Boggy Creek works, as their restoration did not admit of delay. I fear the divided responsibility proposed in Mr. Gilliat's, Mr. Bruce's, and Mr. H. Wood's suggestions will be prejudicial to the efficient maintenance of these works, as the division of duties, through fixing a minimum outlay for the Mining Department, does not say if that amount (£50) is to be the minimum outlay for the Department. If it is not so intended there will be an overlapping of control and a consequent absence of responsibility, and if it is intended as a minimum outlay for this office, I would point out that really efficient maintenance depends entirely on attention to details, *e.g.*, the old adage of "a stitch in time saves nine." It is reported to me by Mr. Wood that all the works seen by him latterly require thorough restoration and renewal. Some of the renewals proposed by Mr. Gilliat can be postponed by timely repair to the existing works, but at the least some £12,000 will be required, and there are no funds for this purpose at the disposal of this Department.—W.C.B., 20/8/83.

Under Secretary.—J.R. Will my hon. colleague of Mines favour me with his views upon Mr. Bennett's report?—F.A.W., 23/8/83. Submitted.—A.B., 27/7/83. The Under Secretary for Mines.

Urgent repairs to Public Tanks and Wells.

Department of Mines, Stock Branch, Sydney, 18 July, 1884.

Memo.—Referring to the accompanying papers, from which it will be seen that considerable damage was done, and more rendered imminent through the want of immediate attention and temporary repairs, I would suggest that, as no objection was taken by the Works Department to any repair, however urgent or temporary, being made at the instance of the officers of the Mines Department (see accompanying papers herewith), that the caretaker or lessee, as the case may be, should be allowed to communicate direct with the proper officer of the Works Department, as well as with the overseer or head officer in order that there may be as little delay as possible in the necessary repairs being made.

In the event of there being no officer of the Works Department in any of the districts that Department might perhaps be asked whether they would not empower the overseer to carry out urgent repairs to the extent of, say, £20 or £30.

A.B., 17/7/84.

The Under Secretary for Mines.

I shall be glad if Mr. Bennett will have this attended to at once.—J. P. Abbott, 23/7/84.

The repairs to the Balranald and Ivanhoe road have been reported as completed. It must not be forgotten that they were handed over to us in the state complained of. As there are officers of this Department in all districts where tanks are constructed, there can be no necessity to empower the "overseer" to expend any sum in repairs; but I think the suggestion that the lessees or caretakers should report any urgently-needed repairs to our local officers is a good one, and might be carried out with benefit.—A.P.W., 23/9/84.

The Secretary for Mines will be advised in a day or two of all the works of which repairs have been completed.—W.C.B., 29/9/84. Tanks and wells.

Respecting Repairs to Tanks and Wells.

Department of Mines, Sydney, 31 August, 1883.

Sir,

Referring to your blank cover communication of the 27th inst. (83-7,870, Works), forwarding report from Mr. Commissioner Bennett as to the future carrying out of repairs to tanks and wells, I have the honor to forward herewith a copy of the decision thereon as given by the Minister for Mines.

I have, &c.,
HARRIE WOOD,
Under Secretary for Mines.

The Under Secretary for Public Works, Sydney.

Steps should be taken to have the Treasury advised of the transfer of the £10,000.—W.C.B., 4/9/83.

So that from these papers I think it will be seen we were actually charged with the maintenance and repairs to these works.

3535. *Major Penrose.*] Since these papers were written has anything been done to disturb that arrangement? Nothing except what I will call the arbitrary action of some of the officers of the Mines Department in regard to it.

3536. *Chairman.*] This completes the documents which have passed between the Departments in connection with this matter? Yes. I would like to add something to the evidence which I gave in regard to fencing last night. I would wish to point out that one great source of loss to the country in regard to these tanks arises more from the extraordinary shapes of the lease areas than from the asserted excessive cost of the works. The Mines Department have employed their own surveyor in the majority of cases to lay out the leases, and as they have no power to lay out Crown lands other than those dedicated to stock routes or as reserves within their control, they had to lay out these areas in long narrow strips along the stock routes. The consequence of this is that there is a great increase in the quantity of fencing. A great deal more has to be done than if the Lands Department had sent their surveyors, who could have dealt with the Crown lands outside the limits of the stock route.

3537. Are we to understand that the Mines Department employ surveyors as well as their various other officers? Yes; they do. The strip of land at the Woolondool well, for instance, set apart as a special lease, is about three miles long and only about 30 chains wide.

3538. *Mr. Woore.*] The shape of the area would not affect the cost per mile? Of course it would not affect the cost per mile, but it would entail a far greater mileage of fencing. I am not using this as an argument bearing on the cost of fencing per mile.

3539. *Major Penrose.*] We have had it in evidence that there was great delay in getting these areas surveyed by the surveyors of the Lands Department? Yes; that was in the very early days, but afterwards the Mines Department took the matter into their own hands.

3540. *Mr. Woore.*] Was the Mines Department confined in its selection of special leases to the land under its own control? Yes.

3541. That being the case could these areas have been surveyed in a more economical shape for fencing than that in which they have been laid out, seeing that the Department was confined to the stock route? No. I will not say that, but then if the matter had been left to the Lands Department this extra mileage expense would not have been incurred, because the officers of the Lands Department would have the power to go beyond the stock route and on to the crown lands adjoining.

3542. *Chairman.*] Can you give us any information with regard to the alleged subletting of contracts? No; but I believe this has been the general custom in many things, and in fencing particularly. In excavation there is not so much room for subletting, and the contractor himself generally does the work. There is one case that might be instanced—on the Cobar to Wilcannia road, where the earthworks were stated to be sublet to another man at a considerably less rate than that paid by the Government; but in that case there was an actual transfer from one man to another on the original terms; the first contractor having obtained two jobs and not being prepared to carry out more than one.

3543. Now with regard to the construction of wells and the erection of all the head works before the supply and quality of water was proved—we have been told that contracts have been made for the whole work to one man, who erects the whim before there is any water found at all. It is stated that the head gear is all erected on the site of the well before anything else is done. Can you give us any information with regard to this? In the first place the contract is let in bulk as you have just stated. The contract includes the sinking of the well and the erection of the head gear, but the practice is not to allow the contractor to put up the headworks until the water is found and its quality is proved. Trial-shafts are as a rule put down and if they are not put down the headworks have, except in one case, not been erected till the finding of the water. It it is cheaper to let the whole work in a lump in this way than to have two separate contracts, one for the sinking of the shaft and the other for the erection of the headworks. One man will take the work at a lesser rate than could be obtained under any system of dividing the work.

3544. *Mr. Woore.*] What instance is that you speak of where headworks were allowed to be erected before the water was found? I was referring to a case on the Mount Brown road.

3545. That work has not been handed over yet? No: it was stated by one witness that the Normanstone well was a case in point, but the Normanstone well had no headworks at all. At the Baloola well the contractor started to erect the service tank and was stopped. The whim was erected, but that is very often necessary in carrying on the sinking of the main work.

3546. *Chairman.*] But the whole question hinges on this, is it desirable to sink wells until you have proved the water by putting down a trial-shaft? But we have sunk trial-shafts. We did it at Gunbar.

3547. But I am speaking of this other contract? Well, it would be cheaper to sink the main shaft on speculation than to put down this trial-shaft on rock.

3548. Is not that then a case where boring should come in? Decidedly.

3549. Why was not a bore used in these two cases of Normanstone and Baloola? It would have been a decidedly preferable course to have adopted. The sites were selected first by the Mines Department and we sunk the wells afterwards at the places stated. But it would have been a better course had the Department bored in the first place.

3550. Now we have also had it in evidence that some of these wells have cost as much as £10 per foot? I do not know where they are, except it be the well which was put down at Tibbooburra by the Mines Department and which cost about £15 per foot.

3551. Will you turn to the second page of the *précis* of evidence. It is said that a portion of the headworks of the Willandra well were placed upon the private property of the Kilfera run owners? That includes all the top works, whim, service tank, troughing, and so forth. It has been put in such a way as to lead to the conclusion that it was for sinking only; it is the same thing as the Holy Box well. There was an encroachment on an old conditional purchase of Mr. Webb's who did not actually know of the position of this conditional purchase, according to his own statement.

3552. *Major Penrose.*] Then, it is said that the construction of this well was not asked for by the Mines Department? I gave it in evidence on the first day that the Mines Department distinctly asked us for two works between Clare and Ivanhoe, but Mr. Gilliat now says that he only asked for one.

3553. Apparently they asked for tanks? Yes; and we put down a trial-shaft in the first place. Mr. Gordon, the local officer, stated that good water had been obtained, and on the strength of that statement we put down a well, but we never bottomed it, on account of having reached running sand or drift. Another well is now being sunk adjacent and the head-works utilized, the other shaft having been abandoned.

3554. *Chairman.*] Would it not have been better under the circumstances to have sunk a tank instead of trying a new well? Considering that the existence of good water had been proved by the trial-shaft, I thought a well would be more economical and more reliable for permanent water than a tank.

3555. Now with regard to the Wooloondool well, I see that the allegation is that the "well has been bored from bottom of shaft, neither pipe nor floor placed in well. Bore liable to, and is constantly choked from silt. Constant baling, even when water is not required, necessitating great wear and tear and useless labour, insisted on by Works Department, as necessary to keep bore from silting. Bore choked on many occasions, and has caused much needless labour and correspondence. The Works Department endeavour to show it is the fault of the Mines caretaker or lessee." What have you to say with regard to that? This well has been bottomed on good stiff clay. It was bored through that stiff clay, and the bore-hole is now larger than it was originally, and is not choked by any swelling ground. I admit that when the well is standing for a considerable time, that the silt deposits will choke the bore. It is usually freed by putting a rod down it, which any man could do, but the putting down of a pipe would rather increase the evil, because it would have a fixed and lesser diameter than that of the existing bore. In fine silt drift like that, I think it is almost impossible—indeed I believe it is impossible—to keep the bore clear, unless the well is in constant use, and there is a current of water through the bore-hole.

3556. *Major Penrose.*] As I understand you this bore has been made through stiff clay? And the drift is below it. The water is artesian and rises above the level of the bottom of the shaft.

3557. *Mr. Woore.*] Is not this bore, having been put through clay, liable to get choked? Yes; but it increases in size by the flow and force of the water. Of course there are cases where putting a small pipe down a bore would answer the purpose, but in this case it is not necessary, because the bore is in good stiff sound clay. They would find that they would have just as much difficulty in keeping the pipe clear as in keeping the bore clear.

A. F. Wood. 23 Mar., 1888.

3558. The only way to stop the bore from getting choked is to pump? Yes, without pumping in a case like that, they would find the drift increase. We have had reports that the well has run dry, but if it has, it is due to their neglect of this bore. Their statements have all proved groundless. Mr. Keighran reported in a great state of excitement that a large number of stock were coming along, and that there was not sufficient water at this place. Mr. Stilwell went out from Hay, pricked the bore, and found an unlimited supply of water there.

3559. *Chairman.*] I would ask you to look at page 3, where the Holy Box well is referred to:—"This well was sunk and small supply of fresh water tapped, followed by a great flow of salt water, which, when twice analysed was declared unfit for use. Evidence as to saltness was submitted. Well was abandoned and tank commenced. Works officer stopped work at tank when about 3 feet deep, declaring well water good. Well again handed to Mines and constant baling insisted on, to improve quality of water; this done without result. Cost of well and price referred to—94 feet deep, cost over £1,000. Mines has to bear cost of maintenance and employ caretaker to bale and protect head works. There is no prospect of leasing salt wells. Caretaker has carted drinking water 17 miles. Whim, service tank, and troughs erected before quality of water decided suitable. Iron in troughs destroyed by action of salt. Well almost useless for stock and quite unfit for travelling public?" Perhaps I had better give the whole history of this well. It was originally sunk in 1878, by Mr. Cambridge, when good water was reported as having been obtained. It was transferred, with other works, to the Mines Department, in 1879, and was condemned by them as being unfitted for stock. A year or two afterwards we were instructed to construct a tank close to the swamp. A contract was let for it, and in view of the top works of this well being in good order and that they could be utilized for new tank works, our Department applied to the Mines for transfer of them, intending to dismantle the well. The Mines Department transferred the Mines to us. Shortly afterwards I was travelling up the road and from what I heard I thought it was advisable to have the water of the well thoroughly tested before dismantling. I employed the contractor for the tank to bale down the well, which he did and found that the water was of a very good quality, and at the very time 10,000 sheep watered there, according to a telegram which he sent me to Wilcannia. Since that time several lots of sheep have watered there; and horses, to my certain knowledge, have drunk the water. I therefore considered that the objections raised to the well by the Mines Department were based on their original action when, at the onset, they condemned the water without giving it a good test. We have a sample of this water in town, which we will submit to you, if necessary.

3560. *Major Penrose.*] Prior to your baling the well you had urged this baling on the Mines Department as necessary? Yes; I believe it was done, but it was done on the strength of Mr. Cambridge's report that the water should be thoroughly tested before being condemned. Testing of course necessitated baling. But the opinions formed in regard to stock water are very conflicting. The Jumping Sand Hill well was said to be unfit for stock, but it has turned out to be the very best water in the district, and the same may be said of the Lignum Hut well. I have seen the letters in the Mines Blue Book concerning these matters, and I think that the quality of the water is very often a matter of opinion.

3561. Sometimes you find that if a well is baled out the water improves? Yes.

3562. *Mr. Woore.*] Might not the refusal to the stock of water have occurred from the troughs and service tank not being kept clear of saline sediment, and the water taken from the well being affected by this sediment? Yes; Mr. Gordon says at page 36 of the Mines blue book, that Parker informed him that Mr. Evans, the manager of Conoble, said he would work the well during the summer months if allowed. Mr. Croydon adds that it might be well to let him do so in order that the efficiency of it might be established. And I know, from other hearsay evidence, that Mr. Evans was anxious to get hold of this well himself. If the water were so bad I do not think that Mr. Evans or any other station manager would be desirous of getting the well into his hands.

3563. What is being done with the well now? It is in charge of the Mines Department. When I last visited it, two years ago, I drank the water from the well, and would not object to drink such water at any time on a pinch. It was brackish but still drinkable. There is another statement that conveys a wrong impression, that the well was over 90 feet deep and cost £1,000. That amount includes the headworks.

3564. Then this sum of £1,000 is inclusive of machinery, timber, and so forth? Yes; and we will furnish you with the final voucher if necessary.

3565. *Chairman.*] Now about the Mount Manara well, it has been said that the whim and head works were erected before the water had been tested? I can swear positively that that statement is not correct, because the work was done under me in 1870, and there is sufficient corroborative proof in that the service tank was made of exceptionally large size to meet the small yield of water that was obtained; and as we had not expected the small yield when we started the sinking, it proved that the headworks had been constructed after the water had been discovered.

3566. Then the report goes on to say that the tank was finally abandoned and another constructed 4 miles away? Under instructions from the Mines Department a tank was constructed 4 miles away.

3567. *Major Penrose.*] Do you think that that well is still a useful one? With repairs it would be; it is put down in good sound ground, part of it in slate rock. I have myself heard that it yielded with the extra surface and storage very nearly sufficient for the travelling stock. Its yield is, I think, about 400 gallons per hour, and with a large service tank, I think it will meet all requirements. There was one objection to it, and that is, it had to be sunk to a very considerable depth—200 and odd feet.

3568. Would that supply have been increased by driving? We did drive. But even assuming that the headworks had been erected before the machinery was put down, we were justified in doing it, because I think we had put down a bore there, and good water was obtained before we started. It was splendid water; nearly fresh.

3569. *Chairman.*] Would it not be possible to find out from the bore what the supply would be? Not very easily.

3570. Now, as to the Dolmoreve well, does the same thing apply to that as to the Holy Box well;—it is said that the caretaker here has to go 4 miles for fresh water? I have seen a report from one of their own officers, in which it is stated that the water is very fair stock water. It is stated at page 111 of the Mines blue book by Mr. Gilman, an acting overseer of public watering places:—

> With constant baling, however, I cannot understand way it should be unsuitable for stock. I gave this as my opinion to Mr. Lindsay, the manager of Til Til Station, who informed me that some of the wells that their sheep watered at were no better, if even as good, as the Dolmoreve, and that, if the Government would let him water his stock at it, instead of baling and letting the water run to waste, he would gladly avail himself of it, and would not be afraid of his sheep being injured in any

any way from drinking the water. It is now nineteen years since I first went to the Kilfera back-blocks, where I remained for about two years, and was at the sinking of several wells, the water being quite as brackish as Dolmoreve well, and decidedly worse smelling, yet the sheep drank freely of the water without any ill effects; in fact some of this description of water at the homestead well (Kilfera), was condensed at the well by a condenser, and turned out quite drinkable for human beings, thus saving long carriage of water.

3571. *Major Penrose.*] The baling of 6,000 gallons a week was not very arduous work for one man? No; not from that well. A man ought to have been able to bale 1,000 gallons per hour. The baling of 6,000 gallons per week, or 1,000 gallons per day, would have had no effect.

3572. *Chairman.*] You have read of the case of the breakage of the wire rope;—no doubt a wire rope would very soon corrode in this water? Yes; and it would be owing to the neglect of the caretaker in allowing it to remain in the water. He should have suspended the bucket mid-way. A wire rope will corrode more rapidly in brackish water than in fresh water.

3573. What sort of rope do you use in these wells? Except in one case, where we had a coil of black iron rope sent us, all the wire ropes were galvanized.

3574. You do not use steel ropes? They are steel.

3575. *Major Penrose.*] Then the Dolmoreve well is perfectly useless? Yes; according to the Mines Department.

3576. And you think it has not had a fair trial? I will not say that as a fact, as I do not pretend to be a judge on the point.

3577. *Chairman.*] As to this costly hutting for caretakers, can you give us any information with regard to that? We were instructed by the Mines Department to have these huts erected. They recommended at the time, two-roomed cottages, 24 x 12, with iron roof, windows, floors, chimneys, and so forth, the cost of which was estimated by Mr. Bruce to range from £56 to £100, according to the part of the Colony in which they were erected. Mr. Bruce issued a circular to the officers in his Department in July, asking them to submit estimates of the cost of the different classes of buildings of that size; and it seems from the estimates of his own local officers that in Bourke the cost would be £100 for a two-roomed dwelling of a type like that recommended by Mr. Bruce—weatherboard, with iron roof, floor, and so forth. At Cobar the cost would be £80; at Hay, from £80 to £90; at Cannonbar, £56; at Narrabri, from £63 to £90; and at Wilcannia, £80. In the average the cost of these works is considerable, but the Mines estimate does not embrace the three-roomed cottages for which tenders were received and plans and specifications issued by us.

3578. *Major Penrose.*] Were your huts bigger than theirs? They were the same size, taking the front part of the main building; but there was a skillion room at the back of our huts which was not in the Mines—that being added on the recommendation of that Department, which is quoted on page 137 of the Mines blue book. The works which they compare against ours are, judging by the reports received from our local officers, of a different class altogether; but very likely the local officers themselves can speak about that when they are examined before you.

3579. Do you think that the tenders sent in for the cottages for which you issued specifications were fair and reasonable tenders? I do.

3580. *Chairman.*] With regard to the defective construction of troughing—which really means that the animals had a difficulty in getting to the troughs—can you give us any information about the original design as shown in your plan? The plan produced shows how the guard to the trough has been erected, and when the works were being handed over to the Mines Department Mr. Gilliat expressed uniform approval of them. We—that is the officers of the Works Department—do not pretend to have an intimate knowledge of stock, and we only acted on the opinions expressed by those whose speciality it was.

3581. *Major Penrose.*] Was the design for the troughing submitted to the Mines Department in the first instance? Before we ever adopted it I saw it at a station when travelling along the road from Hillston to Cobar. I made a sketch of it on that occasion, which I included in my report, as I thought it was a good idea. The report and the sketch were sent on to Mr. Gilliat and approved of by him, and when we handed over these works (which include this type of troughing) he expressed approval with a slight exception that the sharp edge of the rail which caught in the wool of the sheep should be trimmed. In these Mines Papers, at pages 174 and 175, Mr. Gilliat expressed his approval of this troughing, and said that, although it required a little alteration, the caretaker, if he was a man of any energy, could do it.

3582. You are now aware that this fence is being taken up and a centre rail being put down? Yes; they throw the rail more over the centre than before. We are now using steel troughing, as shown in the plan. The other is a thing of the past.

3583. We have gathered from your evidence and the evidence of others that a considerable amount of friction exists between the two Departments? Yes; there is a good deal of what may be called friction with no doubt a certain amount of animus; and I must confess that our officers feel it just as much as the Mines officers do, and I think they would be wanting in "go," in energy, and in self-respect if they did not feel it. Men could not be expected to feel otherwise when the character of their work has been unjustly depreciated by the officers of another Department.

3584. You think it was a mistake to have ever taken over the control and maintenance of these works from the constructing Department? Yes; I think that whatever Department has the constructing of the works should also have the maintenance.

3585. You think it is almost impossible to carry on satisfactorily these public works if this dual control is to continue? Well, dual control has proved as evil in this case as in others.

3586. Then what would you suggest to get rid of this unfortunate difference? That one Department or the other should have the control of the works until such time as local government becomes the order of the day.

3587. In fact you believe that local government would tend to lessen the expense of these works, and enable them to be carried out more efficiently? Well, I do not know that they could be carried out more efficiently than they are carried out at the present time.

3588. I mean with a better regard to the requirements of the public, from the more intimate knowledge which the members of the local bodies would have of the locality in which the works were to be put down? Well, I think it would be better, and for this reason—that many works which are practically unnecessary would not be carried out under a system of local government, as they are at present under the pressure which is brought to bear from political sources upon the Government of the country.

3589. For instance, at present where a small tank would meet all legitimate public requirements, pressure is brought

A. P. Wood. 23 Mar., 1888.

brought to bear to have a large tank put down? Well, I am not in favour of small tanks to start with. If you have a good catchment and a good rainfall perhaps there is no necessity for the construction of a public tank at all.

3590. What I mean is this,—that if a small tank only were required the people who have to pay for the work under a system of local government, would take care that only a small tank were put down? Yes; there is no doubt that it would form a very useful check on public expenditure.

3591. As the Department of Public Works does not pretend to interfere with the stock arrangements, at whose instance would these public works be commenced? Assuming that the works were in our hands for construction and maintenance the difficulty would be very easily dealt with. The Stock Branch is attached to the Mines Department. It would be for the Stock Branch to say that a certain route required watering, and then leave everything else in the hands of the constructing Department, without any interference with the works or the officers of the Department. The Stock Branch would merely say that water was required at certain stages, and we would pick out these sites in accordance with these stages. We would then act entirely irrespective of the Mines Department from the commencement of the work to the finish.

3592. *Mr. Woore.*] There would be no possibility of friction under such an arrangement as that? No.

3593. After these works were constructed who would take care of them? The constructing Department, as I have said. I would decidedly recommend that the revenue received from the watering of stock should be collected, as was suggested some time back, by the stock inspectors, at the time they were issuing traveller's permits. That would free us entirely from any connection with the levying of tolls and rates.

3594. *Major Penrose.*] The caretakers would then be merely responsible for seeing that the water was supplied? Yes; and for keeping the works in order.

3595. *Chairman.*] Are you aware how similar public works are constructed and maintained in Queensland? By the Divisional Boards—from what I have heard. In Victoria I understand that they have local water trusts. The central Department simply acts as a check upon the expenditure of the money lent by the Government to these trusts for the construction of the works.

3596. And you think some such system as that in vogue in Queensland and Victoria would be very desirable in New South Wales? I do; and I believe that a system of local government would be a very great boon.

3597. Now we have heard that great success has attended the boring for artesian water in one or two instances? Yes.

3598. Do you know anything about the country—about the sub-soil—where this water has been found? I know the country a little, but I have not seen the sections of the bores. These bores are not in my opinion the success they are supposed to be by the notices in the newspapers. Mr. Coleman can give you evidence on this point if you should require it. He knows that country, and what has been there.

3599. Does not that simplify the whole matter in that particular part of the country? We understand that it is in this cretaceous formation that you get this abundant supply of artesian water, and if this is the case, will it not do away with the necessity of tanks and caretakers in that part of the country? On the assumption that an abundant supply of water has been obtained it will do away with the whole machinery of public watering places.

3600. *Major Penrose.*] Has this question of artesian boring ever been taken up by your Department? No; we have bored with the ordinary rod, but only on a very limited scale—down to 200 feet.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

William John Hanna called in and examined:—

W. J. Hanna. 23 Mar., 1888.

3601. *Chairman.*] What are you? I am a road superintendent.

3602. In what district? Wilcannia district; but my local quarters have been shifted to the Barrier, and the name of the district has not yet been settled. I think I had better say the Wilcannia district.

3603. How long have you been in your present situation? About four and a-half years in the west.

3604. Have you had the superintendence of many of these tanks or public watering places? Yes; a great many of them.

3605. In fact I suppose in that part of the country there have been a great many works done lately, owing to the influx of population? Yes; and the scarcity of naturally-conserved water.

3606. *Mr. Woore.*] In what way were you occupied in your Department before you went to the west? I was for four and a-half years in charge of the Young district, and a little over nine years altogether in the service.

3607. *Chairman.*] You are aware that allegations have been made by officers of the Mines Department and also by private individuals, finding fault in various ways with the work done by the Public Works Department? Yes.

3608. These allegations take the form of statements that the sites of the tanks were improperly selected, that the construction was defective and costly, and so on? Yes; and some of the sites, I believe, were selected by the officers of the Mines Department themselves.

3609. Is it usual to consult the officers of the Mines Department or those in the Stock Branch of the Department, in selecting sites? Yes; it has been done by the head office. I do not do so. I report to the Engineer-in-Chief for Roads direct.

3610. Will you state exactly what your position and duties are in regard to this matter—how these things are brought about and what puts you in action? I suppose pressure is in some way brought to bear on the Government to put watering places on a certain route? I act under instructions. The necessity for watering various routes at particular stages is sometimes brought up by the people themselves and sometimes by municipalities. Then the matter is brought under the attention of the head office in Sydney. If sent to the Works Department, I am requested to report; but sometimes the application goes to the Mines Department, and then the officers of that Department deal with the matter. When my report is received in the head office, I believe the custom is to send it on to the Mines Department for their approval or otherwise.

3611. And when the matter goes first to the Mines Department do they forward it to the Public Works Department for approval? It is sent on to the Roads Department.

3612. I mean is there reciprocity;—do the Mines when they receive an application for a watering place send

send it on to your Department for approval? I am not aware that they do. I think that they obtain reports from their stock inspectors; but whether they act upon these reports or not, I cannot say.
3613. Then your report having gone to the Mines Department is returned to the Works Office? Yes.
3614. What next? It is returned with their instructions upon it, either approving of the site or recommending otherwise. I am speaking now of what I understand of the custom of the head office, so far as I am aware of it.
3615. Then in any instance do you ever commence the excavation of a tank without having received the approval of the Mines Department? I do not know that all are referred to the Mines Department. For instance, the tank at Broken Hill—that was not referred to the Mines Department.
3616. *Major Penrose.*] But that was a tank for a town? Yes; but I notice that Mr. Low sent in a report upon it.
3617. *Chairman.*] Was that a complaint? No; merely with regard to the cost of the work and the dimensions of the tank.
3618. And yet it is a matter with which that Department had nothing whatever to do? Nothing whatever.
3619. Then let us distinctly know who it is that fixed the exact site of the works;—is it your Department? Yes, in most cases. The Mines Department indicate the general position, and we chose the exact site.
3620. Then the usual course is followed? Yes; tenders are invited and the work is undertaken. I supervise it as the work advances.
3621. *Major Penrose.*] What do you do when you receive an order to put down a tank? I fix the site, draw out specifications as a rule, and invite tenders.
3622. You draw out a design of the tank? Sometimes it is done in the head office, and sometimes I do it myself.
3623. But the general design is liable to modification by the officer on the spot to suit the circumstances of each particular case? Yes; some of the tanks are square, like these on the plan produced, but there are very few of them in my district.
3624. You have a considerable amount of latitude allowed you as regards depth? Yes; and if I deem such alterations necessary, I report to the head office; but any little alteration, such as surface dimensions, I do not.
3625. *Chairman.*] Who fixes the capacity and size of the tank which may be required, or are they all on one plan? It is all according to the importance of the road.
3626. But who decides that? It is decided in the head office. I generally recommend what I consider would be a proper size; but a decision is arrived at in the head office by the Works or Mines Department.
3627. But which Department does this? The Mines Department, knowing more about the stock routes, might be the best to say what the size of the tanks should be? No; I cannot say which Department decides as to the size of the tank.
3628. *Major Penrose.*] I suppose you can modify the disposition of the embankments, if necessary? Yes.
3629. And generally you can modify this design to a considerable extent? Yes; I have only one tank that is exactly like the plan produced. The slopes are nearly all 3 to 1, on account of the looseness of the soil. The tank at Broken Hill is 2 to 1, because it is sunk in exceptionally good ground; and it being for a town supply, it would never be necessary under any circumstances to allow the stock to go into it. 80 × 60 and 90 × 60 are about the average surface dimensions.
3630. Can you state what tanks are 3 to 1 in your district? Yes; I will give you a list of the tanks that have 3 to 1 batters. I have only three tanks in the whole district, namely, the 12, 35, and 48-Mile, on the Booligal road, that have a batter of 1½ to 1. The next steepest-sloped tank in my district is the 26-Mile tank, which has a batter of 2 to 1.
3631. Can you tell us the names of some of those which have 3 to 1 batters? Waratta, Maxwell's or Murlippa, Tarella, Peak, Dry Lake, Cobham, Rathole, and Thackaringa. That is all I will say just now. I believe the Silverton, Day Dream, and Purnamuta tanks have also 3 to 1 batters.
3632. *Chairman.*] You or some other officer in your Department occasionally pay visits to these tanks, measure up work, and pass vouchers? Yes; I try to get round the district about once a month.
3633. Then, when the work is completed, you attend, as soon as possible, to make final measurements? Yes; and if there is a large balance owing to the contractor, I pay him 50 per cent. in advance, that is, when I get back to head-quarters. The balance is then sent on to the head office for payment, and is paid in about three weeks.
3634. That is the plan now adopted? Yes, and has been adopted ever since I have been in the district.
3635. And such delays as we have heard of—delays of months and months—before the final payment is made, never occurred to your knowledge? No, not to my knowledge. In some cases payment is delayed, but it is simply a case where the contractor has left something undone, or has disregarded instructions, or refused to do certain things which I considered necessary.
3636. So that in the event of any long delay occurring, the blame rests with the contractor himself? Yes; but final payments are sometimes delayed for various causes. These, being small, cannot cause much inconvenience.
3637. *Major Penrose.*] Do you ever make any other progress payments? Yes, every time I go round. On some works I have made as many as thirteen advances while the work was in progress.
3638. *Chairman.*] Now, when the work is finally measured up, what guide have you to prevent any swindling on the part of the contractor? On nearly all new works that were started under me, I took the levels at each corner of the tank. If the ground is irregular, I take the levels in two or three other places, and connect these levels with the bench marks. I produce my field-books for 1885–6–7. [*The books referred to were then examined by the Commission.*]
3639. Is it possible for a contractor to so disguise the levels that in the final measuring up he will be able to get paid for more excavation than he has really performed—of course it is possible to pull up the pegs? Yes; it is possible to pull up the pegs, but they cannot shift the bench marks.
3640. But is it not possible, by manipulating the ground, to cheat the Government in this way? It is quite impossible for a contractor to make an alteration of half an inch if you had a bench mark. I never require the surface levels after they have been taken the first time. I can fix the pegs within a quarter of an inch of where they were originally.
3641. *Major Penrose.*] How long have you used this method? Ever since I have been in the district.
3642. *Chairman.*] Are you aware that your predecessors have always taken the same precautions that you state

W. J. Hanna. 23 Mar., 1888.

state you have adopted? I cannot say that. There may be some cases where these precautions are unnecessary, such as places where the ground is perfectly level—where you have a plain to deal with. The contractor cannot alter the ground in that case without being detected, as you can get the average surface inside the tank by going a chain or two from the embankments.

3643. *Major Penrose.*] Did you follow this method in consequence of the circular which had been issued from the head office? I believe there was a circular sent out to this effect, but I did not receive it nor did I act in consequence of it.

3644. Then these precautions that you took were only ordinary precautions? Yes; I found it so much more satisfactory. It avoids all possibilities of having any disputes with contractors. It is a thing that you go into Court and swear to, whereas with the ordinary surface marks it is not so easy to say. As I have said, there may be cases where I have not had an opportunity to take these levels, and where they are not, as on plain country or level surface, absolutely necessary. In such a district as the western you cannot always be carrying instruments around, and sometimes I have had to start work without being able to take these levels; but these are exceptional cases, where the natural surface of the ground is a sufficient guide.

3645. *Chairman.*] Then you think that with an ordinarily sharp man, imposition by contractors is not possible? No; not to any extent. I followed this practice as much to avoid troubles and disputes with contractors as for any other reason, because I do not see that a contractor can get any advantage when I adopt that plan.

3646. Another way in which it has been said the Government has been cheated, is that they have to get a contractor or one of his men to help the road superintendent in the final measurement of the work. The general custom is said to be, if the man happens to be below to gather some of the tape in his hand, and if he is above to give an improper site to the levels—in either case the Government being cheated? Well, I use a levelling-staff, so that they cannot take anything off the end of the staff. Besides I doubt if a contractor would care to risk that, although it may have been attempted in some instances.

3647. Some of them seem to take a pride in doing it? Yes; but there is always the danger of being found out, and I think anything like that would be very soon found out.

3648. Having measured up the tank I suppose it is then handed over to the Mines Department? Yes; after the appliances are erected.

3649. Then, after this have you any control over these tanks? No; but in going over my ordinary rounds I continue to visit the tanks, and report to the head office how the works are, the quantity of water in the tank, and the general appearance of the works.

3650. Then, in the event of negligence being apparent in the management of the works, what would you do? I report to the Engineer-in-Chief for Roads.

3651. Not to the Inspector of Public Watering Places? Oh, no; I have nothing to do with them officially.

3652. Is it by instructions that you report to the head of your Department? Yes.

3653. Do you not think it would be desirable when you see negligence exhibited by the caretaker, that you should report to the caretaker's superior, and let him attend to the matter—would that not involve less red-tapeism? Yes, it would. But if these instructions were not attended to I might be blamed by the head office for not reporting, and justly so.

3654. Then, in the event of any serious repairs necessary from the heavy rains having to be made in the embankment, what do you do—do you find out for yourself or is it reported to you? I generally find it out myself first. After heavy falls of rain I make inquiries in any way I can as regards the state of the works, and if serious damage is reported to any watering place I go there and inspect and see for myself as soon as possible. Having done that I report to the head office.

3655. Then, in the event of a minor repair only being required, what do you do? I follow the same course whether the repair required be a light or heavy one.

3656. Are you aware that the Mines Departments retain the power of repairing small damages without reference to the Works Department? Yes; I believe they have the power to do any repairs up to a certain sum.

3657. How comes it, then, that you also apparently interfere with the works under their charge, and report these trivial matters to the head office—supposing the repair cost only a few pounds? I do not wish to interfere. The fact of my reporting to the head of my Department, does not interfere with their taking any action that they may desire. I simply report if anything has gone wrong, and further action rests with the Engineer-in-Chief or with the Mines Department. My action does not interfere with their doing anything they consider urgent or needful.

3658. But do you not think that all this tends to produce friction and charges, and countercharges between the two Departments? Yes; it does.

3659. Then, in the event of some heavy work having to be performed, you go through the same course? Yes; I report the matter, and if there is anything very urgent, and where a delay of necessary repairs would cause further damage, I take action myself on my own reponsibility and telegraph what I have done to the head office.

3660. Then, in going round to inspect any damage that may be done to the tank—if you see repairs going on under an Inspector of Public Watering Places you take no action? Well, in reporting the quantity of water in a tank, &c., I would very likely refer to the matter and say that the repairs were in hand and progressing satisfactorily.

3661. Do you also report to the head office when the silt-tank is filled up and nothing is done—is it your duty to report that fact? Yes, it is my duty to report anything that is defective about the works or any negligence.

3662. Although all this is properly within the sphere of the caretaker and a part of his duty? Yes.

3663. *Major Penrose.*] Did you ever have any complaints from contractors about delays in payments in your district? If the contractors were kept a day behind their time they would, and do complain, but I have never had anything that I would regard as a serious complaint.

3664. The progress payments would be quite enough, you think, to enable them to carry on the works, the final payment being a very small one? Yes, as a rule very small. In making progress payments I pay 50 per cent. in advance, and the balance is paid in about three weeks. Suppose a man has £200 worth of work done. I deduct 20 per cent. leaving a balance of £160. Of this, £80 is paid in advance as soon as

I reach my headquarters, and placed to the contractor's credit in the bank. The remaining £80 is sent on for payment, and is paid in the usual way in about two or three weeks. I will instance one case—the case of the Menamurtee well. There the total amount of the contract was £566 8s. 8d. The advances paid were £75, £77, £143, £145, and £110, leaving the balance as the sixth and final payment of £16 8s. 8d.
3665. What were the intervals between these several payments? I cannot say here. They extended over about a year I suppose. It will be fully that. I can give you instances where there have been thirteen payments on one work.
3666. *Chairman.*] Have you ever known an instance where a man was forced into the Insolvency Court by delays in getting the balance of his money? No; such a case should not occur under the arrangements made by the Department.
3667. If you find that the caretakers are not competent men to take charge of the works do you allow them to retain charge, or do you caution them? Caretakers are employed by the Mines Department, and are solely under their control.
3668. You have never given such an order as "You must not touch that pump?" No, I have never given such an order as that, but I have explained several things to the caretakers in a friendly way, telling them, of course, at the same time, that if they were not satisfied with my instructions they had no need to pay any attention to them. Some of them did follow my instructions, but very few; others ignored them, and I gave up trying to help them.
3669. It has been stated here that very improper sites for tanks and wells have been chosen—some of them in your district are sunk in the bed of a lake, and are now submerged? I presume you are referring to Dry Lake and Cobham.
3670. Yes, and to other cases where it is said very much better sites might have been chosen in the immediate vicinity? Well, I prefer a tank site in a place where the water is likely to accumulate. I think it has been said with regard to Cobham that we constructed a tank in the lake. Well, it is quite true that it is submerged, but it is not in the lake, and the fact of its being submerged is not, I think, a sound argument against the site.
3671. *Mr. Woore.*] You say it is not in the lake? No, not in the lake proper. Here is a report of mine on the subject.

Cobham Tank.

Silt tank is completed, but will not hold; bottom is in fine white sand; when at Cobham on the 4th there was a heavy thunderstorm, which, judging from what I saw, and the marks on watercourse, should have put at least 3 feet of water in silt-tank.

The greatest depth was 9 inches, and when leaving on the 6th, this was almost gone.

Samson states on a previous occasion when the excavation was down 5 feet, the tank was filled to overflowing, and dry a fortnight afterwards.

On the way to Tibbooburra I asked Samson to get a shaft put down in centre of main tank to be ready for inspection on return.

Section is forwarded herewith showing the thickness of the various strata passed through. From 6 to 13 feet puddling would be required. The watershed is of such a sandy nature that a long time would elapse, and consequently great loss of water, before any benefit could be expected from edposition.

I had a second shaft put down nearer the lake, and found that after passing the surface drift (about 1 foot thick) the sinking was through tough white and red clay up to 16 feet 4 inches. At 17 feet a stratum of sand was struck from which the salt water rose 4 feet in two days. This I believe is the same stratum passed through as the one at 25 feet when boring. (See sketch).

I do not think there would be much difficulty in sinking to full depth (18 feet); the working in the tank would I believe be sufficient to puddle the sides and prevent the salt water coming in in such quantities as to interfere with the progress of work, and probably stop the soakage altogether.

I would, however, prefer sinking only to a depth of 16 feet, and having only three embankments, there would be no necessity for piping. When full the water would be about 3 feet above surface.

As three banks instead of four will be a disadvantage to contractor, I would not recommend any reduction in price, owing to the depth being altered.

Samson informed me that he is now ready to proceed with the work.

On last visit I marked out the site referred to, so that no time would be lost in case the Commissioner approved.

W. J. HANNA, 15/10/83.

Mr. Hanna telegraphed to to arrange for tank as he proposes, but to utilize the lake if possible.—A.P.W., 22/10/83.

3672. Is it not within the banks of the lake? Yes, but not within the lake proper. There is a sand ridge between the tank and the lake. I am responsible for that site, and I am prepared to meet any objections that may be raised against it.
3673. Is not the tank below the high-water mark of the lake when the lake is full? Yes, but Cobham Lake has no outlet. The tank is below the high water level, I admit.
3674. *Chairman.*] With regard to Cobham Lake the objection has been raised that in the event of the lake drying up, and the water becomming more and more salty, eventually the water left in the tank would become unfit for use? Water in the tank would have no connection with salt water in the lake, because the bed of the lake is several feet lower than the surface of the tank, and the tank is not fed entirely from the lake, but from outside sources. I altered that site from the one that was originally selected, but only a few yards. I would like to read you my report, and my reasons for having done this:—

Cobham Tank.

Department of Public Works, 20/11/83.

(14/11/83.)

Work has been commenced on the site.

Herewith I forward sketch plan showing position of tank as regards the lake, and also section from edge of lake to silt-tank on former site.

The ground above the sand ridge I have chosen for the following reasons: The sandy stratum in which the salt water is found was struck at a depth of 24 feet in centre of main tank as originally laid out, and at nearly 17 feet in shaft put down on present site.

At the opposite side of the lake the same stratum is found in several shafts to be only 8 feet below the surface. I did not sink at edge of lake near the tank, but conclude from the above tests, and levels taken, that the stratum of sand yielding salt-water lies about 8 feet below bed of the lake, and in a parallel position.

If, therefore, we put down the tank on edge of lake the salt-water would be struck at the above depth, which might interfere with further sinking, and at this height from bottom of tank would probably affect the quality of the water.

I find also that the rain which would put 1 inch of water in the lake would be sufficient to fill the tank several times from the present catchment.

For instance, during the last heavy rain, although Evelyn Creek (flowing into Cobham Lake) was for a short time running bank high at Milparinka, washing away a portion of the dam, at that place the Coalley waterhole (half way to Cobham) was not filled. Then about a mile north-west from Cobham there is another lake 3 or 4 miles in area, which receives about

W. J. Hanna. about 2 feet of water before overflowing into Cobham Lake. My informants in reference to the state of the creek at Milparinka were two residents who may have slightly exaggerated: but making every allowance, there is ample proof that a supply from the lake into the tank could only be obtained when not wanted.

23 Mar., 1888.

If a site could have been chosen on edge of tank without cutting the salt-water stratum and without incurring the expense of fluming (over the sand ridge), that of course would have been preferable; but under the circumstances, the position as now set out and shown on sketch, I think is better.

Samson claims payment (£30) for some clearing done on the former site. As the alteration has caused no extra clearing, save one small dead tree, I hardly think his claim is a just one.

W. J. HANNA, 14/11/83.

The Commissioner and Engineer for Roads.

I agree with Mr. Hanna that Samson is not entitled to extra payment.—A.P.W., 20/11/83.

Samson will be informed accordingly.—W.J.H., 26/11/83.

My reason for altering the site was that I found the ground near the silt-tank was too porous, and that the catchment was of such a sandy nature that it would be a long time before the tank would be anything like retentive by the deposition of silt.

3675. *Mr. Woore.*] You say still that the tank is not in the lake. I know this place pretty well myself; and if it be within the sand hills around the lake it must be within the lake? The bed of the lake proper is a layer of black clay about 8 feet thick and almost level, but on the outside there is sandy clay ground.

3676. *Major Penrose.*] Was Cobham tank filled by rain-water before the filling of the lake? I really cannot say.

3677. *Mr. Woore.*] At any rate that tank was placed there not on account of any advantage from the flood-waters of the lake, but rather to fill independently of the lake? Yes; if we had put the tank on the bed of the lake proper—on the black soil—we would only have sunk 8 or 9 feet before striking the salt stratum. But by adopting the present position on the south side of the sandy ridge we would get down 16 feet 4 inches before reaching the salt-water stratum.

3678. Do you think that the catchment there is preferable to the catchment of about 4 miles southerly from the lake where there are clay pans? I think I know the place referred to by Mr. Tully, but I have made no examination of it. I do know that the catchment of Cobham Lake is ample for all requirements.

3679. *Major Penrose.*] Is the tank in the place where it is required for stock? Yes; I only shifted the tank a few yards away from the site where it was placed originally.

3680. *Chairman.*] Had you anything to do with the choosing of the site of the tank at Dry Lake? No; I had nothing to do with any of the original sites of tanks on the Mount Brown road.

3681. *Major Penrose.*] Will you be able to erect the watering appliances at Cobham Lake so that in the case of another flood they will not be submerged? The appliances would be erected on the shore line of the lake on the high water level.

3682. *Mr. Woore.*] What depth of water was there above the embankment of the tank at Cobham when the lake filled this time? Well I really cannot say; I never tested it. I should say about 10 feet; that is from the natural surface of the ground.

3683. The embankments were completely submerged? Yes.

3684. You do not know how high the water was above the embankments? I should say about 4 feet.

3685. But still you would be able to keep your watering appliances dry? Yes; the ground rises very quickly.

3686. Even then, I suppose, it is only a question of a greater flood coming to increase the depth of the water in the lake? Yes, a still greater flood. There is no outlet.

3687. And there is no doubt that the water has been very much higher than when this tank was submerged? I was under the impression that that was the highest flood we had had up there.

3688. *Chairman.*] Can you tell us generally about the tank at Seaville's? I have heard that the tank was put there to benefit some particular individual, whereas it is 3 or 4 miles away from the public-house, and 12 miles away from Wilcannia instead of 9. Although I am not responsible for the selection of this site, still I think I can refute some of the statements that have been made concerning it.

3689. A number of these places are objected to on account of their being alongside permanent water. There is one place we have had a great deal of evidence about, the Peri Springs, where a tank was excavated within a short distance of what was thought to be permanent water, and your Department has been blamed for an expenditure of money, where it is said there is no occasion for it? I have not been past that place lately. If the springs would yield sufficient to meet all requirements, of course a tank might have been dispensed with. But whether the springs would be equal to the strain upon them or not I could not say. And then there is the right of the station owners to be considered.

3690. In dry times the lessee would have required the water for his own stock—would there then have been sufficient water for the travelling stock? I cannot say. I think it is doubtful. To try to improve these springs would mean running a risk of losing the supply from them altogether.

3691. *Mr. Woore.*] You were not there in the early days when this tank was put down? No, I was not. The Tarella and Menamurtee watering places are also said to be near permanent water, but I think it is questionable whether these waters can be considered as permanent in a severe drought. The Tarella dams are very much silted up, and the same thing may happen to any waterhole. Then the lessees in these early days constructed these works at great expense and inconvenience—at a time when labour was expensive; and is it fair then to deprive these individuals of their works when the Government are in a position to put down watering places along these routes? I do not see why the Government should take possession of these works, which have been put down at large expense by the early pioneers. I cannot see why the Government should continue to deprive the lessees of the use of the works. That is the view I have taken up to this. In the face of the minute made by a former Minister of Lands, I think it is questionable whether the Government can have any claim upon this water artificially conserved by the lessees. If they are monopolised by the Government the lessees are deprived of the use of them just at the time when they are most required, and when there is a great demand for water by travelling stock.

3692. *Chairman.*] Is there much traffic on the Mount Brown road? Yes, it was one of the most important roads in the colony. It is the main road from Queensland.

3693. And the same may be said of the Paroo? Yes.

3694. Can you give us any idea of the number of stock that would pass along one of these roads in one day? No, I cannot.

3695. What is the maximum demand that a caretaker would require to find water to meet, supposing one mob were going one way, and another mob another way? Mobs going both ways, a caretaker might have to provide for watering 20,000 sheep.

3696.

3696. Have you ever heard of one caretaker having to supply as many as that in one day? No, I have not.
3697. Now, with regard to the injudicious sites of the Box Creek watering place, Youhll Plains, Kerrigundi—these are all said to be injudicious sites—were they made before your time? These are wells in which the water is said to be salt? I have no information about them; they are not in my district; there are no salty wells in my district that the Mines Department have taken exception to.
3698. *Major Penrose.*] What about the Meenamurtee well? That is good water. I do not think that any objection, so far as I am aware, has ever been raised by the Tarella lessees to stock watering at their dams, but the question is whether their successors would be of the same mind. Besides, as I have said, these dams are fast silting up.
3699. Do you lay out drains yourself? Yes, and if necessary grade them.
3700. And what is the steepest slope that you have allowed with drains? Most that I have done I have laid out with the eye, having sloping country to deal with. When contouring hills I use levels, and allow a fall of one inch to the chain.
3701. *Mr. Woore.*] The less fall the better, I suppose? Yes; it is not desirable to have a great fall, because the water will then carry more silt along with it. I generally lay out the last 5 or 10 chains nearly level, so that the silt will not accumulate there. The heaviest silt is caught in the drains, and the caretakers can clean them out with a shovel after the water stops running.
3702. *Chairman.*] And what do the drains cost per chain in your district? I have had some done recently at 4s. 5d. That is the cheapest I have had done, I think.
3703. What are these—6 feet? Six feet broad and 9 inches deep.
3704. What is the highest sum that you have had to give per chain? I think I have paid as high as 7s.
3705. I suppose 12s. or 15s. per chain would be rather an excessive price? Yes: I think 12s. or 15s. per chain would be high, but prices vary very much according to the nature of the ground and the seasons. Some main drains I have made 12 feet wide and 9 inches deep, and they have cost about 9s. per chain.
3706. *Major Penrose.*] Have you ever found the design for fluming defective? No; I think the design is suitable in every way.
3707. It has been objected that the construction of the fluming, where it enters the embankment, is defective. Have you ever noticed any difficulty in this case? I have not experienced any difficulty. If I suspected a heavy rush of water into the tank after a heavy thunderstorm I would put on a cover of 2 feet of earth so as to prevent the water from flowing over the shoot, but it is very seldom that the water would come down so quickly as to overflow a 4 by 2 flume.
3708. Are all your tanks 18 feet deep? Most of them are; but some of them, on account of the nature of the ground, we cannot get down to 18 feet. I always try to get to that depth or as near it as I can.
3709. *Chairman.*] Would you make the batters steeper if the ground were sufficiently firm to stand it? Tanks would be all the better for steep batters for the purpose of conserving water, but it would add a little to the expense.
3710. Have you ever made a calculation as to the relative merits and expense of the two kind of batters? If you had very steep batters the expenditure would be greater, and you would have a greater depth of water in comparison with the amount of excavation. But if you have very much longer slopes the expenditure would be less and the surface exposed to evaporation would be greater. Now which is the best—to make the steep batters, which will conserve more water and pay the extra price, or have more gentle slopes with greater evaporation at a lessened expenditure? Well, 2 to 1 slopes are, no doubt, preferable; but in a district like the Western district bullocks cannot work on 2 to 1 slopes. There is no grass or natural feed for horses except salt bush, and for that reason I prefer 3 to 1 slopes, made with the usual ploughs and scoops which are used in the district.
3711. *Major Penrose.*] You say that in many parts of the country a 2 to 1 slope is practicable? Yes, and advisable; provided the difference in price between the two kinds is not too great.
3712. *Chairman.*] It has been said here that your Department have adopted too expensive forms of machinery for lifting water. Have you come to any conclusion on this matter, or have you made any calculation as to which is the most economical—steam, horse, or man power? Well, I am strongly in favour of steam, as being not only more economical but more efficient. It costs a little more at the beginning, but this extra cost is only very trifling.
3713. I suppose the machinery which is attached to the horse-gear brings up the expenditure nearly equal to the cost of the steam-pump? Yes; it makes the difference in price very little, and besides if you have steam-power, whatever kind of season you have, you are independent of horse-power.
3714. *Major Penrose.*] What form of hand-pump have you seen—what are you comparing it with? I say that steam is superior both to horse and man power.
3715. But you have no hand-pumps on your public watering places, and therefore you must be comparing it with the hand-pumps used on stations? Yes; I have seen the M'Comas lift on tanks. If the M'Comas lift is adopted, the difference between the expense of erecting it and the steam-pump would not be so much. The M'Comas lift I do not think could be erected under £20; cost and carriage added, about £27. At one of the tanks the steam-pump would cost about £90. But if the M'Comas lift is to be adopted who would work it? If the caretakers have not got time to do the little ordinary work that is required about a tank, how are they to make time to do the pumping? And in the event of a large mob of stock (cattle or sheep) travelling, a man would require to work very hard for a few days. The question is, will the caretakers do the work? Besides the supply from the M'Comas lift might fail at the time when it is most wanted.
3716. *Chairman.*] Would not the same thing apply to steam-pumps? I do not see that there is anything to support that idea. It has not been so in my experience. The Mines Department state that the steam-pumps require skilled men. Now I had a man working at the 26-Mile tank who never saw a steam-pump before, and that pump is working splendidly to this day. The man at the Peak tank on the Mount Brown road never worked a steam-pump before, yet he is now working one of these pumps without any trouble. And next month I am putting a man on to take charge of the Broken Hill tank and pump, and I do not think that he has ever seen a steam-pump working or has ever turned on steam in his life, and yet that watering place is by far the most important one in the Colony. If a man who has never seen a steam-pump and has never turned on steam in his life, can go and do the work after two or three hours' instruction, surely it is not correct to say that skilled labour is absolutely necessary in the working of these pumps.
3717.

W. J. Hanna. 23 Mar., 1888.

3717. *Mr. Woore.*] I think you said that the cost of erecting the M'Comas lift at a tank would be about £20? Yes; I was giving the total cost of erecting, but I was only speaking roughly.
3718. Would you be surprised to hear that the cost is said to be very much more than that? It is quite possible. The cost of carriage is sometimes very excessive.
3719. *Chairman.*] Have you had much fencing done in your district? Yes; a considerable amount.
3720. Do you consider it unnecessarily expensive—would not a cheaper fence answer all purposes? A cheaper fence might answer the purpose, but it would not last the same length of time. I do not think the present class of fencing is much too strong.
3721. Would you erect the same style of fencing round the caretaker's paddock as round the tank? Well, if the tank is outside the tenant's lease it should have a stronger fence; but where it is enclosed I would put the same fence as is put round the land to be leased.
3722. *Major Penrose.*] Are the posts unnecessarily deep in the ground? No; I do not think that anyone would consider 2 feet as being too deep for posts.
3723. I think the specifications say that the posts shall be sunk 2 feet 6 inches, and that has been objected to as absurd? Mine are only 2 feet deep.
3724. Then you do not follow this specification? No; not strictly.
3725. *Chairman.*] Will you just describe the kind of fencing that you put up in your district? Round posts, 5 to 6 inches in diameter, according to the class of timber; split posts, 9 x 3, 6½ feet long, 10 feet apart, centre to centre, and 2 feet in the ground; straining posts, every fourteen panels sunk 2 feet 6; corner posts, 7 to 9 inches diameter, sunk 3 feet below the surface; strutted from top of posts to foot of fencing post on each side; seven wires.
3726. What does that cost per mile, and what is the gauge of the wire? The wire is 5 and 7 gauges. I have to make the gauge according to the wire I can obtain. We can only get wire by river from Melbourne. Very often I cannot get No. 4 or No. 5; but I can always get Nos. 6, 7, and 8. I ascertain what gauge of wire is procurable, and advertise accordingly.
3727. Of course the heavier gauge means a very much heavier fence, besides adding to the cost of carriage? Yes.
3728. And do you think that wire of Nos. 4 and 5 gauge makes altogether too heavy a fence? Well, I think No. 4 is rather heavy; but I believe the reason for adopting it is because we did not put up a top rail.
3729. *Mr. Woore.*] The Mines Department suggested a top rail? Yes.
3730. *Chairman.*] A larger wire makes a better baulk? Yes. In many places in the west you cannot get top rails.
3731. If you were to make a suggestion that lighter wire would be preferable, would that be entertained in your Department, so as to lessen the expense? I believe it would be considered.
3732. You never saw such heavy wire round the squatters' paddocks? No.
3733. *Mr. Woore.*] What is the cost per mile of such a fence as you generally put up? It would range from £64 to £100 per mile.
3734. *Chairman.*] In accordance with the locality and the scarcity of timber? Yes.
3735. *Major Penrose.*] Is not this one of your specifications? Yes; and we follow it as closely as we can. We are allowed some latitude, as a specification which would apply to one district might not be desirable in another. In some districts you can get timber easily; but in the west you might have to go 20 miles to get timber of the dimensions specified here.
3736. *Mr. Woore.*] So that these specifications need not be followed in their entirety. You have a great deal of latitude? Yes; it is impossible to draw out specifications that will suit all parts of the Colony.
3737. *Chairman.*] In your neighbourhood, where you pay £100 per mile, what will the squatter pay for his fencing? Well, I really do not know; but the fences in these districts are very weak; they are small short posts, about as thick as your arm.
3738. Are they not sufficient protection against cattle? No; bullocks would walk through them. Even with the fences we have there is sometimes difficulty in keeping them out.
3739. *Major Penrose.*] Then you think the top wire ought to be stronger than the others? Yes; for that purpose. Barbed-wire would be the best for the top, but it is too expensive.

[The Commission adjourned.]

THURSDAY, 12 *APRIL*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R. E. | J. C. WOORE, Esq.

William John Hanna called in and further examined:—

W. J. Hanna. 12 April, 1888.

3740. *Chairman.*] You have some further evidence to offer, I believe, Mr. Hanna? Yes; in connection with the cost of works. I may explain the course that has been adopted for all works except those of a trifling or urgent nature. Tenders are invited in the local papers, and about two weeks allowed for receipt of tenders. Specifications are forwarded to some of the nearest Court-houses for inspection by those desirous of tendering. Contractors living or working in places too far removed from these centres can get any information they require on application, and if time permits, a copy of specification would be forwarded if necessary. I shall refer very briefly to the cost of fences, tanks, and caretaker's cottages. Here are schedules of the last tenders received. [*Schedules produced.*] Reference to these and other tenders will be sufficient to show that there has been in most cases no lack of competition, and considering the nature of the works, seasons, and distances from which timber had to be carted, the prices paid, I think, are only fair and reasonable. The Mines officers, when comparing the prices paid by stations with those paid by this Department, apparently forgot to take into consideration the difference between the two classes of fencing. All stations in my district, with perhaps a few exceptions, are sheep stations, and the fences are consequently of a description suitable to the requirements; but I would respectfully submit that, however good and secure such fences are for sheep paddocks, they would be totally inadequate for enclosing

enclosing small paddocks where stock of all kinds including horses and working bullocks would be occasionally depastured. The value of these paddocks will also in a great measure depend upon the security afforded by the fencing. Mr. Low states in his evidence that the fences at the 26-Mile, the 35-Mile, and the 48-Mile tanks cost £95 per mile, and that no timber was carted more than 5 miles at the 26-Mile and 48-Mile tanks, and not more than 4 miles at the 35-Mile tank; whereas the actual price paid was £94 per mile, and the distance which the posts had to be carted was greater than Mr. Low represents. The distance was 1 or 2 miles more. Then Mr. Low states that the drains at the 26-Mile tank were let at 4s. 6d. per chain, and that they were sublet at 3s. 6d. to the man who did the work. I am informed by the contractor that he paid Walters, the sub-contractor, the same price as he received himself, which, as I have said, was 4s. 6d. per chain.

3741. *Mr. Woore.*] That is not evidence? Mr. Low's evidence is only hearsay also. If I had known sooner I could have had the correct price ascertained and sworn to. I would not have referred to this matter, only that I saw it in Mr. Low's report.

3742. *Chairman.*] That was put in evidence as a written report? In reading over these papers and reports I was strongly impressed with the evident intention of making everything appear in the worst possible light, and I have referred to these items chiefly on that account. I desire to hand in tenders for fencing received only a few days ago from several practical men who have a thorough knowledge of the work. [*Witness hands in tenders for fencing, the prices in the schedules ranging from £57 to £165 per mile for work in the Wilcannia and Mount Brown districts.*]

3743. *Mr. Woore.*] And public competition is invited in every possible way? Yes; and when tenders are considered too high fresh tenders are invited, as will be done in the case of the Day Dream and Purnamoota tanks. The estimated cost of fencing the Day Dream and Purnamoota tanks, according to the specifications, was £131 5s. per mile. It is our intention to invite fresh tenders and to further notify the specifications in these cases.

3744. *Chairman.*] Why was this excessive cost of £131 per mile necessary? Just state the reason for it fully? My reasons are on account of the distance that the timber had to be carted, and the scarcity of labour in the locality.

3745. *Mr. Woore.*] What was the distance that the timber had to be carted? Over 20 miles. There was also a difficulty in getting teams and men.

3746. On account of the place being in the vicinity of the mines? Yes.

3747. *Major Penrose.*] Do you think the design of the fence could be altered without prejudice to its character as to stability? Yes; to some extent.

3748. *Mr. Woore.*] Would the distance the wire had to be carted affect the question? No; it would not to any great extent. The wire would have to be carted 16 miles to the Day Dream tank, and about 20 or 25 miles to the Purnamoota tank.

3749. And in that country where there is a good deal of rock would not the sinking be pretty hard? Yes; the ground there is harder than usual. At the Day Dream tank there will be rock, and also at Purnamoota. Although the wire has only to be carted a comparatively short distance it has to come by rail from Adelaide.

3750. Adelaide is the nearest market to that place? Yes.

3751. *Major Penrose.*] Do you think that the design of this fence is unnecessarily expensive for that district? In this case it is. The specifications in this case will be further modified, and fresh tenders will be invited with a view to make a reduction in the cost of the fence.

3752. In what way will you modify the specification? By reducing the size of the posts and the wire.

3753. Not the distance apart? Yes; it will also be advisable to alter the distance from 10 to 12 feet, making the distance apart 12 feet instead of 10 and the straining posts 20 to 25 panels apart instead of 14.

3754. *Mr. Woore.*] What would you estimate the cost to be of this modified class of fencing that you now suggest? About 25 to 27s. per chain.

3755. But the cost per mile—what would that be? It would be from £100 to £110 per mile.

3756. *Chairman.*] Has your attention ever been directed to the fact that where timber is so scarce iron might be substituted with a good result? No; I do not think that iron fences would be suitable for enclosing the leased areas.

3757. *Mr. Woore.*] I suppose it is the labour that causes this fencing to be so expensive? Yes; and the distance for carting the timber. Labour in that district is not only high, but it is very much below the average.

3758. *Chairman.*] It has been stated here that the shifting of a fence, the expense of which was estimated at £3, actually cost £50, on account of what has been called red-tapeism? That work was not done, and no expense incurred in connection with it. As the shifting of the fences was not urgently required, I did not think that it was advisable to proceed with the work until the leased area was being fenced, when the alteration recommended by the Mines Department could be carried out at a cheaper rate, and without any additional trouble and expense as regards inspection. Here is a report having reference to the subject, which I wish to put in evidence:—

Goomboolara Tank.

Tallywalka, 17th December, 1885.

Sir,

Herewith I forward dimensioned sketch (distances paced) of fencing asked for in connection with instructions issued by Mines Department to have fences shifted.

In November, 1884, portion of the fencing (marked red on sketch) was removed back, and the remainder tightened up and put in order.

Had we known at that time, the same trouble and very little extra expense would have made the alterations required now. It will therefore be advisable to have the distances marked on sketch, so that we may know exactly what is wanted before taking action.

The existing fences are in good order and the embankment constructed last year (see report of 26/11/84) to block watercourses and turn the water into silt tank, I was glad to find uninjured by the unusually heavy flood which occurred in January last.

The inlet pipe is completely stopped at the outer end which may account for the water being about 3 feet below surface in main tank.

Station and travelling stock alike have free access to water, there being no person in charge. The latter remarks apply also to Warramurtie Tank, but the Department is no doubt aware of these facts as the tanks are under control of the pastoral lessees.

I have, &c.,
W. J. HANNA,
Road Superintendent.

The Engineer-in-Chief for Roads, Sydney.

Sketch should be sent to Mines with a request that they will mark the position of fencing required by their officers.

3759. Sketch sent 31/12/85.

W. J. Hanna. 3759. Then this expense was never incurred at all? No.

12 April, 1888. 3760. *Mr. Woore.*] Is this statement at page 19 of the *précis* made by the Mines Department not correct: "The proposed alteration would have cost exactly £3, for which sum the caretaker was fully prepared to do the work. Red-tape routine, however, and Sydney bureaucracy demanded an official inspection by an inspector; even one inspection was not sufficient and two had to be made. The travelling expenses of this inspector amounted to over £30, so what it really cost to supervise the outlay of this £3 is almost beyond calculation."? No expense whatever was incurred. The fence will be shifted when the leased area is being fenced in for which a tender has now been accepted. I do not think that the statement in the *précis* refers to the Warramurtie tank, but rather to the tank at Goomboolara.

3761. *Major Penrose.*] But how do you know that it is the Goomboolara tank—do the circumstances stated fit the case? I think that all the circumstances stated apply to that case. Goomboolara must be the tank referred to, because no correspondence has taken place with regard to the alterations of a fence at the Warramurtie tank.

3762. *Chairman.*] You must have noticed in the *précis* a letter from a Mr. Earngey, stating that the Works officers relied upon coachmen and publicans for their information in regard to the selection of sites, and that they took no trouble to view these sites for themselves. Now what have you to say to that? It has been said with reference to the selection of sites that we have been guided by information received from coachmen and interested parties, publicans, &c., and that we have fixed sites from the box of a coach. In reply to this charge I may state that I am not above receiving information from any one who can give it, whether he is a squatter, a publican, or a coach-driver; and from these men I have often received valuable information, from which, and my own observations, I arrive at a conclusion and act accordingly. If it could be shown to me, before it was too late, that the site for a watering place was in a position that would do an injury to any individual, and if another site equally good could be found, without unduly affecting the length of stage, I would consider it my duty to alter that site, and the same remarks apply in a similar way to the laying out of a new road or making deviations; but that I have ever pandered to the wishes of any man, to the detriment of the public interest, beyond what I have now stated, is, to use the mildest term, not true. Mr. Tully has also referred to this question in a similar way. For my own part I have to give his remarks also the same emphatic denial.

3763. *Major Penrose.*] I do not think that Mr. Tully meant all that. I will read you what he said:—

2487. In your opinion do the road superintendents out there take any trouble to obtain local information as to the best position to put down these tanks in? I have heard it frequently stated that they do not inquire sufficiently or get the advice of the older residents there.

2488. *Mr. Woore.*] You have only heard that? That is all. All I know is that they did not come to me for information. Had they done so I would have given them every information in my power.

2489. And are you aware of any local people in the neighbourhood having been asked their opinions? No; I am not aware of it.

2490. Are you aware that in the early days mistakes were made by the squatters in constructing excavations and in putting up dams that were washed away? Many mistakes were made in the early days. I know that some dams on Bunker Creek and other places were washed away.

2491. So that it could scarcely be expected that the Government officers should be infallible, as if other men made mistakes they were liable to do the same? Yes; mistakes were made all round.

3764. *Chairman.*] You have heard the allegations that have been made with respect to this Day Dream Tank;—what have you to say about the matter? I shall give you all the information I have on the subject, which is embodied in this report:—

THE faulty work referred to was in one of the suction pipe couplings, which I believe was rather small, and as there were none at hand the contractor, in order to complete his contract, beat down the thread and slipped each end of pipe into the coupling, making, or trying to make, the joint air-tight with red lead and hemp. I cannot say whether the officer in charge was or was not aware of this. It may have been done with his knowledge to avoid delay. I have acted similarly under similar circumstances. For instance: There was no reducing sockets sent with pump recently forwarded for Broken Hill tank. I could not get them to buy or borrow in Broken Hill, and was therefore obliged to lay the end of suction pipe against the flange and make the connection air-tight with white lead and hemp, otherwise a most serious delay would have taken place. And that joining, although a temporary one, has stood well. It has also been stated that the work was taken over from the contractor without being tested. That is correct, as I understand there was no water at the time in the excavation. I may further state that Mr. Crummer, who was then in charge, informed me that he arranged with Mr. Crommelin, the local officer, to go out on a certain day to inspect and take over the works; that Mr. Crommelin failed to keep the appointment, but gave this certificate (produced), to the effect that he had taken over the works in good order and condition. After Mr. Crommelin's next visit he informed Mr. Crummer that the pump would not work, and it was then arranged that the caretaker at Silverton tank, who was employed by this Department, should go out and put it in order. Both officers were to blame, and if Mr. Crommelin, after finding that the pump would not act, had allowed Mr. Crummer to make the necessary alteration instead of reporting as he did, the matter would have been amicably settled without causing so much trouble to the Departments or ill-feeling between the officers.

3765. *Mr. Woore.*] How was it that the Works Department did not provide against such a contingency as the pipes not fitting? The Works Department were not to blame in this case. It was Tangye Bros., who omitted to send the reducing sockets. The trouble was caused by the fact that the connecting socket, that screws into the flange, did not come.

3766. Then it was caused by the want of some appliance which should have been on the ground, and which did not come? It was in the case of the Broken Hill tank that the sockets were not sent with the pump. It was through no fault of the Works Department. These things were all ordered by the Department; but not sent by Tangye Brothers.

3767. *Chairman.*] In the evidence given by Mr. Tully with regard to the Goomboolara tank, what have you to say to the allegation as to the unsuitable position in which it is excavated? Mr. Tully's objections to the site are, to use his own words, that "the tank is put on a neck of water running into the lagoon, which holds about 5 or 6 feet of water more than the site of the tank. The water to go into the lagoon must pass the tank. I have frequently seen the water going into the lagoon without filling the tank." There is a natural depression in the ground near the tank, which might hold about 5 feet of water, but as you will see from this sketch, there is a well defined water-course running direct into the silt tank, so that I cannot see how this depression or lagoon (being of limited capacity), can interfere to any great extent with the filling of the tank. When the quantity of water flowing in is greater than the inlet pipe can discharge, the surplus would finds its way round the embankment into the lagoon, which, I believe, is included in the tenant's lease, and can therefore be used for watering stock. Mr. Tully, I think, must

be

be mistaken, when he states that "the tank cannot fill unless the Paroo is running, and unless it runs pretty high, it will fill the lake, but will not fill the tank." The next question is: "Then, there is no local catchment," and Mr. Tully replies, "No; there might be local rains that would run the Paroo for some time." Well, if local rains put sufficient water into the Paroo channel to make it run for some time, surely there must be a local catchment. Mr. Tully has also stated that at certain places he would admit stock to the tanks, and thereby do away with the necessity for caretakers. In my opinion this would be a very serious mistake, as such places would soon become a camping ground for station-stock, drovers, and others. The water would not last long in a dry season, would become polluted, and the tank eventually get into a bad state. Wherever a watering place is considered necessary, some one should, I think, be placed in charge. W. J. Hanna. 12 April, 1898.

3768. The next complaint is with reference to the site of the Tarella tank? I do not understand what is meant by the inlet tank taking the stream out of its course, and the only explanation I can give concerning the opening, which, it is said, would run the water down instead of up, is that the contractor must have been under the impression that the creek ran in the opposite direction.

3769. The statement was, that, unless the Paroo ran, there was no chance of the tank filling? The Paroo might not run throughout its full length; but it runs frequently in places from local rains—a fact which Mr. Tully admits himself.

3770. The main channel of the Paroo might run a few inches deep for a long distance, but it would not run into the branches, unless there were a pretty good "fresh" in the river; and Mr. Tully states that when it ran high, it would spread out into these sub-branches;—are we to understand that this is correct, and that the tank could not be filled unless the Paroo was running? Well, it all depends upon what is understood by the Paroo running.

3771. It matters not if it only runs for a mile? The tank is in the bed of the Paroo channel, and depends upon that chiefly for the source of its supply; but there is also a local catchment.

3772. *Mr. Woore.*] In addition to that? Yes; and the Paroo channel, although flat, is a catchment in itself.

3773. *Major Penrose.*] Do you consider the site of the tank a good one? Yes; I think the site is very good.

3774. *Mr. Woore.*] And have you ever known this natural depression to be filled, and the tank left empty? No; I have not. Before any water from the water-course flows into this lagoon or depression it must go into the silt tank and then through the discharge pipe, which if not able to take off the water as quickly as it flows in, the water will flow into the depression.

3775. Was the object of placing the tank there—to intercept the water and prevent it from running into the depression which you speak of, where it would be more exposed to evaporation? Well, I cannot say. I had nothing to do with the selection of the site, and I could hardly say what the object was. I am only speaking of the question as it now stands.

3776. *Chairman.*] We are more anxious to hear you more directly on the charges which have been made against yourself. Was not the Rathole tank excavated under your directions? It was.

3777. It has been stated here by Mr. Low that the embankments showed signs of water-wash within 3 inches of the top? Yes; but before that tank was completed we had a chance of getting it filled. The water was let in, and the contractor was to finish up the embankments afterwards. There was also some trimming to do to the slopes, and the same contractor had another contract for excavating a tank at Thackaringa, and this work he was unable to complete, owing to the drought. The contract, therefore, had to be cancelled, and the sureties called upon to finish the work. The embankments at the Rathole tank were, therefore, not finished, and I kept about £100 back, pending the completion of the embankment. That money the contractor had to forfeit, as I did not think the trimming of these embankments of sufficient importance to warrant further expenditure, as I thought that the caretaker could easily do all that was necessary to put these embankments into fair order.

3778. *Mr. Woore.*] But these embankments you say were not completed? No; because we had to let the water in.

3779. But would it be the duty of the caretaker to complete the embankments;—is it not their duty to keep things in repair and not to construct? Well, all that was necessary for perfect safety could be done in four hours with a wheel-barrow. The embankment is safe as it is if the caretaker simply allows the water to follow its natural course when the tank is full.

3780. Has this embankment been completed up to the present time? No; I am not aware that it has. I have pointed out to the caretaker what should be done.

3781. Has any damage been done because of its not having been completed? No; a little damage was done by a heavy flood some time ago, but no damage of any consequence; in any case the damage did not occur through the embankment not being completed. I have had the tank full almost to the top of the embankment, or within 3 inches of the top; and even then I considered it quite safe.

3782. Did you not consider that allowing the water within 3 inches of the top was rather dangerous? No; not when a caretaker is on the ground. I would like to read you a report sent in in December, 1886, which may help you to understand this matter:—

Mount Brown Road, 23 December, 1886.

Sir,

In pursuance of your instructions I have inspected the Rathole tank, referred to in telegram attached, and submit herewith the following report, with sketch.

The rainfall causing the alleged damage occurred on the ultimo, when 160 points were registered; fall extending over about 18 hours.

This fall, although heavy, was not in any way calculated to endanger the safety of earthworks, and was less than a former record, when, as in this instance, the tank remained uninjured. I am therefore at a loss to know where the "400 feet temporary embankment" was that is said to have been "washed away." No temporary embankment, that I am aware of, was ever constructed, and no embankment has been washed away.

Referring to the accompanying sketch, it will be seen that two drains have been cut, to intercept the water coming down the numerous water-courses from the hills distant about 60 chains. The main drain, running N.E., also serves the purpose of draining from the creek when required. For instance, in dry seasons, rain, as a rule, falls in brief heavy showers or thunderstorms, and these, generally speaking, are very patchy. At such times it is necessary to draw from every available source, and when tank is full, nothing could be more simple than cutting off the supply at the places marked on sketch, by cutting through the drain-bank and allowing the water to follow its natural course.

In connection with this matter, I think the caretaker is very much to blame. Noticing on previous visit that he was either neglecting this duty, or not aware of it, I pointed out to him how to act; but no attempt whatever was made to carry out these instructions; consequently, when tank was full, the water broke through drain close to embankment, forming a by-wash, which, if allowed to continue, will eventually form into a creek, and become a source of trouble and expense, besides endangering the work. There

W. J. Hanna. 12 April, 1888.

There is another matter in connection with the embankments to which I would draw attention. These were not properly completed, and for this omission a deduction of £100 was made.

The lower end of the embankment is too low, and when speaking to caretaker re drains, told him to throw up sufficient material to raise the embankment 18 inches or 2 feet. These instructions have also been ignored. The embankment at present will impound from 23 to 24 feet, and by raising as suggested and keeping up banks of drains another foot could be added, and the work would provide healthy exercise for caretaker.

After drains ceased running, about 18 inches of water was unfortunately allowed to flow out that could have been retained with perfect safety.

I have, &c.,
W. J. HANNA,
Road Superintendent.

The Engineer-in-Chief for Roads, Sydney.

How much passed away altogether. The man in charge in this case should, I think, be dismissed, the neglect to take steps to prevent waste of water is the best evidence of his unfitness.—W.C.B., 5/1/87.

These were the telegrams upon which I acted in making my report :—

Telegram from Sydney, addressed to W. J. Hanna, Road Superintendent, December 7th, 1887 :—Mines officer reported as follows :—Rathole tank in precarious state from damage by late heavy rains ; 400 feet temporary embankment washed away ; flood water rose to within 6 inches of top of embankment at lower end of main bank ; it would have carried away but for timely cessation of rain ; shall I employ men repair at once ; urgent.

P. FLYNN
(For Commissioner of Roads).

Telegram from Sydney, addressed to W. J. Hanna, Road Superintendent :—Local Mines officer reports that Rathole tank very much damaged by late rains, and in "precarious" state. Please wire Crummer if he knows of it, and report at once what grounds there are for such a statement. If true, steps must at once be taken to repair damage and prevent recurrence.

A. P. WOOD,
Assistant Engineer.

11/11/86.

I wish also to state, in justice to Mr. Low, that this caretaker—in fact all the caretakers in the Silverton district except one—were dismissed. This was done on his last visit. Now here is the telegram which I addressed to the Commissioner for Roads on the 9th July last :—

Rathole Tank.

Water 3 feet below top of lower embankment ; over 2 feet of water lost that should have been impounded ; surplus water still allowed to flow past south embankment, also underneath service tank and portion of troughing ; south fence seriously damaged ; water-course is being formed that will eventually, if allowed to continue, render tank useless. All danger easily averted by cutting off supply at places referred to in previous reports. Such negligence should not be allowed in connection with an important work like this.

W. J. HANNA,
Road Superintendent.

3783. *Mr. Woore.*] But you do not know the reason? No ; I only know that the men either resigned or were dismissed.

3784. *Major Penrose.*] In Mr. Low's evidence he says :—"Embankments have in no case I have seen been erected with a view to conserving water inside and by them, as is usually done with amphitheatre tanks, not one of them being finished with the slightest pretension to being level on top. In fact, any that I have levelled are lowest on the low ground, where they were filled with water and the great weight would be ; consequently in most danger of breaking away?" There are no tanks in my district where any of the embankments are too low for the purpose of impounding water above surface except the Rathole Tank, and I question very much whether the embankments of that tank can be considered as being too low. From 5 to 6 feet can be safely stored above surface.

3785. *Chairman.*] Have you ever had any trouble, other than that which you have mentioned, with the caretakers? Well, I have found the caretakers repeatedly neglecting their duties at the Thackaringa, Day Dream, and Purnamuta tanks, as well as at the Rathole tank.

3786. To whom did you complain about these matters? To the Engineer-in-Chief for Roads, the head of my Department.

3787. Did you ever tell the caretaker he was neglecting his duty, and that he ought not to continue to do so? Yes ; I have told them sometimes what they should do, but they paid so little attention to what I have said that I seldom interfere with them now unless there is something requiring immediate attention.

3788. Would it not have been advisable, when you found that the caretakers did not attend to their instruction, to apply to their masters (the overseers), or the inspectors of public watering places, telling them about the neglect, rather than reporting it to the head office of your own Department? Well, it would have been advisable if matters were so arranged that I could do so.

3789. Of course, you see that it is undesirable that these caretakers should have two masters? Yes ; and I think it is equally undesirable that the tanks should have two superintendents or two officers in charge of them. I have never given any of these caretakers to understand that they were in any way responsible to me.

3790. *Mr. Woore.*] Because they are actually not responsible to you? No ; I have never led them to believe any such thing.

3791. In case of gross neglect, such as that at the Rathole tank, do you make a report to the Engineer-in-Chief for Roads? Yes ; I always do. There are several telegrams about the Rathole tank, as well as others.

3792. *Major Penrose.*] Did you make any representations to the officers of the Mines Department in that district as to the urgency of this matter? Well, I believe I have done so, but I cannot say positively.

3793. *Chairman.*] I understand from your reply to a previous question that it seems a red-tape or round-about way of doing things ; you do not apply to the person in charge to remedy the thing ; now, would it not be better and more advisable to write to the overseer in charge and draw his attention to the fact, instead of reporting to the head of your Department, who can only refer it to the Mines Department? Yes ; it might be better if so arranged. If I received instructions to report in that way I should do so ; but at the same time the overseer could tell me to mind my own business, because he would not be responsible to me in any way.

3794. When you have seen this culpable neglect of public works by the caretakers generally, do you not think that the overseer in charge or the Inspector of Public Watering Places, as the case may be, should have taken action in the matter, as he must have seen it as well as you? Yes ; I think he should.

3795. Can you recollect any instance where you drew the attention of the inspector or overseer to any culpable negligence on the part of the caretaker, and where your action was ignored? I do not at present remember an instance.

3796.

3796. You have general instructions to see that all those works which have passed through your hands, and which are now out of your control, are properly maintained—you have general instructions if anything goes wrong with them to report to the head of your Department? Yes. W. J. Hanna. 12 April, 1888.
3797. *Major Penrose.*] What was it that caused you to visit the Rathole Tank after it had been handed over to another Department? To report on the state of the works and the depth of water.
3798. Then after the tanks are handed over to the Mines Department you still go and visit them? Yes; but not specially unless some serious damage takes place. On my ordinary rounds I pass the watering places, and in doing so see how the works are, the state of the drains, and report as to the condition in which I find them.
3799. You naturally take an interest in the works? Yes; having constructed them, I do most decidedly.
3800. Have you had much to do with the hutting for caretakers? I have just put up one cottage at the 26-Mile tank on the Booligal road, 46 miles from Wilcannia. I had it put up by the caretaker. I supplied the material, and the caretaker put up the cottage himself.
3801. How long since? About five or six months ago.
3802. But had not the whole control of this matter of caretakers' cottages been handed over to the Mines Department? I am aware that the Mines Department have erected a number of cottages for caretakers in the Silverton district; but whether the work was taken over altogether or not, I cannot say.
3803. If that were the case I should like to know how you came to erect this particular hut? This caretaker is a first-class man, and I suggested that he should be supplied with material and allowed to put up the building himself.
3804. *Mr. Woore.*] I presume to save expense? Yes, that was the object; the caretaker has put up the house and attended to other duties as well. He has kept his earthworks, pump, service tank, and troughing in first-class order at the same time.
3805. *Chairman.*] At the time you were not aware that the matter of hutting had been handed over to the Mines Department? I was not. It was a considerable time ago since this hut was sanctioned, because I had to get the timber (½-inch weather-boards) from Echuca.
3806. What was the cost of the hut? I think that the material and carriage would cost about £50.
3807. What accommodation was provided? Three rooms and an outer or verandah-room.
3808. What kind of huts have been erected by the Mines Department in the Silverton district for the caretakers? Have you seen any of them? Yes; I have seen them all, and have been inside one of them. They are made of deal, with uprights 3½ by 1½ inches. The corner studs are, I think, 3 by 3. The uprights seem to be very wide apart.
3809. *Mr. Woore.*] The building has a frame made of deal? Yes; and covered outside with corrugated iron.
3810. Is there a ground plate on blocks? Yes; the cottages rest upon blocks about 4 inches in diameter. There is a light deal flooring and one partition which goes up to the level of the wall plates. They have iron chimneys and iron doors, as far as I can remember.
3811. *Chairman.*] What would you estimate would be the cost of a building like that? From £40 to £50, I should think.
3812. *Mr. Woore.*] Do you think that these huts erected by the Mines Department are suitable for caretakers? No; I do not.
3813. *Chairman.*] Are these caretakers single men? Some of them are single and some of them are married.
3814. And huts like these would be unsuitable for married men? Yes; they are unsuitable, but they have to live in them, notwithstanding.
3815. *Mr. Woore.*] Is the iron covered with any refrigerating mixture? No; the iron is left bare. There is no painting whatever, no lining inside, no spouting, and no tanks to conserve water from roof.
3816. *Major Penrose.*] I suppose a house like that would make it hard to get good men as caretakers—would it not increase the difficulty of getting decent men as caretakers? It would to a certain extent.
3817. But a better cottage would induce a better man to apply for the position? Yes; although a man might at first be glad to accept the situation and then improve things afterwards.
3818. *Chairman.*] Is there any other evidence you would like to give? No; I cannot say that there is anything else in my district that I have anything to say about.

[The Commission adjourned until the afternoon when the siting was resumed.]

Alexander Adam called in and examined:—

3819. *Chairman.*] You are a road superintendent in the Cobar district? Yes. A. Adam. 12 April, 1888.
3820. How many years have you been located there? I think I have been about seven years in the district.
3821. Have you had the management of a large number of tanks in your district during that time? Yes.
3822. Are the tanks that you have had constructed under your supervision carried out under the same specifications as those tanks which you found constructed when you arrived in that district? An alteration was made in the slopes from 1½ to 1 to 2 to 1. These more recently constructed were 2 to 1.
3823. Upon whose recommendation was the change made? There were plans supplied from the head office with the alterations in them. I had recommended it twice myself previous to this.
3824. Have you found that the steep batters were liable to be fretted away by the action of the water? No; I did not find that. I thought that the other slope might hold better. They did not give way in any case; but still I thought that the flatter slope would be preferable.
3825. For what reason? Well, I thought that the tanks with these batters would hold better.
3826. *Major Penrose.*] You mean that the silt would more certainly settle on the batters? Yes.
3827. *Chairman.*] Who chooses the sites for these tanks? In a number of instances Mr. A. P. Wood, the assistant engineer, chose them. The others I chose myself.
3828. What assistance had you in making choice of the sites you selected yourself? My own judgment principally. I made inquiries from all parties who were likely to have knowledge on the matter; but it is a very simple matter, to anyone who has had any experience, to find the best sites.

A. Adam. 12 April, 1888.

3829. Do you generally consult the officers of the Mines Department in the construction of these works? The only instructions we received from the Department was to fence the tenant's lease. They had nothing to do with anything else.
3830. *Major Penrose.*] How many tanks have you constructed since you took charge of this district? On the Cobar to Hillston road there are seven tanks and one well—one tank at Mount Hope. There are seven tanks on the Cobar-Nyngan-Condobolin road, one called Keighran's tank, between Nyngan and Priory; and there are four tanks now under construction (three of which are nearly completed) on the Cobar to Wilcannia road.
3831. *Mr. Woore.*] Are these being constructed under your supervision? Yes.
3832. *Chairman.*] Were there many tanks constructed previously to your taking charge of the district? Yes; there were about four. That is all in my district proper; but recently there have been three others handed over to my charge.
3833. I presume you are instructed to provide watering places at so many miles apart for the convenience of travelling stock? Yes; every 15 miles.
3834. And you chose the exact locality, as nearly as possible, in order to meet the requirements of travelling stock? Yes.
3835. Have you any discretion allowed you with regard to alterations in the specifications? In the case of some of the tanks I had to alter the slope from 1½ to 1 to 2 to 1.
3836. Did you ever undertake to modify the depth of a tank? The depths were nearly always put down according to my recommendations.
3837. You had previously put down trial shafts? Yes; and I recommended depths in accordance with what I discovered from these trial shafts. The specifications are sent from the head office with some blanks left in them. I frequently altered the banks so as to make dams by running out wings to the higher ground on either side.
3838. In the Cobar district the tanks are generally made in valleys, it being a different style of country to the open interior? Yes.
3839. I suppose you have had circular instructions showing distinctly what your duties were under the Department? Yes.
3840. And certain discretionary powers were placed in your hands? Yes.
3841. So that you were not compelled to stick to any hard and fast rule with regard to the construction of these works? Well, we had a general plan supplied, and any alterations had to be sent to the head office for approval.
3842. But still you had discretionary powers? Yes; but I never did anything without getting the sanction of the head office to my suggestions.
3843. Have any complaints been made of the selection of improper sites for tanks in your district? No; not in any case.
3844. Was any complaint ever made that one of the tanks—the Mulya tank—had a very bad catchment area, and that there was little or no water in it? Yes, in that case; but that tank was not in my district. It is only recently that it was handed over to me. I did not choose the site.
3845. But do you think that the site was ill-chosen? It was a very difficult matter to get a good site at that distance.
3846. Was it as good a site as could have been obtained in that neighbourhood? It is possible that it might be improved a little; but, as I have said, it was a very difficult matter to get a good site in that locality.
3847. *Mr. Woore.*] And in your opinion it is the best site that could have been obtained about there? I am not sufficiently acquainted with that part of the country to be able to give any definite opinion. As far as I could see there were really no good sites in the locality at all. This Mulya tank is also called the 64-Mile tank, and is on the Louth to Cobar road.
3848. *Major Penrose.*] Did these specifications go down to you with everything filled in? The specifications came down to us to fill in the measurements as to what the dimensions of the tank were to be.
3849. Then you had discretion to say what should be the cubic capacity of the tanks? Yes. There were general directions that so many tanks were to be put down with a certain capacity.
3850. *Chairman.*] We have had handed to us by Mr. Bennett a printed circular headed "Supplementary General Instructions *re* Tanks and Wells," dated 19th January, 1882, and in accordance with this printed form we find that the road superintendents are given a good deal of discretionary power;—have you not received such instructions? I do not remember just now ever having received a copy of that circular. The sites of most of the tanks were approximately fixed by Mr. Wood, who drove round with me first of all. He gave me directions to take levels, and the sites of most of the tanks in my district were selected in that way.
3851. I see that the first clause of that circular states that the sites of the proposed works are to be fixed by the officers of the Mines Department. Now I want to know from you whether any one was joined with you in fixing the positions of these sites, and you said distinctly not—that you formed your own decision irrespective of the Mines Department? I believe there are communications beforehand between the Mines Department and the Works office—before these sites are chosen. After that I had to fix the exact position.
3852. I want you to be very careful in this matter, because it appears to be one of those things which have led to a good deal of friction. It has been said that the Mines Department's choice of sites was ignored; and if it has been laid down by instructions that you are to be guided by them, is it any wonder that a certain amount of friction takes place? I think that the sites were usually chosen by Mr. Wood in connection with some officer of the Mines Department. I had nothing to do with the matter except to carry out the instruction of my superior officer.
3853. And were you always told to take levels, and to find the best sites? I was told approximately where to put the tanks by Mr. Wood, and I took levels in order to get the best positions.
3854. And you took the best means of finding out the best places by taking levels? Yes; within 2 miles of the place.
3855. You have heard of no complaints made by the officers of the Mines Department with regard to any sites selected by you in the Cobar district? No, none whatever.
3856. *Mr. Woore.*] Has anyone made any complaint that you are aware of, about the sites of the tanks now under your charge? No; all the tanks in my district have been filled over and over again every year.

3857.

A. Adam. 12 April, 1888.

3857. Have you heard any complaint made about this Mulya tank? Yes; one of the officers of the Mines Department (Mr. Cotton) has spoken about it. That is the only complaint I have heard of.
3858. Do you know if this tank has been filled? I was told by the caretaker that there were 12 feet of water in it at one time.
3859. Has any water run into this tank since you took charge of it? No; it is only within the last six or eight months that I had charge of it, and there has been no heavy rain since.
3860. *Major Penrose.*] Could the catchment area of this tank be easily improved? I laid out about a mile or so of drains which will, I think, bring in a good body of water.
3861. *Mr. Woore.*] So that the tank is not at all a useless work? No; I think that the tank is right enough. It will readily fill with ordinary rain by making the proper drains.
3862. *Chairman.*] The whole of the tanks in your district are fitted up with machinery for lifting the water? Yes; we have now no open tanks.
3863. The machinery you use is chiefly the Tangye steam-pumps? Yes; the Tangye steam-pump and the Amos and Smith.
3864. Do you know whether any difficulty has been found in keeping these pumps in proper order? I know that there has been very little difficulty.
3865. Do you not think that they are the best pumps that could be supplied under the circumstances? Yes.
3866. You consider them the most effective and the cheapest—of course I do not mean as to first cost? Yes; I consider them to be the cheapest in the long run.
3867. And any charges that have been made that this machinery is enormously expensive in, you think, without foundation? Yes, I do.
3868. Do you think that the M'Comas pump, which is worked by hand, would be cheaper than these pumps, or less liable to get out of order? It would certainly be cheaper, but I do not think it would be nearly so effective.
3869. By cheapness, I mean not only the cost of the pump, but also of the fixings. Does it not cost a good deal to put these lifts into position? I have no M'Comas pumps in my district at all.
3870. *Major Penrose.*] But you think that the tanks which you have constructed are larger than they need be, considering the requirements of the district? I think they might be smaller.
3871. They all have good catchments? Yes.
3872. Are you of opinion that a smaller tank would answer all purposes? They are none the worse for being large, but I think 15,000 cubic yard tanks would do in any district.
3873. *Chairman.*] What is the capacity of those now constructed in your district? Eighteen thousand yards. I think the fact of their being large, if it is a fault, is one on the right side.
3874. *Mr. Woore.*] It is better to have them too large than too small? Yes.
3875. *Chairman.*] Have you ever lived on the open plain country where the rainfall is very small? No; but I may state that the rainfall in the Cobar district one year was only 7 inches—as low a rainfall, I think, as anywhere else—and yet there remained plenty of water in our tanks all through.
3876. Have you had to do much with fencing in your district? Yes; I fenced in all the tanks.
3877. What has been the average cost of this fencing per mile? It has varied from £58 15s. to £71 per mile.
3878. Do you think the present specifications for fencing call for the erection of a too costly fence? I do not think so.
3879. Do you not think that the wire might be a lighter gauge? Well, I think it is a fair thing as it is; it might be altered, but the fence would not then be so good as the present style of fences.
3880. *Mr. Woore.*] What size of wire do you use? No. 4 gauge as a top wire, and No. 7 (modified in some cases to No. 8) for the lower wires.
3881. *Chairman.*] Why do you use a No. 4 wire? In cases of cattle attempting to jump over. It is a very strong wire, and will hold a bullock on top of it if he attempted to jump it.
3882. What sort of posts are used for the fences in your district? Split posts generally.
3883. Is not timber fairly plentiful in the Cobar district, when compared with the plains beyond? Yes.
3884. Now, do you really think it is necessary to have this expensive fence—expensive as compared with those put up by squatters? Of course we understand that a fence should be a strong one round the tank, but is the same substantial kind of fence necessary round the caretaker's paddock? I have said that the fence round the caretaker's paddock is different to that round the tank. There is a top rail and five No. 4 wires round the tank itself—that is, close round the embankment of the tank.
3885. Why is No. 4 wire placed there when you have a top rail? That was done according to the instructions which we received.
3886. Did you find it necessary—do you not think that a very much smaller wire would be sufficient? Well, wire of a less gauge might possibly do.
3887. *Mr. Woore.*] Are all these tanks of yours fenced in that way—with a No. 4 wire? Yes; I think so.
3888. *Chairman.*] Have you ever made any recommendations to the head of your Department that the specifications for fencing called for wire which was unnecessarily heavy? Yes; I did this in the case of the tenant's lease. The same specification was given to me for the tank as for the tenant's lease, and I wrote down to the head office about it at once. I told them that I thought it would be an unnecessarily heavy fence, and the specification was altered.
3889. *Mr. Woore.*] Do you mean to say that you were instructed to put up a top rail and five No. 4 wires round the tenant's lease? Well, I only received one specification, and I wrote down to Sydney to say that I thought it would result in unnecessary expense, and I got the specification back with this alteration—that the top wire was to be No. 6 and the others No. 7, without any top rail at all.
3890. *Major Penrose.*] Is that the specification dated 1887 that you now allude to? Yes; this is the most recent specification.
3891. You see that there is some difference between the two specifications? Yes.
3892. Is the practice you are now following in your district in accordance with the latest form of specification? Yes.
3893. Have you put up any fences under this specification round the tenant's lease? It has only come recently to me. At most of the straining-posts in the fences put up by me the wires were spliced in the usual way.
3894. And you have not left out straining-posts in any instance yet? No. 3895.

A. Adam. 12 April, 1888.

3895. Do you think it is desirable to do so? I do not think it makes much difference. I think the fence will answer just as well.
3896. Why do you think so—because the posts are so well secured to the ground? Yes.
3897. *Chairman.*] Do you not think that the depth which the posts are sunk in the ground is unnecessarily great? Well, I think that 2 feet ought to be sufficient.
3898. Have you ever had any difficulty with the caretakers, or have you ever been obliged to find fault with them for carelessness? Yes; several times.
3899. Then state generally what their negligence consisted in? They would not keep the drains clean, and generally would not attend to the tanks. The pumping gear is sometimes left in a very dirty condition. It is not kept as it should be.
3900. When you have had reason to find fault with a caretaker, to whom do you send your complaints about him? I spoke to the caretakers themselves several times, and if the matter that I complained of was not attended to I brought it under the notice of the head of my Department.
3901. The caretakers are placed in their positions by the Mines Department? Yes; but a good many of them were placed there by myself and then taken over by the Mines Department.
3902. When they were placed there by your authority I suppose you took good care that they carried out your instructions? Yes.
3903. And since they came under the Mines Department they have been in the habit of disregarding your instructions? Yes.
3904. Have they ever told you as much as that they would not comply with your instructions? Yes; two or three of them did so.
3905. *Major Penrose.*] But had they any very detailed instructions from the overseer of watering places what to do to take care of the tanks? Yes; I believe they are acting under instructions.
3906. Have you seen these instructions? No; I do not think that I have.
3907. *Chairman.*] Have you instructions to occasionally report on these works after they have passed out of your hands? Yes; I am instructed to report every month. I generally go round once every month, and when I do I am supposed to report on them.
3908. Do you think that this tends to promote friction between your Department and the Department of Mines? Well, in two or three instances I believe it has done so. But since Mr. Cotton came to the district I have had no difficulty. Several other overseers are in my district, and there was a slight disagreement with one of them.
3909. Did you ever complain of the negligence of the caretakers to the overseers? I do not think I did, so far as I can remember. I wrote to the head of our Department, and he communicated with the Mines Department on the matter.
3910. *Major Penrose.*] Do you ever go round with Mr. Cotton? No; it is not my practice, but sometimes when we were going in the same direction we went together.
3911. And would you go to the tanks together? Yes; in several instances it occurred.
3912. And Mr. Cotton would report on the tank to his Department and you to your Department? Yes, he would report to his Department and I to mine.
3913. And you might inadvertently recommend something that would be at variance with what Mr. Cotton would recommend? It might happen, but I do not think it would often be the case.
3914. *Chairman.*] We have had a contractor here who gave evidence before us, named Budd, and he stated that he felt quite sure favoritism was shown in certain matters? I will read a copy of what I wrote to the head of my Department in reference to this statement of Mr. Budd's:—

"Mr. Budd states that contractors for Barnato tank had to cart the water the whole of the time the main tank was being excavated, and that the supply tank had been filled time after time. It is true contractors had to do this, but it was owing to the very dry weather in the vicinity of this tank, which has lasted some seven or eight months. As a matter of fact, the supply tank has not been filled once during the whole of that time. About 1 foot of water only was put into tank by a shower on one occasion, but it has been empty most of the time. Contractor Budd also states that tenders should be opened before a Board, and not before one man in the country. He also states that he believes there is collusion between Government officers and contractors. This, and a number of other statements made in regard to partiality shown to other contractors, are entirely without foundation. It is of no consequence to me who the contractors are, provided they do their work properly. Tenders are not opened before one man—myself, as stated by Budd—but before the Police Magistrate along with myself, and we both initial them. Budd also states that I told him he need not tender for the tanks on Wilcannia road, as I thought there were plenty tendering without him. I may state in reply, that this conversation never took place. I had no objection to Budd personally, or as a contractor, and I cannot understand him making such a statement, except that he was a tool in the hands of a certain storekeeper, who wishes to injure me, and to whom Budd owes a large sum of money. I have, on more than one occasion, gone out of my way to oblige Budd. I inspected his contracts every month, as I did with all contractors in the district, and if he or any other contractor asked for an advance on the work, I measured the work and forwarded vouchers at once—provided, of course, that they had done a fair amount of work since previous advance to entitle them to another. In regard to tanks let to Couts and Holly on the Wilcannia road, I may state that they were the lowest tenderers for two of the tanks, both of which were officially approved of in Sydney. It was only after their tenders were officially accepted that contractors informed me that they could not do both at the same time, or within time allowed, and asked me if I had any objection to their transferring one of the tanks to Budd or Hendry. I replied that I had no objection to either of these men, and they could arrange the matter between themselves, but as their tender had been officially accepted for both tanks, bonds for both tanks would better be made out in their names to avoid delay and complication. This they were quite willing to do. Budd also asked me if I had any objection to his getting one of the tanks from Couts and Holly. I replied that I had none whatever."

3915. Then Mr. Budd also states that the contractors were in the habit of "taking in" the officers of the Works Department in the matter of measuring up the works, and that it was a very simple matter to deceive them, and thus get paid for more work than they really performed? Well, that charge was made against Mr. Budd himself by another contractor, so I carefully measured up the tank referred to and found that it was all right. I had heard that he had raised the berm of the embankment inside by 1 foot.
3916. *Mr Woore.*] Did you not check and test it? Yes; I had no bench mark, but in this case the natural surface of the ground scarcely varied at all. I ran the levels across it, and found that there was only a difference of an inch or so.
3917. Is it possible for a contractor to deceive an officer in measuring these works by gathering up one end of the tape? No; I do not think it could be done.
3918. Do you measure by rod or by tape? I use the tapes and the levelling staff. You cannot use a levelling staff all the time.
3919. *Major Penrose.*] Do you take your own man with you when going to measure these tanks? Yes, very frequently; but in some cases I have measured with the assistance of the contractors. But very often I bring my man with me.

3920.

3920. Have they ever tried to deceive you in this way? No; I have never found any one of them try to do so. I watched very carefully to see; but found nothing.
3921. Do you keep a field-book showing the measurements of the tanks? Yes.
3922. And sight plan levels in corners? Well, not of levels; I merely take an average of all of them, and then take the mean. I take four corners and the centre.
3923. Then you refer the levels of these corners to the bench mark? Yes; but the ground is generally so level that there is no difference between the points.
3924. Is it necessary in every case? No.
3925. *Chairman.*] Have you had anything to do with the construction of wells in your district? I have only put down one well.
3926. Has that been a success or otherwise? It has been a success. The water is good. The well is 162 feet deep, and there is about 4½ feet of water in it, which comes up so quickly that you cannot lower the depth. The water has never gone down more than an inch or 2 inches at the outside.
3927. What machinery do you use? I use a whim. There is a supply tank 55 feet long, 15 feet wide, and 5 feet deep.
3928. *Major Penrose.*] What is the name of this well? The Roto north.
3929. Did you lay the well out yourself and choose the site? Yes; but I was told approximately where a well was wanted.
3930. What steps did you take before this well was sunk? I first called for tenders for putting down a trial shaft, and it was put down. The contractor then stated before the shaft was put down that rock ought to be struck there; and when we put down the shaft no rock at all was struck.
3931. Did you test the water before you sunk the well? No; we did not. We estimated from what we had seen of other wells that water would be got at a certain depth.
3932. What was the cost of that well, do you remember? I cannot say just now. I think the cost was somewhere about £1,000.
3933. But what was the cost per foot? I think it was about £2 15s. per foot, as far as I remember.
3934. *Chairman.*] Is that a reasonable price when compared with the wells sunk by squatters in the neighbourhood, or is it much in excess? I think the price is a reasonable one. The work is very much more substantial than that done by squatters.
3935. In what way? Well, the slabbing is much better.
3936. *Mr. Woore.*] Does the price you have mentioned include everything about the well? No; only the timbering and shaft.
3937. *Chairman.*] Allegations have been made that the cost of all these works carried out by the Government are greatly in excess of the cost of similar works to private individuals—now, we would like to know what has been the usual cost in your locality of tanks per cubic yard? Well a great number of them were sunk in the worst days of the drought, and at that time a good many of them cost 1s. 9d. per cubic yard for excavation. There was then no grass, and water and feed had to be carted. Chaff was then some £60 per ton, corn 27s. per bushel, and other things proportionately high.
3938. *Major Penrose.*] And I suppose the contractors had in many instances to go long distances for water? Yes.
3939. Some contractors have said that it would cheapen the cost of works enormously—about 3d. per cubic yard—if the silt-tank were constructed first and the tenant's lease fenced in beforehand, because then they would have plenty of grass and water? Well, it would make a difference; but in these bad seasons grass will grow nowhere, no matter whether the ground is fenced in or not.
3940. You attribute the heavy expense to the bad seasons? Yes.
3941. Squatters would not think of doing work in such seasons? They might do it in some cases of urgency, but it would not be done generally. There was not a blade of grass all over the country when I went there first.
3942. Have you had anything to do with the putting up of huts for caretakers in your district? Yes; I called for tenders for some, but I only put up one.
3943. What sort of hut was that—what was the accommodation and the cost? I think the cost went from £90 to £100. I called for tenders for all the different routes, and I had tenders ranging from £78 to £85—that is, taking a number of the cottages together. Where a contractor takes a number of the cottages they can be done much cheaper. I notice that the Mines Department state that they could put up these cottages in my district at £50, and that the average hitherto had been £82 10s.; but they do not arrange for any painting at all, while we put on three coats of paint. Besides there is not the same accommodation in their cottages as in ours; they have no guttering or piping, and no tank.
3944. Mr. Allison, who is a large squatter in your district, complained to me that he had lost some hundreds of sheep through the defective construction of the troughing at Nullamut tank? That is a tank on the road to Bourke. It only lately came under my care, and I cannot say much about it. It is one of the old tanks that was put down there afterwards—within the last few years. The railing was altered before I took charge of the tank.
3945. Have you heard at all that sheep have died from want of water; and that, owing to this railing, they have refused to drink? I have heard of that occurring to "weaners" several times. They were not accustomed to the troughs, and did not know how to get to them.
3946. But, in spite of that, you do not think it advisable to allow the sheep to water directly at the tanks, and without the aid of troughing? No; and I think it would be a most objectionable thing to allow them to do so. I saw a number of sheep dead at one of these open tanks, and the stench was so great that one could not go within a mile of the place. I see that Mr. Budd states in his evidence that he had tendered for work on the Wilcannia road, and had increased the prices as the depths vary, and as the ground became harder. He said also that he was prepared to submit a tender at a very much reduced price if a concession were made that the slopes should be 6 to 1. The tender he puts in is for the excavation of a tank 14 feet deep for 1s. 1½d. per cubic yard; for a 16-feet tank, 1s. 3d. per cubic yard; and for an 18-feet tank, 1s. 5½d. per cubic yard. Now, the Springfield tank excavated by him, with batters of 2 to 1, was actually excavated for less per yard than the prices quoted by him. The prices for the Springfield tank were: 14 feet, 1s. 0½d.; 16 feet, 1s. 1½d.; 18 feet, 1s 2¾d. That is a saving of 1d. on 14 feet, 1½d. on 16 feet, and 2¾d. on the 18 feet.

A. Adam. 12 April, 1888.

3947. But Mr. Budd's remarks may not have reference to the same tank? [No answer.]
3948. *Mr. Woore.*] Can you give us any explanation about this horse-walk at the Muriel tank? Yes; the horse-walk is not run into the main excavation at all. It touches the outer edge of the roadway.
3949. Is it between the large excavation and the main embankment? Yes.
3950. And did any earth thrown in to make this horse-walk go into the excavation of the tank? I do not see that it could.
3951. But I am asking you whether it did or not? No; I do not think that any of the earth to form the horse-walk fell into the excavation of the tank.
3952. So that, if it has been represented here that a very large quantity of this earth fell into the excavation and partly filled it up, the statement is not correct? No; most of the people who see it call the area covered by the water the excavation.
3953. Did this earth, being thrown into the position that you state, any way damage the tank, or decrease its capacity for holding water? No; the area covered by the water is a few acres, and the water is 4 or 5 feet above the excavation.
3954. *Major Penrose.*] Why was the horse-walk not made on the main embankment or outside it, away from the water? In the previous pump which I put down I was instructed to place the pump 60 feet from the edge of the excavation, and I understood that the same thing applied to this pump as to the previous ones.
3955. *Mr. Woore.*] And you believed that these instructions applied to the Muriel tank? Yes; it was the same kind of pump, and I thought the same thing applied.
3956. You admit that the earthwork for the roadway would have been better if it had been put outside the embankment? Yes.
3957. What was the result of placing it in its present position;—is it any disadvantage? No; it is no disadvantage; but I think it would have been preferable if it were put in the other way.
3958. Was it an extra expense? It was an extra expense to put it where it is; because, had it been put on the other side, there would not have been so much work to do, as the main embankment could have been utilized.
3959. Then you are prepared to admit that unnecessary expense has been incurred in this case? Yes.
3960. And that this was the result of a misunderstanding? Yes.
3961. *Major Penrose.*] Why did you think that you ought not to exceed the limit of 60 feet from the water? Well, I did not know, unless it were to reduce the amount of friction through a long length of piping.
3962. *Mr. Woore.*] Is there anything else you would wish taken down? I wish to say, with regard to the sites of the tanks, that the objections made by the officers of the Mines Department to the sites are sufficiently answered when I state that all the tanks have been filled over and over again.
3963. That is, all the tanks under your charge? Yes; I think this is a sufficient answer—that the tanks have filled, and that a quantity of water went to waste many times—enough to fill two or three tanks. Then, in regard to the cost of the tanks, I notice that in some evidence given by the Mines officers, it is stated that we should have conserved more water above the natural surface of the ground. This would have involved extra expense, because it would have required several hundred feet of fluming and additional pumping apparatus. Most of these tanks are 18 feet deep, and hold quite sufficient water for all requirements without storing it above the excavation.
3964. *Major Penrose.*] Had you many of these tanks constructed before the long drought? No; it was before I went up that the drought was bad.
3965. Did not the drought continue up to 1885? No; the long drought was in 1881 to 1884. That was when I went up there first. I drove from Dubbo to Cobar and did not see a blade of grass on the whole trip.
3966. And some of the tanks were put down at that time? Yes; a number of them. Most of the tanks under my charge were put down since I went up there.
3967. Have any of the tanks at any time given out? Yes; the Hermitage tank gave out in the drought.
3968. Is that a large tank? It was 12,000 yards, I think; but I am not sure as to the cubic contents. One thing about this was that the drains were defective—there were not sufficient drains put down. I increased the size, and put down 2 miles of fresh drains, and the tank has improved since then.

[The Commission adjourned.]

FRIDAY, 13 *APRIL*, 1888.

The Commission met at 10 o'clock.

Present:

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

John Coleman called in and examined:—

J. Coleman. 13 April, 1888.

3969. *Chairman.*] You are Superintendent of Roads and Bridges? Yes.
3970. What is your district? The district of Bourke.
3971. How many years have you been stationed in that district? Six years—between five and a-half and six years.
3972. Have you had construction of or management of any tanks in your district? Yes; I have to look after twelve or thirteen tanks altogether.
3973. Who chose the sites and situations of those tanks? Some of these sites were chosen before I took charge of the district; as to others I received instructions from the head office to put tanks at particular sites, or as near as possible to the sites mentioned.
3974. But by whom were these sites chosen? The latter sites were chosen by our Department, I think, with the approval of the Mines Department.
3975. Have any complaints been made with regard to the situation of these tanks? Yes; in several cases. The Mulya tank is one of those that have been complained of.
3976. Were is that tank? It is 14 miles from Louth, on the Louth to Cobar road.

3977. What is the allegation in regard to that tank? That it is not a good site; but it is almost impossible in that country to get a good catchment.
3978. But is the tank placed in the best position to be found in that locality? Yes; the best position that we could find. In fact, when we chose the site, that was the only place where water was lying on the ground, and that was why we chose the site.
3979. How long has that tank been finished. Nearly two years, I think.
3980. And has since been filled? Yes; it has had 12 feet of water in it, so far as my memory serves me.
3981. Steps have been taken, I believe, to extend the catchment area so as to increase the water supply? Yes; originally the drains were not sufficiently long, but since then they have been increased.
3982. You think now that the increased catching drains should be ample in a moderate season to fill the tank? I do. Since then, as I have said, the drains to the tank have been increased in length, and now the thing is all right.
3983. *Major Penrose.*] Is it true that the drains are so constructed that the water runs back instead of into the tank? No; the drains have been levelled; every chain of the ground has been levelled.
3984. It has been said that the site of this Mulya tank was bad holding ground; that it would never hold water? It is good holding ground from about 1 foot 6 inches below the surface; but my experience of the country is that a tank, after being filled several times, will hold water to the top. Of course it is very difficult in that country to get good holding ground right throughout. It must be remembered that we are confined to certain distances in putting down these tanks.
3985. I presume a tank will always hold better after it has been filled two or three times? Yes.
3986. What are the slopes to that tank? 1½ to 1.
3987. Is that a sufficiently gentle batter, in your opinion? Well, not in all cases.
3988. But for this particular tank? Yes; I think it is sufficiently gentle in this case.
3989. *Chairman.*] It was said, with regard to this tank that a mistake was made in the levelling of the drains, so that the water could only get into the tank by being backed up for a certain distance? The drains were properly levelled by myself, and this was done when the tank was under construction. The whole of the drains, except those recently made, were levelled by me.
3990. Then this statement of Mr. Mackenzie's (the inspector of public watering places) is not correct? No.
3991. The only thing is that you have increased the drains, so as to increase the catchment area. Yes. I did not interfere in any way with the levels of the existing drains.
3992. Now, with regard to this Booroondarra tank? That tank has an excellent catchment.
3993. We have had a charge, too, about the Ford's Bridge tank—that it was not properly situated? It is certainly not good holding-ground, but it is improving every year.
3994. *Mr. Woore.*] And is it well situated as to catchment, &c.? Yes: it is well situated.
3995. *Chairman.* It is said that this tank might have been placed where there is a good hard clay pan catchment? It is on the edge of the clay pans.
3996. So that it means this: that the tank is put on the edge of the clay pans, so that the least shower will send the water to the tank? Yes; the fact of the matter is that we took the water from the clay pan itself on one occasion; but we thought the present catchment from the hills was quite sufficient to fill it.
3997. *Mr. Woore.*] Is this the best catchment to be found in the vicinity? Yes, and well situated.
3998. Has the tank ever filled? Sometimes it has done so, but it depends upon the quantity of the rain. In an ordinary rainfall it would fill.
3999. *Chairman.*] What is the present usual slope of the batters? About 2 to 1. It has been altered from 1½ to 1 to 2 to 1.
4000. Did you find any tanks excavated under your supervision in which it would have been desirable to increase the batter from 1½ to 1 to 2 to 1? Yes; in loose country. The object of making tanks with a batter of 1 to 1 was to get in as large a volume of water as possible, and do away with the evaporation.
4001. Have you had any discretionary power to alter the batter? It was never necessary for me to do so.
4002. You found the batter of 2 to 1 ample? Yes: I think so.
4003. One of the chief complaints made about the steepness of the batters is that it increases the cost of construction so materially that the men cannot use ploughs and bullocks on these steep sides? They do use them, and in this way—by leaving a roadway, which they cut out afterwards. I should say that it does increase the cost a little; but this is not the only reason why our works cost more than the works of squatters. There are other reasons still.
4004. Will you just state them briefly? One of the principal reasons is that the contractor doing work for the stations has many facilities afforded him. He gets his rations at nominal prices almost, and in many cases the station owners have carted water for their contractor. Whereas, if one of our contractors starts to put a tank down upon a run, which is, to a certain extent, directly opposed to the interests of the squatter, he charges him larger prices for his rations and his sheep, and very often charges him for water. In fact, they put many obstacles in the way of the contractor putting down a Government tank. This, however, does not apply in all cases.
4005. Why do these station owners regard these public watering places as being inimical to their interests? Because wherever we put down a tank on a run we reserve or take away a certain amount of their country from them.
4006. So that it is not the putting down of a tank they object to so much as to a slice of their country being taken away from them? Yes; and the travelling stock are then forced through the run.
4007. Is it a fact also that there is considerable delay in the payment to contractors by the Government? No; not in my district. Until quite recently I have paid 50 per cent. right off, and as soon as the work has been measured up I pay 20 per cent. more, in the usual course of affairs. But, of course, there are delays sometimes when questions are raised in regard to certain things in the voucher.
4008. *Major Penrose.*] But this is only in respect to the balance, which amounts to only a small sum? Yes; in very few cases indeed have there been any delays in the making of payments in my district.
4009. Have any regulations been made with respect to payments, other than those which existed when you took charge? Not that I am aware of. We only paid for work first in the usual course of affairs; but certain arrangements were made afterwards, about four years ago, and the contractors were paid on the measurement of the work, 50 per cent., and the remaining 25 per cent. was paid on the usual vouchers being forwarded to Sydney.

4010.

J. Coleman. 13 April, 1888.

4010. I suppose the contractor has sometimes to wait for his money, owing to the Inspector being engaged in other parts of the district? Yes; that occasionally occurs. They have to make complaints if the works are not properly completed.
4011. But I am speaking now of progress payments? We now pay 75 per cent.; and in extreme cases, if the contractor is really actually in want of money, we give it to him, as before stated.
4012. *Mr. Woore.*] But several weeks may intervene, owing to the absence of the Inspector in another part of his district, before the final payment is made? Yes.
4013. What is the longest delay you have known to occur from the fact of an inspector being unable to inspect? I cannot say just now. It might be three or four weeks—sometimes more. We are only supposed to measure up once a month.
4014. *Chairman.*] Now another statement has been made by these contractors;—that the Roads Department are too particular with regard to the dressing of the banks, &c. It has been said that they must make the bottom quite level, and that even if the excavation is of the required depth, and there are small holes in the bottom, these must be filled up, in order to make it smooth? Such a thing as that has never occurred under my supervision. Of course the Mines Department are very particular when taking over the works to have the embankments all square and level throughout. They insist, when the works are being handed over to them, that there shall be this extreme nicety and finish in the work.
4015. After it has been passed by the Inspector? Yes.
4016. *Mr. Woore.*] Can you mention any particular case where this has occurred? Yes; it occurred in connection with the Mulga No. 5 tank, on the road from Byrock to Brewarrina. This particular tank had been completed, but had not been taken over from the contractor by the Works Department. Previous to our visit with Mr. Mackenzie, an overseer of public watering places, the rain-storm occurred, and scoured the embankments; also causing a settlement on the top, and Mr. Mackenzie would not take the work over, although I promised to make everything good. This was some six months ago, and the tank remains on our hands now.
4017. Did this scouring that you mentioned seriously affect the tank in any way, or did it merely affect its appearance? It merely affected its appearance. The tank itself was in no way affected by it.
4018. *Major Penrose.*] I notice that Mr. Waddell mentions this tank as having been completed for some time, but that it was not in order. Is that the explanation? Yes. While we were there my engineer broke the feed-pipe of the boiler. Everything else was in proper order. We guaranteed to fix up everything if they would take the work over, but they would not do so. The consequence of all this is that the Mines Department have lost over six months' revenue from this tank. I went over to this tank to effect a double transfer. I approved of the works as carried out by the contractor, but after this the Mines officer refused to take it over.
4019. Then in your opinion this slight damage to the feed-pipe would not have affected the tank as a public watering place? No; besides we guaranteed to put everything in working order. In fact we would have had to do so.
4020. *Mr. Woore.*] And why has this delay of six months been caused? The Mines officer has never visited the place since.
4021. Have you reported the tank as complete and ready to be handed over to the Mines Department? Yes; several times.
4022. And have you had any intimation from the Mines Department, or from your own, that they declined to take over this tank? No; and I do not know what reason they may have now for not taking it over. I had a memorandum the other day from the Mines Department asking when the tank would be ready to be handed over, and I replied that it was ready six months ago.
4023. How long is it since you sent that reply? About a fortnight ago; and to my knowledge nothing has since been done towards taking the work over.
4024. It is alleged that the Works Department adopt a certain form of tank without reference to the formation or nature of the soil;—what have you to say about that? Well, it remains within the discretion of the officer to a certain extent. The officers have discretion and give reports as to the shape or make of a certain tank. They are not actually bound to hard-and-fast rules. If I had a tank to make where the ground was not suitable for a square tank I would report to the Department, and make recommendations to the Engineer-in-Chief.
4025. As to the batters, do you use your discretion without reference to the Department in regard to them? Yes.
4026. *Major Penrose.*] And as to the form of the embankment? Yes; I would run it out, if thought necessary.
4027. *Mr. Woore.*] In making the slope of the batters do you take into consideration the nature of the soil that you have to work in? Yes; we do.
4028. *Major Penrose.*] Have you ever found it necessary to recommend a batter of more than 2 to 1? No; I think 2 to 1 is quite sufficient for any soil in my district. There may be an odd case where it is not so, but I think, taking it right throughout, as a rule the batter mentioned is sufficient. Of course the steeper the batter is the better it must be for the conservation of water in a warm climate.
4029. Provided, of course, that the sides keep tight? Yes.
4030. And, therefore, you make the sides as steep as you can? Yes; we want to keep the water in as small a surface area as possible.
4031. Have you ever found any sides giving way on account of the batters being too steep? No; except through wind action on the water. The sides will give way in most soils from that cause. The surging action of the water causes the earth-works to drop in, but that would happen in any case, though not to such a great extent.
4032. And, of course, in those where there is a steep batter more than where there is a sloping one? Yes.
4033. A good deal has been made of this wave action;—do you think it has any practical disadvantage? No; it simply alters the appearance of the work—that is all. It might cause a small quantity of earth to fall in, but not the amount supposed; and it would not reduce the capacity of the tank except to a small extent.
4034. *Mr. Woore.*] Do you think that the embankments made round these public tanks shelter the water from the wind? Yes; and prevent the action of the water on the tank. This is the object of putting earthworks round. I may mention in reference to the price paid for our tanks that, as a rule, contractors for

for squatters are allowed to deposit their earth wherever they please, whereas we put our earth uniformly round the excavation to prevent this wave action, and in this way we economize a lot of water.
4035. But the formation of these embankments in this shapely manner increases the expense? Yes, slightly; that is one of the reasons for the larger cost.
4036. But you think this is quite compensated for by the shelter afforded to the water? Yes; I do.
4037. To put the matter in plain words, you think what is gained is worth the price paid for it? Yes; I think it is worth the extra expense.
4038. *Major Penrose.*] It has been said that the inlet from the silt tank to the main tank is in many instances defective in design and in construction? It is not so; not to my knowledge.
4039. You will see in the evidence that Mr. Mackenzie says in his report, "In conclusion, I wish to bring under your notice the state of inlet from silt to main at some of the tanks in my district, which in many cases is a narrow cutting through the earthwork of embankments, which, in time of flood, keeps cutting away and filling in, and, consequently, all loose earth is carried into main tank; this could be remedied by having the sides of embankments logged or stoned, to prevent cutting the tanks. Where this is most required is at Helman's tank, Booroondarra and Mulga No. 5"? A great deal of that depends upon the caretaker or lessee. In many cases this shoot is impeded considerably after rain. When once you get rain, scouring takes place, and unless it is properly attended to at once the thing will continue. In other cases the caretakers put stones in to prevent this scouring—they do this in their spare time. A little care on the part of the caretaker would prevent any danger whatever, and would keep the shoot in proper order.
4040. You do not consider it necessary to "pitch" the drains or "log" the embankments? No; but loose stones are sometimes put in to prevent the action of the water. It is one of the instructions to the caretakers that they are to pay particular attention to this shoot.
4041. *Mr. Woore.*] Do you think it necessary, in the first instance, to protect the shoot in any way? This that I now speak of would be a protection.
4042. But you say that this is not done by the Works Department, but only by the caretakers? In some cases the ground is too hard to scour away. It is the duty of the caretakers to keep it in repair.
4043. In cases where the ground is liable to scour away much, do not the Works Department protect it in some way? Yes; we cut out the drain and board it over, after making provision to prevent scouring in the inlet shoot. What Mr. Mackenzie means here is actual scouring of open drains, and I think in these cases it is necessary to put in stones.
4044. Should not this be done before handing the works over to the Mines Department? No; I do not think so, because it would not give them much trouble to do it.
4045. It is also alleged that in many cases there has been great carelessness shown in laying out drains running into these tanks? No; I know of no such cases in my district.
4046. Now as to the excessive cost of construction of drains? I have no information on that subject.
4047. *Major Penrose.*] What price do you pay for construction of drains? From 14s. to 15s. per chain. The cost averages from 10s. to 15s. per chain.
4048. What are the sections? From 12 to 15 feet wide and 9 inches deep.
4049. And is that the usual price for these drains? Yes; that is the usual price.
4050. *Mr. Woore.*] How much of that kind of drain could a man do in a day in ordinary soil? Well, I cannot say, I am sure. They plough and scoop it out, but then they have to trim it out afterwards with shovels.
4051. It has also been alleged that the forms of machinery for lifting water at some of the watering places are too expensive and necessitate great cost for maintenance? I do not see that the cost of maintenance is any greater than it would be with other forms of machinery. There would have to be a caretaker there to look after the place just the same as if there were no pump there.
4052. What sort of pumps is used? Tangye's steam and horse pumps, and the Amos & Smith's steam and horse pumps.
4053. Do you think that these are the most economical kinds of pumps that could have been adopted for the purpose? I do.
4054. And not liable with ordinary care to get out of order? The machines which I recommended are the Amos & Smith's horse-pumps and the Tangye steam pump. Any man of ordinary intelligence could after a little experience work them, protect, and keep them in order. I think any ordinary workman should be able to do it.
4055. It has been said that the M'Comas pump is very much cheaper and very much better than the others? Well, it might be for small station work, but not for work of such importance as we do.
4056. Have you seen any of these M'Comas pumps in use? Yes; on stations, but never at any of the public watering places.
4057. Do they not lift a sufficient quantity of water? Yes; but it takes too long to lift the water. One man cannot possibly lift sufficient water with a M'Comas pump to water the stock that go along a road.
4058. *Major Penrose.*] Have you any idea how many sheep or cattle have been watered at any tank in your district in one day? Well I cannot say for a certainty, but about 20,000, I should think.
4059. *Chairman.*] What amount of water would they require? Well, at least 20,000 or 30,000 gallons—that is, including what would necessarily go to waste. Of course the pump would have to be kept going while the stock were drinking in order to keep up the supply.
4060. *Major Penrose.*] Do you think that the public watering places in your district will be much more largely used in future? No; I do not think so to any great extent; on the Queensland road they will. On the Barringun and Hungerford tracks, I think that more stock will come down than have come down within the last two or three years. I think that as soon as the Wanaaring track is opened up, a great amount of stock will come through there.
4061. Some tanks, then, will have more pressure put upon them than now exists? To a great extent this will divide the traffic, but with a considerable increase. I do not think there will be any more pressure upon any particular tank.
4062. I suppose that most of the public tanks constructed in your time have had no real pressure put upon them? No.
4063. *Mr. Woore.*] Is there not another form of pump being used—the Amos & Smith steam pump? Is that a complicated pump? No; not at all complicated, but those that I have mentioned are more simple, and are not so liable to get out of order.

J. Coleman. 13 April, 1888.

4064. *Major Penrose.*] Have you ever employed any maintenance men to keep these pumps in repair? Yes; I send one round occasionally, but I do not keep him constantly employed; he is not wholly employed at that work.
4065. *Mr. Moore.*] If these pumps could be kept in order by caretakers of ordinary intelligence, what necessity is there to retain a travelling mechanic to keep them in order? Well, sometimes things go wrong and repairs are required which a caretaker cannot do. This man goes round occasionally and tutors the caretakers in the working of the engines.
4066. Have you had much to do with fencing in your district? Yes.
4067. Do you consider the specifications for fencing call for a fence of too expensive a character for your district? No; I do not.
4068. You are aware that the Government pays a great deal more for fences than the squatters do? Yes; and for the simple reason that a contractor will charge more in proportion for a small amount of fencing than he will for a large contract. Besides on a station he gets every facility for doing his work, which, as in the case of excavations, he does not get when erecting a fence for the Government.
4069. It has been said here that although a strong and expensive fence might be necessary round a tank, there is no necessity to put an equally strong fence round the caretaker's paddock? I do not think that the fences are at all too expensive. If the whole lease is fenced in, it is never more than 2¼ miles, and of course a contractor will do 30 or 40 miles of fencing much cheaper in proportion than he will fence 2¼ miles.
4070. Do you think that the gauge of the wire used is unnecessarily heavy? No; we put five No. 6 wires and one No. 4.
4071. If this very strong wire (No. 4 gauge) were on top, you would not require such strong wire underneath? Well, No. 6 is not a particularly strong wire; certainly not as strong as No. 4.
4072. *Chairman.*] I believe that horses are sometimes placed in the caretaker's paddocks? Yes; the lessee has the right to agist 40 head of stock, according to the terms of his lease. The object of the Mines Department in doing this is to lease as many of the tanks as they can, and so do away with the necessity of having caretakers. I think the privileges of the caretaker extend to having cattle and horses for himself and for the working of the pump, or something of that sort?
4073. *Mr. Moore.*] Notwithstanding the great strength of these fences round the caretakers' paddocks, have you ever known any of them to be broken down by stock? I have seen them broken, but I do not know how they were broken. I have never seen it done. I have noticed, also, the wires broken on several occasions round the special leases.
4074. Have you ever seen a No. 4 wire broken? No, I do not say that. It might be, but I am certain I have seen the others broken.
4075. Do you think that it is necessary to sink the posts to such a great depth? No, not in all cases. In loose, red, sandy country I should say that it would be necessary.
4076. Why should it be so even, then, if there are good straining-posts in the fence? On account of the driving wind, which takes the wind away from the post.
4077. An extra 6 inches of sinking adds considerably to the cost, does it not? No; not very much per post.
4078. But I mean that the sinking of a post an extra 6 inches in the ground makes a difference? Yes.
4079. Do you think that the specifications as printed might be modified without detriment to the stability of the fences, and lessening of the expense? Yes.
4080. *Chairman.*] I believe that timber is fairly plentiful in your district? In some cases; as compared with the plains, it is plentiful.
4081. What is the highest price you have ever paid for fencing in your district? I think it is £88 per mile; that is, for fences round the special leases.
4082. What is it that goes to make up this cost? We have six wires; posts 10 feet apart, sunk 2 feet 6 inches in the ground; straining-posts every 12 panels, sunk also 2 feet 6 inches in the ground, with a post 9 inches in diameter.
4083. Were the other posts round stuff? They were split posts 9 x 3. The timber was of various sorts—hardwood, ironwood, &c. We have no pine in this particular part of the country. We have gidya, but not in this particular fence.
4084. Can a substantial fence be put up round these tenants' leases for £45 per mile—the same sum as the squatters' fences are put up for? It could be put up, but it would not be the same sort of fence that we erect.
4085. But supposing that the squatters' fences last for fifteen years, and yours for thirty years—would the difference in durability be equal to the increased cost? I may say that most of this work was done in the middle of the drought, and of course we would do it cheaper now if we had it to do. The carriage of the material then cost a great deal of money.
4086. While admitting that the Government work should always be strong, yet it is considered that in many instances too much money is spent on it. We want your opinion? Well, I think the design might be modified to some extent.
4087. *Mr. Moore.*] Do you think that these strong fences that you are asked about are worth the money, or do you think that too much has been paid for them? No, I think not; considering that the most of the work done was done in the middle of the drought when everything was very dear indeed.
4088. Have you ever had to call for fresh tenders? Yes; and I think the fact that there has been so much competition proves that we have had our work done in the cheapest market.
4089. *Chairman.*] Have you ever known any contracts to be sublet at very much reduced rates? No; I have not. Men may have sublet the providing and the putting in of the posts, but I do not think any great profit was made. In no case of tank excavation have I ever known of the subletting of work.
4090. *Major Penrose.*] You always estimate the cost of a fence yourself? Yes.
4091. And as a rule some of the tenders are higher and some lower than your estimate? Yes.
4092. Do you generally accept the lowest tender? Invariably.
4093. Although it may seem to you to be an absurdly low price? Yes; I accept the tender, but occasionally they refuse to carry out the work; but I always recommend that the lowest tender be accepted. In a few instances contractors have declined to go on with the work.
4094. *Chairman.*] What kind of gates have you put up at these paddocks? Five-barred gates 12 feet long.

4095. What is the cost? They vary in price from £10 to £15. The latter figure is, I think, the maximum.
4096. Do you think it necessary to have such costly gates? Well, it is necessary that the gates should be substantial. And they seem to last very well.
4097. Have you ever seen gates made of battens and bolted together with bolts and nuts, without any mortices? No. I have not seen anything of that kind.
4098. *Major Penrose.*] Are not these gates let with the fences? No; they are a separate item. The contractor gives a special price for the gates.
4099. *Mr. Woore.*] In speaking of the cost of the fences, do you include the gates? No; a special price is always given for the gates.
4100. *Chairman.*] Now have you ever had any trouble with the caretakers employed by the Mines Department? No; not directly. I have had no actual interference with them. I have often had to instruct them to do certain things, and, as a rule, they did what they were told.
4101. Are these the caretakers who are under the Mines Department? Yes.
4102. By what right, then, did you give them instructions? I had actually no right to give them instructions; but if I saw anything going wrong, I thought it was my duty to do so.
4103. Was this resented in any way? No; not by the caretakers.
4104. And when you have had occasion to find fault, has any caretaker ever resented it or told you that you had no business interfering with him? No.
4105. Then they generally complied with your directions? Yes; but it was after some time. However, what I asked was generally done in the end.
4106. And if the work is in any way neglected you report to the head of your Department? Yes.
4107. Do you ever report the matter to the overseer of public watering places? Yes; in my experience the only actual trouble I have had with the Mines Department is in the handing over of works to that Department.
4108. *Major Penrose.*] Have you ever found repairs were carried out by the Mines Department which you considered were unnecessary or detrimental? The only repair that I noticed was this alteration to the troughing, &c.
4109. That, I understand, has to be carried out by the Mines? Yes. On the Tindarey tank they have altered the rail by placing it down the centre.
4110. And the Works Department are carrying that out now? Yes; it was done as an experiment by the Mines Department.
4111. Have you ever had any trivial matters referred to you that ought to have been done by the caretakers? No.
4112. *Chairman.*] Have any wells been sunk in your district? No.
4113. Have you had anything to do with hutting? No.
4114. Now, then, as to the troughing—which seems to be a vexed question in the adjoining district of Cobar—a great many complaints have been made about these troughs, and it was said that it was impossible for sheep to water at them, in consequence of which a great many died? There have been complaints of the old system of troughing, but these complaints did not include anything about the loss of sheep. I think that occurred years ago, in the open tanks.
4115. Have drovers never made any complaints to you that sheep would not drink at the troughs? Yes; they did under the old principle of troughing; but I think they are now perfectly satisfied with what we are doing.
4116. We were told that the guards, while allowing the larger sheep to drink, effectually shut out the smaller sheep from the water? Yes. The difficulty under the old system was that large cattle could drink, but smaller ones could not; but I think that the rail down the centre and the iron troughing is very much more perfect, and have remedied any difficulty which existed.
4117. You would never, I presume, recommend a return to the old system of watering stock from open tanks? Certainly not. It caused a great waste of water.
4118. Now, in the event of a contingency such as this arising, that a large number of travelling stock came up to the water and there were no means of watering them, what would you do? We should in that case have to let them into the tank.
4119. But they could scarcely drink owing to the steep batters that you make to the tanks? That would be the only way to do.
4120. Do you think that it would be desirable to have one side of the tank made with a gentler batter to meet such a contingency as this? I do not see that any danger is likely to occur if we have steady men to work these pumps.
4121. Have you ever felt any inconvenience or trouble from the present control over the tanks and wells—one Department having the construction and the other the management? I certainly think it would be very much better for everybody if the whole were under one head; and especially so for one reason, the delay in taking over the works from one Department to another, causing a very large loss to the public revenue.
4122. And then to do larger repairs when necessary? This is one of the principal arguments in favour of taking the whole thing under one common head. In the case of this Mullga No. 5 tank I guaranteed if the Mines officer took it over, to do anything which was required to put the work in good order.
4123. Are you occasionally called upon to make good damage done by heavy rains? In some few cases I have done so. I have put on horses and carts occasionally to assist the caretakers.
4124. I presume the silt tanks occasionally fill up? Yes; and I have occasionally had them cleaned out.
4125. Is not that still the duty of the caretaker? Well, it should be. The inspectors of public watering places have permission to spend up to £10 in making repairs, and they could do it.
4126. Will you now tell us when you lay out the site for a tank what course do you adopt? I test the lay of the country as to the catchment, and then I take general opinion on it: but I use my own judgment, combined with general opinion. The people who have travelled the country for years ought to know the chief catchments. I then peg out what I consider is a reasonable site of a catchment to fill the excavation. One cannot well take a long time in getting information, but I get what information I can from outside and use it with my own.
4127. Do you put down trial shafts? Yes; we do that first in order to test the nature of the ground.
4128. *Major Penrose.*] How many trial shafts do you put down? We put down two or three in different places. Of course occasionally we have to shift our tank sites if we get into bad ground.

J. Coleman. 13 April, 1898.

4129. *Chairman.*] And having tested the nature of the ground you draw up specifications and call for tenders? Yes.
4130. To whom are these tenders sent? To the head office in Sydney, together with my recommendations.
4131. But are they not opened by the local officer? Yes; in the presence of the Clerk of Petty Sessions, who checks and countersigns them, and then signs the schedules of tender.
4132. Is it at all possible that any favoritism can be shown to any tenderer? Not the slightest. The lowest tender is in every case recommended for acceptance.
4133. In the event of the work then being carried on under your supervision, could you, if you found it necessary, modify the specifications in any particular? So far as the capacity of the tank is concerned we could make the tank either larger or smaller. There is a clause in the specifications allowing for that.
4134. Can you alter the batter or the depth? Yes; I would recommend it to the Department if I thought anything of that sort necessary.
4135. Have you ever found out any attempt on the part of the contractors to deceive you in the measurements? In very few cases. The only difficulty I found was in getting the slopes properly made; sometimes they rounded the slopes.
4136. In the event of a rock being come upon which had not been discovered by the trial shaft, do you think the contractor should have compensation? No; because I think the shaft generally shows them what they have to do. In fact, no claim has yet been made for any such compensation. I generally put down trial shafts first and then every contractor is at liberty to test the ground further if he likes.
4137. *Mr. Woore.*] But he is not allowed any compensation if he comes upon rock which was not shown in the trial shafts? No; he has every opportunity to test the ground.
4138. *Chairman.*] We have had it in evidence here that one contractor came upon rock and that he lost money by the contract. It was stated that had this work been done for a squatter the squatter would have made some allowance? As I have said, the contractor has every opportunity to test the ground. If we were to compensate the contractors for this we should have to compensate them also for every kind of loss imaginable. Frequently the contractors put in prices for rock, and if they do not protect themselves in this matter it is simply their own fault. It has occurred in one case that a contractor came to rock and was paid for it, as it was known to exist, his tender containing a price for such work; but there have been other cases where contractors came to rock or conglomorate and were not paid for it.
4139. *Mr. Woore.*] Have you ever known men to lose by their contracts? Well, possibly they might have done so. Certainly this sort of ground would not pay them so well as ordinary alluvial sinking.
4140. *Major Penrose.*] Was that cement which you have spoken of found in any of the trial shafts that were put down? Yes; the contractors knew of it. I would like to draw your attention to the evidence given here by Mr. Mackenzie:—

> 1671. *Mr. Woore.*] Has there been any carelessness shown in not taking advantage of the formation of the ground and utilizing catchment area so as to avoid collection of silt? This is what I have mentioned before. There is the Kerrigundi tank, which is placed in a depression of undulating country, and the drains go into it from a very steep slope; consequently everything is washed down into it from the hills. It is most difficult to keep the silt tank clean, and at the present time I believe the water is only 3 feet deep.

I want to say now that there are no drains at all to this tank. There are drains to carry the surface water clear of the troughing, but that is all. The site of this tank is one of the best on the road.
4141. Was the site of this tank chosen by you? No; by my predecessor in the district.
4142. Do you think that the objections to the sites are uncalled for? Yes; I do think so. I always expend a great deal of care in the selection of sites. The only tank in my district, the site of which is said to be badly chosen is Mulya. I do not know the other districts at all. In some cases an uneducated man may be a very efficient man as a caretaker, but at the same time he is not capable of keeping the set of books that are required of him. So that very often a good working man is sacrificed to a man who can merely keep a set of books.
4143. *Chairman.*] Supposing a scheme were devised making it compulsory on the drovers to pay for the watering of their stock at the time of getting their permit to travel, would such a scheme be a good one, in your opinion? It always has been my opinion that such a scheme would be a good one. It would do away with the necessity of keeping books by caretakers. I think it is very desirable also for the reason that it will bring in a greater amount of revenue to the country. We will suppose that a drover starts from Barringun with 25,000 head of sheep and is travelling towards Hillston, on the Lachlan. When he obtains his permit he should have to pay for every tank on the road between these two places. The Stock Inspector would say to him, "You have so many public watering places to water at and we will charge you 10s. per 1000 of your stock for each one of these watering places." He is compelled to pay this amount, whereas under present circumstances if there is water to be had elsewhere on the road he gets it and passes by the public watering place. Now I hold that as these public watering places were constructed for the use of travelling stock, the travelling stock should be made to pay for every one of them. This is the only way I can see of dealing with the matter. By not having to attend to this book-keeping the caretaker could be made less responsible, and it would give him more time to attend to his work.
4144. Do you think it desirable to fence off these travelling stock routes, excepting those which have any frontages to water? It would be a very good thing for the squatter.
4145. But it would not be a very good thing for the travelling public? No; not in all cases. In some cases stock have to go by other roads.
4146. But they do it at their peril? Yes.
4147. But if the road were fenced off the squatter could not eat off the grass as he does sometimes now? I think if there could be some arrangement devised by which the Government would pay one-half and the squatter the other half, it would be a good arrangement. It would be a good thing for the travelling public. The squatter now has to pay for his run, which contains the travelling stock route, and of course has a right to eat off the grass.
4148. *Mr. Woore.*] Would not this fencing mean a tremendous expense to the country? Yes.
4149. And even if the squatters paid one-half the cost of the fencing it would still be a great expense to the country? Yes; and I hardly think the expense would be justifiable.
4150. *Chairman.*] Are there any other suggestions that you would like to offer to this Commission? Not that I can think of just now.

4151.

J. Coleman. 18 April, 1888.

4151. Now do you think it would be advisable to place these works in the hands of local bodies? I think the Local Government Bill will deal with that. But as for the control of stock, that would be a different matter. Different bodies would want to collect portions of the money. Local bodies would of course take charge of the tanks and make a revenue out of them. The present system is not at all desirable, the works being under two Departments.
4152. *Major Penrose.*] Do you think it will ever be possible to get rid of caretakers? No; I think it will always be necessary to get somebody to look after the machinery. It would, I think, be very advisable to hand these works over to lessees, if you could have it done. But, under the arrangement that we were speaking of, caretakers would still be necessary.

[The Commission adjourned.]

WEDNESDAY, 18 *APRIL*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

E. G. Cronin. 18 April, 1888.

Edward George Cronin called in and examined:—

4153. *Chairman.*] What are you? I am Road Superintendent for the Deniliquin district.
4154. How long have you been in that district? A little over six years.
4155. Have any tanks been constructed under your supervision during that time? One only.
4156. What tank is that? Black Swamp tank.
4157. When you were selecting the site for that tank were you only responsible, or did the Mines Department give you any assistance? I think the selection of the site emanated from a conference between Mr. Gilliat and Mr. Wood.
4158. Did the Mines Department fix the site, or merely select the locality? Well, I would not be certain about that. A conference took place, I think, and I got a memorandum from Mr. Wood to sink trial-shafts to try for water. The exact place was left to my discretion. Instructions were first given to sink for a well, but as we could not get good water, I was instructed to sink a tank.
4159. Has any fault since been found with the site by the Mines Department? None whatever; and I do not think it was possible to have found fault with it. In fact Mr. Gilliat specially praised the work when he came to take it over.
4160. What batter did you give the sides for the tank? 1½ to 1.
4161. Is that the usual batter, or is it an excessive one? I would not consider it so in my district.
4162. Is that batter sufficient for the nature of the soil? Quite sufficient.
4163. Have you travelled much outside your district? Yes; previous to having charge of the Deniliquin district I had the Hay district under my supervision.
4164. And are there many tanks in that district? There are.
4165. From what you know of that district you think that the sites there are well chosen? Yes; so far as my experience goes with regard to that district, they are well selected.
4166. And having due regard to the necessity of putting them a certain distance apart? Yes.
4167. Have you ever noticed much wash-away in these tanks owing to the steep batters? Of course it would be attributed to the batters; but it is merely a frittering away of the top soil on account of the water getting between the soil and the clay at a lower level than the natural surface of the ground. This slides to the bottom and the tank forms its own batter.
4168. Do you not think that in any instance like this it would be desirable to make a greater slope? I think that no matter what the slope was the tank would still fritter away at the berm, owing to the wind—that is, in friable soil.
4169. You are aware that making these steep batters necessitates increased expense in excavation? Yes.
4170. Then, taking so much for granted, is it desirable to go into this extra expense when the tank will eventually slip in and form its own slopes? I would simply like to repeat, in answer to that question, that in any case there would still be the frittering away at the berm.
4171. But if it was a very gentle batter it could not slip in? The earth must go somewhere, and the action of the wind will carry it back. There are many things to consider in connection with these tanks, and the principal one is as to the permanency of the water at the public watering places. By the construction of the steep batters we reduce the evaporation.
4172. Just state the reasons which actuated the Department in making these steep batters, and reply in your own way, if you wish it, to the arguments of those who are in favour of gentle slopes? The main object of these steep slopes was to conserve water with as little superficial exposure as possible. Now, with regard to the adverse opinion as to the slopes of tanks, I can only look upon our works in most instances as being carried out to the true intent and purpose of the end in view; and that with any easier slopes to such tanks it would be necessary that the tank should be deepened in order to give the same cubical contents of water.
4173. And this deepening of the tanks would, of course, increase the cost of excavation? Yes; it would bring up the cost to a similar amount, at least, to what is now paid.
4174. *Major Penrose.*] But you might get the same cubical contents by taking a larger superficial area and a lesser depth? Of course.
4175. *Mr. Woore.*] In order to reduce the expense it would be necessary that the batters should be such as would allow bullocks to draw scoops up? Yes; and that would be a batter of about 4 to 1. It would be necessary to have a larger extent of the surface of the ground opened up or go to a greater depth, and I do not think it would be advisable to expose the water to greater exposure than at present.
4176. You were talking about this frittering action on the banks—has it ever extended, in your experience, far enough to endanger the embankment? No.

4177.

E. G. Cronin. 18 April, 1888.

4177. *Major Penrose.*] And what do you consider it has ever reduced your batter to? Very probably to about 2 to 1—about 3 feet back. The actual amount would depend upon the depth of the tank. I would say the average would be 9 feet back. It has not extended to the drain between the berm and the embankment.
4178. *Chairman.*] Then comes the point, would it not be much better to make a gentler slope originally than to have the banks slipping in afterwards? No; because the bank would still go somewhere.
4179. Now, do you not think it would be desirable to have gentler slopes on one side in order to enable the contractor to get the stuff out? No; I think the benefit the contractor would derive from this would not be such as to justify the upsetting of the professional opinion already given why the slopes should be steep.
4180. Then let us look at it from another point of view. In the event of the pump getting out of order would it not be desirable to have one slope to the tank more gentle than the others, in order to allow travelling stock to water at the tank direct until the necessary repairs had been effected? Well, in the first place I can hardly admit that with proper care the pumps will get out of order. In fact, a Chinaman could understand and work the pumps we provide at these tanks and wells; and I think it is hardly worth while providing for a contingency that may never occur.
4181. *Mr. Woore.*] Do you not think that making one of these slopes with a less batter than the others would be dangerous, inasmuch as drovers would sometimes take advantage of it? Yes; I am of that opinion. It would lead caretakers to be very reckless, and in order to save themselves from pumping they would very likely allow stock to go into the tanks. I think, too, it would lead to dishonest practices between the drovers and the caretakers.
4182. *Major Penrose.*] With regard to this washing-down of the batters, is it not the duty of the caretaker to keep the batters up, if he can? Most undoubtedly it should be.
4183. And can he prevent by proper care and attention any undue washing-away of the batters? Yes; it has been done at Black Swamp. The system of facine work has been carried out by the caretaker to protect part of the bank with ordinary lignum bushes and sticks.
4184. That is, to adopt a similar plan to that adopted in every large embankment on which pitching is put? Yes. This facine work merely acts against the force of the waves. Wherever the bank has started to wash this has been found to be a practical plan to prevent it.
4185. Does this washing-away take place at every tank? No; I think not; only at those tanks where the top of the surface is of a friable nature, and where the banks are acted upon by strong prevailing winds.
4186. *Mr. Woore.*] When the bank frets away would not this rivetting with lignum bushes be apt to wash into the water and foul it? No; I do not think so. The stakes are driven into the clay.
4187. *Major Penrose.*] Does this washing-away seriously interfere with the efficiency, as regards depth or otherwise, of any tank that you know of? So far as my experience goes I know of no such case.
4188. *Mr. Woore.*] Has any tank that you have protected with lignum in the way that you describe been afterwards filled to the berm? Yes.
4189. And what was the effect when the water went down? The facine work was wholly intact. Black Swamp tank is the only tank I have had constructed.
4190. *Chairman.*] What forms of machinery are used in the Deniliquin district for lifting water? The Tangye pump and some horse-gear pumps.
4191. And are these very effective? Yes, very effective.
4192. Which do you consider most desirable—horse or steam pumps? Of course we must be guided by the circumstances of the case.
4193. You would not have steam machinery where you could not get wood, but where you could get it you would advise steam rather than horse power:—have you ever gone into the question at all? Well, not very seriously. A good deal depends upon the class of caretakers and upon the surrounding circumstances. We adapted our works and our lifting appliances in each case to suit the surrounding circumstances.
4194. Presuming that the caretakers' wages are increased from 1s. 6d. to 2s. per day on account of supplying a horse, would you not in that case recommend the adoption of steam-power? It would even then depend upon the surrounding circumstances.
4195. I have been giving you the circumstances—the caretaker provides his own horse and has to pay for supplies for the horse as well as for himself? Yes; but on the other hand we have to pay for the timber for the steam-engine, and if we are obliged to cart it a long distance the cost would be very great. In some cases it might be advocated. Of course it is a difficult thing to give an answer to such an all-round question as that.
4196. What kind of machinery would you order yourself—steam or horse-power—presuming that you had the surroundings enabling you to make a choice between them? I certainly should prefer to order motive-power by steam in preference to horse-power, where the surrounding circumstances would admit of it.
4197. *Mr. Woore.*] Are you of opinion that any hard and fast rule should be laid down, either for the construction of tanks or for the adoption of water-lifting machinery; or in each case would you not be guided by the local circumstances? I am of opinion that it is very necessary in the first instance to refer to the type designs, and if these designs apply to the tank or well about to be constructed, then they should be adopted. But it is within the power of the constructing officer to make those alterations which the case demands.
4198. *Major Penrose.*] You mean, to suggest alterations? Yes; we have discretionary powers, and whatever we recommend is invariably carried out.
4199. *Chairman.*] Then you do not think it is desirable to have a cheaper mode of lifting water—say by a hand-pump? Certainly not.
4200. Why? Because we have proved, in a practical manner, that hand-power is not equal to the demands made upon it.
4201. *Major Penrose.*] How did you prove it—by testing it? I cannot give the exact particulars; but the thing is almost self-evident.
4202. *Chairman.*] It has been said that one man, with a M'Comas lift, can water 10,000 sheep in a day? [No answer.]

4203. Do you think that is possible; and, if so, would it be sufficient? No. My opinion of this matter is more or less theoretical; but still it is borne out by the owners of stations, who, at the present time, are using the same class of lifting appliances as ours. E. G. Cronin. 18 April, 1888.

4204. *Mr. Woore.*] Similar to those used at public watering places? Yes; similar to those that we are using. I know of instances where the Taugye steam-pumps are applied in my district on stations to the lifting of water.

4205. *Major Penrose.*] Is the M'Comas lift much used by station owners in your district? I do not know of any stations where they are used; and, in fact, it was only recently that I spoke to a majority of the squatters in my district, as to whether they would purchase the M'Comas water-lift at Box Creek, for which we had no use. They condemned the M'Comas lift, and said they would not have anything to do with it. They said that they would not have it at any price.

4206. *Chairman.*] I believe the expense of fitting up a M'Comas lift would be very great? Yes; there is a great deal of gear in connection with it.

4207. *Mr. Woore.*] Have you seen any of the M'Comas lifts put up? Yes; I have seen them after being erected. I should think that our pumping gear should be of the simplest kind, and we have adopted that idea now. I think the machinery for lifting water should be of the simplest nature compatible with the cost of erection and after maintenance.

4208. And could anything be more simple than the forms of machinery now adopted by the Department? No; nothing more simple.

4209. It has been alleged that some of the fences round the lessees' paddocks are faulty in construction and excessive in cost. What have you to say to that? With regard to faulty construction, I think the charge is not justified. As to the excessive cost, I can only say that no matter what the works cost, they can be done for less. But work done at less expense would not be of the national description that all works under the hands of Government should be.

4210. Do you think that these fences have cost more than they are worth? No.

4211. You think that the prices paid for them was a fair price for that class of work? Yes; a fair price for the class of work, so far as my experience goes.

4212. Now, what is the class of work in these fences? Well, I can only speak of my own district. I have had the posts which are erected, split 9 by 3 and 8 by 4 respectively; they are split posts. They are 2 feet 6 inches in the ground, 9 to 10 feet apart, the top wire being No. 4, to take the place of a rail; the rest of the wires were Nos. 7 and 8 gauge. Of course if we start with No. 8 we use it right through.

4213. And how many straining-posts? A straining-post every twenty-second post of round timber, 9 to 12 inches in diameter. They are put 3 feet in the ground.

4214. Are the fences which you describe round the caretakers' paddocks, or round the tank itself? This fence is round the caretaker's paddock.

4215. Do you think that 2 feet 6 inches is an unnecessary depth for posts to be in the ground? No; I should not think so, in view of the object.

4216. I suppose you admit that if the posts were only 2 feet in the ground, it would mean a considerable lessening in the cost of construction? Yes.

4217. What is the difference in cost between sinking holes 2 feet and 2 feet 6 inches in the ground? I think the difference would be about £3 per mile.

4218. Would not that depend upon the kind of ground? Yes.

4219. Are the posts put down 2 feet 6 inches in the ground, irrespective of the kind of soil? Yes; the soil does not differ much below the surface.

4220. And do you not think it is unnecessary to do that? No; our fences require stability, and we want them as a protection against horned cattle as well as sheep.

4221. Now, with regard to the No. 4 wire, do you not think that it would be as effective if No. 6 were used, and considerably less expensive? Well, it stands to reason that No. 4 is stronger and more expensive than No. 6.

4222. But is there not an objection to it on this ground, that one man cannot strain it properly? I know of no instance in my district where it cannot be done.

4223. You think that, taking them altogether, these fences are of a good class for what they are intended for? I consider that we have studied economy in the erection of these fences, and in fixing on No. 4 gauge wire instead of a top rail. The object of fencing is not only to keep sheep but also horned cattle from breaking into the paddock. The Mines Department recently erected a fence at the Colombo dam. It has six wires above the ground, and the top wire is only 3 feet 6 inches high. It is a sheep fence. I am informed that the contractor's price was £44 per mile for it, in fact the contractor told me so himself.

4224. Was that a good fence? It was a pine fence, but not suitable for the purpose.

4225. What should be the cost of this fence as you describe it? It would depend upon the carriage of the timber. In some instaces we have had to cart timber 60 miles.

4226. As you have had some fencing done yourself, can you give us some instances as to what are the highest prices you have known to have been paid for fencing? The highest price ever paid for our fencing in the Deniliquin district was 25s. per chain.

4227. But I want to know the cost per mile? It would be £100 per mile. But in this instance the timber had to be carted 63 miles.

4228. What is the lowest price that you have known to be paid for fencing? The lowest price paid for fencing in the Deniliquin district of the class described is £74 per mile: that is, for fences round the caretakers' paddocks.

4229. Have you ever seen such a fence as you describe as having been put up by the Works Department, erected on any station;—have you ever seen these fences so substantial and costly? No; I have not. It would never pay a station owner to erect a fence of that description; neither are such fences required on stations.

4230. *Major Penrose.*] Have you seen the specifications, for fencing, issued in 1887? Yes; I have seen them.

4231. You see that there are no straining-posts stipulated for there? Yes. I think it certainly would be better to strain to one post; but I have had no experience in that class of work—fencing without such strainers. I find that all wires can be expeditiously strained by adopting one straining-post.

E. G. Cronin. 18 April, 1888.

4232. *Mr. Woore.*] Do you think that straining-posts are indispensable in the making of good fences? I would not say that.
4233. *Major Penrose.*] What is the type of fence round the tanks in your district? Post and top rail, split and mortieed, with four or five wires.
4234. *Mr. Woore.*] In the evidence of some of the Mines witnesses it is said that gates of a very expensive character, and altogether too good for the purpose, are put up in the caretakers' paddocks? With regard to the charge of the Mines Department that the gates are too costly, I think the onus rests to a certain extent with the Mines officers themselves; because when Mr. Gilliat accompanied Mr. Wood to Black Swamp tank in 1883 for the express purpose of taking delivery of the works which were completed, Mr. Gilliat spoke in the most favourable manner of the works at Black Swamp tank, and he made a special request that a gate similar to the one already constructed at the north-west corner of the works should be fixed at another corner of the paddock.
4235. And was it erected accordingly? It was.
4236. Now will you describe the construction of these gates and what they are made of? This particular gate in question—and this particular class of gate, which I believe is one of the gates complained of—is constructed of soft wood, 12 feet wide, 4 feet high, morticed and bolted. It has three cross bars and uprights, hinged to a post apart from the fence. The gates are also painted white.
4237. What do they cost each? From £10 to £12.
4238. And how many gates are there in the caretaker's paddock? One is quite sufficient.
4239. But as a rule how many are there? There is usually one, but in some cases there are two.
4240. *Major Penrose.*] Altogether at a watering place there are only two gates? That is all.
4241. *Mr. Woore.*] Apart from Mr. Gilliat's request about this gate that you spoke of, do you not think that a much less expensive gate would have answered the purpose? A gate might be constructed cheaper, but I venture to say that the cost of our gates is caused by the strength of their construction.
4242. I suppose you put up a gate in accordance with the fence;—if you have a first-class fence you put up a first-class gate? Yes; we put up a gate in keeping with the fence.
4243. It has been alleged here that great interference has taken place by the officers of the Works Department with the caretakers and overseers of the Mines? I have merely heard that such has taken place; I do not know anything of my own personal knowledge. That may be accounted for by the fact that I have sensible overseers in my district. When anything has been required in the district of which I have charge, the overseer invariably asked me for my opinion in writing, accompanied by plans of any proposal that the Mines wished to adopt.
4244. Then nothing has come under your notice in any way tending to show that there has been interference with the caretakers by the Roads officers? No; everything went on very smoothly in my district.
4245. And there has been no friction between you and the caretakers? No; we had instructions to assist them in every way we could, and we did so.
4246. *Major Penrose.*] You stated just now that the Mines Department had erected a fence at a dam;—were fences at that time being constructed by the Works Department? I think so. I must say that this dam was constructed by the homestead lessee. The water flows out of the Yanko into the Colombo Creek, and at a point on a branch of the creek the dam was made. The Mines Department took it over, used it, and made a public watering place of a big water-hole at the back of it.
4247. Can you explain why it was that the Mines Department fenced this place when the Works Department fenced all the others? I can only account for it in a certain light. They were laying charges of extravagance against the Roads officers, though at the same time their own Department had been guilty of paying a caretaker about 8s. a day for over two years at this watering place, when the revenue from it was only a few pounds per year. And they did this while there were people in the locality who were only too anxious to give a decent rental for it.
4248. All I wanted to know was why the Mines Department fenced this one watering place when you fenced all the others? Well, the reason for that I really do not know. But, as I have said, a caretaker was placed at this dam by the Mines Department, and kept there for two years, at 8s. per day when the place could have easily been let. To my own knowledge people were anxious to get a lease of it. I know that similar things have occurred at Pretty Pine well, near Deniliquin, and at the Wanganella well, 30 miles north of Deniliquin.
4249. You say that all these places might have been leased at a fair rental? Yes; and in support of this statement I wish to hand in a letter from Mr. H. J. Poynter, of Wanganella, showing that the Government could have derived a revenue from this well by leasing it:—

Wanganella, 13 February, 1888.

Dear Sir,

Yours to hand re Mr. Laing. He was appointed caretaker, Government well, Wanganella, in September, 1886, at a salary of 8s. per day. I tendered for the well on the 11th May, 1886. *Re* charge by Mr. Laing for stock; he used to charge 1s. per head per night. What he used to charge by the week I do not know—2s. 6d. per head, I believe, but am not certain. I could not say what number of stock he used to have. I would be willing to give 2s. per acre per annum for the paddock, and to keep a man there as well to keep everything in good repair.

I am, &c.,
H. J. POYNTER,
Wanganella.

Edward Cronin, Esq.

4250. Was the tenant's lease fenced off at that time? Yes; it was being fenced.
4251. Were tenders called for by the Mines Department? Yes; and about £70 was the highest bid.
4252. How, then, do you account for the watering place not having been let? The highest bidder was the manager of a station, who afterwards refused to take it up, having himself found water close by; but I believe there were other tenders a few pounds under his. The Mines Department could easily have obtained a revenue of about £40 a year for it.
4253. Has this Wanganella well been leased since? No; the caretaker is still there, and it has not been leased at all.
4254. Then if this tender had been accepted in May, 1886, how much would the country have gained from it since? Well, supposing £10 was taken in fees for 1887, there would have been a clear gain to the country of £280 on this watering place alone—that is, if it had been let in May, 1886, at £40 a year, the rent offered by Poynter.
4255. Do you know of any other instances? Yes; there are two or three cases, but I have no definite knowledge.

4256.

E. G. Cronin. 18 April, 1888.

4256. Do you know any other instances of loss to the country by the Mines Department failing to let these watering places? I have been told about it, but I have no knowledge of my own.
4257. Are these three places that could have been leased still attended by caretakers? No; only Wanganella has a caretaker; all the others have been leased.
4258. *Chairman.*] Do you think it desirable that tanks and wells should be leased rather than that caretakers should be placed in charge? Yes.
4259. Are the public watering places as well looked after by the lessees as by caretakers? Yes; just as well. A lessee can be bound down and made to look after the works. In fact they always do it.
4260. Are you instructed to visit the tanks and wells in your district occasionally? I am instructed to report upon them every time I pass round or that I see them. I report to the head office, to the Commissioner for Roads.
4261. Have you ever had reason to find fault with the caretakers during your visits? No; everything has gone on smoothly in my district.
4262. Have you had anything to do with the construction of wells? Yes; I have constructed four wells.
4263. *Mr. Woore.*] If this system of keeping caretakers at public watering places is to be universally adopted, is there any necessity for having these large and expensive paddocks fenced off? None whatever. If caretakers are to be kept there money is being wasted.
4264. These paddocks were fenced off with the idea of leasing the works? Yes; in order that a revenue might be derived from them.
4265. *Chairman.*] Coming to the wells which you have sunk, can you tell us where these wells are situated? The Pretty Pine well is near Deniliquin, the Wanganella well is 30 miles north of Deniliquin, the Murray Hut well is 15 miles north of Tocumwal, and the Berrigan well is 10½ miles south of Jerilderie.
4266. Why was the usual plan of tank sinking not adopted in these instances—why was it thought more desirable to sink wells? By way of economy, to commence with. A tank was recommended by the Mines Department at Murray Hut, but after testing the ground, the Roads Department found that suitable water could be obtained from a well, showing that a great saving could be effected thereby.
4267. What would be the difference in cost between sinking a tank and sinking a well? Roughly speaking, about £500 less than a 15,000 cubic-yard tank. A well would cost about £700 less than a 20,000 cubic-yard tank.
4268. And one would be absolutely permanent while the other would not be so? Yes.
4269. Then wells have been adopted in this locality, because it is known that good water can be had? Yes; there is very good water along that road.
4270. Is it the intention of your Department to continue the sinking of wells wherever water is now required in the district? I would certainly advise trial shafts.
4271. On whose recommendation were these wells sunk instead of tanks? I think on the recommendation of Mr. Wood of our Department.
4272. What did the officers of the Mines Department say about them—did they agree? I believe so—at least I heard nothing from them against the wells. I heard no complaints as to their wishes not being carried out; though they had recommended a tank at Murray Hut.
4273. Who selected the sites of these wells? I did. Mr. Gilliat selected the site for a tank at the same place. I saw a big stick stuck in the ground, and heard that Mr. Gilliat had been there.
4274. You have since found no reason to change your opinion as to the desirability of having wells instead of tanks? No; not at Murray Hut, and I might say that the same remark applies to the other three.
4275. Have all quite fulfilled your expectations? Yes.
4276. *Major Penrose.*] Have these wells had to withstand any sudden demand? Yes.
4277. *Chairman.*] What machinery is used at these wells for lifting water? A whim and buckets.
4278. Are they satisfactory? They are.
4279. What is the cost of one of these whims with all appliances? Taking the average cost I should say it would be about £200.
4280. And this, of course, necessitates keeping a horse? Yes.
4281. In times of great demand for water, would one horse be quite sufficient? Yes; and there would be no need of relays.
4282. *Major Penrose.*] Do you think that these whims are unnecessarily expensive in design? No; I do not.
4283. It has been stated here that a perfectly good whim can be put up for £50? Well, I daresay a Chinaman could put up one for £30. There is no doubt a station owner can put up one cheaper than the Government. But I do not think that the expense of our whims could be lessened with advantage, as the work required of them is such as to necessitate a very strong and permanent structure; and of a different class to those in use on stations. In most instances squared timber is cheaper on account of the long distance which it had to be carted. Mr. Gilliat specially approved of the Berrigan and Murray Hut wells, referring particularly to the top works.
4284. How long have you known these Government whims to remain at work—how many years have you known one to be erected? About four years, I think.
4285. Have they been costly in repairing? No; the fact is there have been no repairs to speak of, except the screwing up of the bolts.
4286. And you think that that is due to the exigencies of construction in the first instance? Yes.
4287. *Chairman.*] If you could have used your own discretion, would you have had horse-whims or steam-power at these wells? Of course circumstances alter cases.
4288. I am speaking now with regard to the wells in your district. If you had been able to use your own discretion would you have used steam-power instead of horse-whims, the latter necessitating, of course, the use of a horse and paddock for him? Well, with regard to Murray Hut and Berrigan wells, I would have preferred whims.
4289. Why would you have preferred whims in these two instances to horse-power? Because at the Murray Hut well the water is slightly brackish, and the other well at Berrigan, was constructed at a time when there was an exceptional demand for water along the road; and is not of much value at other times; consequently it would be difficult to lease.
4290. Now, with regard to the other two? As to the Pretty Pine well I should prefer steam-power, on account of the abundance of timber for firewood close by, and the fact of a reliable man being always stationed in the locality who would lease the work, and would not abuse it.

4291.

E. G. Cronin. 18 April, 1888.

4291. And what about Wanganella? Well, with regard to that, I think it would come under the same category as Murray Hut and Berrigan, there being a long cartage for the timber.
4292. What objection have you to brackish water in connection with steam-power? I understand that it tends to shorten the life of the boiler. There are minerals in the water which would destroy the boiler.
4293. You never attempted to sink wells in this locality before you found that there was water underneath? No; not in any case.
4294. Now, about the hutting for caretakers. It has been stated here that the Works Department were about to construct caretakers' huts at an excessive price which the Mines Department objected to, and the huts have since been erected by the Mines at about half the price which the Works Department would have paid? Well, that is not borne out by any work which they have done in my district. In fact, I think, the hut erected at Wanganella well carries with it a great waste of money.
4295. What did it cost? I can only go by what I have heard—that this hut cost about £48 5s. It is built of two rooms, with galvanized iron roof, covered in with weather-boards. The hut is altogether, and in every way, inferior to the huts that we have erected in the Deniliquin district.
4296. And has it less accommodation? Yes. Tenders were invited by the Works Department for a hut in this locality. It was to have three rooms, and be of greater strength, with water-tank, spouting, and painting similar to the type design produced, and the lowest tender was £69. Comparing the design adopted by the Works Department with the design carried out by the Mines, I should say that the hut put up by the Works Department is certainly worth double the other. The amount stated by the Mines Department for the erection of this hut might, I think, have added to it the value of the caretaker's time and the cost of the bricks, which were obtained gratis. And yet the building is of a ricketty nature; for if you put your hand against it with force, you would knock almost everything off the shelves; and it is hardly able to withstand the force of the wind.
4297. Have you any huts in your district that are built wholly of iron? No.
4298. And you think this Wanganella hut is a fair sample of those in other parts of the country? That I cannot say. This is the first one the Mines Department have erected in my district, and they may have been taught a lesson by it.
4299. Are you aware that complaints were made about defective construction of troughing? Yes.
4300. And your Department has seen to it that a much better system has been adopted since? Yes. The Mines Department had no reason to bring that matter up at all, because we made the alterations before the friction commenced. We exhibited no slowness or delay in adopting this.
4301. Now with regard to the necessity for caretakers. Is it not desirable that lessees should be substituted for caretakers, and that the latter should be done away with in the management of the works? Where the works can be leased they should be leased without delay. And where they could not be leased the fact could be very easily found out by advertising before the enclosed paddocks were made, stipulating the area to be enclosed within a certain time. Then, I think, the area enclosed might be very much reduced. And where these watering places have steam appliances for lifting water under caretakers, there is hardly any necessity for fencing the paddock off.
4302. *Mr. Woore.*] And does it not follow that there would be a very great saving? Most undoubtedly.
4303. *Chairman.*] At present the caretakers must be men of some education, because they have to keep accounts; but there has been a method mooted by which this could be done away with. This is to compel the drovers before they leave, and when obtaining their permits, to pay a certain sum for using the water in the districts through which they have to pass, whether they used the water or not? Yes; I believe that idea originated with Mr. A. P. Wood, and that he mentioned it to Mr. Gilliat when at Black Swamp.
4304. From your knowledge of the country do you think this desirable? It is undoubtedly the best course to adopt.
4305. These works are erected for the express purpose of supplying water to travelling stock;—do you think that the owners of travelling stock should pay for the water whether they use it or not? Yes; it is a very good idea.
4306. Do you think it would be desirable to have the travelling stock routes fenced off from the squatter's lease, excepting those portions having water frontages? I think so; on main roads.
4307. Why do you think this desirable? Well, the Works Department have for years past been carrying out works for the watering of stock in order that in seasons of extreme drought—when necessarily there is very little grass—stock will be able to move from the perishing country to places where there is more grass. And I may be allowed to add that the preservation of grass for such traffic is equally necessary as providing water.
4308. *Major Penrose.*] And that object would be gained, you think, by fencing off the stock route? Yes.
4309. *Chairman.*] Of course you know that the squatter pays rent for these stock routes; and naturally he takes care that there shall be no grass left on them? Yes; I have had great experience of that, more so in the Hay than in the Deniliquin district.
4310. Do you think it would be desirable to put all these watering places under the control of local bodies? Yes; evidently they must come under local bodies when the Local Government Bill is brought forward.
4311. But, pending the passing of this measure, do you think it is desirable to continue the present system of dual control? Certainly not. Pending the Local Government Bill being passed into law, the public watering places should be placed in the hands of one Department.
4312. *Major Penrose.*] Why should not the present arrangement continue until something better takes its place? Well, I cannot give any better reason than that stated to the Commission. There is a double pense to start with in the matter of supervision.
4313. Is the Mines Department ready to take over the construction of the works, and on the other hand is the Works Department ready to take over the maintenance? I think our Department could construct the works and attend to the maintenance as well. But of course this is a matter which should be left to others to decide.

[The Commission adjourned until the afternoon, when the sitting was resumed.]

Edmund

Edmund Caswell Bowyer-Smijth was called in and examined :—

E. C. B. Smijth.

18 April, 1888.

4314. *Mr. Woore.*] What are you? I am a civil engineer and road superintendent for the Albury district.
4315. How long have you been in the public service? About five years in this Colony, and four years in the Government service in South Australia.
4316. How long have you been in charge of the Albury district? About four years.
4317. How many public watering places are there in the district of which you have charge? Seven.
4318. What are they—tanks or wells? All tanks—six tanks and a dam.
4319. Were any of these works constructed under your supervision? Yes; Brocklesby, Lowesdale, Daysdale, and Carson's Swamp.
4320. Have you read the evidence of the Mines officers? I have had extracts from it sent down to Albury, and have no doubt read the portion you wish me to speak of.
4321. It is alleged that there are faults of judgment in the selection of sites for tanks;—now, have any complaints been made with regard to this of tanks in your district? Do you mean by the Mines Department or by the outside public?
4322. By anybody? Well, I cannot say that there have been.
4323. It is said that the sites are unsuitable; that there is a want of proper catchment, &c.? The only thing I remember is that the Mines Department were under the impression that the tank at Walla Walla is bigger than it need be. But, so far as I know, there has been no complaints about sites. I think, most decidedly, that the sites are very good, and suitable for the purpose.
4324. It has also been alleged that there are defects in design, and faults in the construction of some of these works—not particularly in regard to works in your district; but generally. Have any complaints of this kind come to your knowledge? No; I had the building of four out of seven in my district, and if there had been anything wrong with the construction of them I should have reported the matter, and had it altered. So far as I have seen there is no fault. They have stood the test, and now they are full I think they were honestly and well designed.
4325. It has been said that the batters are too steep? Well, one of my tanks, which is made in very hard ground, has a batter of 1½ to 1. This is Brocklesby. The remainder of my tanks are all 2 to 1. The ground is very hard, and capable of standing; the batters also have stood admirably.
4326. Have the batters of any of your tanks become damaged by their being too steep? Not that I know of. Of course I cannot answer for Jindera, because it is full.
4327. And there is no batter steeper than the one you have mentioned? I believe Jindera is 1 to 1; but it has been full since I have been in the district.
4328. And you are of opinion that it is a good thing to have the batters as steep as possible? Yes; as steep as the ground will allow, conserving the water more effectively from evaporation.
4329. Now, in these tanks that you have had constructed under your supervision, have you been tied down to any particular form of tank by a hard-and-fast rule? I have not been tied down to a certain type. I can use my own judgment in altering the batters or anything else to suit the nature of the ground. Of course I would consult the head office first and make suggestions. Certain dimensions were given to me; but, if necessity arose, I should have represented the matter, so as to have the dimensions altered.
4330. It is said also that there is something wrong in the flumes and inlet pipes, and in the laying out of drains? I have heard of no complaints in regard to that.
4331. You know the Walla Walla tank? Yes; there is no trouble with the fluming there, nor with the fluming at any of the tanks in my district.
4332. Was this Walla Walla tank constructed before you took charge of the Albury district? Yes.
4333. What is your opinion with regard to the capacity of the tank;—do you think it is altogether too large for the purpose for which it was intended? I do not think it is. There is no use in putting down a tank unless you put down one of a respectable size. The only water within 3 miles of this tank is the Billabong Creek, and that gives out sometimes. It is a great godsend to people in the neighbourhood, and there is a small township close by. This is the only water that is permanent, and when the creek dries up there is simply no water in the neighbourhood, and the inhabitants are entirely dependent upon it. Therefore, I do not think the tank is in any way too large. There is a large swamp near the tank, which has been filled this season for the first time in many years. There is now no more than 4 feet of water in it, and in summer the depth would not be more than 6 inches.
4334. *Major Penrose.*] I notice in Mr. Boultbee's report it is said:—"The tank is almost surrounded by water; the creek which flows down to the tank is now running a strong wide stream (30 feet) down the byewash into the Walla swamp, in which the water is now backed up within a few feet of the end of the troughs. In view of the fact that the takings for stock-watering here since the tank was made are almost nil, and that the water in the swamp will, in my opinion, last for two years or more, it is, I think, a matter for consideration whether any additional expense should be incurred at this place in carrying into effect Mr. Low's recommendation that a wing embankment should be made to protect the troughs, or that the byewash should be made into an overshot dam, or that the railing at the troughs should be altered, or new shoots fixed to embankments. In the event of it being decided to carry them out, considerable time must elapse before anything, owing to the boggy state of the place, can be done." You do not agree with what is said there? No; I do not. There is only 4 feet of water in the place, and that would not last through a dry summer. The evaporation would be half an inch daily at least, besides the soakage.
4335. Both Mr. Low and Mr. Boultbee complain of the state of the embankments to this tank? The embankments are supposed to be looked after by the Crown lessee; and, as a matter of fact, Mr. Douglas, of Walla Walla, has had a summons served on him to repair the banks. Some repairs were wanted; but it was for the Mines Department, which is the responsible body, to look after that.
4336. Then this statement is made by Mr. Low:—"I do not think that the Government are justified in spending a large sum of money in such a place as this Walla Walla tank is constructed in, where, at the time of my inspection, there was natural water enough to last for two years"? With reference to this, my answer is the same. Now, with respect to the statement made in Mr. Low's letter of the 26th July, and in his report, that has only connection with water running round the tank after there had been a rainfall of three inches in about twenty-four hours, which occurred about eighteen months ago. The cause of this was the bursting of five dams on Petrie's Creek above the site of the tank—a thing which could not have been foreseen.

E. C. B. Smijth. 18 April, 1888.

4337. *Mr. Woore.*] Was there much damage done? No; the only thing was that there remained traces of heavy streams of water.
4338. Now, with reference to Hovell's dam, it has been said that there has been a great waste of public money here by cutting a byewash through the rock when the natural byewash would have sufficed? Well, there was a certain amount of material required to form an embankment, and I saw no reason why we should not take it from the hill, and by making this byewash through the solid rock, get it there rather than elsewhere—possibly some distance away. We thereby made a much safer byewash than by letting the water run round the other way. And for this reason: that, supposing the natural byewash had scoured out, as would most certainly be the case, the level of water in the dam would be lowered to a corresponding extent. Supposing that the creek were to come down and scour out 3 or 4 feet deep, that would lower the water to a corresponding extent.
4339. Do you think, then, that the dam cost no more by taking the material to construct it with from this byewash than it would have cost had you obtained the material any where else? I cannot say that without going into the quantity, but I think the difference would be very slight; and the advantage of having the byewash where it is more than outweighs the difference in cost.
4340. If the surplus water, instead of going through the rocky byewash, were allowed to escape round the other end of the dam, is the fall such as would cause a considerable scour in the ground? I think it is most probable it would. On referring to the plan of Hovell's dam, I see that the fall is set down as 6 feet in 20 chains, and that is quite sufficient, in my opinion, to cause a very considerable scour; and probably would if the amount of water were large. Getting small bodies of water it would not scour, but the velocity of a large body of water would be enormous.
4341. *Major Penrose.*] It has also been stated about this, that it is an expensive byewash, and that none of the excavated material was used in the embankment, but was allowed to lie about there? The dam was built, I believe, 12 years ago, and so I cannot tell. I was under the impression that the stuff was used in the embankment—in fact, I never had the smallest doubt on the subject. The embankment always appeared to me to have been formed from the stuff that was taken out of the cutting, and so far as I know it has been taken all round the embankment. Besides, boulders may have washed down the embankments.
4342. Is it your opinion that there has been no waste of public money in the construction of this work, and that it is well and properly constructed? Yes; that is my opinion.
4343. It was far preferable to make a byewash where it was made than round the other way? Yes.
4344. It is also said in the latter part of this report: "The existing byewash is excavated through the spur spoken of, from 1 to 15 feet deep through solid rock, almost as wide as a railway cutting, about 70 yards long"? I do not think it is solid rock; I should call it shale.
4345. Both Mr. Low and Mr. Boultbee said that the end of the embankment here on the flat ground should have been protected by "logging" if there were any fear of the abutment of the embankment washing away? Well, it appears to me that it would have to be logged right down to where the water runs out. If this byewash had been chosen, it could have been protected; but what it would have cost is another matter. This, however, would not have prevented the ground from scouring away.
4346. *Chairman.*] The next matter we want to inquire about is the expensive forms of machinery used in raising water. Do you think that the machinery used is too expensive for the work to be done? No; I do not.
4347. Your machinery consists of Tangye's steam and horse pumps? Yes.
4348. Would not hand-power pumps have been suitable for your purpose? I do not think so. I have never seen one at work at these places.
4349. Which kind of pumps do you prefer—steam or horse pumps? I have had no experience of steam; mine are all horse pumps, and I cannot give any opinion.
4350. Do you not think that where firewood is to be obtained readily, steam would be more economical than horse-power? You see that the use of a horse entails paddocks, fences, and other things, which mean money, and then it seems that the caretaker, who has a horse, gets extra wages for the use of horse;—under these circumstances, which do you think would be most desirable—horse or steam-power, supposing firewood was obtainable? That question opens up rather a wide field. With steam you must have a man who can attend to an engine.
4351. We have had it in evidence here that men who attend to engines get less wages than men who have horses of their own? Yes.
4352. *Mr. Woore.*] It appears also that these Tangye pumps are so simple that any man of ordinary intelligence, after being shown once or twice, knows all about them? Well, I have had no experience with engines; but personally I should prefer to have a Holman horse-pump. The feed of the horse costs nothing.
4353. *Chairman.*] But the fencing does? Yes; that is true.
4354. *Mr. Woore.*] Where you employ caretakers, would it not be more economical to have steam-power than to incur this extra cost of fencing? In my district all the works are leased, or will be leased, and it is this special lease area that induces people to come forward and lease the works.
4355. But I am speaking of places where the works cannot be leased? I do not know. I have 20 men in my employment who are working at 8s. 6d. per day, and who feed their own horses.
4356. These are caretakers? No; they are maintenance men on the roads. They get 8s. 6d. per day, and the billets are sought after.
4357. *Chairman.*] Have you had anything to do with fencing in your district? Yes.
4358. It has been alleged that the cost of fences put up by the Government is excessive; that the specifications are unnecessarily strict, and that the cost of the work has been altogether out of reason. Now, do you know what the fences that surround the tanks and caretakers' paddocks in your district have cost? Well, I think I am right in speaking from memory in saying that the cost would be about £80 per mile.
4359. And what does fencing cost the Crown lessees—what do the squatters pay? I should not like to say; but I think about £65 to £70 per mile. That, however, is only my opinion. It depends to a great extent on how far you have to cart the timber. Good fencing timber is very scarce in these districts, and in fencing these special lease areas a man will split 100 posts, out of which I will condemn 30. He may get rid of the rest by selling them to the selectors and others. But when the Government puts up a fence it puts up a good one.

4360. And you think the fences are well worth the money that they cost? Yes; of course the fence is a far better one than the squatter will put up. But it is money well spent, for the fence will last as long again.
4361. Do you not think that the gauge of the wire used in these fences put up by the Government is unnecessarily large? No; I do not think so.
4362. What gauge is used by the Government in fencing in the Albury district? No. 7 wire.
4363. And for a top wire? I have got a barbed wire for that. The squatter generally uses No. 8; but that is only one size smaller.
4364. Then the ordinary specification for fencing does not apply to your district? Yes; we use five No. 7 wires to run through each post. The specification which I see here does not apply. I have a special specification. This specification is for No. 4 wire; but that is only round the tank itself. The special lease area is fenced in with No. 7 wire, and a barbed wire on top.
4365. *Major Penrose.*] You think a very strong fence is necessary round the tank itself? I think it is advisable, because I can understand a mob of wild bullocks trying to rush a tank. I think if you totted up the difference in cost between a small wire and a large one, it would be found to be very small.
4366. *Chairman.*] Have you ever had any difference with the officers of the Mines Department? No; we have always worked harmoniously together.
4367. And it is your duty, although you have given up the works which you have constructed, to look after them as you pass along? Yes; I am always supposed to look at a tank in passing.
4368. Has that led to any unpleasantness? No; but if I saw anything wrong I would mention it to the local overseer of public watering places. But, as a matter of fact, none of the works have been damaged since I handed them over.
4369. *Major Penrose.*] I believe that the Carson Swamp tank is one of those from which the stock drink direct? Yes; it has a roadway on the side.
4370. Why was that made different from the other tanks? I think it was done more on the score of economy than for any other reason; because there are not many travelling stock, and the inhabitants round there would be likely to use it, though this would be sufficient for all their wants. There is not much traffic there.
4371. Is this roadway pitched? Yes; but not the whole width.
4372. I see that as soon as the Mines Department got this tank into their care they wanted to alter the fence? Yes; they wanted to take the wires out so that sheep could go down, and the top rail would keep out the bullocks. If the bullocks went in in wet weather they would sink and get bogged, but it would not matter to the sheep. That, I think, was the idea of the local inspector of stock.
4373. And this has been carried out? Yes.
4374. *Mr. Woore.*] How does this form of tank seem to answer—an open tank for stock to go into? I should say that is a question which depends on the number of stock that went into it. If the number was small it would answer well, but if there were many travelling stock it would not answer.
4375. You think that no stock should be allowed into the water along the main stock routes? Yes; because stock going in foul the water most terribly.
4376. It has been suggested by some witnesses to have one of the slopes of the tanks made with a gentler batter, so that stock might be allowed to water direct in case of necessity—in case of the pump or appliance breaking down? Well, that is purely a matter of opinion, and very hard to say.
4377. Do you not think it would involve the danger of undue advantage being taken by the drovers, and possibly collusion between them and the caretakers? Yes; and there is no doubt that the evaporation on one of these long flat slopes would be very great.
4378. Are there no wells in your district? No; none.
4379. Have you had anything to do with erecting huts for caretakers? No.
4380. Are there many travelling stock in your district usually? Yes; a good deal.
4381. Is there any difficulty with regard to the travelling stock routes—I mean in connection with the rights of the lessees through whose runs these travelling stock routes pass? In what way do you mean?
4382. You are aware, probably, that the lessee leases and pays rent for the run through which these travelling stock routes pass—have you found any dissatisfaction or ill effects from that cause? Well, that is not a matter I can say much about. I only know a travelling stock route from seeing it.
4383. Have you any complaints made to you by drovers? No; they would not make them to me but to the inspector of stock, who is also an inspector of public watering places.
4384. Are you aware that there is a considerable amount of friction between the Works and the Mines Departments with regard to the dual control over these works? Yes; I have heard of it.
4385. Have you any personal knowledge as to the origin of this friction? I think it is always the way when two sets of people have to look after the same work. I do not think dual control will ever answer.
4386. And you think it undesirable that it should continue? Yes; because it is bound to lead to friction.
4387. What would you suggest to stop the present state of unpleasantness? I should say to leave the construction and maintenance entirely in the hands of the Works Department. We had to construct the works, and I see no reason why we should not continue to look after them; for, as it is, if anything was seriously wrong we have to put it right, and there is always something unsatisfactory in doing another man's work.
4388. Is it possible that the damage may have been caused by neglect on the part of the officers of the Mines Department? Yes; and if the tank is handed over in good condition it must necessarily be so—under ordinary circumstances it must be so.
4389. And if that caretaker was under your supervision you would see to it that he did his duty? Yes; and I should hold myself responsible if anything went wrong.
4390. *Major Penrose.*] Can you tell what the cost of excavation has been in your district? The cost of excavation at Carson's Swamp tank was 1s. 1d. per cubic yard; at Brocklesby's, 1s. 3d.; and at Drysdale, about 1s. 3d.—it was a lump sum sent in.
4391. Are these prices largely in excess of what the squatters pay—when you take into account what the Government tanks are and what the squatters' tanks are? Not largely in excess when you take into account what the Government tanks are and what the squatters' tanks are. There is an extra depth in the Government tanks, and the price given is not too much for the work.

E. C. B. Smijth. 18 April, 1888.

4392. What other reasons are there for the extra cost? One is the extra depth, another is the form of the embankments round the tank. To do that at any time increases the depth, and several feet of water are gained by pumping over the embankments. Another is that in the case of a squatter's tank a contractor is given every convenience in the shape of water and feed; and then, in addition, there is the question of the slopes.

4393. *Mr. Woore.*] And the squatter chooses his own time? He chooses a good season for the work? Yes; and the Government have to go on whether there is a drought on or not.

4394. *Major Penrose.*] Now, as regards the slopes, how do they affect the case? They make an immense difference. The squatter's tank is generally made with a slope of 6 to 1 at each end, which allows the bullocks to go out without turning. Now, a contractor cannot use a scoop in the same way in a Government tank, and the stuff that comes out has to be taken out in a dray.

4395. But do not the squatters try to make their water as permanent as the water in the Government tanks? Yes; but I do not believe there is a tank in the district, except the Government tanks, that would stand a four years' drought.

4396. *Mr. Woore.*] Even in the largest squatters' tanks that you know, would they ever have the demand made upon them in the dry season which would fall on the Government tanks? Not at all. The Albury district is thickly populated, and in the event of a dry season coming the selectors' tanks would all dry up and the whole population would have to depend on these Government tanks.

4397. *Chairman.*] Is it said that in Albury, where you have an ample rainfall, you use no discretion, but go and construct enormous tanks at great expense? Yes; but where you get an ample rainfall you get a large population. I know that about three years ago there was a severe drought in the Albury district, and many people had to drive their stock down 15 miles to the Murray for water. They left with them one day and returned the next. This occurred to the west of Walla Walla—more in the direction of Carson Swamp.

4398. So that you do not think the Works Department is open to the charge of recklessness which has been alleged here? No; I do not think so.

4399. *Major Penrose.*] Now, in laying out these tanks it has been alleged in many instances the work has been carelessly done and that contractors have defrauded the Government by piling up earth inside the berm, and have not gone down the full 18 feet below the natural surface? I do not think they got over me in that way. I always levelled with corner pegs and bench marks outside the tanks.

4400. *Chairman.*] There may be other matters of which you wish to give evidence. If so, we shall be glad to receive it? I know of no tanks outside my district, and could give no opinion beyond it.

[The Commission adjourned.]

THURSDAY, 19 *APRIL*, 1888.

The Commission met at 10 a.m.

Present:

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

Arthur William Stilwell called in and examined:—

A. W. Stilwell. 16 April, 1888.

4401. *Chairman.*] You are Assistant Engineer and Road Superintendent in the Hay district? Yes.

4402. How many years have you been in this district? About three years and a quarter.

4403. Have many tanks been excavated under your supervision during that time? Yes; as nearly as I can remember, seven tanks have been excavated.

4404. Who chose the sites of these tanks? I chose the sites of several of them myself, and others were chosen before I went to the district by Mr. Gordon, in conjunction, I think, with Mr. Wood.

4405. In saying you chose the sites of several of these tanks yourself, I presume you mean that you were acting under certain instructions—that you had a place pointed out to you? Yes; we were instructed to excavate these tanks within a certain distance—the exact sites I chose myself.

4406. I presume the officers of the Mines Department regulated the distances apart? Yes; they fixed the sites approximately. They stated they wanted a tank at a certain place, and we put it there as nearly as possible.

4407. Have any tank sites selected by you been objected to by the Mines Department as unsuitable? No; there has been no objection made directly to me, but I see in the evidence that Mr. Low stated that Dowdigan's was not a good site.

4408. Why was the site of this tank alleged to be a faulty one? The objection was to the catchment—that was not sufficient, in his opinion. I think it was Mr. Low or Mr. Boultbee who said that.

4409. Is that a fact? No, it is not. In my opinion the site is a very good one; and I may say that it was approved of by Mr. Cronin, who gave evidence here yesterday.

4410. *Mr. Woore.*] Is it the best site to be had, all things considered? Yes; it is at the junction of the stock routes, and it is the best site we could obtain there. Certainly a better one might have been obtained further on; but it is the best site, and satisfied all requirements.

4411. *Chairman.*] Will you state what tanks were excavated under your supervision? Yes; the Ivanhoe Clare, Carowra Swamp, Hulong, Mount Elliott, and Pulletop, and there are two others in course of construction at Harmon's and Waterman's.

4412. We will take the Ivanhoe tank first. Strong complaints have been made with respect to Ivanhoe tank—complaints which I presume you have heard of, or read in the evidence? Yes.

4413. Now perhaps the better way for you would be to reply to this evidence in your own way, and without our asking questions;—you might give a history of the matter in your own words? I may state first concerning this Ivanhoe tank that another site was first chosen (about 1½ miles away from the township) by Mr. Wood, in conjunction with Mr. Gordon. The land on which that site was situated was selected by the squatter who took it up as a conditional purchase. On this account we were prevented from proceeding with the works. Another site had consequently to be chosen, and that in the township was adopted as the best alternative site after the other had been taken.

A. W. Stilwell. 19 April, 1933.

4414. *Mr. Woore.*] Was the township a surveyed township at that time? It was. At the time there was no objection on the part of the people. I spoke to Mr. Williamson and others, and they concurred that it was a suitable site, and would be advantageous.
4415. Was that the general opinion of the people in the locality? Yes; so far as I could ascertain, it was. I heard nothing to the contrary until some time after the work had been in progress. The site in the township was the only one available without going below and getting the drainage from the town. At present we have no drainage from the town at all.
4416. *Major Penrose.*] Is this site on Mr. George Williamson's land? No; it is on the surveyed village site.
4417. I see that Mr. Gilliat says here:—"I am in correspondence with Mr. George Williamson, of Ivanhoe, upon whose land the only available site for a tank in the neighbourhood is found, which I shall have the honor to submit to you, if it terminates in a reasonable proposal, with a recommendation for the construction of a tank at this place"? So far as I remember Mr. Williamson wanted compensation, and the site being below the town, I thought it was unsuitable. At that place we would have got the drainage from the township; I, therefore, chose this site as being the most suitable, taking everything into consideration. It is on the stock route, at the junction of the roads from Hay to Wilcannia, and from Balranald to Ivanhoe. It is also in a position where it affords a suitable supply for the township. In selecting the site I drove round and examined all the suitable places and conferred with most of the residents. So far as I could ascertain, all the residents concurred that it was the best site available. When the work was in progress I heard indirectly that the townspeople were raising objections to the tank on account of the obstruction it would cause in bringing stock through the township, and also because it occupied an area which might at some time have been sold for business purposes. One of the drains to the tank was afterwards modified so that the allotments in the township might be sold if necessary. I think there was no further complaint after that except that as to driving stock through, and it was said that this was an objection which could not be very well got over.
4418. *Chairman.*] Is it a fact that the road crosses these drains at a number of places? It crosses the drains to the south once, but that is some half-mile from the tank.
4419. Is it true that the drainage from Cobb & Co.'s stables will flow into this tank? No; the stables are below the drain. A piggery, too, has been spoken of, but that is also below the drain. There are no residences or buildings of any kind above the drain; I am positive of this.
4420. And with the exception that it is somewhat inconvenient for travelling stock there is no other objection which can be taken to the site? Not that I know of.
4421. Have you heard any complaint about the Clare tank? I see in the evidence a statement by Mr. Low that the tank has been placed in a swamp, or something of that sort. As far as I can ascertain the objection is that the tank is situated too low on the swamp. Of course it is put there on account of catchment—to get as large a catchment area as possible. It is a fact that the tank was surrounded by water, as stated by Mr. Low. The rainfall was very exceptional during that season; and we had tapped another swamp by cutting a drain through, which increased the flow into the swamp. If it were at any time found desirable to reduce the flow it could easily be done by intercepting this drain. A man could have done this in half an hour.
4422. Is this swamp in hard or in soft ground? It is in lignum ground; it is soft, but still very good holding ground.
4423. Then the only objection that could strike anyone would be that the ground surrounding might become boggy? I have pointed out that that could be prevented by obstructing the drain from the upper swamp. This tank is necessarily put on a low level to obtain a catchment by gravitation.
4424. Was there any hard clay-pan there? No; not in the catchment. The site is the best one in the locality. It was not chosen by me but my predecessor, Mr. Gordon; but still I agreed with him that it was the best available site, so that I am quite responsible for it.
4425. *Major Penrose.*] You say that by the management of these drains from the upper swamp the supply of water round the tank could be regulated? Yes; with a little management on the part of the caretaker that could be prevented in future.
4426. *Chairman.*] Is it the case that in this black soil it takes a very heavy rainfall to make the water run? Yes; generally it is the case.
4427. *Mr. Woore.*] But with regard to this particular case? Yes; but the drainage there was quite adequate, as was proved by the tank being filled. I may state that if it had not been for the water, which was not retained in the tank, the water in the swamp would have evaporated much more quickly. But owing to the valve being left open the water escaped into the swamp. The erosion of the tank by the lapping of the water is very trifling indeed, and will not go any further.
4428. *Major Penrose.*] What about the foundations? They are perfectly secure, because the water has been all round them, and nothing has been disturbed.
4429. *Chairman.*] When you last visited this Clare tank you found that the sluice had not been closed, that the water had escaped into the swamp and had evaporated? Yes; that is so.
4430. And when you complained to the caretaker for not having attended to this, what did he say? He told me that he left the sluice open by Mr. Low's instructions, as he considered the embankments were in danger. But they were not in the slightest danger, being then 10 feet high above the water level.
4431. *Major Penrose.*] How much water could you have conserved over the natural surface? About a foot had escaped then. If the valve had been shut we could have saved a foot more.
4432. And this would mean a great deal of water? Yes; about 280 feet square.
4433. *Chairman.*] What about Tom's Lake tank? It is in my district, but it was not constructed by me.
4434. I believe Pulletop is one of yours;—complaint has been made about that tank that there is too rapid a fall into the tank by the drains thereby causing silt to get in? The fall is somewhat steep, and more or less silt is carried down by the drain; rather more than the usual quantity of silt. But the silt tank is quite adequate to meet all requirements if properly attended to.
4435. *Mr. Woore.*] Could the steepness of these drains have been avoided? Not very well in this case.
4436. But Mr. Low said that it could? I took everything into consideration. If the drains had been taken at right angles to the flow, the soil being hard, the water would have broken over the drains. There is a high range above, and as the rainfall is exceptionally heavy we should have lost a lot of water if we had had gentler slopes. The drains now keep clear at the expense of the silt tank, but there are ample

opportunities

A. W. Stilwell. 19 April, 1888.

opportunities of clearing that occasionally. The drains must have been put in obliquely, otherwise a heavy fall of water would run across the drains instead of flowing into the silt tank—that is, if the drains had been put at right angles to the flow.

4437. *Chairman.*] Now, it is said here with regard to the same tank that the water-lifting appliances are placed in the most unsuitable site, &c.? The water-lifting appliances are not on the lowest ground, but on one side of the tank, and there is no danger whatever of the water flowing under or around them so as to create a scour. There have been heavy rains since; but there has been no damage done to speak of. The drains were cut, and the water diverted round, by the caretaker sending it down under the service tank and troughs, creating a slight scour round the service tank piers. The caretaker should not have done this.

4438. I see a complaint that this byewash is not excavated? No; this is not a dam, and we do not excavate byewashes round tanks. There would be no use in it; and if at any time the tank was full, and we found it necessary to prevent a further inflow, the water could be taken down the channel in the creek, which would be, to all intents and purposes, a byewash.

4439. Another complaint is about these embankments, it being said that "they have been erected with no regard to being level; in fact, at the corner opposite water-lifting appliances, lowest being 2 feet 7 inches lower than middle of the embankments, thus further endangering water-lifting appliances. It seems that the embankments are said to be not level, and that they are lower when they ought to be higher? They are not quite level; but I do not think it is at all the case that they are lower where they ought to be higher. There are inequalities along them, here and there, and the maximum would be 2 feet at the highest and lowest points. The work was not abandoned by the contractor. He left the embankment in an improper shape, and I had the matter rectified at his expense; but the embankments were not made thoroughly level on top. There is now no defect, except as regards appearance.

4440. The contractor was mulct in expenses through his neglect? Yes; the cost of the rectification of the embankments was deducted from his payment.

4441. *Mr. Woore.*] Why were they not levelled up in the usual way? Well, I thought it would be putting the contractor to an unnecessarily heavy expense; we are generally taxed with being too strict with these embankments.

4442. *Chairman.*] It has been said that one reason why the contractors are chary of taking contracts from Government, is because the road superintendents insist upon the strict letter of the specifications being carried out? Well, I should have passed this, although the embankments were not quite level in accordance with the specifications. We do not insist on the strict letter, although we are no doubt more strict than the squatters with regard to details. There is a slight increase in the cost of works owing to this, but it is not material.

4443. *Mr. Woore.*] If the contractor had gone on and finished the work as it is now, would you have passed it? Yes; I would.

4444. *Chairman.*] Now, with regard to the Mount Elliott tank drains, it is said that "These have been constructed evidently with little or no idea of what is required of a drain. These drains have been excavated down face of hill, and, although my inspection was immediately after heavy rains, I could discover no trace of water having run into these nor waterwash. Had one of these drains been extended about half a mile it would have caught the water in a good natural watercourse, which, in any ordinary season, would be quite equal to filling this tank, thereby saving the outlay incurred for what is and will remain useless?" These drains have proved useful. They were cut in an oblique direction on the line of flow to prevent the interception of the water. The ground is very flat, and a lot of water is lost in slight depressions in the ground. The tank has been filled repeatedly; otherwise the drain spoken of would have been extended; but I found it unnecessary to do so. The tank is filled now, and has been since its construction; therefore a further extension of that drain would have been an unnecessary expense.

4445. Now with respect to the Hulong tank drain, Mr. Low says:— "One is here so constructed as to run water from instead of to main tank. This showed plainly at the time of my inspection, owing to the water lying in different parts of the drain, which had been banked up to prevent water running from main tank. Were this drain opened up and main tank full, I feel confident it would run quite 1 foot of water out." This means that the Hulong tank drains would run the water out of the tank instead of into it, to the extent of 1 foot? The only reply I can give to that statement is to flatly contradict it. It is not the case at all. I took the levels for these drains myself. The swamp consists of gilgai holes. The drains are cut through the hummocks and embanked across the holes. The water remains in these depressions, and owing to the negligence of the caretaker the embankments at times break away and the water escapes into the swamp that should have run into the tank, and would have done so in the ordinary course of things.

4446. *Mr. Woore.*] Is that owing to the negligence of the caretakers? Yes—that the embankments give way is.

4447. *Chairman.*] The next case mentioned is Tom's Lake tank, of which it is said: "Is here excavated in a rotten boggy swamp, a place which was well known to all travellers on that road as a spot to be avoided after rain, owing to its boggy nature. Had this tank been excavated about three quarters of a mile northerly of its present site, it would have been on much better holding ground, and on ground naturally less liable to cut up, which in fact is an old natural watercourse, into swamp, which has cut up little if any. Mr. Overseer Keighran, of Hay, has for many years known this place, and fully bears me out in my remarks"? The site of this tank was not fixed by me, but it was only at this low level that a catchment was obtainable. Now as to the ground not being good holding ground, it has been proved to be quite the reverse, and exceptionally good holding ground indeed. As to the boggy swamp, that is behind and away from the tank and from the line of access to the troughing. The swamp that Mr. Low speaks about is a mile further on, and we have obtained a catchment from that by cutting an intercepting drain with an embankment across the other flow.

4448. Then this tank is not in the swamp, but on the edge of it? Yes; it is in the swamp—necessarily so to obtain a catchment.

4449. How did you arrange that the troughing was not in the swamp? The troughs are on the edge of the swamp and clear of the bad ground, and stock going down to the troughing go down on sound ground.

4450. Consequently if the troughing can be got at, you think it is immaterial where the tank is placed? Yes. It is good holding ground, and the tank keeps full.

4451.

A. W. Stilwell. 19 April, 1898.

4451. *Mr Woore.*] Mr. Low says there is a better place than this about three quarters of a mile north of it? Yes; but we have obtained the water from that place. In any case I do not think it would have been a better site, and we commanded a greater catchment area by having the tank where it is than if one had been put at any other place.

4452. *Chairman.*] This is what is said of the drains to this tank:—"These are badly constructed, especially one alongside of road which for some distance from its commencement runs water from instead of to main tank. This drain crosses main road almost in front of main tank, having a direct and sudden fall without the waters as is usual passing through a silt-tank. Owing to no silt-tank being here, and the drain being much cut up both by traffic and nature of ground, much silt must have been carried into main tank, which I feel confident is quite half silted up. This drain could easily and practically have been led to opposite end of tank when water could have run through swamp and silt-tank, thus allowing silt to settle and not be carried into main tank."? That statement is directly at variance with the facts. There is a silt-tank on this side of the tank, through which all the flow must pass into the tank. Then the drain referred to is the intercepting drain from the swamp that I spoke of. It has been much neglected by the lessee under the Mines Department. It is silted up and obstructed by vegetation and all flow prevented. In consequence of this the embankment across the swamp, to divert the water into the drain, has been partially destroyed. The tank is also fed from the swamp side through another inlet, and goes through another silt-tank from that side. But if the water were allowed to escape from this main drain into the swamp before going into the tank, as Mr. Low suggests, we could conserve no water above the berm level. As it is, the water is conducted in on the eastern side, and we can conserve 2 or 3 feet of water above the berm level, which is an immense augmentation of the supply.

4453. Is much silt deposited in the main tank owing to the carelessness of the caretaker? I cannot say positively, but I think it is an exaggeration to say that the tank is half filled with silt. I do not think it is anything like half filled. I feel confident that it is not half filled.

4454. Is the Gunaramby tank in your district? Yes.

4455. This is what is said of the tank in the report:—"This has been excavated in rotten copai ground, which owing to steepness of batters, has fallen in to a very large extent. A good site for a tank could easily have been secured near to this"? This site is very similar to that at Tom's Lake. We obtain a flow from both sides of the tank up to the berm level, and above that level from the higher catchment on one side; but in this case as the catchment above the tank is small in area, the water is taken round the berm into the inlet on the lower side. It was objected by the Mines Department that this was dangerous and would lead to the cutting away of the berm and the destruction of the batters of the tank. But it has been proved not to be the case, and the tank has been several times filled by heavy rains.

4456. Why do you depart from the usual course in bringing the water round in this way? To save what I consider would be an unnecessary expenditure. It would cost £100 to put down another inlet shoot. The catchment was small in area above the tank, and by diverting the water round the tank to the inlet on the lower side we obviated the necessity of another inlet shoot. And it has proved to be quite safe to do so.

4457. *Major Penrose.*] Does this tank conserve over the natural surface of the ground? Yes; it is a similar tank to Tom's Lake tank. It has embankments on three sides and wings. We might conserve 6 feet of water there.

4458. *Mr. Woore.*] How could that affect the drains round the tank? They would not be materially affected except by being silted up by sediment, which could easily be cleaned out when the water subsided.

4459. *Chairman.*] The next case mentioned is the Box Creek tank and dam. Are these in your district? Yes.

4460. This is what is said:—"One embankment here forming a dam would have been quite sufficient for requirements instead of the large outlay for tank and dam. In this opinion I am borne out by Mr. Lindsay, manager, Til Til station"? There is no dam here at all. The tank is constructed in the shallow bed of Box Creek. It has embankments round on four sides. The embankments have had the effect of damming the creek.

4461. Is it desirable to have tanks put in the beds of creeks? No; but in this case the country is very flat. The water flows down from the Lachlan by billabongs and deposits all the sediment on the way. It flows something like 100 miles, and it is upwards of a month in reaching this tank after it leaves the Lachlan.

4462. Then it is said further about the same matter:—"The embankments around excavation are of no practical use and must have increased cost of tank considerably. The site would have been a more favourable one, and more water conserved had a simple dam been constructed down creek about three-quarters of a mile near to 'Thompson's Hotel;'" I believe you have already explained about the embankments—that they conserved water above the level surface? Yes; the water is thus conserved above the natural surface if the valves are closed—when the tank is at its fullest—and the water not allowed to go back again. These embankments also serve to protect the water from wind action.

4463. What is the depth of this billabong? From a guess I should say from about 8 to 10 feet, and that would not be nearly sufficient.

4464. So that a mere dam in this creek would not have been permanent? No; certainly not. It would not have provided permanent water.

4465. Had it been selected three-quarters of a mile down, would that have made a permanent dam? I think the depth of the creek is the same all along I think it would be about the same.

4466. Then the report deals with the new works 16 miles from Balranald:—

Main tank.—This excavation at my inspection was almost completed. The site is certainly not a good one; a much better one could have been procured within half a mile. The present excavation will require a large outlay for drains if even by these it can be filled with a fair rain.

Drains.—There were 50 chains 6 feet x 9 inches excavated here, although there had been heavy rains shortly before my visit. These had run no water into silt-tank, in fact they never will, as both drains in some places were full of water, but quite dry near to tank, thus showing that they would run water from instead of to main tank. Contractor informed me that he was getting 6s. 6d. per chain for these drains, which is quite 2s. per chain more than the work is worth, when he was, from rain, unable to work in tank and not as if he were losing time going to and from a small job.

——? I think I have stated that the site is the best that could have been obtained with regard to the convenience of watering stock from both stock routes.

4467.

A. W. Stilwell. 19 April, 1888.

4467. Then about the drains? Well, I hardly like to say it, but in my opinion the statement is at direct variance with the facts. At the time I visited this place I could not measure the silt tank, because it was full to overflowing, and the ground surrounding it was submerged by water brought down by these very drains. I think this was in November last. The drains showed scour, but there was no water standing in them, proving that the levels were correct.
4468. How much water is now in the tank? The inlet shoot has just been completed. The work itself is not yet completed, and consequently there is no water in the tank at present.
4469. *Major Penrose.*] You say there is plenty of water at the silt tank and near the main tank now? Yes; and it had to be dammed out of the main tank owing to the construction not being completed.
4470. *Chairman.*] Then it was quite unnecessary for Mr. Low to have made any remarks about this tank, until the works were handed over by you to the Mines Department? I think so. The same remark would apply to the fences, which have not been handed over to them yet.
4471. Have you read the evidence? Yes; but not with particular attention, and not at all with respect to anything outside my own district.
4472. Well, we have had a great deal of testimony here tending to show that there had been faulty design and faulty construction with respect to these tanks, thus enormously increasing their cost to the country? If I understand aright that applies to the ratio of the batters to the tanks.
4473. Yes, and in many other ways. In the first place it is said that the batters are too steep, preventing the contractors from constructing the works at a reasonable cost, as compared with the tanks constructed by the squatters;—just state what are the batters to your tanks? 1½ to 1 is the maximum batter in my district, but the average is 2 to 1. The steepness of the batters does doubtless increase the cost, but we made them advisedly steep, considering that the increased cost was warranted. It would give less area to be exposed to evaporation for one thing, and comparison of our tanks with the tanks of the squatters would be altogether unfair, because the conditions are altogether different. Our tanks are constructed for practically an unlimited number of stock, but squatters know exactly the number of stock they want to feed. We do not know how many travelling stock may come along the road. We have to allow a margin on the safe side. I still submit that the conditions are altogether different, and therefore no comparison can fairly be instituted between our works and the works of the squatters.
4474. It has been stated that if you had one of these slopes made gentler it would decrease the cost of the work? Well, it would decrease the cost very slightly. The scoops could not turn round, and if they could not turn you might as well use drays.
4475. Have you any discretion in the construction of these works—to alter the batter in accordance with the friableness or stability of the ground? Yes, certainly. There is a specified batter, but we can depart from it. In the new specifications I think a blank is left for the batter. In the old specifications the batter of 1½ to 1 is specified.
4476. *Major Penrose.*] But even that did not bind you down to anything? No; we had discretion. If we considered that any ground necessitated it we could recommend an alteration in the ratio of the batters, and the alteration would be approved of by the head of the Department.
4477. Then the Government tanks are really much cheaper than the squatters' tanks, considering the depth and other things? Yes; the depth of our tanks is 18 feet, and I think the maximum depth of the squatters' tanks is from 14 to 16 feet, so far as I know.
4478. Then the extra 2 feet would naturally increase the cost? Yes; I think so.
4479. And the increased cost would, in your opinion, be fairly compensated for by the more certain permanency of the water? We considered so.
4480. It has been stated that the banks round these tanks, not having been utilized in many cases, have been built at an altogether unnecessary expense? Well, we considered that their construction was warranted by the protection which they gave from evaporation; and they are constructed with that intention only in some places.
4481. *Mr. Woore.*] And could they have been utilized in any instance to conserve more water? Where they could be so utilized we tried to do so; but in many cases they could not be utilized to any appreciable extent.
4482. *Chairman.*] Did you ever find that these 1½ to 1 batters were liable to fall in by the action of the water? No; not to any appreciable extent. No matter what the batter might be there is always bound to be a slight erosion from the wave action at the surface of the water. That occurs at different levels all down the tank as the water falls.
4483. *Mr. Woore.*] But is not that erosion considerably decreased in old tanks? Yes; when the banks become hardened. It is only in the new works that this takes place, and not then to any appreciable extent. If I had to construct these tanks again, knowing what I know now, I would put in the same batters.
4484. *Chairman.*] Can you give any other reason why the Government have paid more money for these works than the squatters? Yes, there are many other reasons. A contractor for a squatter has many advantages given him which we cannot offer. As a rule, the squatter's contractor has grass and water free: but in our case it is quite the reverse. Their contractors occasionally—in fact, almost invariably—have the use of the bullocks belonging to the station-owner, who is anxious to get them broken in by the contractors. The squatter's contractor has also every facility offered to him for obtaining supplies at a low rate.
4485. Is that the case with the Government tanks? Where we can do so we select a good season, but, as a rule, we cannot do so. As a rule we have little discretion as regards that, because when a tank is ordered to be made it has to be made.
4486. Is it a fact that the persistence with which officers of your Department insist upon the literal wording of the specifications being carried out tends to increase the cost, and necessitates the contractors tendering at a higher rate, owing to this extreme nicety shown in the finishing work? It may, to a slight extent, increase the cost, but in our case we must adhere to some type of construction. There can be with us no loose methods of constructing works. For instance, a work is let according to a certain plan and specification publicly tendered for; and if afterwards the plan and specification is departed from and any laxity allowed, the unsuccessful tenderers would soon hear of it, and would have good grounds of complaint, and would not be slow in making these complaints heard through the Member for the district.

A. W. Stilwell. 19 April, 1888.

4487. A contractor whom we examined has stated that he has known a case where a tank has been sunk 18 feet; that some holes were left in the bottom, and that the constructing officer insisted on these holes being filled up? Well, I can only speak for work which I have supervised myself; but I think this is a very improbable story. I would not have done so had it been my case, and I hardly think anyone else was so foolish as to insist upon such a ridiculous thing being done.
4488. It has also been stated that in one or two instances the road superintendent has insisted on the embankments being dressed down, as if it were a matter of great importance? I think this is an exaggeration; we do certainly insist upon a certain amount of neatness and uniformity, and we are bound to it by the plans and specifications, as I said before.
4489. It has been said also that you insist that the earth shall be taken a great distance away from the embankment? The distance is about 30 feet, and I do not consider it too far. I think the distance the squatters take their spoil is in some cases even greater.
4490. Is it a fact that contractors have to wait occasionally long periods for their money? Not to my knowledge; not a very long time. A special regulation was made with regard to that in payment for works at tanks and wells.
4491. But, although there is now a new arrangement, it is said that many men have been ruined by this delay? It is not a new arrangement. The regulation was made in 1883, and provided for the payment of an advance of 50 per cent.
4492. *Major Penrose.*] Is it since 1883 that most of the tanks were made? Yes.
4493. *Chairman.*] So that the practice could not force a man to go into the Insolvent Court now? I cannot conceive such a thing occurring. Of course there is always an unavoidable delay in Government payments as compared with the making of payments by a private individual. A certain routine must be gone through; but we have tried to lessen the delay as much as possible.
4494. *Mr. Woore.*] Do you think that this delay is worth taking into account by the contractors? I think not. I think that to a man of means it does not stand in the way at all.
4495. *Major Penrose.*] The delay now is only with respect to the final payments? That is all. There are progress payments also. The payment of 50 per cent. of the value of the work done is a progress payment; otherwise a progress payment has to be certified by me, and checked in the head office. It entails a delay of a fortnight or three weeks, between the date of my certificate and the date of payment. I have to travel over 200 miles square of country, and I cannot be in every place at the same time. I try to arrange to travel so as to meet the requirements of the contractors. We obviate any difficulty by giving them 50 per cent. of the money on the spot.
4496. *Chairman.*] We notice that as much as 1s. 9d. per cubic yard has been given for a number of tanks:—do you think that, under the circumstances, this price is an excessive one? I do not know of 1s. 9d. having been given, speaking from my own knowledge. The highest price given in my district was 1s. 7½d. This was for the Carowra Swamp tank, which was constructed in a bad season. The contract was let in a very dry season, and the rain came before it was completed.
4497. I suppose that this was a season when a squatter would not have undertaken such a work? Yes; and we were compelled to do it by the necessities of the case.
4498. Is it a fact that these works have been taken by contractors and let to sub-contractors, at a rate very much lower than the original rate? I do not know of any tank work having been sublet; all was carried out by the contractors themselves.
4499. Are you aware whether, as a rule, the contractors have made money out of their contracts? Well, that is more a matter of inference than anything else. I know that several of them have become insolvent, and most of them are, apparently, poor men.
4500. So that these so-called excessive prices have not, at all events, enriched the contractors? I do not see how excessive prices can be obtained for works which are submitted to public competition.
4501. Reverting again to the Ivanhoe tank, it has been said that the drains leading into this tank are very faulty in construction, as well as being excessively costly. I notice here at page 187 of the Mines blue book:—

> The drains here have evidently been constructed with no respect as to what a drain is for. One drain for a good half-mile running water from tank; another is brought along road to Mossgiel, and cut up very badly by both stock and teams. The water from this drain overflows silt-tank, which is very small, and partly upon main road, and runs into Eliot's tank on opposite side of road, which water Eliot afterwards sells to the public. Another long drain runs through township allotments, which have been sold, and are now being blocked up.

——? Now, as to the defective level—this applies to the northern drain. This drain had to be constructed about 30 chains, and the scrub cleared. It was then found that an advantageous extension might be made, by making the cutting about 3 feet deep through a slight rise for 15 chains. Before the tank was handed over, I set the caretaker to make this cutting, and when the tank was handed over the Mines officers discontinued this work; consequently that end or portion of the drain is ineffective. It was Mr. Yeo who did this. I think the next statement is that the drains run along the Mossgiel road. It crosses the road obliquely, but at the crossing point a stone causeway has been put in, so it is not cut up. The drain is still in use. Now, as to the drain running through the township, we were asked that this drain might be altered, owing to the allotments in the town being required for sale, and a portion of one of the drains was abolished for that purpose. I do not know that the allotments were since sold.
4502. Another statement is that the water overflows the silt-tank and runs into Elliot's tank? Well, I visited the place shortly after that statement was made, and I found that the loss of water was occasioned by the neglect of the upper drains. The water had overflowed them, and consequently overflowed the lower drains and had escaped altogether. If proper attention had been given to the upper drains this could not have occurred.
4503. You heard what the Minister said about this:—"I cannot help saying, after having seen this tank, that, in my opinion, a very improper situation was selected, and the work, in my estimation, is badly done?" No specific charge is made, so I cannot well answer that.
4504. I suppose when this tank was excavated it was done to serve the town as well as to serve the travelling stock? Yes, and the townspeople have largely availed themselves of it ever since.
4505. And you think that no other site would have been so convenient for the townspeople and for travelling stock combined? No; and any other site would not have been so good from an engineering point of view, for the supply would have been contaminated by the township; but this is above it.

A. W. Stilwell. 19 April, 1888.

4506. *Mr. Woore.*] We have been given to understand that the whole drainage of the township goes into this tank? The statement is quite contrary to fact.
4507. *Major Penrose.*] If care is taken not to build above the catchment will this tank continue to give pure water to the town? Yes; I made application to have this portion of the village area revoked and proclaimed a public reserve.
4508. *Chairman.*] Now, we have had some very heavy charges made of the extreme and exorbitant prices paid for the drains to this tank. Here is what is said by Mr. Yeo:—"The drains at the Ivanhoe Tank were made by Messrs. Farrell and Gallagher, who received 15s. per chain, which was an exorbitant price, as stations in the district were only giving 3s. 6d. to 5s. per chain, and I might mention that a reliable person informed me at the time the contract was let that one of the contractors, while consulting his partner as to what price they should do the work for, said they should ask 7s. 6d. per chain, which, he said, would pay them well, but his partner said, 'As it's Government work let us ask 15s. per chain,' which they did, and got. I might also mention that the drain running from the north-east corner of the main tank, from a point about half a mile from the main tank should not have been passed by the road superintendent, as it was never graded properly, and the water runs in the opposite direction to the tank. No tenders were called for the cutting of these drains?" I am not quite sure that the price paid was 15s., but I know that an excessive price was paid for the drains. It is true that tenders were not publicly invited in the press, but on several occasions I endeavoured to obtain tenders locally. The newspaper published nearest to the place is 140 miles distant, at Hay. I notified the matter at the post office at Ivanhoe, and made it public as well as I could otherwise. I also endeavoured to obtain a tender from the contractor for the tank, and the lowest I could obtain from anyone was from this man Gallagher. Lower prices probably might have been obtained by waiting, but in that case we should have lost the first rainfall into the tank; and rather than entail the risk of this it was considered advisable to let the drains. Of course, I cannot say anything as to what was said about the contractors first arranging to ask only 7s. 6d. I left word with everybody in the town, with the postmaster and others, that I wanted tenders for the drains.
4509. What was the size of these drains? The drains were 6 feet wide by 1 foot deep. I think the figures are given in my papers. In this case the drains are not included in the tank contract, and the price demanded by the tank contractor was largely in excess of the price of this man Gallagher.
4510. *Mr. Woore.*] It is not possible to include the drains in the contract for the tank, as when that is let, it may not be known what is the exact extent of the drainage? We can specify the drains without stating the amount.
4511. Would the cost of the work be cheaper if it were all given in the one contract? Yes; I think so; but this contract for the tank was let before I went to the district.
4512. In dividing your work up in this way you are simply placing yourself in the hands of the Philistines? Yes; I agree with you that it would be better. But I am not in any way responsible for the fact that the drains were not let with the tank.
4513. Who is the officer responsible for that? The contract was let under Mr. Gordon, my predecessor.
4514. *Chairman.*] Have you stated what is the size of these drains at Ivanhoe tank? I cannot say positively, but I think they are 6 feet wide and 1 foot deep.
4515. Do you not think that 15s. per chain is an exorbitant price to give for this work? Yes; and I considered it so at the time; but rather than allow the tank to remain without being filled I gave it. If, on the other hand, I had not let the drains even at that price, I would have lost the water from the tank in consequence of not obtaining the first flow, and it would have been looked on as a very false economy; and, in fact, would have been so.
4516. *Mr. Woore.*] Would you probably have had to wait an indefinite time to get the work done cheaper? Yes. No doubt they could have been done cheaper if I had waited, but I did not know how long I might have had to wait. Of course, for my own credit's sake, I would let the drains as cheaply as I could; but it was a matter of great urgency to have the drains constructed then. I think the man Farrell, one of the contractors, is now employed as a caretaker by the Mines Department. He is one of the men who, according to Mr. Yeo, conspired to get these exorbitant prices from the Government. He is employed at Mossgiel, I think.
4517. *Chairman.*] At page 184 of the Mines blue book in connection with Tom's Lake tank, I notice the following statement:—"With reference to the main drain and the broken dam, the drain is, I should say, considerably over a mile long, from 12 to 14 feet wide, and from 3 to 5 feet deep"? I daresay it is of these dimensions.
4518. "It starts from a watercourse, and a wide low dam across this forces the water into the drain. The water will have, I think, to rise 3 feet in this dam before it enters the drain. From appearances the water has been within an inch of flowing over the dam; the break, which is a cutting in the solid earth about 20 yards wide, evidently saving the dam, the bottom level of the drain being in places too high to carry the amount of water"? That is owing to the drain being obstructed.
4519. "If this cutting or bye-wash is to be repaired. I think the whole dam should be raised 2 feet for safety. The water will then flow down the drain to the place where the water has escaped into the swamp, and where, I think, the ground surface is lower than at the tank. The earth excavated from the drain is placed in irregular heaps each side without making a continuous bank, and it is between those heaps the water has made its way and cut down. The drain continues, and ends abruptly about a chain from and parallel to the tank. A small dam throws the water by a small drain into the tank. I was informed the drain was originally of uniform size, but owing to the obstruction of the traffic was filled in. The main road, I must mention, passes between the drain and tank, and follows the drain the whole way; and, I am told, that when the water came through to the tank, the space here was a perfect bog-hole. The original intention was, I suppose, to bring sufficient water down to fill up the embankments, and to do this I think it will be necessary to raise the dam and bank the earth along the low portion of the main drain in a form that can be utilized as a roadway, and to construct a culvert, and open up the drain again. I found the drain scoured and cut, which, owing to the friable nature of the soil, is inevitable, but not so much silted. The caretaker informs me that he and a man were at work in the water endeavouring to arrest the flow of water from the drain into the swamp, but were unsuccessful. The dam and drain also, I believe, are off the public watering place, and the amount of water lodging in the dam militates against the tank, since the lessee cannot charge for water from it." Are these statements correct? I did not take the levels for the drains myself, but to the best of my belief, the defect in the

A. W. Stilwell. 19 April, 1888.

the drain is not due to any fault of construction, but to the want of proper maintenance. The drain is obstructed and silted up by vegetation.
4520. Is not the drainage sufficient without going to another creek to supplement the supply? Not having constructed the tank, and not having had the original design to deal with, I have not gone into the question fully. I do not know the drainage area to be dealt with, but I think I should have made this drain myself, had I the work to do, to obtain a supplementary supply.
4521. *Major Penrose.*] Do you know that water has ever come down by this drain? Yes, it has come down; but I cannot say that it has come all the way from the swamp, because the drain has always been more or less obstructed since I have been there.
4522. *Chairman.*] In reading the evidence are there any other matters you would like to refer to in connection with the drains? I think not.
4523. The next matter that we have to go into is the expensive forms of machinery for lifting water. It has been stated that you have used appliances which necessitated a greater cost for maintenance. What water-lifting machinery have you in your district? We have the special Tangye steam-pump, the Holman horse-gear pump, and the Amos & Smith horse-gear pump.
4524. Have these different forms of machinery been erected in accordance with the requirements of the localities; have they been put up with regard to the surrounding circumstances? Yes, and in no case has steam-power been used where fuel is not obtainable within a short distance. In the other cases there are paddocks provided for the caretakers' horses, but I should prefer steam-power in all cases if fuel were available. But it is not so.
4525. But does not the use of steam-power necessitate a greater expense? No, I think not; because the cost of erection is less than the other.
4526. But how about the cost of maintenance? Well, I think the caretakers who look after steam-pumps are paid less than the caretakers who keep horses for the horse pumps.
4527. And I believe there is another matter to be taken into consideration—that there is no need for paddocks to be fenced off if steam-pumps be erected? Yes; but we have nothing to do with the fencing: We fence simply in accordance with the instructions of the Mines Department.
4528. But there would be no necessity for paddocks in case steam pumps were used, as horses would not be required? Certainly not.
4529. Do you think that the use of hand-power pumps would be desirable, or would lessen the expense in any way? I think the reverse would be the case. I believe that hand-power pumps would be ineffectual and would not meet requirements.
4530. And I suppose the cost of erecting and fitting them up would be so great as to bring up the total cost to more than that of the steam-pumps? Yes; the cost of erecting the M'Comas lift would be much larger than the cost of putting up our present appliances. A M'Comas lift would entail the use of a great deal of timber, and as that country is untimbered it would mean the incurring of great expense.
4531. *Major Penrose.*] How do the squatters in the district lift water from their tanks? I think they use the M'Comas lift. They have only a small quantity of water to lift, and they can take their own time to do it. They know also exactly what they want.
4532. And with respect to the putting up of these lifts? It is simply a hand-gear lift, rigged on staging over the tank. So far as I know, where squatters do raise water they use the M'Comas lift.
4533. *Chairman.*] Is it a fact that the Tangye steam-pumps require very little skill in their management and working? Yes; any man of ordinary intelligence could learn all about them in twenty-four hours.
4534. Then they are not at all liable to get out of order? No; quite the reverse.
4535. *Major Penrose.*] Are windmills used at all? I have only one in my district—at the Lignum Hut well. Of course I only know of my own district, but there may be others in use. I do not know of any case where the squatters use windmills to raise water for their stock.
4536. What is your opinion with regard to that form of lifting water for stock? It would entail the use of a large service tank, as you cannot rely upon always getting wind to run the machinery.
4537. *Chairman.*] The next matter we wish to inquire about is the alleged excessive cost of the fencing. Some of the most expensive fences that have been erected under your Department are said to have been put up in your district, and I think you are to a large extent held responsible for it. We have had it in evidence that fences have been erected at the extreme cost of £116 per mile;—will you give the Commission some information with regard to these allegations? I think £112 per mile was the highest price paid for fencing—that is, on the road between Booligal and Mount Manara. Tenders were called for publicly in the local newspaper three times, and the lowest tender was eventually accepted.
4538. Do you think that the specification for this fencing entails unnecessary expense on the Government? No; because I think that the fences required for these watering places should be more substantial than those used on stations. Our fences are virtually road fences, and the greater part of them are put up between the stock route and the paddock, and are meant to keep out large stock as well as sheep.
4539. It may be said that expensive and very substantial fences are necessary round tanks, but would that apply also to the fences round the caretakers' paddocks? Not to the same extent, certainly; but it would apply with certain exceptions. For instance, the fences round the paddocks require to be of a much more substantial character than station fences, because the fence round the paddock is practically a road fence.
4540. But only on one side? But very often there are large stock in the paddocks—cattle as well as sheep. Three sides of the paddock are on the stock route, and the other side is leasehold land.
4541. What are the specifications of the fences put up by you—do they include a top rail? No; I will give full particulars if necessary. The posts are 9 inches by 3 inches, sunk 30 inches in the ground, 5 feet out; the panels are 10 feet long, with five No. 6 wires and a top wire of No. 4 gauge. There are straining posts at intervals of 12 panels, and they are put 3 feet in the ground.
4542. Do you not think it is quite unnecessary to have these posts 30 inches in the ground, and that it increases the cost? I have had very little experience with fencing until I went down to that district, and I should say, judging from what I saw, I did no more than what was necessary for public requirements.
4543. Are you aware whether squatters put the posts of their fences so deep in the ground on roadsides? No; I do not think they do.
4544. And do you not think they would do so if they thought it was necessary? Well, that would be merely an inference.
4545. But if the squatters found that a less depth was sufficient, why should the Government go to the extra expense? As substantial fences to retain stock and to exclude stock on stock routes, I do not think the fences are excessive with regard to the depths of the posts or to anything else. 4546.

A. W. Stilwell. 19 April, 1888.

4546. Do you ever depart from the specification which you have just mentioned? No; I have seen no cause to depart from the specification except in the case of straining posts.
4547. Why did you do it in this case? It was done at the suggestion of Mr. Wood, made during one of his visits of inspection. It was done to avoid splicing the wires. We used a No. 4 and a No. 6.
4548. *Mr. Woore.*] Do you think that No. 4 wire could be strained by one man to its full length? The straining has been done without straining posts, and the wire has been fairly strained. The weight is supported every 10 feet by the posts.
4549. *Chairman.*] Then there is another objection to this—where you strain to split posts, has it not the tendency to split the post in two? Yes; I think that is objectionable.
4550. *Mr. Woore.*] Is that plan of doing without straining posts to be continued? No; on account of the objection raised by the Mines Department we went back to the other style of fencing.
4551. *Major Penrose.*] When did you last see the Ivanhoe fence? In November last.
4552. Had it then been long completed? Yes; several months. A portion of it had been completed a long time.
4553. Was it in a good condition? Yes. Apparently there was no tendency of the posts to split, or to go sideways.
4554. Was this omission of straining posts a concession to the contractor, or was it done by way of experiment? It was done as an experiment.
4555. Has it tended to cheapen the cost of the work? In this case the contractor had straining posts provided, so that there was no alteration in the cost.
4556. But it might tend to cheapen the cost? Yes.
4557. *Mr. Woore.*] And was it with the object of reducing the cost of the fence that this experiment was tried? Yes, and of doing away with the splicing of the wire, to avoid the danger of breaking at the splices.
4558. *Chairman.*] You have not told us why you paid £112 per mile for fencing—did you not think at the time the tender was received that the price was an excessive one? Yes; but tenders had been repeatedly invited, and we saw no prospect of our being able to get a lower tender, and the construction of the work was urged by the Mines Department; therefore we saw no alternative but to accept.
4559. *Mr. Woore.*] Do you think that the price was too high for such a fence? I think it could have been done cheaper, had the season been a good one.
4560. But do you think that the fence is a good one? Well, the contractor had great difficulty in getting his timber. In the case of the Holy Box and Lignum hut wells the timber had to be drawn 25 miles. When this work was let the weather was bad. For the works at Tom's Lake and the Jumping Sand Hills the contractor had to go for timber some 60 miles. This is, of course, merely the contractor's statement, and not the result of my observations.
4561. *Chairman.*] What sort of posts were those that were used? Some of them were round. In one or two cases, up near Mount Manara, I had used belar.
4562. *Mr. Woore.*] From your knowledge of the country, do you believe the contractor's statements as to the distance which he had to draw the timber? Well, not in all cases; but in these cases I do. Certainly the contractor in one case might have got timber close at hand, had he not been prevented by the lessee of the run. I mention this to show the conditions under which our fencing is done as compared with station fences.
4563. *Chairman.*] Do you not think that some discretion should be allowed to the officer-in-charge to allow other timber to be used than pine? I do not insist on pine being used; but I got it because it was more easily obtainable. I think that pine is the easiest obtainable timber in that part of the country, and not mulga, gidya, or belar. It was for this reason that I used it. Here is a letter from a contractor now fencing the Box Creek and Youhll Plains tanks:—

Mr. Stilwell, Engineer of Roads Department, Hay.

Balranald, 27 March, 1888.

Sir,

I have to state that having cut all the timber for Box Creek tank, on Magenta pastoral holding, I have, under great difficulty, obtained and now on the tank ground, (700)* The manager of Magenta refuses to allow me to cart, so I have to get through to cut one fence, as there is no water on the main road; and if the manager of Magenta would allow me Mr. M'Intyre's D block, [but he] point blank refuses to do so. I have taken three 400-gallon tanks and have made troughing to water the bullocks, but the water is positively refused. I must ask that I be allowed time on contract until rain falls, as, even if I abandon the timber cut on Magenta, I am in the same, or even worse, position for water on Sunbury [?] holding. I wired to you to-day as to the legality of my action; but Mr. Cronin, who is at Balranald to-day, has just told me I am in the wrong, and cannot cut the fence or take the water. I trust you will give the advance asked, and ease my position, and the time also, as it is not, humanly speaking, possible to get the timber until fully 1 inch rain falls; then a month will see the matter out.

I have, &c.,
W. J. MEREDITH,
Contractor, Balranald.

In some places where I am doing fencing, perhaps the lessee will have all the timber cut and stacked for his own use. That timber would come in for station fences, the price of which is quoted against us, while we have correspondingly longer distances to go for the timber.
4564. Now, in this particular place, Ivanhoe, can the round timber be used without going to this enormous cost? I do not refuse to take round posts if they give me good scantling. I would not stick to a hard and fast rule of 9 by 3 timber; and, in many cases, round posts are put in.
4565. There is a statement here, made by one of the witnesses, which I would like to call attention to:—

Fencing.—This was originally let to one Bevan, I am informed by Mr. George Williamson, J.P., Ivanhoe, and Mr. Brougham, Ticehurst, at £116 or £120 per mile, who sublet to Elliot, who afterwards sublet to Anderson (my informant) at the following:—30s. per 100 posts splitting; 100s. per 100 posts carting; £18 per mile erecting and wiring The panels are supposed to be 10 feet, which would allow of the following:—

	£	s.	d.
530 posts, splitting, at 30s.	7	19	0
530 posts, carting, at 100s.	26	10	0
Erecting, per mile	18	0	0
Wire	30	0	0
	£82	9	0

The allowance for wire is ample, thus leaving a profit from first contract price of at least £33 11s. per mile.

4566. ——? [No answer].

* Several words undecipherable.

A. W. Stilwell. 19 April, 1888.

4566. *Mr. Woore.*] Do you think the contractors made such a profit as that? Well, I doubt it very much. I know nothing about this sub-letting, and I doubt very much that it is done. No doubt a good deal of the work is done by piece, and that is what I presume they call sub-letting.
4567. Then he goes on to say:—"This description of fencing is new to me, and I unhesitatingly condemn same. In this opinion I am borne out by Messrs. Webb (Kilfera), Brougham (Tichurst), and Laird (Mosgiel), all of whom have had much experience in fencing and fencing timber in this particular district, and neither of whom would erect a fence without straining-posts?" Well, I am not responsible for this, and, as the work has not been handed over, they are criticising work which has not yet come into their hands.
4568. *Major Penrose.*] Have you any idea or knowledge as to whether these contractors who did the fencing by piece made a profit out of it? I cannot say; but one contractor told me that he had got nothing out of it. He said also that he would not do similar fencing under similar conditions at the same price again.
4569. *Mr. Woore.*] But you admit and have stated that the price was excessive? Yes; at the time of letting. We called for tenders repeatedly, and we had no alternative but to let the work.
4570. *Major Penrose.*] What was the amount of the highest-priced tender you received? I cannot remember just now, but I know that we accepted the lowest tender. These works are open to the same men that construct the squatters' tanks; and if so much more money were to be made out of Government works, then why do not these men tender for our works? Of course, our's is better work, but even so, there are proportionately higher rates paid for it.
4571. *Chairman.*] Do you think it is necessary to have this large gauge of wire—No. 4 on top, and No. 6 wire under? Yes.
4572. Why?—you must know it entails extra expense? Because cattle often break the lighter wire by thrusting themselves against it. I have seen working bullocks do this repeatedly in their endeavour to get into the paddocks if there is no feed on the road. The top wire takes the great strain that is made on the fence under such circumstances.
4573. Why insist on a No. 6 wire when the squatters are satisfied with a lesser gauge? Well, heavy wire will last longer than light wire; and I think the extra expense is justified by the extra durability.
4574. Why, a fence is useful only so long as the posts will last? Yes.
4575. Is it, then, desirable to use this extra strong wire, which will last longer than the posts? I cannot say. I have not had sufficient experience to say definitely. My experience is not sufficiently lengthy to enable me to say whether the wire will outlast the posts or not.
4576. Statements have been made here by officers of the Mines Department to the effect that they would put up a sufficiently good fence for from £50 to £55 per mile, intending, no doubt, to show that the expenditure by the Works Department was excessive? I think these are merely unsupported statements. Mr. Low put it to the test once by calling for tenders, but he got no reply, except one to do the work at £90 per mile.
4577. A statement has been made by one of the witnesses that the fence round Mount Manara paddock cost £120 per mile? It cost the same as the Ivanhoe fence, which was £112 per mile. I know the work was delayed for months owing to the contractor being unable to get any timber at all. He could not get permission, either, to cross the paddock or get water from the station tank, and the work was suspended on account of this.
4578. It was said here by Mr. Low that at the Mount Manara paddock the fence cost £120 per mile, and that the timber had not to be carted more than 5 miles. Can you give us any information why this enormous price was charged for the fence? It was included in the same contract as the other, for which we called for tenders three times. As to the distance from timber, I cannot contradict the statement positively, but I know that the contractor had very great trouble in getting the timber.
4579. *Mr. Woore.*] At any rate was this the lowest price that you could possibly get the work done for after calling for tenders? Yes. With regard to the fence at Ivanhoe, and the diverting of the stock through the township, which has been complained of, the plan was submitted to the Mines overseer, Mr. Yeo, before the work was undertaken, and it was approved of by him verbally, not in writing.
4580. *Chairman.*] Another matter is the very expensive gates that you are alleged to have had erected at these paddocks? There are no separate prices for these gates. The contract is let in bulk sum, and gates are included in the price submitted. They may be specified in the contractor's schedule, and in some cases we have omitted gates, at the prices stated.
4581. Do you think that these gates, which cost £15, are necessary? No, I think the gates are not unnecessarily expensive. A general fault with the ordinary gates is that they are more or less dilapidated and in a state of disrepair.
4582. Have you seen any squatters' gates made wholly of battens without morticing—why not adopt these? There is nothing very elaborate about our gates. They are a little costlier than the others, but very little. They are made in the town and sent out, and there is very little extra cost in putting them together in the way we do. In our case, if the bars break they can be taken out with very little trouble.
4583. You are concerned to some extent in these charges of interference with caretakers and overseers? I have a good deal to say about that. This is the cause of the friction between the two Departments.
4584. Just state the facts with regard to the care, or want of care, shown to the works under your control? I cannot say that I have ever interfered with men under the Mines Department at all. I have given no instructions to them, and have been very careful not to do so. Charges to this effect have been brought against me, notably in connection with the Pulletop tank, where the lessee excused himself from neglect by stating that I had countermanded the overseer's instructions, but the statement is utterly false.
4585. Can you say anything about the other case, where you had been called on to remedy the most trivial matter, which could have been undertaken by the caretaker, and who, it is said, showed utter ignorance of and want of attention to his duties? Well, I want to read a report in reference to this case of the Box Creek tank. There has been no co-operation whatever between the two Departments; and instead of co-operation we have had only conflict and collision. We have been trying to maintain the efficiency of the works in the interests of the public, but the Mines overseers and caretakers appear to be doing the reverse. That is my opinion, and the inference which I draw from their actions. A joint control is, perhaps, in any case undesirable; but if there had been any co-operation on the part of the Mines officers,

A. W Stilwell. 19 April, 1888.

4591. *Major Penrose.*] Had the silt-tank in this case silted up through the carelessness of the caretaker? No. The silt-tank had only recently been constructed. It needed cleaning out, but not urgently, and there was nothing to complain of with regard to the caretaker.
4592. *Chairman.*] Now, with regard to the tank at Merri Merriwa:—"I think this should go on to the Mines. We report bad men. A good man should have the benefit of the favourable report, as far as it may weigh with the authorities at the Mines.—W.C.B., 14/8/86. Under Secretary, for transmission to Mines." He apparently makes a very grave charge—that public money has been spent in doing what ought to have been done by the caretaker. That applies to your case, too, although it is not yours? Of course divided control leads to many things of that sort, but it need not have done so had there been co-operation and singleness of purpose on the part of those concerned.
4593. *Mr. Woore.*] What have you to say with reference to the charges in Mr. Boultbee's letter, referring to Hulong tank, dated 21st December, 1886, referred to at page 42 of the Mines blue book:—

Referring to my instructions to visit the Hulong tank, I have now the honor to inform you that I did so, and found that Mr. Road Superintendent Stillwell, after Mr. Overseer Elworthy had instructed the caretaker to coal-tar the boiler, &c., in accordance with your circular, 3rd September last, had issued fresh orders to the caretaker to paint it red and to apply to Mr. Elworthy for paint. Mr. Elworthy instructed the caretaker to prepare the newly-dished top of the embankment for the reception of a shoot for carrying off the storm-water and material, for which Mr. Elworthy was supplying. These instructions were also countermanded and a length of India-rubber hose, 2½ inches in diameter, was supplied by Mr. Stilwell to carry off all the storm-water from the four embankments. I need hardly say how totally inadequate this is, and must, at the same time, protest against such a useless waste of money and such a childish innovation, that in the eyes of the travelling public so reflects upon the public watering places officer.

——? I deny that I ever interfered with the instructions of the overseer.
4594. What did you do? I took out the rubber hose forming the syphon and gave it to the caretaker and instructed him how to use it; but as he told me that he had instructions from his overseer to put in the shoot I did not countermand these instructions, but took the hose away again.
4595. *Major Penrose.*] Did you find this rubber hose effectual in that case? I tried it at Mount Elliott, and found it effectual there.
4596. I believe there is a very small drainage area on the top of the embankments? Yes; and you can conduct the drainage to one or two points, as the top of the embankments are concave.
4597. Do you think it necessary to have four shoots, one foot across, to carry off the water from the top of the embankment? No.
4598. *Mr. Woore.*] What is the width usually of the top of these embankments? About 10 feet.
4599. Does the syphon serve to drain off the water and prevent it from scouring down the sides? Yes; this syphon that I used was quite sufficient for the purpose on a similar embankment.
4600. And when the Mines officers complained about it you took it away? I did not interfere with the caretaker at all. The only inference that I can draw from the actions of the Mines officials with regard to neglect and their reports as to works being insufficient, is that they wish to bring the works into disrepute with the object of wresting control from the Works Department. This is the most simple explanation, and it is only a fair inference, though a very hard thing to say, perhaps.
4601. Have you endeavoured to conciliate the officers of the Mines Department and to show them that you would meet them half way? Well, I have never met either Mr. Boultbee or Mr. Low, and there cannot be anything personal between us. I met some of the subordinate officers of the Mines Department, but no friction took place between us. I know Mr. Keighran, at Hay, and get on very well with him.
4602. So that this friction principally appears in the correspondence? Yes, and refers principally to the action taken by Messrs. Boultbee and Low.
4603. *Major Penrose.*] It appears that you suddenly found your works were subjected to elaborate criticism, when before you never heard anything against them? Yes.
4604. *Mr. Woore.*] And has this criticism been confined to the officers of the Mines Department, or have you had any complaints from the general public? No; I have heard no complaints from the general public, except such as were based on reports which seemed to be circulated by the Mines officials. I certainly did hear some complaints about troughing. It was said that the railing formed an obstruction to the watering of stock. But that is the only thing which I can call to mind.
4605. You know what the charges are with respect to the Dolmoreve well; and, if so, what have you to say to them? Yes; I know them. I had a man there named Flynn. A bucket was lost in the well on the 10th July. I cannot say whether the bucket was recovered then or not, but on the 8th August I reported that the travelling mechanic had stated that the well rope was broken, and that the centering below the water level was forced out by the fall of the bucket. There was great difficulty, with the assistance of a man and horse, in lowering the water, effecting the repairs, and recovering the bucket. A new rope and bucket had been sent out. The breakage of the rope had apparently been occasioned by the end near the bucket being injured by the action of the water in the well in which the bucket had been left suspended during intervals of baling. The bucket should have been raised out of the water. The mechanic also reported that on his first going to the well on this occasion he could obtain no assistance from the caretaker owing to his absence at an inn 7 miles away, where he was drinking. The caretaker finally returned in a state of intoxication. The bucket had fallen full of water from the top of the well down to the bottom. The water in this well is pretty brackish, and the rope corroded. I told the caretaker this, and asked him to keep the bucket suspended out of the water.
4606. Mr. Low stated here that he would not trust himself on a wire rope? Yes; but I think the wire ropes are the best that can be used.
4607. *Major Penrose.*] What kind of rope was this? Galvanized steel ropes, and I think they are 1¼ inches in circumference. The breaking strain of such a rope is absurdly beyond anything that we ever put on them. As to a man stating that he would not trust himself on such a rope it only shows his ignorance of the whole question.
4608. Is there anything else you would like to add with respect to these statements about interference? Not that I can think of.
4609. You think there was no unnecessary delay in effecting those repairs? Well, I cannot remember—that all refers to the one case. If so, there was delay; but that might be accounted for by the fact that the country was all under water at the time and there was no necessity for the work. No water was then required from tanks and wells, because the country was flooded; and there being no urgency, the matter was allowed to stand. I had a new rope and bucket sent out as soon as possible. The caretaker might have done what my man did,—got the rope and bucket up with assistance.

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A. W. Stilwell. 19 April, 1888.

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4610.

A. W. Stilwell. 19 April, 1888.

4610. Are the caretakers put on these watering places by the Mines Department capable men, as a rule? No; capable men are the exception, not the rule.
4611. Are many of the watering places in your district leased? Very few.
4612. And you think that many of the caretakers, if kept up to the mark, would effect these repairs themselves? Yes; and might save unnecessary though trifling expense. There could be nothing more clear than that case at Box Creek.
4613. *Mr. Woore.*] Then it is in consequence of the incapacity of many of these caretakers that friction has arison? There is no doubt about it—the incompetence of the caretakers and of the Mines officials, who go away and leave things as they find them.
4614. You wish us to infer, then, that some of the Mines officers are scarcely capable of putting things in proper order? Yes, that is the only inference I can draw.

[The Commission adjourned.]

FRIDAY, 20 *APRIL*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R. E., | J. C. WOORE, Esq.

Arthur William Stilwell recalled and further examined:—

A. W. Stilwell. 20 April, 1888.

4615. *Witness.*] Before going further I would like to read a report, sent in answer to a circular received from Mr. A. P. Wood, with reference to the appointment of the Commission, which will be found at page 9 of the Mines blue book:—

(Copy, Tanks 87-869).

As to Construction, Effectiveness, and Maintenance of Tank and Well Works in Hay District.

The Commissioner and Engineer for Roads,— Mossgiel, 12 November, 1887.

Sir,

With reference to your memo. of 3rd instant, attached:—

1. No works have been sub-let by contractors, but piece work has in some instances been let by them. For instance, the sinking of Dolmoreve and Willandra wells was let by the contractor, at per foot, to gangs of men, he putting all material and appliances on the ground. Piece work is similarly let in fencing contracts. The getting of the posts, haulage, and the erection of the fence, are generally let separately, the contractor finding the wire and tools, frequently working himself. No tank works have been sub-let. The construction of appurtenances may probably have been sub-let as piece work.

2. Any information obtained by me respecting contractors' profits is to the effect that they have been the reverse of excessive, and they are declining these works for that reason. For the last works let there was the greatest difficulty in obtaining tenders, although every possible publicity was given. The contractor who has just completed one of these works (tank at Dowdigans) says he could not take another at the same price; that although he remained constantly with his men, and worked hard himself, he has made next to nothing; that he has always done better at station contract work, and will either go back to that or sell his plant. Squatters on whose runs Government tanks, &c., have been constructed have in several instances told me that from what has come to their knowledge the contractors could not have cleared anything out of their work. Business people with whom the contractors have had financial or other dealings have reported the same. Several of the contractors have got into financial difficulties. Few of them tender for tank work more than once.

3. No works have been let except by public competition. Extensions of contracts have been made by task, and these have principally been caused in fencing contracts by the method of setting out the areas by the Mines officers.

4. As to the maintenance of these works by the Mines Department, it is a fiction, a pretence. There has been no maintenance in the proper sense of the term; rather the reverse. I take it that the occasion demands plain speaking, whatever reluctance there may be to breaking through the reticence usually observed respecting the operations of another Department; and so, as to this so-called maintenance, the most gross ignorance, the most utter negligence and indifference as to the welfare of the works or the public benefit do not explain or adequately describe it; because it has, in addition to these negative qualities, the positive one of endeavouring to bring the works into disrepute—to depreciate them, to bring discredit upon them. The only capacity or ingenuity displayed in this "maintenance" has been in this direction. Unfortunately, the public in Riverina, Victorian in proclivities and alien to the Government of this Colony and all its doings, has lent itself only too readily to this; and it is to a superficial public opinion, thus educated, that the late misrepresentations of the Press reporters who travelled through the district with the Minister, are partly due. With few exceptions the men employed as caretakers are totally unfit for the post—ignorant of everything except the situation, and only alive to magnifying and advertising defects which, when they are not imaginary, are nearly always due to their own incompetence or negligence. Disreputable people have been put in charge who, when such a small matter as the necessity for tightening the fence wires around a tank is pointed out, have said they were not sent from Sydney to work but merely to take charge; who for a great part of the time have been absent, drinking at the nearest inn, and from whom nothing but the most unblushing falsehoods could be elicited. I have frequently found caretakers absent rabbitting. The man at Lignum Hut well, in addition to shamefully neglecting the windmill and pump, thereby causing disrepair and breakage, keeps the mill idle to save the necessity of attending to it, allowing the service tank of embanked earth to be damaged by becoming empty and contracting. A travelling mechanic has to be employed by this Department to effect repairs, &c., that should properly devolve upon these caretakers. He has sometimes to be sent as much as 100 miles merely to renew a pump bucket leather or some such trifling matter. I have had to send my assistant 50 miles, when the road was almost impassable, merely to put in a pin connecting the horse-works with the pump-rod, which took, I suppose, two minutes to do, but which the caretaker would not touch. I have frequently, on my rounds, to stop and take a pump apart and clean it myself, the caretaker perhaps assisting, perhaps merely looking on and making depreciatory or sarcastic remarks. Mr. Wood has had similar experiences. I have known a pump to be partly taken apart and left so, lying about the horse-walk for six weeks by the instruction of the Mines overseer, who gave out, as did also the caretaker, that the pump was defective; and I heard it so spoken of by the public 50 miles away, and have myself put it to rights so that it worked perfectly, in half an hour.

Wells are frequently left without baling for weeks, causing the bore to become choked, when it is reported by the Mines officials that the supply has failed. Pumps have repeatedly been reported by overseers and caretakers ineffective, that they would not throw enough water to fill the service tank in less than two days, when a test has always shown that they would do so in from six to eight hours if fairly worked. Holy Box well was abandoned by the Mines officials because, as they gave out, the water was unfit for stock. I found the appliances being destroyed by the public. Put a man in charge, and made him draw water daily. When fairly tested the quality proved to be excellent, but the Mines overseer at Ivanhoe still kept reporting that it was bad, preventing the public from using it; and it was only after some persistence that this opposition was overcome and they were induced to take charge of it. It is now one of the best wells in the district.

At Boonoona tank, some months ago, the Mines overseer had the valve opened and some 3 or 4 feet of water let out of the tank, because he said he thought the embankment was endangered; and two days ago I found a similarly absurd waste of water, by direction of Inspector Low, at Clare tank, where the valve was left open so that the water might escape into the swamp. About 2 feet had been lost. At

A. W. Stilwell. 20 April, 1888.

At Mount Manara tank the overseer ordered all the water to be run to waste out of the service tank because a few of the foundation piers had the outer casing of cement slightly scaled off at the edges. This was apparently done to substantiate a report that the foundations of the tank had failed, and that it would have to be taken down, which I heard repeated all along the road. There was found to be no defect in the strength of the piers, and their appearance has been restored by the mechanic—about half a day's work. A few days ago, at Box Creek tank, the caretaker told me he could not make the pump act, that it had been so nearly three months, during which time he had not been able to raise any water, and his service tank was thus nearly empty; that Inspector Low had been there, but could not say what was wrong beyond some absurdity as to the foot valve being out of position. I found the pump very dirty and neglected. Cleaned it and packed the pistons with hemp that the caretaker had in his possession, and in less than an hour had the pump working well. Now, there was nothing here that the most ordinary care or intelligence could not have accomplished, and yet, in spite of the visit of the Mines inspector, this pump was lying disabled—as far as the public were aware hopelessly so—and would have remained so indefinitely, so far as action of the Mines officials was concerned. At Ivanhoe tank, this morning, I found the pump also disabled, Inspector Low being, I was informed, there at the time, although I did not see him. The foot valve of this pump had been sent quite needlessly to Sydney about a month ago. The pump, the caretaker said, worked well enough before, and it had during that time been idle; and stock, instead of watering at the tank, had been taken to private tanks in the township. Now, all that was required was a piece of ordinary fencing wire bent spirally for a spring for the valve. Anyone could have put it in, or for that matter the pump will act without the foot-valve at all; and yet it is kept idle and publicly reported broken down. I heard so miles away down the Balranald road, while stock have to go for water elsewhere; and this occurs where, in addition to the caretaker, there are stationed an overseer and an inspector of the Mines Department. I also found yesterday, at Gunaramby tank, the pump had been for some time worked with a dry bearing, and with one of the clamp bolts of the brasses on the horse-works loose, damaging the bearing; and here both Inspector Low and the overseer had visited a day or two before. Numerous similar instances to the above might be cited without exhausting the list, or of adequately conveying the utter futility of the system.

5. There has been little actual clashing with the Mines officers, because my function, after construction of the works, is restricted to looking on, effecting repairs with my own hands, or sending a man of my own to do them. I can give no instructions to the Mines caretakers. The Mines officers stopped the coating of the service tanks and troughing by this Department with composition for their preservation, alleging that it polluted the water. The overseer at Ivanhoe objected to the inlets at Gunaramby tank, and wished to insist upon an additional one. As this was not done he gave out that the first heavy rain would burst over and destroy the tank batters. This has not proved to be the case. The overseer at Euston objected to the inlet at Youhll Plains tank, and reported that an additional one was required. His caretaker was induced to pay a little attention to his drains, and the inlet asked for, which would have cost at least £100, was proved quite unnecessary.

The shape of lease areas, as set out by the Mines Department, is quite at variance with the suggestions of this Department, and has enormously, and without any corresponding benefit, increased the cost of enclosing them. Inspector Low has interfered with a contractor under this Department and ridiculed his work—fencing of lease areas, Whitton to Enabalong. The same gentleman has recently ordered my travelling mechanic to repair the service tank and well runners at Holy Box. On visiting them to-day I find the tank holding well and the runners in good repair. It appears the caretaker let a bucket down lower than usual, below the point to which the runners extend, and it caught but was soon freed again. As the mechanic reported, Mr. Low had sent him word that the runners had given way; I at once sent up from Hay, timber for new runners and a canvas bucket to lower the water, by coach—as it turns out, an unnecessary expense. The embankment at Pulletop tank was allowed to remain much out of repair for months by the Mines officers, on the plea that their lessee had said I directed him not to touch it; and founded on this falsehood, Mr. Gilliat made an elaborate complaint of my interference with the functions of his officers.

6. So far I have only obtained the attached opinion in writing—from Mr. J. Waugh, of Clare station—as to the relative advantages of the tank and trough systems of watering stock, but on my return to Hay in a day or two, I expect to receive several others which will be then forwarded. Mr. Parsons, of Mossgiel station, and Mr. J. Evans, of Conoble station, are both of opinion that our system is the only one practicable for travelling stock; while Mr. Parsons says, even on his run, he waters all his sheep from troughing.

7. As to prices paid by squatters for excavation in bad seasons, it will be noted what Mr. Waugh says in his letter, and I will obtain and forward other statements. Mr. Parsons says he paid 1s. 1d. a cubic yard for 15 feet deep, 4 to 1 slopes, and gave all advantages, such as free grass and water, &c., to his contractors.

8. As to our appurtenances, the conditions to be met differ materially from those obtaining on the runs where a very limited and known number of stock is to be provided for at each tank or well. On the stock routes all contingencies must be provided against, and in addition to larger reservoirs, more extensive and perfect appliances have to be afforded. To meet these conditions our appurtenances are, I believe, the best so far devised. The iron service tanks and the new type of steel troughing, for simplicity of construction, durability, and effectiveness, cannot be excelled. This opinion I have heard generally expressed even by some who, not fully realizing the conditions or requirements, demur at the cost. As to the water-lifting appliances, the M'Comas lifters have been discarded in favour of pumps, because of the amount of timber (a serious item of cost in this timberless district) required in connection with them for well and staging, and also because of the greater amount of other perishable material, leather, &c., in belting and buckets of which they are composed, as compared with the pumps.

9. The pumps in use in this district are the Holman, and Amos & Smith's horse power, and the Tangye special 3-horse power steam. All of them are of the utmost simplicity of construction. In connection with the steam-pumps there is practically no machinery, the power being applied direct from the steam to the pump cylinder, and the pistons working in both are attached to the same rod. Any man of ordinary intelligence can learn all about them in an hour.

About the horse-pumps, there is nothing more complicated than the horse-works, which are the same as required for a M'Comas lift; attachment is made to a plunger or piston rod, and the rest is simply a piston working in a cylinder. The only repairs required are occasional renewal of bucket leathers, also required with the M'Comas lift, a little packing and tightening of bolts, occasional cleaning and oiling. I should think a blackfellow could learn how to keep them in repair in less than a day. They are incomparably easier and less expensive to erect than the M'Comas lift. The horse-pumps will throw from 3,000 to 4,000 gallons an hour without distressing the horse. The steam-pumps will throw from 5,000 to 7,000 gallons an hour. I consider that they are thoroughly effective and perfectly adapted for the purposes to be served. As to their maintenance by the Mines officials, need more be said?—when a pump is worked with dry bearings, when steam-pumps are allowed to become so foul and rusty that they cannot be started, when pumps are reported disabled and left unworked for months because a bucket leather requires renewing, or because a piece of wire is required in a valve, the only question is as to whether it would be worse or better if there were no "maintenance" at all.

I have, &c.,
A. W. STILWELL.

Hay, 16th November, 1887.

The Commissioner for Roads,—

Memo.—Attached are letters from Messrs. A. M'Farland, J. Russell, and D. Grant forwarded in conjunction with my report of 12th, with which a letter from Mr. J. Waugh. All of these gentlemen are squatters in this district, and it will be observed that they all favour the trough system of watering for travelling stock. I expect to receive further letters in the course of the next few days, which will be duly forwarded.

Mr. Webb, of Bladen Park station, whom I met at Mossgiel, told me he considers our system the only one suitable. He much admires the buckled plate tanks and steel troughing. He gives the cost of excavation on his station at 1s. a cubic yard for 15 feet deep and 4 to 1 slopes. At this price the contractor had not to feed his horses, having station grass. He considers our dry season prices, when contractors had to feed, not at all excessive.

A. W. STILWELL.

Clare, 11 November, 1887.

A. W. Stilwell, Esq., Hay,—

Dear Sir,

In reply to yours of the 5th instant, I beg to state that I have tried both systems, and find watering by troughs preferable to allowing stock free access to an open tank, for which my reasons are that cattle cut the slopes of the tank away, and weak sheep coming to water after them cannot drink, and if they try to do so invariably get bogged. Also watering at troughing keeps the tank water far cleaner, as no impurity can find its way into the excavation. I am adding troughing to my tanks yearly, so convinced am I of its superiority to letting stock at the main body of water.

In

A. W. Stilwell. 20 April, 1888.

In seasons such as 1884 and 1885, 1s. 6d. per cubic yard for tanks (say) 16, and not over 20, feet deep is the lowest I can do them at. The side slopes to be not less that 2 to 1 in the best soil, and in some soils 2½ to 3 to 1 of a slope, and this is for tanks to which stock have no access; and, if stock are to have access to the water, the slopes should be from 3 to 4 to 1. The price, 1s. 6d., may seem high to some, but when it is considered that horse feed has to be carted, and water also in some cases, from 5 to 10 miles, the figure will not be so very much out of the way.

I have, &c.
JOHN WAUGH.

A. W. Stilwell, Esq., Assistant Engineer, Hay,— Thelangerin, Hay, New South Wales, 12 November, 1887.

Dear Sir,

Yours of the 5th instant to hand, re watering stock at tanks.

I have several years experience of both the methods you mention, viz., that of allowing the stock free access to the tank or reservoir, and the other of pumping the water into receiving tanks, and allowing it to flow from these into troughs by means of self-acting valves, so that a supply of water is always in the troughs. I unhesitatingly give my opinion in favour of the latter method, as being by far the most economical way of using the water and preserving the tanks from silting up.

When stock are allowed to run in the tanks in dry weather they pulverise the embankments into fine dust, which is blown into the excavation; and they waste large quantities of water by carrying it out in the fleece (I am speaking, of course, of sheep) to be licked up by the sun. In fact, I tried the experiment, about three years ago, with two tanks of about 7,000 cubic yards each. The water from one was pumped up for the sheep, and the other the sheep had free access to. The result was that the latter was dry in about six months, and the former lasted well into the following season. I forgot to say that each had 6,000 sheep watering at them of a similar description, and quite similar country; by the way, we had to reduce the number of sheep on the tank they had free access to, when they had been on it about three months, in order to eke out the supply of water.

With regard to cost of excavations in dry seasons, when the contractors had to buy and cart feed for the horses, I paid 14d. and 15d. per cubic yard; depth of excavations, 12 to 14 feet, with slopes of 3 feet in 1 foot.

Yours, &c.,
A. McFARLAND.

A. W. Stilwell, Esq., Assistant Engineer,— Eli Elwah, Hay, New South Wales, 15 November, 1887.

Dear Sir,

In reply to yours of the 5th November, I am of opinion that the better plan is to fence off the tank and pump the water into troughs, as stock will get a cleaner drink and there will be less waste.

With regard to excavating tanks:—Ten years ago I used to give 12d. a yard; latterly I found a man half the bullocks and scoops, and he did the job for 6d. a yard. Of course he got the grass. Our tanks are no great size, running from 3,000 to 4,000 cubic yards. They are rather shallow, being 10 feet at the deepest, and are made 1 in 3 at the sides, 1 in 6 at the ends. All are open to stock, as in droughts we have to depend on the wells. I believe with large tanks a windmill would be found to work well. About Mannambool, all stock are watered from shallow wells and windmills. Regretting I am unable to give you any more information,

I am, &c.,
JAMES RUSSELL.

A. W. Stilwell, Esq., Roads Office, Hay,— Illillawa, 14 November, 1887.

Dear Sir,

In reply to your letter of the 5th instant, asking an opinion as to "The relative merits of allowing stock free access to the water in tanks and dams, and of preventing access and elevating the water and supplying it in troughs."

On stations in this district where the ground is fairly retentive and catchment areas good, the stock is generally allowed free access to the water, preference being given to a larger first outlay in the number and quantity of tank supply, to the other method of merely excavating for a certain necessary supply only, which to prevent waste must be doled out economically in a trough, thereby no doubt effecting a saving in providing the water, but committing one to the cost of elevating machinery which is more or less troublesome to maintain, and to labour too costly for the work to be obtained.

For the above reasons it seems to me the free access system prevails on all sheep stations here.

But in the case of tanks on travelling stock routes, with which I presume you are mostly concerned, I fear free access could not be allowed. Were it for sheep alone, with the sites well chosen on hard red ground and slopes 5 or 6 to 1, and the supply brought in carefully through a water tight box or drain, a great deal of trouble and expense could be avoided by leaving them open. But as travelling cattle—in large mobs—and also horses must be supplied, they will cut up any slopes on this clayey country, so that before the water receded half way down, a boggy ridge would present itself around the water-line, which would make it destructive for sheep to approach, and dangerous for large stock also, together with greatly hastening the process of silting up the tank.

Therefore with regard to the public tanks on the stock routes; for the supply of cattle, horses, and sheep, the most satisfactory way presenting itself to my mind is the use of the simplest possible kind of elevating machinery and good troughs.

And now as to the cost of tanks and the best slopes. We could have got any quantity excavated in the seasons of 1884 and 1885 at the following rates per cubic yard, viz.:—For tanks under 8,000 yards, 14 feet deep, 10d.; for tanks from 8,000 to 15,000 yards, 15 feet deep, 1s.; for tanks from 15,000 to 20,000 yards, 20 feet, 1s. 3d.; and the stuff carefully embanked (say) 20 yards away from the excavation. Of course our slopes would be 5 or 6 to 1, enabling ploughs and scoops to work freely; these being generally accepted as the best slopes, where free access is allowed, although it increases evaporation.

But for tanks from which it is intended to raise the water 3 to 1 slopes should be sufficient, on two sides at least, and say longer slopes on two sides or ends, for the sake of cheapness in construction.

In giving you the prices at which we could get the work performed, I must say out of fairness to contractors that in private contracts, there is no delay to the honest workman in getting his work completed, and taken off his hands with immediate payment, while I understand the opposite is generally the case in Government works. Trusting you will not consider the foregoing rather a digression from the subject of your letter.

I am, &c.,
DON GRANT.

Ivanhoe Tank.

Extract from Mr. Stilwell's report No. 87-918.

The pump—Tangye's special steam—needed cleaning, and had not been worked for upwards of a month, the foot valve having been taken off and sent away to Sydney for a new spring by the Mines overseer; the suction joint was elevated out of the water.

This was quite a needless stoppage of this pump; the renewing of the spring is a very simple matter, or indeed the pump could be kept at work without it.

Stock in the interim had to go elsewhere for water.

A. W. STILWELL,
1/12/87.

Clare Tank.

The Commissioner for Roads,— Hay, 1 December, 1887.

Sir.

On the 11th ultimo, I found this tank full to 9 inches above berm level. There had been nearly 2 feet more water in, but the valve had been left open, the caretaker said, by order of the Mines Inspector, and it had escaped.

In addition to this being a most absurd waste of water, it tended to prevent the drying of the ground at the service tank and troughing, both of which were surrounded by about 9 inches of water. The service tank was empty, the water having been run off as a precautionary measure during the flooding of ground around the foundations. The inside of the tank was much rusted, showing the want of the composition with which it was intended to coat all the tanks and troughing, but which was prevented by the objection of the Mines. The tank and foundations were otherwise in good repair.

The embankment was eroded at foot by wave action. The pump, Smith and Amos' horse-gear, very dirty and neglected.

The accumulation of water round this tank is owing to a drain having been cut through a sand rise to a swamp at a slightly higher level. To augment the supply this has proved most effectual, while if it is at any time found desirable to curtail

curtail the supply so as to prevent flooding of the service tank foundations and the troughing, it can readily be done by obstructing the drain, and so retaining the water in the other swamp, but if the water had not been allowed to escape from the tank, the water outside would have disappeared before. A. W. Stilwell.

The fencing in of 640 acres—tenant's lease—H. Bevan, contractor—is finished, except portion of the wiring, which should be done in a fortnight. 20 April, 1888.

I have, &c.,
A. W. STILWELL.

4616. *Chairman.*] You state in that letter that you never gave any work except by contract and by public tender? Yes.
4617. But is it not a fact that you gave the fencing of the tank at Ivanhoe without calling for tenders? No; that work was given as an extension of an existing contract on which there had been other extensions, necessitated by the alterations of the survey made by the Mines Department.
4618. Is it a fact that you ever told the caretaker of the Mines Department never to touch the pump, as he did not understand it? No; certainly not.
4619. Were you in the habit of giving orders to the caretakers? No, not orders. I have pointed out omissions and neglect on their part, and have offered them suggestions; but I never gave them what they could take as orders or definite instructions to do any work.
4620. You said that the overseer had demanded another inlet to the tank at Youhll Plains? Yes.
4621. Which would necessitate a cost of something like £100? Yes; that at the least.
4622. Has that ever been done? No.
4623. And has the tank ever been filled? Yes; it is full now, and has been full two or three times since then.
4624. Then the carrying out of the request of this overseer would have entailed unnecessary expense? Yes; the same thing occurred at the Gunaramby tank; but before referring to that, I would like to make a further explanation as to this friction. In most instances, friction arises in this way: It is one of my duties to occasionally inspect these tanks and well works, and report the result to my chief. In the course of these inspections I find that, owing to the incapacity and misrepresentations of the Mines officials, and owing to the gross negligence and incompetence of their caretakers, there is an absence of any efficient maintenance on these works, and consequently that the works are wantonly brought into public disrepute. I send in reports in accordance with my instructions, giving details. How could I do otherwise? Am I to condone or suppress these facts, hush things up, and smooth matters over in order to avoid friction with the Mines officers at the expense of the works which I naturally take a great interest in—to the prejudice of my Department and my own reputation? These reports are objected to by the officers of the Mines, and hence the friction. But I would submit that, if in the execution of my plain duty in endeavouring to protect the works and to promote their efficiency in the interests of the public and my Department, this friction as regards the Mines officials is the result, then so much the worse for the result and for the causes produced by the other side which lead to that result. So much the worse, also, for the divided control, but not so much the worse for the works or the public. Had it been otherwise, had the supervision exercised by the Mines officers been effective, and had they evinced a desire to promote the efficiency and good repute of the works, had their goal been the same as ours, there might still have remained a feeling of rivalry or emulation; but, as I said yesterday, a *modus vivendi* would have been possible, as has been pointed out by Mr. Bennett, and some good might have resulted from this divided control. But as it is, I cannot charge myself with any desire to needlessly cause friction. I cherish no personal animus towards the Mines officers, but I cannot retract or withdraw anything that I have advanced. I cannot even say that under the circumstances I regret that this friction occurred. It has been the inevitable outcome of the system of divided control and responsibility, and of the Mines officers taking the view they did of their share of the work. Had they been solely responsible for these works—had they felt, as the Works officers necessarily did, that their interests and the interests of the works were one and the same, and that in promoting the one they were promoting the other, their conduct would, I think, have been very different.
4625. *Major Penrose.*] Have you ever given the Mines officials or caretakers advice or instructions not to interfere with the machinery internally? To the best of my recollection, no.
4626. *Mr. Woore.*] Are you aware of any reason why the works connected with any public watering place should be handed over from the Works Department to another Department for maintenance any more than any other public works? No; certainly not.
4627. So far as you know, are any other public works of this character handed over from the Department constructing them to another Department for maintenance? No; and I think that this action with regard to tanks and wells is quite exceptional. I would like to hand in this report in reply to the charge of Mr. Elworthy in connection with Pulletop tank:—

The Commissioner and Engineer for Roads,— Hay, 9 February, 1887.

Sir,

Referring to the attached papers, it is to be observed that Mr. Elworthy does not state that I countermanded his instructions to the tenant (O'Neill), but that the tenant informed him so. An obvious preliminary on Mr. Elworthy's part would have been to ascertain whether such were the facts. For your information I may state that it is about the reverse of the fact; but, as this was not elicited by Mr. Elworthy, it may perhaps be neglected as irrelevant; and now, apparently, the points to be considered are that this man's unsupported statement is taken by his overseer (as he intended it should be) as an excuse for gross neglect, for some two months, of a most obvious and urgent duty; and then his hand is unwittingly played further to by Mr. Elworthy's report and Mr. Gilliat's consequent minute being based upon it.

It would really appear that up to the present Mr. O'Neill has been master of the situation. I do not see how any responsibility regarding it rests with this Department. In fact, the matter should be one, as Mr. Gilliat somewhat elaborates in his minute, so obviously and solely between the Mines officer and their tenant, and unless it had been forced upon me I should have had some delicacy or reluctance in dealing with it at all.

I can, however, heartily concur in what Mr. Gilliat says respecting the interference of officers with the men under another Department, the more especially as this has been at times somewhat realized for me by actions of his overseers at works still under my jurisdiction; but I confess that I have failed to draw from it the somewhat anomalous conclusion that it is impossible an officer can successfully accomplish his work if his orders are countermanded by an officer of another Department possessed of no authority to interfere.

On the contrary, I have found little difficulty in maintaining my authority, and little harm has resulted; and I have taken it all in good part, as evincing only mistaken zeal on the part of his officers.

I have, &c.,
A. W. STILWELL.

4628. Do you thing it is a good or bad principle to hand over works constructed by your Department to another Department for maintenance? Well, if the other Department were made solely responsible after the handing over, but little harm or prejudice to the works might result.

4629.

A. W. Stilwell. 20 April, 1888.

4629. But do you think the principle is a good one or a bad one? I decidedly think it is a bad one; more especially in this case, where the responsibility rests with us.
4630. Do you think it would be advisable for the Department which now has the maintenance to have also the construction of these works; or would that not create another Works Department, and entail more expense? I should say that the work of construction had better remain with the Department whose officers are competent to construct as well as to maintain. It is very doubtful whether the Mines Department have officers competent to construct the works.
4631. But even supposing that they have, would it not create another Department of Works, and entail a great deal of expense on the country? As regards field work it might, but it would not as regards office work. The preparation of the plans and specifications is all now in our hands.
4632. It would mean a separate and special Department of Works? Yes.
4633. Is there any reason why the Department of Works should not have the sole responsibility of maintaining, as well as constructing, these public watering places? No reason at all that I know of; rather the reverse. It would lessen the expense. We must necessarily have men in these districts to do the road works, and these officers could attend to the works attaching to public watering places. If this work were taken away from me I should still have to remain in the Hay district.
4634. Would it be a saving to the country for the Works Department to have in its hands the sole maintenance of these watering places? It would be a saving in this respect—that the roads officers are necessarily in the district, and, therefore, their supervision over tank and well works does not entail any additional outlay in regard to the salaries of officers, and so on. On the other hand, if the works were taken from our Department our officers would still necessarily be employed in the districts where they are at present, and the supervision of the tank and well works by other officers would, therefore, be an additional and unnecessary expense.
4635. But the Works Department, having the sole construction and maintenance of these works, would render the employment of the officers under the Mines Department, who are now charged with the control and maintenance, unnecessary? Most decidedly it would.
4636. And this would be a great saving to the country? Yes; a saving in men and salaries. This refers to the inspectors of public watering places, and not to the inspectors of stock, who would still be required. The only saving there would be in regard to them is so far as their travelling expenses were concerned.
4637. Do you think that in the event of the maintenance being handed over to the Works Department it would be advisable for the Stock Branch of the Mines Department to suggest localities where public watering places are required;—do you think they should have that much to say in the matter? Yes; the Stock Branch are more particularly acquainted with the requirements of the routes. I think that would be a good arrangement, and that is as far as they should be allowed to go.
4638. That would make them responsible for showing where a necessity existed for a public watering place? Yes. We do not pretend to know much about stock.
4639. *Major Penrose.*] But then, on the other hand, why charge the Department of Works with the construction and maintenance of these watering places, which are mainly for stock;—why charge that to a Department that knows nothing about stock? We know nothing about stock as to the requirements of the stock on the stock routes for water, but as to the actual construction of the works we do know a good deal. It is the business of the stock officers to know the movements of travelling stock. Most of these stock officers themselves will tell you that it is an utter absurdity that they should have anything to do with the construction or maintenance of these works; that they know nothing about them, and would rather not have the responsibility of looking after them.
4640. *Chairman.*] Are there any wells in your district? Yes. I have had the supervision of the completion of some of them, but I did not select any sites.
4641. It is said that the Willandra well, which is only 102 feet deep, has cost £1,050? That applies not only to the well, but to the appliances at it. I cannot say whether the amount stated there is correct or not.
4642. Can you tell us what is the usual price for sinking and timbering wells? The prices paid in the Hay district for sinking and timbering have ranged from 22s. 6d. to 42s. 6d. per foot.
4643. What is the cost of the headworks? A wooden service tank, iron-lined, ranges according to localities from £200 to £400. The troughing (300 feet) ranges from 20s. to 30s. per foot. Then there is the whim and head-frame over the well—they would cost, I should say, from £50 to £60.
4644. Then all these added together would about make up the cost stated here? Yes; but I cannot give you the exact amount paid for this well.
4645. Would the same remark apply to Holy Box well? Yes; but that was done many years ago.
4646. In any instance that you are aware of, have wells been sunk without your first knowing whether water was below or not, or whether the water was of any value for watering stock? No. My knowledge and experience tends to the reverse—that trial-shafts have always been previously sunk. In one case I sunk a trial-shaft in my district, and the result, not being satisfactory, we substituted a tank. This was at Hulong.
4647. *Major Penrose.*] The sinking of a well would cost about half that of a tank? Yes.
4648. *Chairman.* What about the Wooloondool well? This well was finished before I went to the district. The complaints made in this case, and in the case of the Dry Lake well, are utterly without foundation. There was no necessity for a floor and piping, which would have entailed expense, without any benefit at all, as far as I can see.
4649. *Major Penrose.*] I think you said that this choking was due to neglect of baling on the part of the caretaker? Yes; and this is the case with all the wells. If they are left unbaled the silt gets hard in the bore.
4650. *Chairman.*] Have you had anything to do with the erection of huts for caretakers? Nothing more than the calling for tenders. I have obtained tenders and submitted them. No huts were erected under my supervision, but I have since seen some of those erected by the Mines officers.
4651. Have you had anything to do with artesian boring? No; I have bored to ascertain what supply could be obtained by sinking a well. I have given the matter some consideration.
4652. You are aware that in some instances very successful results have been obtained? I have heard it so reported, but I do not know it of my own knowledge.
4653. Do you know anything of geology as it bears on the character of this artesian supply? I have a general knowledge of geology, but nothing special.

4654.

4654. You are aware that when you get to a certain formation an abundance of good water may be anticipated, even though the formation is below the place where the salt water has been obtained? Yes; I think that has been proved.
4655. And do you not think that in future in this country artesian boring should be carried on? In that country, but in that country only; which I think is only of very limited area as compared with the whole of Riverina.
4656. *Mr. Woore.*] At anywhere south of the Darling in any of the wells known to you, whether public or private wells, has this cretaceous formation been touched in which artesian water is found? No; there are no such wells to my knowledge.
4657. What is the deepest well that you know of south of the Darling? Speaking from memory, I should say that there are none over 150 feet deep.
4658. How, then, do you arrive at the conclusion that the area is very limited in which cretaceous formation may be found? In this way—that the area of elevation from which this artesian supply must come is very small relatively to the extent of the country; that is, to the depressed area or flat country. Therefore an adequate supply cannot be expected.
4659. Is not that a geological question which is as yet involved in doubt? I think it is rather a matter of common sense.
4660. *Chairman.*] At present I believe the stock routes are all defined, although not fenced in? Yes.
4661. From your knowledge of that country do you not think that it would be desirable to have these routes fenced in, and wholly, instead of partly set apart for the use of travelling stock? Most decidedly, I think that the stock routes should be withdrawn from lease.
4662. Now, I would like to have your reasons for thinking so? Well, it is simply because the lessee paying rent for the travelling stock route, feeds the grass off it first before availing himself of the grass on the rest of his run. After rain the travelling stock route is fed off first and left bare; so that when the route is most wanted to save stock in dry seasons it is very often that stock are prevented from travelling from there being no feed left on the road, thus rendering the route almost useless. I know of my own knowledge that during the last drought sheep died round our tanks in thousands from want of feed, though there was plenty of water.
4663. Of course it would not do to fence off the river frontages? No; I did not mean that, either.
4664. Do you think it would be desirable to hand over these public watering places eventually to public bodies, who would have a more intimate knowledge of the requirements of stock than the present authorities? In some respects it would; in others, decidedly not.
4665. Why? Well, from what I have seen and heard, many abuses obtain with these local bodies. Take the case of road trustees, for instance. Road works are let where they most benefit individuals or townships or are let in a manner to benefit individuals, and in some cases the friends of the people having control. I think there would be for some time quite as much abuse under that system as under the system of centralization, but that remark applies more to road work than tanks and wells.
4666. *Mr. Woore.*] In the event of the passing of a Local Government Bill the construction and control of public watering places would be under local authority? Yes.
4667. Do you think that would be a public benefit eventually? Yes. No doubt it would result in a better system being established.
4668. You are aware that a similar system prevails in Queensland? Yes; but I do not think that the road boards there answer the purpose well. The same system exists in Victoria with regard to water supply and other requirements. I have heard it stated about Queensland that these local bodies are made up partly from townspeople and partly from residents in the country. The townspeople are always on the spot, and attend all the meetings, and carry matters their own way, causing works to be done to suit their own people, and not the people in the country.
4669. *Chairman.*] You know that under the present system the country is involved in heavy cost by these public watering places, from which a very small income is derived? Yes.
4670. Do you not think that it would be a fair thing to make those people, for whom the watering places were made, pay for the maintenance? Yes, I do.
4671. It has been suggested that all drovers of travelling stock should, at the time of getting their permit to travel, pay for watering at all the tanks they may pass getting to their destination, whether they use the water or not. Of course in good seasons they do not go to the tanks, although the country has been to the expense of making them on their account. Now do you not think it would be fair to make every drover who travels these routes contribute towards the expense of maintenance? Yes; most decidedly so. Something of that sort would be a very desirable arrangement, and far preferable to the existing arrangement in every respect.
4672. At present the caretakers have to keep books? Yes.
4673. Although they may be very illiterate men? Yes. There is virtually no check, or very little, so far as I can see. In large items there may be, but in small ones there cannot.
4674. But under this arrangement there would be no necessity for these men keeping the books? No; as a rule the educated men are the worst caretakers.
4675. *Mr. Woore.*] Do you think it is absolutely necessary to have some person in charge of each of these public watering places—either a lessee or a caretaker? I have thought of that subject frequently. It would be very desirable if men could be done without at these places. Still I do not see that it can be avoided, but where possible they should be lessees.
4676. *Major Penrose.*] Do you think that all the works possible in your district have been leased? Certainly not; quite the reverse.
4677. And can you give any reason why they are not leased? No. I know that in one case two tanks were let, but some mistake was made in drawing up the lease, and the thing fell through, and they now remain unlet. There are only two or three works in the whole district that are let.
4678. Have you ever known a case where a man, anxious to lease these works, was unable to get them? I cannot say that.
4679. *Mr. Woore.*] Would it not be advisable on the less frequented stock routes to have tanks so constructed that stock could water direct at them, and so save the expense of caretakers;—are there no such routes in your district? No; and I do not think it would be advisable to adopt that arrangement.
4680. Will you explain the reasons? The same reason would apply in this case as apply generally. When the water would be most required it would be polluted and wasted. There might be a saving effected in this way:

A. W. Stilwell. 20 April, 1888.

way: to have only a pump and troughing, and no service tank, and where the traffic is very slight, and the movements of the stock known beforehand, men could be sent ahead to pump. But still it would be necessary to keep a man there for the protection of the works. Any stock route is liable to great increases of traffic, more especially in bad seasons, when the more frequented routes are bare, and when circuitous routes are adopted for the sake of the feed that is upon them. Or sometimes rain may have fallen in that particular locality and have not fallen somewhere else. A little rain falling on one of these slightly-frequented routes would bring a lot of stock that way, and if appliances were not at the watering places, the water would be unavailable.

John Henry Adams called in and examined:—

J. H. Adams. 20 April, 1888.

4681. *Chairman.*] You are a road superintendent? Yes.
4682. For what district? For the Walgett district.
4683. How long have you been stationed there? About eight years.
4684. Have you had the supervision of many tanks and wells in that district? Yes; of all the tanks that are there.
4685. How many are there? Four.
4686. What are their names? Bunghill, Boro, Lightning Ridge, and Glendon tanks.
4687. What about Galathera and Boggy Creek tanks? They are not in my district.
4688. You have heard what was written by Mr. Doyle, in January, 1883, about the Boro tank—that it was damaged by heavy rains,—was this due to any fault in construction? I made the final measurement of the tank in 1882, and the tank was almost immediately afterwards filled with water; and so it would be difficult—indeed impossible—to describe the damage mentioned by Mr. Doyle. The tank was full of water, and the communication pipe could not be seen.
4689. Was the damage which this tank sustained attributable to want of care and attention or to faulty construction, or was it something beyond the control of the Department? It was quite impossible to say whether any damage occurred at all or not. I could not, indeed.
4690. And yet this occurred five years ago? There never has been a failure in consequence, and stock is watering there now.
4691. But it is stated here that the water would not run into the tank? It must do so.
4692. Now, here again Mr. William Regan, the caretaker, writes:—

> I beg to call your earliest attention to the present condition of the tank at this place. There has no water come through the suction-pipe from supply tank during the past four months. The water in drinking tank is 3 feet less than the supply tank. The stones all round the drinking tank are dropping down, having no foundation. Every morning for the past week I have pulled out from the drinking tank bogged and dead sheep.

——? The proof is that the water is there, or the sheep could not have drunk. The matter of the stone pitching getting loose also proves that it has been used by stock, and that the water must have been there. I have had to report Regan several times, and the man was subsequently dismissed. He was quite old and useless.
4693. *Major Penrose.*] You think that he ought to have done these things himself? Yes.
4694. *Chairman.*] Has your Department discontinued the making of tanks of this character now? Yes.
4695. Then the complaints are really attributable to the want of care and attention on the part of the caretaker? I should say so.
4696. Now about the Bunghill tank, Mr. Doyle, on the 1st March, 1884, writes:—

> I found this tank contains 12 feet of water, taking the depth from the end of the platform, as shown in the accompanying sketch; the water is 3 feet below the top of the tank, and, allowing the tank to have been 18 feet deep, this shows a silting up of about 3 feet. I fancy the silt has accumulated more at the mouth of the roadway. This tank sustained a considerable amount of damage at the first rush of water after its completion; it carried away part of the brake between the silt tank and the main tank, shown in the sketch. The water is sweet and wholesome; but the supply-pipe from the main tank to the drinking tank acts very feebly, doubtless on account of the silt in the drinking tank choking up the mouth of the pipe. In consequence of the steepness of the batter in the main tank the ripple of the water has undermined a considerable quantity of earth at the edges, and caused it to cave into the tank. The drinking tank cannot be said to be in good order; the rough paving-stones that were placed on the sloping surface of the sides and end have become very much displaced, and a great number of them have slipped in towards the bottom of the tank; it would, in my opinion, be advisable to have the stones broken into ordinary sized metal, so as it would mix with the earth and form a more solid foundation for stock. The silt tank into which the drains empty is filled up to within 2 feet of the top with silt. This should be cleaned out, and, in my opinion, instead of allowing the water to enter the main tank as it does at present, it should be conveyed from the silt tank by means of a wooden flume sufficiently long enough to carry the water clear of the bottom of the batters. This would prevent a very large quantity of silt from finding its way into the main tank. I have inspected several large private tanks in the neighbourhood, and find that they are all supplied by this means, and I am told they all answer well. The fence round the main tank is in good order. I would strongly recommend that the drinking tank be also fenced and fitted with gates for the entrance and exit of stock, as half the caretaker's time is taken up in endeavouring to prevent stock, the property of lessees and others, from using the tank; but it is impossible for him to do so, for, though driven away in the day time, they return at night. It would also be desirable to erect a suitable hut for the caretaker, as it is a matter of great difficulty to get competent and trustworthy men as caretakers, unless provided with a weather-proof hut to live in.

It seems that this place was not in a very satisfactory condition at the time? I would like to deal with the fencing. Immediately after the survey was made by the Mines Department tenders were invited for the fencing, and as regards the inlet, which is a stone-pitched apron leading from the silt tank, a very heavy storm occurred there, and 3 inches of rain fell in about two hours and scoured the drain, sending the stone pitching down some distance. That I repaired by putting sheet piling in and then pitching behind, which, so far, made everything all right. As to the piping getting feeble that may or may not be so; I cannot say. At all events the piping needed no repairs to keep up a constant supply. The best proof of this is that the stock water there now, and without any further repairs on my part. That was seven years ago, and that is a very fair trial for a tank, which has never failed during that time.
4697. I see you made two reports explaining all these matters fully? Yes; but I have not seen them for years. I had to reply to Mr. Doyle, and did it very reluctantly.
4698. *Major Penrose.*] Has this supply piping never choked up during these seven years? The supply is just the same now to my knowledge as when it started. You will find water in the drinking tank now.
4699. *Chairman.*] You recommended that pumps and troughing should be substituted? Yes; that was done, and I have got all the material for troughing ready to be put up at the tanks. I invited tenders at once for the erection of them, but they were all too high. Then the floods set in, filling all the natural water holes, so that there has been no use for the tanks, practically, since.

4700.

4700. So that the tanks, as originally erected, were a sort of experiment? Yes; and not being found satisfactory, I have recommended that pumps and troughing be substituted.
4701. What is the nature of the soil? A light red soil. At Boro and Bunghill the soil is black.
4702. On whose recommendation was this open drinking tank made? That I cannot say; but I was called on to give my opinion as to the relative merits of troughing and open drinking tanks, and I recommended in the first instance pumps and troughing.
4703. In fact it would be foolish to make an open tank in this black soil? I said if the drinking slopes would act they were simple and very much to be recommended; but I thought the only proper way to water stock was by pumping gear and troughing.
4704. Are these tanks now open to any reasonable complaint? I do not think so. The public do not not complain, and the works answer all purposes and have always done so. I may say that I was deeply interested in the works, as I had designed and constructed them; and it was my care that they should not fail. If I saw the slightest danger, I would have looked to it.
4705. Have any complaints been made with regard to the other tanks? No; I do not think so.
4706. Are the Baloola and Normanstone wells in your district? No.
4707. You have just finished a new work? Yes; at Glendon, No. 116. It was handed over to the Mines Department and filled at once.
4708. Has any complaint been made with regard to the sites on which your tanks are constructed? No; not to my knowledge.
4709. What was the pump which you put up at this Narn or Glendon tank? It was the type pump of the Department. It is a horse-gear pump of the Holman make.
4710. A great deal of fault has been found with your having made the batters of your tanks too steep. Do you consider the batters in the specifications too steep? They are 1½ to 1 and 2 to 1. The Glendon tank is 1½ to 1. It is in tough red soil—good stable ground; and, in my opinion, sufficient for that class of work.
4711. Do you think that a sufficient batter? For unprotected earth work in country like that, the more you lessen the surface area the better it will be, and the less wash there will be. Except for the matter of depositing silt, I do not see that there is any advantage at all in having gentler-sloped tanks.
4712. If you had found that the specification of the batter was two steep for the soil you were excavating it in, would you have any discretion to alter it? Yes; certainly. I always sink a trial shaft first. I generally put down four shafts within the site of the tank. The less top surface you have the less force the waves will have on the banks.
4713. Will you now state anything in connection with your duties which you think it desirable the Commission should know, particularly with regard to the friction between the two Departments? The only friction likely to arise is that which has been before referred to, by the caretakers neglecting their work, and so on.
4714. I suppose that these caretakers, being officers of the Mines Department, you have no control over them? No.
4715. And in the event of works under your supervision becoming deteriorated for want of care, all you can do is to send down a complaint to your chief? Yes; but I always reported it to Mr. Doyle, the inspector of stock; and I must say we always worked harmoniously together.
4716. Did he ever resent your interference? No; he always attended to anything that I reported. He discharged Regan and another caretaker whom I saw drunk, when I mentioned it to him.
4717. Has there been any hutting erected in your district? None. I only invited tenders for huts.
4718. Why were not the huts erected in accordance with the tenders? I never heard the reason.
4719. Were the tenders considered to be too high? I cannot say. £90 was the lowest tender.
4720. For what accommodation? Three rooms.
4721. Weatherboard? Yes, and iron roof and tank, piping and guttering, &c.
4722. You thought that very reasonable? Yes, and could not be done now for that money in my district.
4723. What kind of huts have been erected for your caretakers? Simple bark huts. The one at Boro is such as a carpenter could put up for himself. There is a bark hut at Lightning Ridge, and a very bad one indeed. The rest of them were made by the caretakers, and I believe something allowed for the construction by the Mines Department.
4724. If good huts were put up better men as caretakers might be more easily obtained? Yes; I think so.
4725. You cannot expect a good man to remain in a hut which is not fit for a man to live in? Quite so; and it is not right to ask people to live in such places.
4726. *Major Penrose.*] Do you consider the huts designed by the Works Department, for which you called tenders, were too good for the class of men? No.
4727. *Chairman.*] Are there many stock travelling through your district? Yes; a great deal.
4728. Is there any trouble occasionally with this stock on the roads through the action of the lessees? Sometimes. The 60-mile track between Collarendibri and Angledool, near the Queensland border, requires watering.
4729. Do the lessees of runs in any way lessen the usefulness of stock routes? Yes.
4730. In what way? By making the stock route a paddock. I speak advisedly, because I have seen that done myself.
4731. They cause the grass to be eaten off and so render the route useless? Yes.
4732. How could this best be remedied? By impounding the sheep, I think.
4733. But the lessees pay rent for these travelling stock routes, and it would not be just? Yes; I see it is a difficult matter.
4734. You think these travelling stock routes should be withdrawn from lease? Yes; decidedly so.
4735. Then you cannot prevent the lessee's stock from running over them without fencing them in? No.
4736. Do you think that it would be desirable to fence them off? Yes; the business of a squatter cannot be carried on unless facilities are given him to get his stock to market. I would like to see a broad drift-way right through the country for this purpose, where grass would have a chance to grow. In the block reserves drovers do not know where they are, as the routes are not fenced off. Besides, the grass is all eaten down by local stock. The reserves should be devoted entirely to their proper use and fenced off, and a penalty inflicted for any trespass.
4737. *Mr. Woore.*] Do you think that in the present financial condition of the country such an enormous expenditure would be justifiable as would be necessary for the fencing of stock routes? No; I do not think

J. H. Adams. 20 April, 1888.

think so, if we were empowered to impound any sheep found on the routes. I think if the penalty was inflicted, even without the fencing, it would serve a very useful purpose.
4738. *Chairman.*] Of course, where travelling stock routes touch water frontages fencing would be impossible, because it would deprive the lessee of the use of water? Just so; in my district, most of the squatters have fenced off and others send their men along to conduct the travelling stock through.
4739. Fencing saves them a large amount of trouble, because they have to send a boundary rider to bring the stock through the run? Yes.

John Thomas Prichard Bassett called in and examined:—

J. T. P. Bassett. 20 April, 1888.

4740. *Chairman.*] What are you? I am a civil engineer, residing at Narrabri.
4741. We understand that you can give us some particulars as to the construction of tanks and wells in your district to guide us in considering the allegations that have been made against your Department? I have only been in charge of the Narrabri district for about 17 months, and know only the Galathera and Boggy Creek tanks. They are under the Mines Department; but I have looked at them all to see that everything was going on in a satisfactory way, and they appear to be in fair order. One or two little things require looking to, but they are not worth mentioning—merely maintenance work which I had done. I have had nothing to do with the sinking of Government tanks before. My knowledge of the subject is really very small.
4742. *Major Penrose.*] Do you know the Baloola and Normanstone wells? No.
4743. Is the old drinking tank still in use at Boggy Creek? Yes; and it is used occasionally.

William Christopher Bennett called in and further examined:—

W. C. Bennett. 20 April, 1888.

4744. *Witness.*] I beg to present to the Board these papers to be attached to papers belonging to this Department, sent to supplement the Blue Book prepared for Parliament by the Mines officers, and to which Mr. Gilliat refers in his memo. I have already protested against this book as an *ex parte* statement presenting the Mines view of the matter, and calculated, whether designedly or not, to prejudice this Department before the Parliament, the Commission, and the public; but even that compilation will not bear out Mr. Gilliat's statement, that whatever the faults of the Mines Department, discourtesy is not one of them. The present papers afford strong evidence to the contrary. Mr. Gilliat, on the strength of a statement in a newspaper paragraph which is entirely baseless, takes occasion to express his opinion, that under judicious management, with properly constituted works, stock should not be allowed to go past unwatered, even if lifting appliances are incomplete. I pointed out that such reference is uncalled for and not calculated to diminish friction. Mr. Gilliat then writes memo. dated 26th March, in which he refers to the completed Blue Book as described, and states that his words express "a tenable general proposition that if, while in the hands of this Department works were judiciously managed and properly constructed, there would be no reason for stock going unwatered." He then goes on to say that the works have been in progress four years, the two latter of which have been the most favourable ever known in the Colony; the press and the public are justified in assuming that they were transferred, and that the duty devolved on Mr. Gilliat to correctly inform the Secretary for Mines. As it happens, the information given in this instance is incorrect. The delay in completion of these works is, first owing to the unprecedented drought the excavations were obliged to be suspended for want of feed and water. The iron tanks obtained from England were used elsewhere, and those ordered to replace them were delayed in construction and in transit from England, and in erection, by the exorbitant demands of contractors. Had we yielded to these demands and pushed on the work regardless of cost, the converse accusation of extravagence would have been made. I submit this correspondence to the Commission as a sample of the treatment which has been given to this Department by the Mines. There is nothing whatever to justify Mr. Gilliat's foregone conclusion, or as he calls it, "tenable general proposition," that the management of the Department was injudicious or the construction improper.
4745. *Chairman.*] Are there any documents which apparently have been suppressed and which should have been put in the Blue Book presented to Parliament that might have thrown a somewhat different complexion on the case as it appears here? I cannot say that anything in the possession of the Mines Department has been suppressed, but there are letters and documents from the Roads Department which would throw more light on the subject, and such letters and documents I have given to the Secretary to the Commission. Some of the papers which I have given to the Secretary were in the possession of the Minister for Works and were only returned to me recently.
4746. You think that this is an *ex parte* statement, and that rebutting papers might have been included in the book, and were at the command of the Mines Department? I cannot say what was or was not at their command.
4747. But could not they have asked for the documents? Yes; and it is usual for one Department to ask another for any papers that are required by Parliament; and we received no such request.
4748. Consequently this public statement is incomplete and might have borne a somewhat different complexion if these papers had been put with the others? Precisely.
4749. Since your examination before the Commission have you read over the evidence, and do you wish to make any further statement to the Commission? I had undertaken to prepare a short statement on the evidence. I have not been able, owing to many causes, to complete that statement; but I will be able to do so if I can obtain an extension of time.
4750. The Commission will not meet again until the 10th May? Then I will have it ready by that time.

[The Commission adjourned.]

THURSDAY,

THURSDAY, 14 *JUNE*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, ESQ.

William Christopher Bennett called in and further examined :—

W.C. Bennett. 14 June, 1888.

4751. *Chairman.*] Did you receive a letter from the Commission forwarding to you a statement made by the Mines Department of the 14th May, 1888, that in your evidence a certain statement appears to the following effect: "It is usual for one Department to ask another for any papers that are required by Parliament, and we received no such request." To this statement the Mines Department have taken exception, and to bear this out they enclose a letter dated 10th November, 1887, showing that a letter had been written to the Works Department requesting certain papers which were specified in that letter. And we have it here that as far as the request contained in that letter is concerned, it has been complied with by your giving all the papers in your possession? Yes. I would like to read this letter:—

Department of Public Works, Sydney, 28 May, 1888.

In reference to the papers from Mines forwarded to me by the Tanks and Wells Commission, asking an explanation of the evidence given by me,—That this Department was not asked for papers.

To comply with order that copies of all papers, minutes and reports, and all other correspondence between Works and Mines should be laid upon the table of the House.

The Mines letter herewith is not to that effect, but asks for certain specific papers, the Mines numbers of which apparently have been only given, as no such numbers could be found in the registers of this office; and as will be seen herewith a reply was sent forwarding such papers as could incidentally be traced, stating that if some idea of the subject matter of the others was intimated every endeavour would be made to trace them. No reply was received. Such an application giving the numbers of certain specific papers was never thought to refer to compliance with order (that all papers should be sent) and was regarded in this office as a request for papers in connection with some of the many annual or other Parliamentary returns made out by the Mines.

I send herewith an example from the Lands of usual form asking for papers;—no such paper was sent from the Mines.

The letter from the Mines of the 30th November, on the face of it, bears out the inference that even if the papers were required for this return the Mines only wanted such papers as supported their view of the case, or they would have asked for all papers of the character defined in order of the House, and not for specific numbers.

I still maintain that the usual application was not sent, or I would have seen that the papers referred to in my evidence were forwarded. I since gave them to the Secretary of the Commission. They were in the possession of the Minister for Works until date stamped in blue.

I now refer the Commission to those papers, and more particularly to Mr. Stilwell's report, which sums up a number of cases the original papers of which can be produced, and which I do not forward as only adding to the immense mass of documents already submitted.

I forward a copy of a memo. of mine, dated 8th February, protesting against the publication of the Blue Book in the way in which it was done, and in which I state that the compilation was without reference to this office. I think the original was sent to the Commission.

WILLIAM C. BENNETT.

To the Chairman, Tanks and Wells Commission.

8 February, 1888.

Order to lay Tanks and Wells papers on the table of the House.

YESTERDAY Mr. Mahon, Secretary of the Tanks and Wells Commission, handed me a copy of a printed document purporting to be copies of papers passing between the Departments. This included the case against this Department as stated by the officers of the Mines; also a most incoherent and untruthful letter of Mr. Earngey, a discharged officer of this Department; omitting several most important papers, amongst others my reply to the charges of the Mines office, and several papers by Mr. A. P. Wood—in defence of the Department. I think it is unnecessary for me to point out to the Hon. Secretary for Public Works that papers compiled in this way, introducing letters foreign to the subject of order and omitting important documents which tell against the Mines, should not be sent forth to the public as officially correct.

The papers were compiled by the Mines officers without any reference to this Department, and I think a request should be sent to the Speaker to have the papers withdrawn until corrected by this office, and the missing papers added.—W. C. BENNETT. Submitted, 8/2/88.

As these papers have been printed and commented on by the press, I do not think it advisable to take any steps for having them withdrawn as suggested, but if Mr. Bennett will furnish copies of the papers he refers to as omitted, I will lay them on the table of the House as a supplement to those prepared by the Mines Department.—J.S., 8/2/88. Mr. Bennett, B.C., 8/2/88.

I will, as soon as possible, collect the missing papers, but I would record my opinion that putting an *ex parte* statement of this sort before the public is unjust. With reference to the sweeping statements made by Mr. Earngey, I forward papers in his case, attached to which is a pamphlet by that gentleman which I have to apologise for submitting as an official paper, and only do so as it is the best evidence as to the state of his mind, as stated in my minute.—W.C.B., 9/2/88. Under Secretary.

4752. Then you think the exception taken with regard to your evidence has not been borne out by the letters sent in by the Mines Department? Certainly not. I should give the same evidence now.

4753. And you still assert that, to a certain extent, this Blue Book was *ex parte* and unfair to your Department? Yes; and I will quote one remarkable instance. In the case of Mr. Earngey, a discharged officer of the Roads Department, a letter was written by him and published in these papers, full of grave accusations. That letter was never submitted to me for report, but was published at once in these papers. I have since forwarded a mass of papers to the Commission proving how totally unreliable is any statement of Mr. Earngey's for any purpose. I never thought that any letters of this sort could have been required by the Mines, because they were matters of every day intercourse between the Departments—asking for certain papers.

4754. If you had known that these papers were about being published and you had papers in your possession that could have thrown some light on the allegations, would you have sent them in? It was my duty to know that the papers were about being published and that Parliament had called for them. But it was not for me to volunteer these papers, and I was awaiting the usual formal letter asking for them. I wish to hand in certain papers marked "Department of Roads and Bridges, consideration list," and I declare that the statements made in them are true to the best of my belief.

[The Commission adjourned.]

TUESDAY.

TUESDAY, 21 *AUGUST*, 1888.

The Commission met at the Holy Box Well.

Present:

HON. G. H. COX, M.L.C., CHAIRMAN.
MAJOR PENROSE, R.E.

Thomas Pollard called in and examined:—

T. Pollard. 21 Aug., 1888.

4755. *Chairman.*] Please state who you are, and how this watering place has been used by travelling stock during the time you have been caretaker? I have been caretaker at this watering place for three years. When I first took charge, travellers would not bring stock to water through the well bearing a bad name. It is very rare for a mob to pass now without watering when there is no natural water about. I induced one or two drovers to try the water, and they proved it to be excellent stock water. Now, I have plenty of custom. There is a tank close by belonging to Mosgiel station, where many drovers and teamsters get water at night time for nothing. This is done without the consent of the lessee, otherwise I should have more custom. In April, 1886, rains began, so that the well was not required. In October, 1887, stock began again to water in fair numbers, and the demand for the water has been pretty regular since, except when there was water on the road. My takings were:—October, £8 6s. 2d.; November, 5s. 4d.; December, £4 8s. 8d. January, 1888 (rain fell). February, £10 0s. 8d.; March, ——; April, £4 1s. 4d.; May —— (rain in May); June ——; July, £2 19s. 8d.; August 1–20, £5 1s. 6d. I am also watering 5,000 sheep from Canoble Station, since 14th August, which I understand pay 80s. per thousand per month.

4756. Has the water improved since you came? I am sure of it—through continued baling. I bale three or four times a week. If it remains stagnant in the tank it gets bad, both in smell and taste.

4757. Do you find incrustations of salt in the troughing? Not since the baling has been regular.

4758. Have you ever had any complaint of the water from drovers? No, not when they brought their stock to drink.

4759. What is the greatest number of stock you have watered at one time? 24,500, in two days. The well was only just capable of giving the necessary supply in the time—although the service tank was full when they came—owing to a runner being displaced at bottom of well 25 feet under water 5 feet from bottom. If the runner was right I could water all the sheep in the country, but now I dare not let the buckets nearer than 10 feet from the bottom where the spring of water is.

4760. How much do you find sheep drink of this water? 12,000 odd sheep drank all the water in my service tank in one day.

[The Commission adjourned.]

THURSDAY, 23 *AUGUST*, 1888.

The Commission met at Clare Station.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.
MAJOR PENROSE, R.E.

John Waugh called in and examined:—

J. Waugh. 23 Aug., 1888.

4761. *Chairman.*] You are one of the lessees of Clare station. Yes. I have had considerable experience in pastoral matters.

4762. Clare station is dry country? Yes; we have had to go to great expense in making, first wells and then tanks, because we found the wells unsuitable for profitably keeping sheep to grow wool. I think tanks are better than wells in this part where the well water is brackish.

4763. Do you think the Government expenditure on the Ivanhoe-Balranald road, in connection with public watering places, has been judiciously spent? Yes, as regards the tanks. I have not seen enough of the wells to speak positively, but whether it is the fault of the caretaker not baling sufficiently or not, it is certain that the Dolmoreve well is not good stock water as supplied to the public. I think it probable that if baled regularly and the service tank and troughing are kept cleaned out often, it will keep it purer. I am a great advocate for constant baling and cleaning out of tanks and troughs in this country.

4764. Do you think the Government were fairly chargeable with extravagance in the construction of the tanks near here? I do not think that the tanks made near here—Clare and Gunaramby—could be executed under the conditions they were, under 1s. 6d. to 1s. 9d., the conditions were so unfavourable as regards grass and water. The contractors for Clare had to cart water from my tank, 7 miles for fresh water, and 6 miles for water for horses, and they had to cart their horse-feed from Hay and Balranald, 135 miles and 125 miles respectively. I also think the buckle-plate service tanks are admirable.

4765. Do you find any fault with the sites of Clare and Gunaramby? I think Gunaramby might have been a couple of miles further north, but I talked it over with Mr. Gordon, the engineer, when he was choosing the site, and pointed out the site referred to; but he objected that it would not divide the distance properly. I preferred this other site simply because I considered it had a better catchment. I think the Clare site is a very good one.

4766. Do you consider that one public watering place would be enough between Clare and Ivanhoe? No; I asked for three on this line. I think, if suitable sites can be obtained, watering places should be every 12 miles on main travelling stock routes; and I also think that in future the tanks should be made double, *i.e.*, with a bar in the centre, so that when the tank gets low the water can be pumped from

one

one into the other to allow of the silt being cleaned out. I am adopting this principle on this run with great success. The water can be run back, half of it with a syphon. I use a centrifugal steam-pump to travel about for this purpose, and also for the purpose of pumping water from the swamps into the tanks. John Waugh. 23 Aug., 1888.

4767. Can you give any suggestions with regard to the management of the tanks? In the first place, I think that the caretakers' paddocks and tanks should be made rabbit-proof, if only to test the system, and also because it will be no use our wiring in our tanks so as to trap them if the Government tanks are left open. Also, the tanks should be leased. If not leased, the caretaker should be allowed to take in working stock in agistment, which would help to defray expenses.

4768. Do you think it desirable that every one using the stock routes should have to pay a watering rate when getting his permit? Yes, if the rates were reasonable, and about half of the present rates. I also think that all these matters could be far better managed by local boards, such as the Stock Boards.

4769. Do you think it advisable to have the travelling stock route fenced off from the leases? I do not think it would be advisable, except on short lines near railways such as Booligal to Hay, and Hillston to Carrathool, where large amounts of travelling stock congregate.

[The Commission adjourned.]

WEDNESDAY, 29 AUGUST, 1888.

The Commission met at Hay.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E.

John George Carew-Gibson called in and examined.

4770. *Chairman.*] What is your occupation? Roads overseer in the Hay district. J. G. C. Gibson.

4771. Have you lately visited Tom's Lake tank? Yes; on the 9th of May.

4772. Did you take soundings of the tank? Yes; from south to north near the middle of the tank. I produce a diagram showing section of the tank as sounded by me. 29 Aug., 1888.

4773. What depth of water did you find? 14 feet 6 inches in the centre.

4774. How far was the water behind berm level? About 2 feet 6 inches. If the tank had been sunk 18 feet this would show one foot of silt.

4775. Did you examine the drains at Tom's Lake tank? Yes; on the 17th March.

4776. What state were they in? The east main drains wanted clearing badly. Apparently the east main drain had no connection with the tank; the drain was dammed up.

4777. *Major Penrose.*] Do you think that drain would bring water to the tank if allowed to? Yes; I think it would bring a large quantity. I have often noticed water standing in the drain.

4778. *Chairman.*] In what condition was the silt tank on the eastern side? It was full of silt and no water in it.

4779. Do you think it possible that all that silt could have been brought in to that tank unless this drain had run water into it at some time or other? I think it is very unlikely.

4780. *Major Penrose.*] Is there any other drain in connection with this silt tank? I think there is one in a south-east direction, but am not quite certain.

A. W. Stilwell called in and further examined.

4781. *Chairman.*] Has the flume at Hulong tank been lowered? Yes. A. W. Stilwell.

4782. How much? About 1 foot.

4783. Was this done after delivery to Mines Department? I think so. 29 Aug., 1888.

4784. Why was this flume lowered? It was put in defectively by the contractor as regards level and jointing of the pipes.

4785. Was the contractor paid for this work? No. The work was never passed as given over by the original contractor.

4786. What steps did you take as regards the finishing of the work as left by the first contractor? We re-let the completion of the excavation to another contractor, and the other incomplete works were finished by day labour—such as the drains and embankments.

4787. Was the work completed by day labour considered satisfactory? Yes; except in regard to the drains. These were left in a very bad state by the contractor; not properly graded through the uneven swamp ground. I purposed getting these gradually put right by a man I had in charge there. This man was so employed when the Mines took the work over.

4788. Were the Mines informed of the incomplete state of the works? I rather think they were with regard to the drains, but not as regards the inlet shoot, which I knew I should have to do myself by day labour.

4789. Did the Mines Department make any demur at taking the work over in its incomplete state? Not so far as I remember.

4790. Did the Mines clearly understand that the flume would require alteration? I do not think so. It was desirable to alter flume, otherwise we should have lost a lot of water in the swamp before it would have run into the main tank.

4791. By whom was the flume eventually lowered? By men working under me.

4792. How long after being handed over to Mines? About a month. The work was not quite completed at time of handing over. I handed over on 13th July, 1886, and the fluming alteration was completed on 17th August, 1886.

4793. Is it usual for the Mines to take over work incomplete? No; not usual, but sometimes done.

4794. *Major Penrose.*] Do the Mines Department in taking over make any tests as to the levels of drains, &c.? No, not to my knowledge.

4795. Then they practically acknowledge to receiving the work in good order? They give a receipt in which everything is specified in detail, stating that everything is in good order and condition. If any detail is still incomplete it is noted in this receipt. 4796.

A. W. Stilwell. 29 Aug., 1888.

4796. Then it is open to the Mines Department to make any examination they think proper as to levels of flumes, silt tank, drains, &c., and to make objections under these heads at the time? I should think it was their duty to do so.
4797. What water is there now in Hulong tank? On the 27th July, 15½ feet of water.
4798. Is this drain through the centre of swamp now effective? No.
4799. Could it easily be made so? Yes, at no great cost. I think there is a misapprehension in regard to that drain on the part of the Mines Department officials. It was not intended to take water from the swamp, but as an aqueduct through the swamp conveying water from the higher ground the other side of the swamp. Also, the drains can never actually fill the tank to berm level until the swamp becomes full, when the valve can be closed and the water retained.
4800. *Chairman.*] Is not this an admission that the tank is placed on an injudicious site? No; the tank was properly placed on the edge of the swamp to obtain sound ground for the appliances and apparatus to them.
4801. *Major Penrose.*] To what level will the drains fill the tank without the swamp getting filled? Speaking roughly, to about a foot below berm level.
4802. *Chairman.*] It was not because you saw water lying in the drains that you altered the level of the flume? No, it was one of the defects left by the original contractor which had to be made good at his cost.
4803. *Major Penrose.*] Did you extend the drains after handing over, and why? Yes; the drains cut at first were not to the full extent intended. I always intended to extend them to their present extent.
4804. When was this done? On the 12th August, 1886, I set out 130 chains extension of then existing drains.
4805. *Chairman.*] Are you aware of the reason why the contractor threw up his original contract? He sent me word that his excavation was finished. On inspection I found it was not done according to specification, and of course refused to pass the work. I pointed out the defects, the chief of which was that the tank was not excavated to the full depth of 18 feet. He, having his roadways taken out then, said that he could not take out the remainder, and in fact elected to be dealt with as a defaulter rather than finish the work. On a subsequent visit, shortly after, I found that he had removed his plant, and as soon as possible afterwards the completion of the work was re-let to another man.
4806. Did you also point out to him the faulty setting of the flumes? Yes; and also the defective construction of the embankments and drains. When all was measured up and passed the retention money was more than sufficient to pay for the completion of the work.
4807. Having visited a number of public watering places in your district, we wish to ask you a few questions in regard to them. What is the cause of the water breaking out a new channel through the northern end of the embankment conducting the water into north drain at Tom's Lake tank? In my opinion it is owing to the drain being obstructed by the silt and vegetation—I have seen dead sheep in it amongst other things—preventing the flow, and causing the water to rise higher in the swamp or creek than was originally anticipated or provided for.
4808. Are you aware that at present there is no drain leading into the upper silt tank? Yes.
4809. Why does this drain not lead water into this silt tank? The drain has been dammed and the bank cut through, and the water led into the swamp instead of into upper silt tank.
4810. At whose instance was this done? I cannot say positively. It certainly was not at mine.
4811. No use can now be made of the embankments of tanks to conserve water above the berm to any great extent? No; not more than a foot or two if the swamp is full. Fully 6 feet could be conserved over the berm if the northern drain had been left and maintained as originally constructed.
4812. *Major Penrose.*] Did this damage to the upper drain occur while the tank was in charge of the Mines Department? Yes; most decidedly.
4813. Have you ever known water to run down this drain to the upper silt tank? I have not known water to flow right through from the creek or swamp, but there is a small catchment above the drain from which water has flowed into the silt tank during my supervision; but the drain has not acted for the purpose for which it was intended since I have known it, and that is owing to its being obstructed.
4814. Would this small catchment you speak of run water before the creek or swamp? Yes.
4815. *Chairman.*] We noticed an imperfect inlet flume at Box Creek tank whereby the water is allowed to run back again as the creek falls, owing to the valve being out of repair—whose business is it to repair it? The Mines Department profess to do small repairs of this nature. I think the caretaker should be competent to do what is wanted there.
4816. We also noticed a quantity of iron pipes and a screw-down valve lying there unused. What was this for? I presume it was intended for an inlet flume, but cannot state positively, as it was there many years before I came.
4817. *Major Penrose.*] The tank has had 19 feet 6 inches of water in it. The gauge now reads 12 feet 6 inches, and the water is 1 foot 6 inches below flume, so that it is 14 feet depth from bottom of flume. Owing, therefore, to this defective valve, 5 feet 6 inches of water has been lost owing to the fall of the creek outside. Do you not think, therefore, that a more perfect inlet with a better form of valve should be provided? Yes; if that step is necessary to prevent a similar loss of water in future.
4818. Is it your duty to initiate such a repair, or that of the Mines Department, in whose charge the tank is? That is a question which has never been settled.
4819. *Chairman.*] We visited the Willandra well and found one shaft filled up, and a new shaft a few yards off incomplete and apparently abandoned, and no water for travelling stock, with head works all completed. What reason have you to give for this apparent extravagant outlay without any satisfactory result? The amount paid to contractor on account of this first shaft, whim, tank and troughing, &c., was £900. The contractor failed to penetrate the drift, and got the shaft out of plumb near the bottom, and it was found impracticable to rectify it. This shaft was therefore abandoned and a new one sunk—somewhere about £200 retention money being forfeited. The second contractor on the original shaft also failed, and received no payment whatever; the third contractor, who sank the existing shaft, also drew the timbering from the old shaft, removed the whim to its present site, and failing to carry the shaft down through the drift received only £52, so that the cost of the works up to the present time has been considerably less than that of the original contract, and I consider it still possible that the work may be completed and a supply obtained at a cost exceeding by very little, or any, that of the original contract.

4820. What are the intentions of the Works Department under the circumstances? To put a bore down from the bottom of the present shaft, to tap a supply lower than that at the bottom of the new shaft. We propose to stanch the bottom of the shaft with concrete; say, if we find a good supply at a lower level by boring, such as has been found I believe in the adjoining station of Kilfera. A. W. Stilwell. 29 Aug., 1888.
4821. We observed a fine dam in the Willandra Creek, within a few yards, containing a large though shallow supply of water. Could not a tank in connection with a dam have been made at this spot to give a permanent supply? I do not consider that site suitable for a tank because the supply would have to be obtained from the flowing of the creek, which occurs at rare intervals. The dam there was dry for several years before the last wet season. There is not sufficient local catchment for a tank in my opinion at that site.
4822. Would not your remarks apply in the same way to the Box Creek tank and dam? No; because that creek runs more frequently, and there is also a local catchment.
4823. Then you think the Works Department was justified at the time in placing a well at Willandra? Yes; bearing in mind the fact that wells are so much cheaper, as a rule, than tanks.
4824. With regard to expenditure, we noticed that a drain at Ivanhoe tank had not been properly completed or constructed. Which Department should be charged with carrying out that work? The construction of the drains, of course, pertains to the Works Department, but in this case the grading of this length was being done by the man employed by me as caretaker previous to the work being transferred to the Mines. I pointed this out to the Mines overseer when the transfer was being made, and I understood that he would let the man complete the work. He made no objection to it at the time. The work, however, has not been completed, and that extension of the drain is accordingly ineffective.
4825. We found in some instances the caretakers or lessees cleaning out the silt tank; in another case the caretaker professed he did not know who had to do it, and in yet another case the lessee objected that the silt tank was full when he took the lease, and that there was an understanding that it should be cleared out for him, which has not been done. We should like to know whose business it is to attend to this important duty? The caretaker's, in my opinion. I cannot say about the lessees, as I do not know the terms of their leases.
4826. Again, under the heading of expenditure, we were given to understand that you provide new buckets at wells when required. This being a small matter, how is it that you still retain control over such matters? We have always supplied new ropes and buckets at wells when required, the Mines Department applying for them. I have a stock of ropes and buckets in store for the purpose.
4827. In the event of machinery breaking would you also make it good? We have always done so.
4828. Then if maintenance is only carried out by the Mines Department, how comes it that you have occasionally cleaned out a silt tank without reference to the Mines Department? There is no definite arrangement or understanding between the two departments on these matters. I, of course, cannot instruct the Mines caretakers to clean out a silt tank; and I do not know that it is even included in his specified duties.

[The Commission adjourned.]

THURSDAY, 13 *SEPTEMBER*, 1888.

The Commission met at 10 a.m.

Present:—

HON. G. H. COX, M.L.C., CHAIRMAN.

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

William Christopher Bennett called in and further examined:—

4829. *Chairman.*] I believe there are certain papers you would like to put in evidence? Yes; I put certain vouchers in as a return of payments made in the office. (*See Appendix.*) W. C. Bennett. 13 Sept., 1888.
4830. I believe some other papers in your Department were too late for publication in the papers submitted to Parliament by the Mines Department? Yes.
4831. This is a statement of the cost of the tanks and wells and dams? This appears to be a copy prepared by the Mines Department. It may be a true copy from the original in my Department, but I cannot say. I will admit that it is correct.
4832. Then the return sent in from your Department, dated 3rd February, 1888, signed by John Rae, was a statement of the cost of tanks up to that period? Yes; up to that period. (*See Appendix*).
4833. The return sent to the Commission on the 6th February requests us to compare the returns of 1888 with some previous returns of January, 1885, and that it would be seen there was a considerable discrepancy between the two returns; can you show how this occurred? That no doubt occurred in additions, alterations, maintenance, supplying machinery, fencing and carriage.
4834. Are these amounts likely to be increased by any future works? It is possible but not probable, because in February the works were much more complete than when the other returns were sent in.
4835. *Major Penrose.*] Then an account for particular works may remain open for some time? Yes; the carriage was one of the chief items. We could not get the accounts from the carrying firm and this caused a delay.
4836. *Chairman.*] Have you lately had to supplement the cost of any of your works by an expenditure for completing them? Yes; in Bevan's case for instance; but it can hardly be called supplementary cost, because it was a part of the original contract for fencing. The fencing had been ordered by the Mines Department long after the completion of the other works.
4837. *Major Penrose.*] Then in putting in a return of the cost of a work, this return would only show the actual cost up to the date and not the projected cost? No, not the projected cost. A great deal of additional expenditure has been incurred in works of maintenance. In my previous evidence I stated that the receipted vouchers showing the cost of excavation of certain watering places were available, but I now find that the vouchers are destroyed by the Audit Department at the end of seven years. I have our own copies of same with all the official brands on them. I will hand them in as the best evidence available as to the price paid; also the bonds. These are the final vouchers (duplicate copies) sent in to our office. (*See Appendix*). I now put in the instructions referred to in my answer to question, which are to

W.C. Bennett. 13 Sept., 1888. to the following effect:—"9. The tenders to be opened in the presence of the Police Magistrate or Clerk of Petty Sessions or of a Local Magistrate in their absence. All tenders to be numbered and initialled by the officers and the magistrates, and the schedule on the proper form to be filled in and signed by both. The officer will then without any reference to the magistrate, whose duty ceases with the opening of tenders, forward the tenders with recommendations, accompanied by plans and specifications, if any." I also put in a number of papers with regard to fencing. With reference to my statement at page 156 (*Question* 3277), I may say that Mr. Bruce's estimate for huts will be found at page 135 of the papers prepared for Parliament by the Mines Department. I also put in original bonds and agreements for the 12-Mile and 35-Mile tanks, the excavation of which was said to have cost 2s. 6d. per cubic yard. (*See Appendix*). I put in further some plans with respect to Hovell's dam.

David William Gregory called in and examined:—

D. W. Gregory. 13 Sept., 1888

4838. *Chairman.*] What is your position? I am inspector of accounts in the Department of Audit.
4839. What is done with vouchers received by you? They go to the examining branch if the rates and computation are checked. If a contract exists the contract rates would be checked.
4840. What becomes of the vouchers ultimately? If there are any arrears, or any question arises, they are submitted to the Auditor General. The vouchers are then returned by the Department of Audit. I see the forms produced; similar vouchers may be in our office. Last year we destroyed all vouchers up to the end of 1879.
4841. *Major Penrose.*] Can you produce the receipted vouchers corresponding to these? I do not think so, because they do not show the date of payment.
4842. *Mr. Woore.*] Can you say that the receipted vouchers for the work shown therein have been destroyed? I cannot say; it depends on the date of payment whether they are destroyed or not. I can produce them if they are not destroyed.

(The witness was allowed possession of the vouchers in order to obtain the duplicates.)

Arthur Pepys Wood called in and further examined:—

A. P. Wood. 13 Sept., 1888

4843. *Mr. Woore.*] It was stated in evidence by Mr. Quin that there is a three or five chain road right down to the water at Menaunurtee—was the road made there by your Department for the purpose of watering stock? I do not know of any such road.
4844. When the site was determined on for the Ivanhoe tank, where you sunk the trial holes at the Box Swamps, were any steps taken to secure the land from selection? No.
4845. Why not? It was an omission on our part, I presume.
4846. *Chairman.*] Are not these tanks and wells sunk on the travelling stock routes? In this case the site was off the route, and we never dreamt of anyone selecting it; we adopted the usual practice, taking no exceptional steps. I produce a general type plan of tanks (marked A) detailed plan (marked B) showing appurtenances; and detailed plan (marked C).
4847. Why was the Amos & Smith's substituted for the old Coleman pump? In the first place, the former gives a greater discharge; in the second place, it is self-contained on a rigid bed-plate, and there is not the same chance of extra friction arising from displacement of the parts. Besides it threw a greater volume of water and is more easily and more cheaply worked.

[The Commission adjourned.]

SATURDAY, 15 *SEPTEMBER*, 1888.

The Commission met at 10 a.m.

Present:—

MAJOR PENROSE, R.E. | J. C. WOORE, Esq.

In the absence of the President the Chair was taken by Mr. Woore.

Arthur Pepys Wood called in and further examined:—

A. P. Wood. 15 Sept., 1888

4848. *Witness.*] I now produce original minute by Mr. Abbott, of 3/7/84, referred to in my evidence of 16th March last, for the inspection of the Commission. I also produce for inspection original report *re* Roto well, dated 16/4/82, and Mr. Gilliat's minute thereon of 16/5/82, approving of the sites, and I now produce in reference to my evidence *re* Holy Box well, on 22nd March last, the original vouchers showing payments made on account of that work—showing that these payments, amounting to £1,088 18s. include cost of top works, in addition to sinking and slabbing—in fact everything in connection with the making of the well except the fencing of the special lease area.

[The Commission adjourned.]

LIST

LIST OF APPENDICES.

	PAGE.
I.—Return showing cost of Public Tanks, Wells, and Dams, and Machinery for working same	240–1
II.—Return showing Wages paid and Revenue received from Public Watering Places for the years 1886 and 1887, and a portion of the year 1888	242–6
III.—Abstract showing prices paid per cubic yard for Excavating Tanks	246–7
IV.—Concerning proposed Transfer of Construction of Public Watering Places to Mines Department	248–55
V.—Earlier Specification under which Tanks were completed...	255–6
VI.—Later Specification under which Tanks were completed	256–7
VII.—Specifications for Erection of Caretaker's Cottage, under Roads Department (A and B)	258–9
VIII.—Specification for Erection of Caretaker's Cottage (iron) in Silverton District, under Mines Department	259
IX.—Specification for Gates for Public Watering Places, recommended by Chief Inspector of Stock	259
X.—Report of the Inspector of Public Tanks and Wells on Repairs and Alterations recommended as urgent...	260
XI.—Report of the Chief Inspector of Stock on Proposals by the Inspector of Public Tanks and Wells of 20th January, 1883	260–1
XII.—Report of Inspector of Public Tanks and Wells on New Works proposed for 1884 ...	262
XIII.—Abstract of Reports on Tanks and Wells in the Hay District, by A. W. Stilwell ...	262–4
XIV.—Report on Composition for Service Tanks, and on General Control of Tanks, by A. P. Wood	264–5
XV.—Letter from A. H. Doudney to F. A. Franklin, C.E.	265–6
XVI.—Public Watering Places Act	266–7
XVII.—General Type Plan of Tanks	269
XVIII.—Plan of Caretaker's Cottage, constructed under Roads Department	271
XIX.—Plan of Caretaker's Cottage, constructed under Mines Department	273
XX.—Twelve-foot Field Gate erected by Works Department at Public Watering Places ...	275
XXI.—Sketch of Gate for Public Watering Places, recommended by Chief Inspector of Stock	277
XXII.—Cross-section of Tom's Lake Tank...	279
XXIII.—Map of the Colony, showing Stock Routes, Public Watering Places, &c.	281

APPENDIX.

I.

RETURN showing cost of Tanks, Wells, and Dams; and Machinery for working same.

Road.	Watering Place.	Earthwork, Shoot, Fencing, &c.	S. tanks, Troughing, Machinery.	Total.
		£ s. d.	£ s. d.	£ s. d.
Deniliquin to Hay	Pretty Pine well Wangonilla well	.....	.....	1,072 0 5
	Pine Ridge tank	2,155 9 1	515 7 4	2,070 16 5
	Black Swamp tank	1,420 10 8	414 1 4	1,834 12 0
	16-Mile Gums tank	1,186 7 8	571 1 4	1,757 9 0
Tocumwall to Jerilderie	Murray Hut well Berican Creek well	.....	.....	2,225 15 3
Hay to Booligal	Woolloondool well	.....	.....	1,756 5 7
	One Tree tank	2,398 14 10	740 2 4	3,144 17 2
	Quandongs tank	1,742 11 2	639 1 1	2,381 12 3
Booligal to Wilcannia	Tom's Lake tank	2,149 6 1	614 1 8	2,763 7 9
	Jumping Sandhill well	.....	.....	1,124 12 1
	Lignum Hut well	613 5 3	597 16 7	1,211 1 10
	Mossgiel tank	1,764 13 7	776 0 10	2,540 14 5
	Holy Box well	.....	.....	1,064 9 9
	Ivanhoe tank	2,011 15 11	699 7 6	2,711 3 5
	Boonoona tank	.....	587 4 2	.....
	Ward's tank	1,413 11 9	637 0 0	2,050 12 6
	12-Mile tank	.....	.....	3,333 4 3
	26-Mile tank	1,387 17 10	469 5 11	1,857 3 0
	35-Mile tank	2,931 3 10	667 6 0	3,598 9 10
	48-Mile tank	2,590 9 1	435 4 2	3,025 13 3
Mossgeil to Paddington	Carowra Swamp tank	1,926 19 3	568 15 3	2,495 14 8
Balranald to Ivanhoe	Dowdigar's tank	.....	.....	1,066 19 9
	Box Creek tank	1,866 19 2	623 16 4	2,490 15 6
	Youhl Plains tank	2,253 8 7	516 16 3	2,770 4 10
	Til Til tank	2,164 16 3	593 7 4	2,758 3 7
	Dolmoreve well	1,219 9 10	.....	1,219 0 10
	Clare tank	2,019 4 10	639 9 0	2,649 14 4
	Gunnaramby tank	1,818 14 0	578 11 0	2,395 5 0
	Willandra well	.....	.....	1,087 5 8
Carathool to Hillston	Dry Lake well	.....	.....	794 4 0
	Gunbar well	.....	.....	1,555 1 11
	Crows' Nest	.....	.....	1,130 7 2
Whitton to Euabalong	9-Mile or Ulong tank	1,440 14 4	504 11 0	1,945 5 4
	Mount Elliot tank	1,185 5 3	515 17 2	1,701 2 5
	Pulletop tank	1,511 1 6	557 6 10	2,068 8 4
	Waterman's tank	.....	.....	40 16 4
Narrandera to Grenfell	Harman's tank	.....	.....	360 0 0
Hillston to Cobar	Roto well	.....	.....	1,181 4 0
	North Roto well	.....	.....	1,206 16 3
	Merri Merriwa tank	2,530 12 6	723 17 11	3,254 10 5
	Wagga tank	2,601 11 6	587 18 9	3,189 10 3
	Rock Holes tank	2,565 5 0	382 3 8	2,947 8 8
	Sandy Creek tank	2,240 16 6	565 9 3	2,806 5 9
	Priory tank	2,252 13 7	476 14 0	2,729 8 4
	Shearlegs tank	2,538 16 5	407 9 8	2,946 6 1
	Gibbs' tank	2,281 16 6	552 14 0	2,834 11 3
Condobolin to Cobar	Mowabla tank	2,061 6 11	550 19 3	2,612 6 2
	Boona tank	2,285 9 4	574 14 8	2,860 4 0
	Tinda tank	2,450 5 0	600 0 11	3,056 6 8
	Mombil tank	1,960 5 0	598 7 0	2,558 12 0
	Wicklow tank	2,221 11 8	527 2 6	2,748 14 2
	Belonra tank	2,290 0 9	539 2 1	2,820 2 10
	Nymagee tank	2,418 6 8	522 5 7	2,940 12 3
	Keighran's tank	2,498 0 0	567 13 2	3,065 15 2
Nyngan to Cobar	Hermitage tank	3,038 1 7	660 14 11	3,698 16 6
	Muriel tank	1,456 13 2	505 14 2	1,962 7 4
	Booroomugga tank	979 4 3	481 12 0	1,460 16 3
Nyngan to Nymagee	Thorndale tank	2,051 16 7	484 8 0	2,536 4 7
	Gilgais tank	1,514 19 6	495 19 4	2,010 18 10
	Bahinda tank	2,309 14 1	537 9 1	2,847 3 2
Cobar to Wilcannia	Leslie's tank	1,674 1 3	512 11 11	2,186 13 2
	Meadows tank	.....	.....	958 11 7
	Springfield tank	.....	.....	1,206 3 4
	Barnato tank	.....	.....	786 12 11
Cobar to Louth	Cuttygullyaroo tank	1,200 9 11	598 3 3	1,798 13 2
	Booroondarra tank	2,233 19 5	569 16 0	2,803 15 5
	Kerrigundi tank	2,202 15 0	725 8 7	2,928 3 7
	Mulya tank	1,222 0 3	584 10 0	1,806 10 3
Cobar to Bourke	Cobar (stock) tank	880 5 5	.....	880 5 5
	Cobar (town) 2nd tank	8,743 16 3	.....	8,743 16 3
	Nullimut tank	966 11 0	461 1 9	1,427 12 9
	Tindarie tank	977 8 8	472 4 3	1,449 12 11
	Hillman's tank	1,620 15 10	550 2 9	2,170 18 7
	Currawecna tank	1,118 14 1	463 0 8	1,581 14 9
	Corilla tank	1,303 12 0	520 12 4	1,824 4 4
	Two Waterholes tank	1,075 4 6	651 15 11	1,727 0 5

RETURN showing cost of Tanks, Wells, and Dams; and Machinery for working same—*continued.*

Road.	Watering Place.	Earthwork, Shoot, Fencing, &c.	S. tanks, Troughing, Machinery.	Total.
		£ s. d.	£ s. d.	£ s. d.
Bourke to Eringonia	The Lake tank	2,129 15 5	437 17 4	2,567 12 9
	Clay Pan Hollow tank	2,083 16 3	470 17 1	2,554 13 4
Eringonia to Brewarrina	18-Mile tank	1,599 13 9	582 13 2	2,182 6 11
	Lednappa tank	2,127 16 7	576 18 3	2,704 14 10
Bourke to Hungerford	Ford's Bridge tank	2,662 14 4	580 7 10	3,243 2 2
	Yantabella tank			756 10 10
Bourke to Wanaaring	18-Mile tank			
	Kulkine tank	Purchased for		850 0 0
Byrock to Brewarrina	Mulga No. 5 tank	1,586 15 1	488 12 9	2,075 7 10
	Nellie's Paddock tank	1,545 19 0	551 6 10	2,097 5 10
Trangie to Dandaloo	Derribong	2,212 11 6	442 1 2	2,654 12 8
Nevertire to Coonamble	Nevertire	1,872 15 10	510 12 5	2,383 8 3
	Bullagreen	1,281 14 2	813 7 10	2,095 2 0
Dubbo District	Girilambone	1,646 7 7	879 18 9	2,526 6 4
	Tomingley			837 11 0
Wilcannia to Hungerford	Scaville's	1,151 17 4		1,151 17 4
	Copago	1,741 11 9		1,741 11 9
	Peri Springs	1,549 7 6		1,549 7 6
	Yentabangee			
	Warramurtee	1,536 8 0		1,536 8 0
	Goomboolara			1,407 8 5
Wilcannia to Tibbooburra	Mulga Valley well			920 7 9
	Dry Lake tank			1,004 17 11
	Beefwood well			1,230 8 4
	Menamurtie well			967 3 1
	Tarella tank	1,101 13 4	378 9 10	1,480 3 2
	The Peak tank	1,635 11 10	377 7 9	2,012 19 7
	Murlippa tank	1,865 10 11	344 5 4	2,209 16 3
	Cobham tank	1,251 8 6		1,251 8 6
	Milparinka well	1,185 9 11	341 8 9	1,526 18 8
	Warratta tank	1,587 17 8	414 12 6	2,002 10 2
	Tibbooburra well			1,238 17 6
Silverton District	Silverton tank			
	Silverton well			5,749 2 1
	Rathole tank		510 7 5	
	Thackaringa tank	1,656 5 10	403 5 9	2,059 11 7
	Purnamoota tank	1,968 1 7	413 19 3	2,382 0 10
	Wilson's dam	1,533 19 9	387 15 6	1,921 15 3
	Broken Hill tanks			1,181 3 4
Walgett to Bangate	Boro Waterholes tank			2,379 18 6
	Lightning Ridge tank			2,729 7 10
	Narran tank	1,912 11 0	397 2 4	2,309 13 4
Barwon to Narran	Cumborah tank			2,518 3 1
Narrabri to Moree	Galathera tank	1,665 15 5	481 8 0	2,147 3 5
	Boggy Creek tank	2,058 9 0	570 17 7	2,629 6 7
Gunnedah to Coonabarabran	Normanstone well			1,000 15 3
	Baloola well			1,024 0 6
	Mannum well			828 8 6
Coonabarabran to Pilliga	Baradine well			1,001 16 1
Albury District	Jindera tank	1,023 2 0	379 18 4	1,403 0 4
	Walla Walla tank	1,336 2 3	239 7 10	1,575 10 1
	Carson's Swamp tank	819 11 6		819 11 6
	Brocklesby tank	948 0 0	528 12 4	1,476 12 4
	Lowesdale tank	1,215 15 9	471 16 11	1,687 12 8
	Dayadale tank	1,305 12 1	271 18 6	1,577 10 7
	Wallacetown dam	609 15 0		609 15 0
	Junee dam			
	Hurley's dam	511 4 6		511 4 6
	Major's waterhole	1,219 15 2		1,219 15 2
Wagga District	Coolaman tank	1,533 1 8	314 19 0	1,848 0 8
Warialda to Inverell	Whitecoaks well			620 1 11
Mount Hope	Mount Hope tank	1,845 2 0	486 4 4	2,331 6 4
Parkes to Bogan	Brolgan tank	1,283 2 10	567 5 9	1,850 8 7
Bourke to Wanaaring	Goonery well			450 8 7
Wilcannia to Tibbooburra	J.K. Waterhole well	1,095 6 0	390 0 0	1,485 6 0
	Coally dam	546 1 0		546 1 0

II.

Public Watering Places.

Return showing Wages paid and Revenue received for the Year 1886.*

Name of Watering Places.	Wages paid to Caretakers in 1886.	Revenue received.			Remarks.
		Fees collected by Caretakers.	Rent received from Lessees.	Total Receipts.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Amphitheatre Tank	111 17 6	11 18 9	.....	11 18 9	
Babinda Tank	127 15 0	30 6 10	.....	30 6 10	
Baradine Well	54 15 0	9 5 0	.....	9 5 0	
Belours Tank	127 15 0	3 16 2	.....	3 16 2	
Berrigan Well	.....	.....	20 0 0	20 0 0	
Black Swamp Tank	49 1 6	84 14 10	16 13 4	101 8 2	Leased, 1/9/86, £50 per ann.
Boggy Creek Tank	.....	.....	78 0 0	78 0 0	
Boona Tank	127 15 0	14 11 0	.....	14 11 0	
Boonoona Tank	231 3 0	60 13 6	.....	60 13 6	
Booroomugga	118 12 6	39 15 1	.....	39 15 1	
Booroondara Tank	70 14 0	29 19 6	16 5 0	46 4 6	Leased, 4/9/86, £50 per ann.
Booroorban Tank	.....	.....	85 0 0	85 0 0	
Boro Tank	109 10 0	9 10 4	.....	9 10 4	
Box Creek Tank	132 0 0	24 0 2	.....	24 0 2	
Brocklesby Tank	130 8 0	0 0 6	.....	0 0 6	
Brolgan Creek Tank	86 9 0	1 4 0	.....	1 4 0	
Brura Creek Tank	127 15 0	90 6 7	.....	90 6 7	
Bullagreen Tank	28 2 6	0 6 0	.....	0 6 0	
Bunghill Tank	118 12 6	1 10 8	.....	1 10 8	
Carson's Swamp Tank	70 0 0	.....	.....	.....	
Clare Tank	153 0 0	5 0 4	.....	5 0 4	
Claypan (Grass Hut) Tank	.....	.....	53 0 0	53 0 0	
Cobar Stock Tank	118 12 6	133 7 9	.....	133 7 9	
Colombo Dam	135 1 0	5 0 5	.....	5 0 5	
Coolaman Tank	84 6 0	0 6 2	.....	0 6 2	
Corilla Tank	.....	.....	40 0 0	40 0 0	
Corowra Swamp Tank	185 12 0	9 3 0	.....	9 3 0	
Crow's Nest Well	9 10 0	.....	40 0 0	40 0 0	Leased, 1/12 85, £40 per ann.
Curraweena Tank	146 0 0	54 7 0	.....	54 7 0	
Cuttygullyaroo Tank	127 15 0	62 11 9	.....	62 11 9	
Daysdale Tank	116 18 0	1 5 8	.....	1 5 8	
Dolmoreve Well	76 10 0	4 6 6	.....	4 6 6	
Dry Lake Well	103 12 0	26 6 10	11 13 4	38 0 2	Leased, 1 9 86, £35 per ann.
Eighteen-mile Tank	.....	.....	36 8 7	36 8 7	,, 1 9/86, £52 ,,
Ford's Bridge Tank	17 14 0	.....	56 15 6	56 15 6	,, 15/3/86, £80 ,,
Forty-eight-mile Tank	110 17 0	30 9 11	4 3 4	34 13 3	,, 1/12 86, £50 ,,
Galathera Tank	.....	.....	126 0 0	126 0 0	
Gilgaii Tank	91 14 0	50 9 9	35 0 0	85 9 9	,, 1/6 86, £60
Girilambone Tank	78 10 0	0 7 8	.....	0 7 8	
Goonery Artesian Well	.....	.....	60 0 0	60 0 0	
Gunnaramby Tank	71 18 0	0 4 4	.....	0 4 4	
Helman's Tank	128 8 0	95 14 8	.....	95 14 8	
Hermitage Tank	139 5 0	87 9 8	.....	87 9 8	
Holy Box Well	170 6 0	39 8 0	.....	39 8 0	
Hovell's Dam	75 8 0	11 5 9	7 10 0	18 15 9	Leased, 1 10/86, £30 per ann.
Hulong Tank	59 3 0	10 9 5	.....	10 9 5	
Ivanhoe Tank	29 12 0	9 19 4	.....	9 19 4	
Jindera Tank	130 8 0	5 2 10	.....	5 2 10	
Jumping Sand Hill Well	101 0 4	41 1 8	.....	41 1 8	
Junee Dam	104 18 9	.....	.....	.....	Stock water gratis.
Keighran's Tank	71 8 0	11 7 0	.....	11 7 0	
Kerrigundi Tank	70 0 0	27 1 6	16 7 10	43 9 4	Leased, 3/9/86, £50 per ann.
Ledknapper Tank	.....	.....	78 1 4	78 1 4	,, £110 ,,
Lightning Ridge Tank	118 12 6	16 1 8	.....	16 1 8	
Mannum Well	45 3 0	4 1 0	.....	4 1 0	
Merri Merriwa Tank	127 15 0	8 16 7	.....	8 16 7	
Mombil Tank	127 15 0	18 15 10	.....	18 15 10	
Mossgiel Tank	174 3 6	67 11 2	.....	67 11 2	
Mena Murtee Well	12 8 0	.....	.....	.....	
Mount Elliot Tank	64 8 0	7 7 10	.....	7 7 10	
Mount Hope Tank	127 15 0	7 11 4	.....	7 11 4	
Mount Manara Tank	129 2 7	25 4 1	.....	25 4 1	
Mowabla Tank	127 15 0	12 19 3	.....	12 19 3	
Muriel Tank	61 4 0	82 6 2	32 1 8	114 7 10	Leased, 1/6/86, £55per ann.
Murray Hut Well	.....	.....	20 0 0	20 0 0	
North Roto Well	110 10 0	4 6 5	14 0 0	18 6 5	,, 1/5/86, £21 ,,
Nullamut Tank	54 6 0	72 19 8	30 12 6	103 12 2	,, 1/6/86, £52 10s. ,,
Nymagee Tank	127 15 0	2 17 0	.....	2 17 0	
Old Gunbar Well	146 0 0	.....	.....	.....	Water bad.
One Tree Tank	228 12 0	87 10 0	.....	87 10 0	
Polygonum Hut Well	130 14 0	40 18 8	.....	40 18 8	
Pretty Pine Well	135 0 0	15 8 7	23 6 8	38 15 3	Leased, 1 6 86, £40 per ann.
Priory Tank	93 16 0	33 12 9	.....	33 12 9	
Pulletop Tank	85 15 0	13 3 8	15 0 0	28 3 8	,, 1/10/86, £60 ,,
Purnamoota Tank	55 4 0	.....	.....	.....	
Quandong Tank	38 14 10	60 19 0	.....	60 19 0	
Rat Holes Tank	76 16 0	50 10 1	.....	50 10 1	
Rock Holes Tank	127 15 0	29 0 0	.....	29 0 0	
Roto Well	126 10 0	0 0 4	15 6 8	15 7 0	Leased, 1/5 86, £23 per ann.
Sandy Creek Tank	127 15 0	20 13 9	.....	20 13 9	
Shearleg's Tank	.....	.....	50 0 0	50 0 0	
Silverton Tank	93 12 0	.....	.....	.....	
Silverton Well	120 0 0	2 16 9	.....	2 16 9	
Sixteen mile Gums Tank	146 0 0	73 15 0	.....	73 15 0	
Tambar Springs	6 0 0	.....	.....	.....	No charge made for water.
Thackaringa Tank	4 0 0	.....	.....	.....	Lately taken over.
The Lake Tank	.....	.....	50 0 0	50 0 0	

*Copied from Blue-book, prepared at the Mines Department, and laid on the table of the Legislative Assembly, 7 February, 1888.

RETURN showing Wages paid and Revenue received for the Year 1886—*continued.*

Name of Watering Place.	Wages paid to Caretakers in 1886.	Revenue received.			Remarks.
		Fees collected by Caretakers.	Rent received from Lessees.	Total Receipts.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Thirty-five-mile Tank	131 5 0	52 2 4	.....	52 2 4	
Thorndale Tank	127 15 0	78 0 3	.....	78 0 3	
Till Till Tank	109 10 0	4 13 8	.....	4 13 8	
Tinda Tank	122 17 0	3 1 2	.....	3 1 2	
Tindarie Tank	125 15 0	55 8 2	.....	55 8 2	
Tom's Lake Tank	.....	.....	51 0 0	51 0 0	
Twelve-mile Tank	.....	.....	57 0 0	57 0 0	
Two Waterholes Tank	.....	.....	52 0 0	52 0 0	
Wagga Tank	127 15 0	4 15 0	.....	4 15 0	
Walla Walla Tank	106 0 0	2 1 4	12 10 0	14 11 4	Leased, 1/10/86, £50 per ann.
Wangonella Well	89 0 0	1 0 6	.....	1 0 6	
Wicklow Tank	127 15 0	0 15 4	.....	0 15 4	
Wooloondool Well	94 7 6	66 1 11	18 6 8	84 8 7	,, 1/9/86, £55 ,,
Yeutabangee Tank	.....	.....	30 0 0	30 0 0	
Youhl Plain Tank	79 16 0	16 4 1	13 6 8	29 10 9	,, 1/9/86, £40 ,,
Totals	8,922 4 0	2,177 16 2	1,265 9 1	3,443 5 3	

SUMMARY.

Total wages paid	£8,922	4 0
Total Revenue	3,443	5 3
Number of tanks under lease in 1886	36	
Total rental per annum	1,777	10 0
Average rental per annum	49	7 2

9 June, 1887. J. S. RAMSAY.

Department of Mines, Public Watering Places, Sydney, 27 June, 1888.

At the request of the Commission *re* Tanks and Wells, the annexed return has been prepared.

In submitting it for the consideration of the Honorable the Secretary for Mines, I may add that my remarks accompanying a similar return for the year 1886, apply with equal force to the one for 1887, viz. :—

"1st. That the year was an exceptionally favourable one, and that during the greater part of it water could be obtained by travelling stock almost everywhere without having to fall back upon the public watering places.

"2nd. That when the Department is enabled to gazette the works as public watering places no further obstacle will exist to their being leased, and the majority of these works will be producing revenue."

To this I may now add, that the altered arrangements in dealing with notifications of travelling stock and camp reserves, and with the surveys through the district surveyors directly, has resulted in expediting their preliminary notification under the Land Board, and consequently their gazettal as public watering places. This result is, I think, shown by the fact that there are now sixty-three watering places either under lease or for which tenders have been called, and I have fair reason to anticipate that by the end of the year the great majority of the completed works will be gazetted, and under lease.

I have felt that neither the Secretary for Mines nor myself desire to withhold any particle of information that would assist the Commission to the fullest and most impartial discharge of their duties, whether it is within the actual scope of the inquiry or not.

At the same time, I feel it my duty to point out the injustice that may arise by the Commissioners embodying in their report the subject of *maintenance* without having fully investigated it. This, perhaps, they could not do under their commission; it must, therefore, be apparent, that any attempt to deal with the subject without a full inquiry might, perhaps, lead from imperfect knowledge to incorrect conclusions.

HARRY GILLIAT,
Chief Inspector of Public Watering Places.

The Under Secretary for Mines.

PUBLIC WATERING PLACES.

RETURN showing Wages paid and Revenue received for the year 1887.

Name of Watering Place.	Wages to Caretakers in 1887.	Revenue received.			Remarks.
		Fees collected by Caretakers.	Rent received from Lessees.	Total receipts.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Amphitheatre Tank	147 7 6	6 8 1	.....	6 8 1	
Babinda Tank	127 15 0	9 10 10	.....	9 10 10	
Baraaline Well	54 15 0	.....	.....	.....	
Beloura Tank	127 15 0	1 2 4	.....	1 2 4	
Berrigan Well	.....	.....	20 0 0	20 0 0	
Black Swamp Tank	.....	.....	50 2 6	50 2 6	Lease cancelled, 16/1/88.
Boggy Creek Tank	.....	.....	78 0 0	78 0 0	
Boona Tank	127 15 0	16 4	.....	16 4	
Boonoona Tank	146 0 0	62 2 4	.....	62 2 4	
Boordomugga Tank	146 0 0	14 15 1	.....	14 15 1	
Booroondarra Tank	.....	.....	50 5 6	50 5 6	
Booroorban Tank	.....	.....	85 0 0	85 0 0	
Boro Tank	123 3 0	13 2 11	.....	13 2 11	
Box Creek Tank	146 0 0	2 9 2	.....	2 9 2	
Brocklesby Tank	146 0 0	4 9 11	.....	4 9 11	
Brolgan Creek Tank	118 12 6	2 4 10	.....	2 4 10	
Brura Tank	127 15 0	49 11 6	.....	49 11 6	
Bullagreen Tank	137 17 6	1 18 6	.....	1 18 6	
Bunghill Tank	118 12 6	2 17 8	.....	2 17 8	
Carson's Swamp Tank	127 15 0	9 2	.....	9 2	
Clare Tank	146 0 0	2 13 10	.....	2 13 10	
Cobar Stock Tank	118 12 6	59 8 10	.....	59 8 10	
Colombo Dam	118 12 6	0 7 0	4 3 4	4 10 4	Leased, 1/12/87, £50 per ann.
Coolaman Tank	109 10 0	1 6 1	.....	1 6 1	
Corilla Tank	.....	.....	40 8 5	40 8 5	
Carowra Swamp Tank	158 0 0	13 19 9	.....	13 19 9	
Crow's Nest Well	.....	.....	40 0 0	40 0 0	
Curnaweena Tank	146 0 0	11 12 1	.....	11 12 1	
Cuttygullyaroo Tank	127 15 0	8 8 0	.....	8 8 0	

Return showing Wages paid and Revenue received for year 1887.—*continued.*

Name of Watering Place.	Wages paid to Caretakers in 1887.	Revenue received.			Remarks.
		Fees collected by Caretakers.	Rent received from Lessees.	Total receipts.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Day Dream Tank	176 12 0	9 10 5	.....	9 10 5	
Daysdale Tank	127 15 0	7 2 0	.....	7 2 0	
Derribong Tank	73 4 0	4 0	.....	4 0	
Dolmoreve Well	157 4 0	2 8	.....	2 8	
Dry Lake Well	.....	.....	35 1 3	35 1 3	
Eighteen-mile Tank	.....	.....	52 0 0	52 0 0	
Ford's Bridge Tank	.....	.....	80 8 8	80 8 8	
Forty-eight-mile Tank	.....	.....	50 1 10	50 1 10	
Galathera Tank	.....	.....	126 0 0	126 0 0	
Gilgaii Tank	.....	.....	57 10 0	57 10 0	
Girilambone Tank	90 13 6	.....	3 6 8	3 6 8	Leased, 1/9/87, £10 per ann.
Glendon Tank	146 0 0	1 7 4	.....	1 7 4	
Goonery Artesian Well	.....	.....	60 0 0	60 0 0	
Grass-hut Tank	.....	.....	53 9 10	53 9 10	
Gunaramby Tank	146 0 0	5 18 7	.....	5 18 7	
Helman's Tank	146 0 0	49 10 11	.....	49 10 11	
Hermitage Tank	146 0 0	.....	.....	.....	
Holy Box Well	146 0 0	20 17 2	.....	20 17 2	
Hovell's Dam	.....	.....	30 0 0	30 0 0	
Ivanhoe Tank	146 0 0	4 12 0	.....	4 12 0	
Jindora Tank	146 0 0	5 17 2	.....	5 17 2	
Jumping Sandhill Well	144 8 0	34 18 4	.....	34 18 4	
Junee Dam	113 0 0	.....	.....	.....	Stock water gratis.
Keighran's Tank	127 15 0	12 1 6	.....	12 1 6	
Kerrigundi Tank	.....	.....	50 5 6	50 5 6	
Ledknappa Tank	.....	.....	110 0 0	110 0 0	
Lightning Ridge Tank	118 12 6	5 17 11	.....	5 17 11	
Lowesdale Tank	127 15 0	.....	.....	.....	
Mannum Well	54 15 0	1 1 4	.....	1 1 4	
Menamurtie Well	146 0 0	.....	.....	.....	
Merri Merriwa Tank	127 15 0	2 13 4	.....	2 13 4	
Mossgiel Tank	146 0 0	16 1 0	.....	16 1 0	
Mount Manara Tank	127 15 0	118 3 11	.....	118 3 11	
Mount Hope Tank	127 15 0	5 4	.....	5 4	
Mulya Tank	6 6 0	1 4 10	.....	1 4 10	
Muriel Tank	.....	.....	55 0 0	55 0 0	
Mount Elliot Tank	127 15 0	10 17 7	.....	10 17 7	
Mowabla Tank	127 15 0	1 12 8	.....	1 12 8	
Mombil Tank	127 15 0	1 0 4	.....	1 0 4	
Murray Hut Well	.....	.....	20 5 0	20 5 0	
North Roto Well	.....	.....	21 2 8	21 2 8	
Nullamut Tank	.....	.....	52 15 4	52 15 4	
Nevertire Tank	10 1 6	.....	10 0 0	10 0 0	Leased, 1/11/87, £60 per ann.
Nymagee Tank	127 15 0	16 15 11	.....	16 15 11	
One Tree Tank	146 0 0	6 4	.....	6 4	
Old Gunbar Well	146 0 0	.....	.....	.....	
Pretty Pine Well	.....	.....	40 12 9	40 12 9	
Polygonum Hut Well	110 0 0	1 13 10	.....	1 13 10	
Priory Tank	127 15 0	12 0 9	.....	12 0 9	
Purnamoota Tank	176 12 0	7 0 7	.....	7 0 7	
Pulletop Tank	21 7 0	0 1 4	50 0 0	50 1 4	Lease cancelled, 31/10/87.
Quandong Tank	144 8 0	14 17 2	.....	14 17 2	
Roto Well	.....	.....	23 3 0	23 3 0	
Rock Holes Tank	127 15 0	8 17 4	.....	8 17 4	
Rat Hole Tank	186 13 0	214 14 7	.....	214 14 7	
Sixteen-mile Gums Tank	146 0 0	2 1 8	.....	2 1 8	
Sandy Creek Tank	127 15 0	22 10 9	.....	22 10 9	
Shearleg's Tank	.....	.....	50 0 0	50 0 0	
Silverton Well	176 12 0	87 19 9½	.....	87 19 9½	
Tom's Lake Tank	.....	.....	51 1 10	51 1 10	
Til Til Tank	146 13 8	5 17 1	.....	5 17 1	
Tindarie Tank	127 15 0	33 0 8	.....	33 0 8	
Two Waterholes Tank	.....	.....	52 0 0	52 0 0	
Thackaringa Tank	176 7 0	48 14 11	.....	48 14 11	
Tambar Springs	6 0 0	.....	.....	.....	No charge made for water.
The Lake Tank	.....	.....	50 15 0	50 15 0	
Thorndale Tank	35 0 0	6 8 8	37 10 0	43 18 8	Leased, 1/4/87, £50 per ann.
Tinda Tank	127 15 0	1 18 6	.....	1 18 6	
Twelve-mile Tank	.....	.....	57 2 1	57 2 1	
Thirty-five-mile Tank	146 0 0	47 10 1	.....	47 10 1	
Ulong Tank	127 15 0	23 9 0	.....	23 9 0	
Walla Walla Tank	.....	.....	50 3 11	50 3 11	
Wangonilla Well	149 8 6	4 16 4	.....	4 16 4	
Wooloondool Well	.....	.....	55 0 0	55 0 0	
Wagga Wagga Tank	127 15 0	7 9 9	.....	7 9 9	
Wicklow Tank	127 15 0	2 0	.....	2 0	
Youhl Plain Tank	.....	.....	40 0 0	40 0 0	
Yentalsangee Tank	.....	.....	30 0 0	30 0 0	
otals	£9,319 1 5	£1,149 1 7½	£1,822 15 1	£2,971 16 8½	

Summary.

* Total wages paid	£9,319	1 5
Total revenue	2,971	16 8½
Number of tanks under lease in 1887	38	
Total rental per annum	£1,863	0 0
Average rental per annum	49	0 6

23rd June, 1888.

S. A. MYRING

* The increase of wages in 1887 is due to five additional tanks taken over during that year.

Public Watering Places.

Return showing Wages paid and Revenue received from 1st January to 31st October, 1888.

Name of Watering Place.	Wages paid to Caretakers, 1 Jan. to 31 Oct., 1888.	Revenue.			Remarks.
		Fees collected by Caretakers.	Rent received from Lessees.	Total Receipts	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Amphitheatre Tank	114 7 6	14 10 1	.....	14 10 1	Leased, 1/11/88, £41 per ann.
Babinda Tank	70 9 0	28 19 4	8 11 9	37 11 1	Leased, 14/8/88, £40 per ann.
Baradine Well	45 15 0	2 1 5	.....	2 1 5	Leased, 1/12/88, £25 per ann.
Beloura Tank	106 15 0	24 12 7½	.....	24 12 7½	
Berrigan Well	.....	.....	16 13 4	16 13 4	
Black Swamp Tank	116 0 0	1 1 4	2 4 3	3 5 7	Lease cancelled, 16/1/88.
Boggy Creek Tank	.....	.....	65 0 0	65 0 0	
Booma Tank	106 15 0	5 19 10	.....	5 19 10	
Boonoona Tank	122 0 0	25 2 1	.....	35 2 1	
Booroomugga Tank	85 4 0	25 10 11	20 0 0	45 10 11	Leased, 1/5/88, £40 per ann.
Booroondarra Tank	.....	.....	41 13 4	41 13 4	
Booroorban Tank	.....	.....	70 16 8	70 16 8	
Boro Tank	99 2 6	62 10 2	.....	62 10 2	
Box Creek Tank	122 0 0	128 11 10	.....	128 11 10	
Brocklesby Tank	122 0 0	14 4 0	.....	14 4 0	
Brolgan Creek Tank	99 2 6	9 12 11	.....	9 12 11	
Brura Tank	106 15 0	88 10 4	.....	88 10 4	Leased, 1/11/88, £50 per ann.
Bullagreen Tank	114 7 6	38 8 10½	.....	38 8 10½	
Bunghill Tank	99 2 6	33 2 5	.....	33 2 5	
Carson's Swamp Tank	106 15 0	1 1 11	.....	1 1 11	
Clare Tank	122 0 0	14 6 1	.....	14 0 1	
Cobar Stock Tank	99 2 6	77 11 9	.....	77 11 9	
Colombo Dam	.....	.....	41 13 4	41 13 4	
Coolaman Tank	91 10 0	26 4 3	.....	26 4 3	
Corilla Tank	.....	.....	33 6 8	33 6 8	
Carowra Swamp Tank	122 0 0	16 17 9	.....	16 17 9	
Crow's Nest Well	.....	.....	33 6 8	33 6 8	
Curraweena Tank	122 0 0	22 15 6	.....	22 15 6	Leased, 1/12/88, £20 per ann.
Cuttygullyaroo Tank	106 15 0	65 17 5	.....	65 17 5	
Day Dream Tank	137 15 0	162 1 2	.....	162 1 2	
Daysdale Tank	106 15 0	3 4 2	.....	3 4 2	Leased, 1/11/88, £55 per ann.
Derribong Tank	122 0 0	46 1 11	.....	46 1 11	Leased, £1/11/8, £40 per ann.
Dolmoreve Well	122 0 0	7 8 2	.....	7 8 2	
Dry Lake Well	.....	.....	29 3 4	29 3 4	
Eighteen-mile Tank	80 10 0	222 7 8	10 11 0	232 18 8	Leased, up to 14/3/89.
Ford's Bridge Tank	.....	.....	66 13 4	66 13 4	
Forty-eight-mile Tank	.....	.....	41 13 4	41 13 4	
Galathera Tank	.....	.....	105 0 0	105 0 0	
Gilgai Tank	.....	.....	25 0 0	25 0 0	
Girilambone Tank	.....	.....	8 6 8	8 6 1	
Gleudon Tank	122 0 0	4 11 0	.....	4 11 0	
Grass Hut Tank	.....	.....	14 3 4	44 3 4	
Gunaramby Tank	122 0 0	7 9 7	.....	7 9 7	
Goonery Artesian Well	.....	.....	50 0 0	50 0 0	
Helman's Tank	122 0 0	25 2 0	.....	25 2 0	Leased, 1/12/88, £32 per ann.
Hermitage Tank	122 0 0	111 13 5	.....	111 13 5	Leased, 1/11/88, £50 per ann.
Holy Box Well	122 0 0	72 13 11	.....	72 13 11	Leased, 1/11/88, £72 per ann.
Hovell's Dam	.....	.....	25 0 0	25 0 0	
Ivanhoe Tank	122 0 0	46 17 3	.....	46 17 3	
Jindera Tank	122 0 0	3 9 7	.....	3 9 7	Leased, 1/11/88, £25 per ann.
Jumping Sandhill Well	122 0 0	69 17 7	.....	69 17 7	
Jumee Dam	122 0 0	.....	.....	.....	Stock water gratis.
Keighran's Tank	106 15 0	34 2 11	.....	34 2 11	Leased, 1/11/88, £30 per ann.
Kerrigundi Tank	.....	.....	41 13 4	41 13 4	
Ledknappa Tank	.....	.....	91 13 4	91 13 4	
Lightning Ridge Tank	99 2 6	62 6 6	.....	62 6 6	
Lowesdale Tank	67 11 0	8 12 6	26 0 0	34 12 6	Leased, 1/5/88, £52 per ann.
Mannum Well	45 15 0	6 0	.....	6 0	
Menamurtie Well	122 0 0	.....	.....	.....	
Merri Merriwa Tank	106 15 0	29 18 6	.....	29 18 6	
Moesgiel Tank	122 0 0	53 12 7	.....	53 12 7	
Mount Manara Tank	106 15 0	67 0 7	.....	67 0 7	
Mount Hope Tank	106 15 0	78 8 9	.....	78 8 9	
Mulya Tank	106 15 0	62 19 3	.....	62 19 3	
Muriel Tank	.....	.....	45 16 8	45 16 8	
Mount Elliott Tank	106 15 0	49 6 10	.....	49 6 10	Leased, 1/11/88, £26 per ann.
Mowabla Tank	106 15 0	19 15 1	.....	19 15 1	
Moombil Tank	106 15 0	42 7 4	.....	42 7 4	
Murray Hut Well	.....	.....	16 13 4	16 13 4	
Milparinka Well	54 8 0	.....	.....	.....	Taken over, 18/6/88.
Murlippa Tank	49 4 0	41 2 6	.....	41 2 6	Tank taken over, 1/7/88.
Mulga, No. 5 Tank	21 7 0	9 17 6	.....	9 17 6	Tank taken over, 31/8/88; leased, 1/12/88, £60 per an.
North Roto Well	.....	.....	17 10 0	17 10 0	
Nullamut Tank	.....	.....	43 15 0	43 15 0	
Nevertire Tank	.....	.....	50 0 0	50 0 0	
Nymagee Tank	112 17 6	209 6 7	.....	209 0 7	
One-tree Tank	70 16 0	12 14 3	23 7 6	36 1 9	Leased, 11/7/88, £76 per ann.
Old Gunbar Well	122 0 0	.....	.....	.....	Water bad.
Pretty Pine Well	.....	.....	33 6 8	33 6 8	
Polygonum Hut Well	99 2 6	40 13 8	.....	40 13 8	
Priory Tank	106 15 0	48 3 11	.....	48 3 11	Leased, 1/11/88, £25 per ann.
Purnamoota Tank	150 19 0	174 9 1	.....	174 9 1	
Pulletop Tank	77 7 0	5 7 4	10 0 0	15 7 4	Leased, 1/8/88, £40 per ann.
Quandong Tank	122 0 0	27 14 8	.....	27 14 8	

Return showing Wages paid and Revenue from 1st January to 31st October, 1888.

Name of Watering Place.	Wages paid to Caretakers from 1 Jan. to 31 Oct., 1888.	Revenue Received.			Remarks.
		Fees collected by Caretakers.	Rent Received from Lessees.	Total Receipts.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Roto Well	.....	.....	19 3 4	19 3 4	
Rock Holes Tank	106 15 0	33 8 3	.....	33 8 3	
Rat Hole Tank	137 5 0	181 1 10	.....	181 1 10	
Sixteen-mile Gums Tank	122 0 0	53 5 0	.....	53 5 0	
Sandy Creek Tank	106 15 0	45 0 6	.....	45 0 6	
Shearleg's Tank	.....	.....	41 13 4	41 13 4	
Silverton Well	156 4 0	85 15 10	.....	85 15 10	
Seaville's Tank	18 6 0	8 15 2	.....	8 15 2	Tank taken over, 1/9/88.
Tom's Lake Tank	.....	.....	42 10 0	42 10 0	
Til Til Tank	122 0 0	41 1 5	.....	41 1 5	
Tindarie Tank	106 15 0	28 17 2	.....	28 17 2	Leased, 1/11/88, £27 per ann.
Two Waterholes Tank	.....	.....	43 6 8	43 6 8	
Thackaringa Tank	149 11 0	239 4 5	.....	239 4 5	
Tambar Springs	5 0 0	.....	.....	.....	No charge made for water.
The Lake Tank	.....	.....	41 13 4	41 13 4	
Thorndale Tank	.....	.....	41 13 4	41 13 4	
Tinda Tank	106 15 0	30 15 1	.....	30 15 1	
Twelve-mile Tank	.....	.....	47 10 0	47 10 0	
Twenty-six-mile Tank	73 12 0	120 7 7	.....	120 7 7	
Thirty-five-mile Tank	122 0 0	99 13 0	.....	99 13 0	
The Peak Tank	71 4 0	64 0 3	.....	64 0 3	Tank taken over, 1/6/88, leased, 1/11/88, £52 per an.
Tarella Tank	49 4 0	82 7 7	.....	82 7 7	Tank taken over, 1/7/88.
Ulong Tank	74 11 0	20 3 9	10 0 0	30 3 9	Leased, 1/8/88, £40 per ann
Walla Walla Tank	.....	.....	41 13 4	41 13 4	
Wangonilla Well	122 0 0	51 1 7	.....	51 1 7	
Wooloondool Well	.....	.....	45 16 8	45 16 8	
Wagga Tank	106 15 0	42 10 2	.....	42 10 2	
Wicklow Tank	106 15 0	15 4 1	.....	15 4 1	
Waratta Tank	54 8 0	.....	.....	.....	Tank taken over, 18/6/88.
Youhl Plains Tank	.....	.....	33 6 8	33 6 8	
Yeutabangee Tank	.....	.....	25 0 0	25 0 0	
Totals	£8,186 17 6	£3,841 18 3	£1,571 19 6	£5,413 17 9	

Summary.

Total wages paid, 1st January to 31st October, 1888	£8,186 17 6	
Total Revenue received " " "	5,413 17 9	
Number of watering places leased during 1888	58	
Total rental per annum	£2,716 10 0	
Average rental per annum	46 16 9	

30 November, 1888.

S. A. MYRING.

III.

Abstract showing Prices paid per cubic yard for Excavating Tanks.

Department of Mines, 18 May, 1887.

My Dear Sutherland,

May I request you to have a return prepared for the Cabinet, showing the amount paid per cubic yard for excavation of the several tanks that have been constructed by the Roads Department, and oblige,

Yours truly,

F. ABIGAIL.

Mr. Bennett for report.—J.S., 19/5/87.

I would point out that at one time Mr. Bruce had absolutely promised seven tanks to Sloane & Co., at 1s. 4d. per cubic yard for a much easier specification. Further information, however.—Mr. Wood. Urgent.—W.C.B., 19/5/87.

The prices paid for excavating 18 feet deep and removing to bank, range from 10½d. to 1s. 9d., as in the case of the Jindera and Boona tanks. I may add that in the latter case 2s. 2d. was asked for steam scoop excavation, so strongly advocated by the Mines. The average cost of 18 feet deep excavation, with sixty of the tanks constructed in the dry districts in the drought, has been 1s. 5d. per cubic yard. If further details are required, the cost per cubic yard of each tank can be given, but as this paper is marked "urgent,' I have confined myself to information ready to hand.—A.P.W., 19/5/87.

Department of Mines, 31 May, 1887.

My Dear Sutherland,

Will you be good enough to inform me if the returns of the cost per cubic yard of the excavation of the tanks constructed in connection with your Department, are ready, my reason for asking being that I wish the Cabinet to settle the matter early; and this information is very necessary for that matter.

Faithfully yours,

F. ABIGAIL.

Mr. Bennett to say—J.S., 1/6/87.

Lists herewith; but this list should not be dealt with without referring to my paper of this day, with Mr. Wood's, both referring to application for transfer of charge to the Mines.—W.C.B., 1/6/87.

Abstract

ABSTRACT showing Prices paid per cubic yard for Excavating Tanks.

Road.	Locality.	Price.	Road.	Locality.	Price.
		s. d.			s. d.
Deniliquin to Hay	Black Swamp	1 1½	Albury District	Carson's Swamp	1 1
	Pine Ridge	1 2		Jinders	0 10½
Booligal to Wilcannia	Tom's Lake	1 1		Walla Walla	1 3
	Mosgiel	1 4		Lowredale	1 5
	Ivanhoe	1 7		Daysdale	1 4
	Ward's	1 6		Brocklesby	1 0
	Twenty-six mile	1 8	Warren to Coonamble	Bullagreen	1 3
Wilcannia to Tibbooburra	Dry Lake	1 6	Balranald to Ivanhoe	Box Creek	1 4
	Tarella	1 6		Til Til	1 9
	The Peak	1 6	Hay to Booligal	Quondong	0 11½
	Murlippa	1 6	Cobar to Bourke	Curraweena	1 5
	Cobham	1 6	Bourke to Hungerford	Ford's Bridge	1 3
	Warratta	1 5	Dubbo District	Girilambone	1 9
Balranald to Ivanhoe	Clare	1 5	Cobar to Bourke	Cobar (town)	1 6
	Thirty-four mile	1 6		Cobar (stock)	1 4
Cobar to Louth	Cuttygullaroo	1 6	Nyngan to Cobar	Booroomugga	1 6
	Booroondarra	1 6½		Muriel	1 6
	Kerrigundi	1 5½		Hermitage	1 8¼
	Sixty-four mile	1 5	Parkes to Bogan	Brolgan	1 7
Cobar to Bourke	Hillman's	1 8	Deniliquin to Hay	Sixteen-mile Gums	1 1
Bourke to Eringonia	The Lake	1 5½	Mossgiel to Paddington	Carowra Swamp	1 7½
	Clay-pan Hollow	1 5½	Booligal to Wilcannia	Twelve-mile	1 9
Eringonia to The Culgoa	Eighteen-mile	1 4	Mount Hope	Mount Hope	1 6
	Lednppa	1 5½	Narrabri to Moree	Galathera	1 3
Byerock to Brewarrina	Mulga (No. 5)	1 2½		Boggy Creek	1 3
	Nellie's Paddock	1 9	Wagga District	Coolamon	0 11
Nymagee to Nyngan	Babinda	1 4		Glendon	1 9
	Gilgies	1 4	Walgett to Bangate	Boro	1 3
	Thorndale	1 6½		Lightning Ridge	1 8
Trangie to Dandaloo	Derribong	1 6	Booligal to Wilcannia	Thirty-eight mile	1 9
Hilleton to Cobar	Merri Merriwa	1 9		Forty-eight mile	1 9
	Wagga	1 9	Wilcannia to Hugerford	Seaville's	1 5
	Rock Holes	1 9	Balranald to Ivanhoe	Dowdigans	1 1
	Sandy Creek	1 8	Wagga District	Wallendbeen	1 3
	Priory	1 7		Illabo	1 2
	Shearlegs	1 9	Wilcannia to Hungerford	Copago	1 6
	Breura	1 9	Cobar to Wilcannia	Meadows	1 5
Condoblin towards Cobar	Mowabla	1 5½	Bourke to Hungerford	Yantabulla	1 2
	Boona	1 9	Dubbo District	Tomingley	1 1
	Tinda	1 9	Narrandera to Grenfell	Harman's	1 1½
	Mombill	1 9	Whitton to Euabalong	Waterman's	1 0½
	Wicklow	1 9		Twenty-seven mile	1 0
	Beloura	1 6		Horse Lake	0 11½
	Nymagee	1 9		Springfield	1 2¾
	Keighran's	1 7	Cobar to Wilcannia	Barnato	1 3½
Whitton to Euabalong	Nine-mile	1 1		Jay Plains	0 11
	Pulletop	1 2	Silverton District	Broken Hill	1 1
	Mount Elliot	1 1½	Cobar to Bourke	Corilla	1 3
Silverton District	Silverton	1 6		Two Waterholes	1 2¾
	Rat-hole	1 6		Nullamut	1 4
	Wilson's	1 4½		Tindarie	1 4
	Purnamoota	1 6	Silverton District	Silverton	1 6
	Thackaringa	1 5		Seventy-one mile	1 2½

Department of Public Works, Tanks and Punts, Sydney, 4 February, 1888.

In reply to the Commissioners' minute on attached note from the Secretary to the Tanks and Wells Commission, I have to submit the following cases in which prices in excess of 1s. 9d. per cubic yard have been paid for tank excavation :—

Nymagee Tank.—In this case the contractor, Henning, was allowed the sum of 10½d. per cubic yard over and above his contract price of 1s. 9d., for removing rock which had escaped detection in the trial shafts put down by the Department for the guidance of contractor. [4,362, at 10½d., £190 10s. ; or, 1s. 11½d. per yard over the entire tank.]

Wicklow Tank.—This is a similar case to the above, where 1s. 9d. per cubic yard in excess of contract price of 1s. 9d., was paid for granite excavation. [£9 9s. extra, or, one-eighth of a penny extra, over the whole excavation.]

Nellie's Paddock.—In this case the contractor provided in his tender for rock excavation at 2s. 4d. per cubic yard, which was paid to him. [£157 10s. or, one half-penny per yard extra over the whole excavation.]

Mulga No. 5.—This work was abandoned by the contractor (Finn) when about five-sixths of the excavation was completed ; the work was relet, and 3s. 10d. per cubic yard paid for the remaining one-sixth, which was a hard cemented gravel,—this price covered all trimming of slopes in cutting a bank. The contract price was 14½d., so that the average price in this case was under 1s. 9d.

I would again point out to the Commission that in no case has more than 1s. 9d. been paid for such excavation.

ARTHUR P. WOOD.

To illustrate the precautions taken in such matters, I forward the papers relating to the first-mentioned work. There has been some delay in looking the vouchers up at Audit Office, so that it is desirable a few days should be allowed to obtain any information of this sort which may be necessary for my defence.—W.C.B., 7/2/88.

Mr. Mahon, Secretary, Tanks and Wells Commission. B.C.

IV.

Concerning Proposed Transfer of Construction of Public Watering Places to Mines Department.

Department of Mines, 21 March, 1887.

The administration of the Public Watering Places Act, 48 Vic. No. 16, which gives statutory authority for the construction, control, and maintenance of works for storing or providing water adjacent to any public road, is charged to the Department of Mines.

The administrative arrangements of 1880, which are still in force, also allot to that Department the charge of works for the storage of water in the pastoral districts. In addition to the control, maintenance, and leasing, the survey of the watering places and the construction of huts have more recently been undertaken, and it is now found neccessary to assume the charge of fencing, and provision has been asked for that purpose on this year's Estimates.

The construction and repairs still remain with the Department of Public Works, but this division of authority is accompanied by drawbacks, such as much unnecessary correspondence, great loss of time, and a resulting want of economy, which it is thought will be obviated if the service is placed under one Department.

The Secretary for Public Works will perhaps agree with me that under the circumstances it might be desirable in the public interest that the whole of the business connected with these works, including construction and repair, be handed over to this Department.

FRANCIS ABIGAIL.

Memorandum.

Some causes, that may appear to indicate the advantage of reorganizing the respective duties of the Departments of Mines and of Public Works in connection with public watering places :—

1st. A divided control in construction and maintenance ; weakening the administration, making it difficult, if not impossible, to apportion the responsibility ; and failing in economy.

2nd. A divided control seems impossible without a considerable friction, waste of time in apparently unnecessary and sometimes intemperate correspondence, serious delays in the transfer of works, and an undesirable jealousy between officers.

(a) Hesitation may be shown in taking over a new work, upon a question whether the execution is good, or details sufficiently complete ; the constructing Department, not unnaturally perhaps, objecting to such criticism, while the Department with whom the maintenance rests points out that it is responsible for the work taken over being in effective order.

(b) Repairs and alterations being necessary, the tendency of the constructing Department is to find fault with officers of the maintaining one, and to attribute the necessity to the carelessness of the officers ; and a tendency on the other side to place the fault upon imperfect design or defective construction.

3rd. The Department administering the Act, dealing with the survey, measurement and leasing of the works, supervision of tenants and caretakers, will undoubtedly have to undertake the fencing ; and it has been proposed to do so during the present year, and a sum for that purpose placed on the Estimates. The construction of huts has already been undertaken ; if repairs and alterations are to follow, the construction alone will remain with the Works Department, and it may perhaps appear that the whole of the construction, maintenance, and administration would be more smoothly and economically dealt with if transferred to one or other of the Departments.

Memoranda as to Transfer of Tanks and Wells to Mines Department.

Department of Public Works, 18 April, 1887.

The construction of the wells and tanks was commenced in 1869 ; a few sums of money were voted to make route from Booligal to the Darling passable ; a party was sent out under Mr. Wood across this country, then almost unoccupied, to bore for water.

For some years those works were carried out as money was voted and to extend benefit as far as small sums admitted ; it then became necessary to lease them, and the Crown Lands declining to delegate to this Office the power of leasing, the works were handed over to that Office as executed.

Failing to realize any revenue, the works without any supervision fell into a state of disrepair. Charge of repairs was resumed in 1881 by Roads Department, the leasing remaining in charge of the Crown Lands Department ; in the interim the Mines took charge of the Crown Lands Occupation Branch and of these works.

The administrative arrangements of 1880, though described as works for the storage of water in the pastoral districts, were held at the time by the then Minister for Works to apply only to the letting of such works on lease and collection of tolls. Some time after the Mines assumed the right to select sites and determine what works should be carried out, and published in several printed reports in a conspicuous way—after the names of many of the works—"condemned"—in some instances without the slightest reason other than the injury by silting or otherwise, consequent on the neglect of that or the Lands Department, during the time the works were in their charge.

Much fault was found with the lifting and drinking apparatus which were on the inexpensive scale suited to the amounts of the grants with which we had to deal. No end of devices—syphons, double whips, &c.—were proposed by the officers of the Mines Department, and it was proposed to purchase expensive excavating machines by Fowler, of Leeds ; those proposals were steadily resisted by this Department, and it was then sought to have an hydraulic engineer and staff for the Mines Department—this Mr. Abbott, the Minister, decided against.

The survey of the watering places, reserves, and of the leases, has, I believe, been carried out by the Mines. I presume this will revert to the Survey Department. The construction of huts was handed over to the Mines under the following circumstances :—They stated certain accommodation was required ; tenders were invited by this office for permanent structures in accord with the views stated. The Mines officers, on receipt of tenders, stated that they could get the work done for one-half by their caretakers, and under the circumstances the vote was handed over to their charge.

I am not certain that the fencing has been transferred to them, as there has been no reference to the Minister for Works. There has been no delay or shortcoming by this Department in that respect. On the contrary, we have tenders accepted for almost the entire of the fencing ; and are waiting in any cases where it has not been provided with, for the surveys by the officers of the Mines Department not yet completed. A re-vote is in this year's Estimates for this purpose. The only official transfer of this fencing to the charge of the Mines is the insertion of the word "fencing" in the long title of a vote ; by what specific authority this was done I cannot say, but the vote is not yet passed.

The drawbacks accompanying the division of authority arise solely from the action of the officers of the Mines, and most certainly the unnecessary correspondence is entirely from those officers, and the want of economy is certainly not attributable to this office. On the contrary we have endeavoured on every occasion to simplify and cheapen the works, but in every case without avail. I may instance the cheap tanks put between Bourke and Cobar, which the Mines insisted should be supplied with expensive lifting and drinking apparatus. I have felt some reluctance so far in dealing with the minute signed by the Honorable the Minister of Mines, but I think if he were made fully aware of the facts he would perhaps alter his views.

I may now deal with the unsigned and undated memorandum accompanying minute which proposes to show some causes which may appear to indicate the advantages of reorganizing the respective duties of the Department of Mines and Public Works in connection with public watering places :—

1st. The divided control in construction and maintenance weakens the administration, making it difficult if not impossible to apportion the responsibility, and failing in economy.

These arguments are equally applicable to any other Department of the Service. As well might the Medical Board ask to be allowed the building of lunatic asylums and hospitals ; or the Department of Justice the gaols, court-houses, and lock-ups ; or the Military Department to build the Barracks ; or the Postal Department to build roads and bridges because they were for their use. As well might they complain that want of such control weakens their administration.

As to the difficulty in apportioning responsibility, that is very simple to anyone reading over carefully the records ; and I am confident that any impartial person conversant with the facts would have very little difficulty in attributing the entire responsibility for neglect and failures to the officers of the Mines Department. It would lengthen this paper too much to quote the countless instances of frivolous complaints put forward, the fault in most cases being that of the Mines officers themselves.

2nd. With all the reasons under this head I most cordially concur. First as to the friction—there is nothing so easy as to make an appearance of friction by groundless and frivolous complaints. There has been no friction introduced by the Roads officers, but simply to rebut the implied charges of inefficiency brought against them. No

No waste of time has been caused by, and no intemperate correspondence has emanated from this office, though it has been exposed to exasperating and groundless criticism from unqualified persons.

(*a*) The hesitation in taking over works has arisen from the inability and disinclination of the Mines Office to decide whether work was complete or not, and has been avoided lately by a note being taken of the alleged defect. It is stated this Department naturally objects to criticism; on the contrary, it courts the fair criticism of qualified and impartial judges, and such has been pretty favourable.

(*b*) I have explained how (easy?) by the interpolation of the one word "fencing" in an estimate, it is to acquire that duty from this Department, without the approval or knowledge of the Minister. Similar action has gradually led to the transfer of all the other duties, and it is now intended to attain the end so long sought by the transfer of the construction, which I trust will not be allowed. Repairs and construction can best be attended to by the experienced officers of this Department, the best of whom are stationed in the districts where there are most tanks; and who in common with everyone else in the Department take a keen interest in the success of the works constructed by them, which they are anxious to preserve from the neglect experienced on previous occasions when the works were removed from charge of the Department. And I would point out, that whether we have the repair and construction of these tanks, &c., or not, the officers charged with such duty must be retained in their respective districts in order to provide for road and bridge necessities, so that though there can be no doubt the administration would be more smoothly dealt with, the economy of keeping two sets of professional officers—one for tanks, and one for roads and bridges, in the same district—is not so evident.

I have no doubt that when the officers of the Department of Mines understand that the settlement to be now made is final, and not to be disturbed, further friction will cease; and I am of opinion that the divided authority—the duties of both parties being clearly defined—will result in a public benefit, by the check which will be established on the officers of each Department in those out-of-the-way districts where effective and vigilant superintendence is so difficult.

WILLIAM C. BENNETT.

I append a memoranda of Mr. Wood, Assistant-Engineer.

General Control of Tanks and Wells.

Roads, Sydney, 18 April, 1887.

In reference to the accompanying minute, signed by the Honorable the Minister for Mines, and the attached memoranda forming the basis of that minute, I have to submit for your consideration the following remarks:—

The minute, after defining the duties of the "Mines," under arrangements made in 1880, such duties being confined to the charge of works, further states, that in addition that Department has undertaken: (1.) The survey of watering places; (2.) the construction of huts; and that it is now found necessary to (3.) assume charge of fencing.

1. The survey of watering places was never carried out by us, so there is no necessity for me to deal with it further than to state that, had the work been left with the Survey Department, there would have been less delay in obtaining the necessary delineation of boundaries on which we have fenced the areas in question; there would have been less call for alterations in existing fencing after plans had been submitted, and no necessity for sending surveyors three and four times over the same work.

2. The construction of huts was vested, with the rest of the construction work, in this Department—tenders were invited and received for three-room cottages, and were then forwarded to the "Mines" for their final decision as to whether, in the face of the heavy expenditure on tank works, it was still considered desirable to proceed with their erection. All these works were in the dry districts, many of them being in most out-of-the-way places where material would be difficult to procure, and the tenders averaged about £85 each, and were recommended as being reasonable by our local officers. The Chief Inspector of Public Watering Places thought otherwise, and as the "Mines" stated they could carry them out more reasonably than we were prepared to do, this Department, though doubtful of the fact, thought, that in the public interest, they should have the opportunity of proving their case and if possible reduce the expenditure. At the same time it was considered that certain conditions should be imposed, fixing the standard of work and providing for information as to the cost of same. The Mines, as was naturally expected, accepted the construction, but as was also naturally to be expected, declined being bound by any condition on which a comparison could be based. In this way was the work acquired, and then only as regarded the erection of these huts at existing tanks and wells, then unprovided with such accommodation; their erection on all subsequent works having been provided for in the main construction contract. So far, I believe, no huts have been completed by the Mines, and so far no direct proof is forthcoming as to the wisdom or otherwise of handin a large sum of money to that Department for this purpose.

3. The charge of the fencing has always been under this Department, and after much patient thought, I have been unable to imagine on what grounds it is considered necessary for the Mines to assume charge of this particular work, unless it is to confine the evils connected with errors of survey to their Department, and save ours from the disagreeable duty of going over work twice on account of mistakes for which it is not responsible. If this is not the reason, it may possibly be found in the fact that having gradually absorbed or abstracted bit by bit much of the work from other Departments, they can then find a better claim for the transfer of the balance. This latter view is probably correct, as it is practically advanced as a reason for the transfer; concealed, however, to a certain extent, by statements with which I shall presently have to deal. To do this the more effectively, and to preclude the possibility of being charged with "interference with the functions of the Honorable the Minister for Mines," I will now traverse the statements advanced in the unsigned memoranda:—

> "1. A divided control in construction and maintenance weakening the administration, making it difficult, if not impossible, to apportion the responsibility, and failing in economy."
> This clause can best be taken in conjunction with the next.
> "2. A divided control seems impossible without a considerable friction, waste of time in apparently unnecessary, and sometimes intemperate correspondence, serious delays in the transfer of works, and an undesirable jealousy between officers."

I am well aware of, and have on many occasions had to point out the evils of a divided control—have endeavoured to show that the only connection originally obtained by the Mines with these works was that due to their being vested with the control of the stock routes and reserves on which the tanks and wells were constructed, a duty that necessitated these works being leased by that Department, and to this their connection with them should be limited—though even that connection could be avoided by a very slight alteration in the Act.

The connection with the Mines has been gradually extended, with the result that good works have been neglected and condemned, and obstacles thrown in the way of this Department carrying out necessary repairs, because routine was neglected, and some weeks' time lost in passing reports and instructions through the two Departments. On the other hand, constant and frivolous complaints are made in reference to repairs, necessary or imaginary, and our officers sent travelling scores of miles in a most annoying and unnecessary manner. On the one hand we are guilty of "interference with the Minister's functions" (as per minute herewith relating to coating of tanks) if we do the work at once without waiting instructions from the Mines; and on the other hand if we neglect the public interest and observe strictly the rules and regulations, innumerable complaints are formulated against us. "Friction" is then complained of,—the wonder would be if under such conditions it did not exist. Charges of that nature can be brought against the most perfect and smoothest running machinery when the man in charge is seized with the absurd idea that sand is a better lubricant than oil.

"Waste of time" can most certainly not be charged against this Department, while as regards the question of "jealousy" it is quite safe to say that no officers of ours have the slightest grounds for any jealous feeling in regard to any of the Mines officers with whom they have had the pleasure of being brought into contact.

> (*a*) "Hesitation may be shown in taking over a new work, upon a question whether the execution is good or details sufficiently complete, the constructing department not unnaturally perhaps objecting to such criticism, while the department with whom the maintenance rests, points out that it is responsible for the works taken over being in effective order."

The framer of these memoranda is perfectly correct in this case when he states that the "constructing department not unnaturally objects to such criticism." Fair and competent criticism is always valuable, and even when unpleasant can be respected; but criticism from gentlemen who, however capable they may be as inspectors of stock, are quite ignorant of constructive or mechanical detail, can be of little value especially when assertive and incorrect.

This (*a*) clause assumes relations between the two departments that do not exist; it assumes that we are simply the constructors, without any responsibility for maintenance. We are responsible for all repairs, with a concession to the Mines

Mines that where necessary to save time—not waste it—they can expend a sum of money not exceeding £10. Criticism on design or on character of construction, provided the water can be properly supplied, is therefore unnecessary; but it is to be regretted that this is not recognized, and of my own pastoral knowledge I can certainly say that such unnecessary criticism has, in addition, been in many cases incorrect and most unjust. At the same time, I am quite prepared to admit that there have been defects in some of the details of construction in some of the works—defects that have necessitated repairs in some cases; but it is a strange thing that this army of ready critics, with which we have to deal, have failed in these cases to prove their qualifications for this role, having given us receipts for the works in good order and condition.

(*b*) "Repairs and alterations being necessary, the tendency of the constructing department is to find fault with officers of the maintaining one, and to attribute the necessity to the carelessness of the officers, and a tendency on the other side to place the fault upon imperfect design or defective construction."

The maintenance here referred to is that carried out, or that should be carried out, by the caretakers of the Mines or by the lessees. Unfortunately, there is too much ground for complaint as to the way in which these duties are performed. We have numberless complaints as to these men being absent from their duty; of neglect of drains, fencing, pumping gear, and appurtenances; and, worse than all, notwithstanding this neglect, a strong objection on the part of the Mines to our officers, who are constantly travelling these districts, and seeing these works, giving any instructions to the men in charge. Such neglect with consequent damage must accumulate until it has been inspected by a stock officer, reported to head office, and instructions passed through us to our local officers. I can readily understand that it must be most exasperating to the gentlemen who have constructed these works—their professional reputation at stake—to see them neglected, and to know that the consequent injury to the works is brought before them in the form of a complaint from the offending party, and to have to make long, expensive, and unnecessary journeys to attend to repairs which they might have had done when present in the first instance.

In the third clause of these memoranda the framer twists the strands together—shows how the Mines are charged with the administration of the Public Watering Places Act; how, by a slow process of absorption, they have acquired the survey of the public watering places, the construction of huts, and the partial general maintenance; how, by some unknown process, the introduction of one word—whether by the actual consent of the Minister or not—it has been decided that they "will undoubtedly have to undertake the fencing,"—thus by a piece-meal process of quiet, patient abstracting, leaving this Department construction only. Then the final twist is given to these strands, and the result stands boldly out in the form of a suggestion that "the whole could be more smoothly and economically dealt with if transferred to one or the other of the Departments." The inference as to which is obvious. When an octopus stretches forth its arms and fastens them one by one round its victim's arms and legs, and then suggests a transfer, it can be safely predicated that the transfer must be into the octopus; and that nothing but the entire man is intended. Similarly, there is not much room for doubt but that it is the intention of the Mines to absorb the entire work connected with tanks and wells. If such a transfer can be proved to be in the public interest, then there should be no opposition to this course being adopted,—if it is not in the public interest, then the claims of a far older Department than that of the Mines—the claims of officers who have been connected with these works from their initiation—are surely worthy of consideration.

I have no hesitation in stating that I consider any such transfer as that proposed would not be in the public interest; and I will give reasons that should free me from any charge of having formed a prejudiced opinion.

These works were initiated by this Department in 1869, and the whole of the small amount then available was expended between Booligal and Wilcannia; the tanks and wells then constructed were satisfactory to the Department and to the general public, being highly spoken of at the time, and adjudged the best works of the kind in the western districts. Since then about 130 more works have been constructed on the stock routes, nearly the whole of which have been handed over to the Mines, and receipts obtained showing them to have been in good order. The major portion of these works was carried out under very great difficulties during an exceptionally prolonged and disastrous drought, and when handing some of these works over to the Chief Inspector of Public Watering Places, he expressed himself as much pleased with the general design and the arrangement of details; on this point, I have no doubt he will bear me out. As all our subsequent works have been constructed on a similar type, I fail to see where the grounds for complaint arise. That such complaints are numerous our records can prove; as also, that in the majority of cases, they are due to the neglect of their own caretakers or lessees, or have no foundation in fact. If the overseers of public watering places are unequal to the duty of carrying out an efficient maintenance, it follows, *a fortiori* that they will be also unequal to laying out, designing, and supervising the construction. It is a fair assumption that none of the inspectors of stock, who are also overseers of public watering places, can use a level, and as that instrument is greatly required in laying out these works, that consequently they would be placed at a great and unfair disadvantage. Their stock duties, too, would not allow of efficient supervision being bestowed on these works, as is the case now; therefore, to properly carry out the works it would be necessary for the Mines to employ special officers, create a new staff at considerable extra cost to the country;—this, too, without any reduction in the staff of this Department now supervising these works, for their presence would still be required in their respective districts to supervise the other work of the Department.

A transfer to the Mines would thus be a source of great extra expense; the work would not be carried out in a more satisfactory manner, as I am sure the Commissioner will agree with me that our staff in the dry districts is fully competent for more important and extensive works than these; and that the general character of the work done is satisfactory. There being nothing to gain by such a transfer it could not be looked on as being anything but an injustice to take it out of the hands of those who have faithfully striven to do their duty, and have done it well.

ARTHUR P. WOOD,
Assistant Engineer.

The Commissioner for Roads.

Fencing at Public Watering Places.

Department of Mines, Public Watering Places Branch, Sydney, 11 May, 1887.

THIS letter from Mr. Overseer Yeo, shows the prices given by Mr. Stilwell for the erection of fencing at the Ivanhoe tank:—

First and original contract to Bevan, £112 per mile.
Bevan sublet to R. Elliot; price not ascertained.
Elliot sublet again to Anderson, 30s. per 100 for getting posts; £18 per mile for erecting same; £5 per 100 for carting posts from Kajulijah to Ivanhoe;

Equal to about £52 per mile, to which may be added cost and carriage of wire from Hay, showing that from £35 to £40 per mile has been paid in the excessive price given over and above a fair estimate; and about £60 per mile above the current station rates, which should not, I submit, be exceeded by this Department. In submitting these particulars I may state that from what I understand the prices paid for fencing upon this road, and indeed at most of the public watering places fenced by Roads and Bridges Branch are greatly in excess of ordinary rates; but this is the only instance in which I have directed the overseer to endeavour to verify the statements.

I have, however, reports from Mr. Inspector Boultbee and Mr. Overseer Keighran, and a declaration made by the late caretaker of the One-tree tank, of a very undesirable and I may say unfortunate concession to some fencing contractors, by allowing them to dispense with straining posts.

I append extracts that bear very forcibly upon the existing state of things, and show the necessity of the Government making a stand against the exorbitant prices, that the careless manner of accepting contracts have induced contractors now to stand out for.

HARRY GILLIAT.

The Under Secretary for Mines.

Sydney, 9 March, 1887.

I, George Young, late caretaker of the One-Tree tank, do hereby make the following declaration: That the fence enclosing the said tank is strained from corner post to corner post, a distance of 100 yards, and that there are no intermediate straining posts. The knots in the wire from the length of the strain are prevented from being drawn tight. The wire is slack and cannot be properly strained without the intermediate straining posts. It is not usual in fencing to have this length of strain; the fence was left in this condition by the contractors a few days before I took charge.

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."

GEORGE YOUNG.

Taken and declared at Sydney aforesaid, this ninth day of March, A.D., 1887.

ALEX. BRUCE, J.P.

Extract

Extract from letter from Mr. Overseer Tully, Wilcannia, re fencing in his district, 19th March, 1887.

"Wire delivered anywhere within 100 miles of Wilcannia £20 per mile. If a supply of the wire required was purchased privately it could be delivered here under £14 per ton. At least the stores offer to supply it at that price, and carriage is very low at present.

Ferguson, Wilcannia, quotes by wire on 11th inst. Best brands No. 8 steel wire, £13 5s. a ton.

"M. J. C. TULLY."

Extract from Mr. Overseer Yeo's letter of 5th May, 1887.

* * * * * * * *

"Their (the contractors') tenders would be ridiculous, as they inform me the huts would cost from £90 to £120; in fact they are very reluctant in giving any information to assist me, as they are afraid if they do it will be the means of cutting down the very high prices they have previously received for Government works.

"J. YEO."

Administration of Public Watering Places.

Department of Mines, Public Watering Places, Sydney, 13 May, 1887.

It appears, to put it briefly, from Mr. Bennett's minute, that the difficulties connected with the maintenance and construction of public watering places are chiefly the fault of the officers of the Mines Department.

There are no doubt faults in this as in other Departments, but I submit that this is not a reply to the Ministerial minute, or to my memorandum prepared for the Secretary for Mines, and which I regret to see was forwarded to the Works Department unsigned, but which I desire to acknowledge and affirm as an impartial statement.

The papers now annexed are a few of the cases referred to by the Commissioner for Roads; they are not selected, but are some of the more recent ones, and do not, I respectfully submit, bear out the contention of Mr. Bennett; the character of the minutes written by the Mines and Works officers will speak for themselves.

With reference to economy in construction I must refer to the cost of hutting as quoted by the Works Department, and the rates now being paid by this Department. With respect to the fencing, I must refer to the Ivanhoe case; with respect to construction of tanks, reference may perhaps be allowed to the Dry Lake, Seavilles, Cobham Lake, and Cupago tanks; the first three new tanks, the latter an old one, but all four under water for the last fifteen months; to the Paroo tanks, three of which are sunk within easy distance of water more permanent than they afford.

More professional training in the construction of tanks is hardly, I contend, so much required as practical experience and absolute economy; pastoral tenants construct scores of tanks for one by the Government, comparing favourably in most respects, at cheaper rates per cubic yard; and I fail to see why Government work should be paid so much in excess of private, and I venture to submit the opinion that contractors would not ask it if they were properly supervised and promptly paid.

It will be neither necessary not desirable in my opinion to maintain such a staff as employed by the Commissioner for Roads; half a dozen active practical men, similar to Mr. Inspector Boultbee, with ample bush experience, who can use a level, will readily do all the work required—ensuring, I have every reason to believe, a marked reduction in prime outlay without interfering with efficiency. The result, as shown with the hutting, is in favour of this view.

The reflections upon the officers of this Department have been, I think, uncalled for, and unjust.

HARRY GILLIAT.

Mr. Bennett will please make a careful report on the difference between the items shown on the enclosed papers as soon as possible.—J.S., 175/87.

APPENDIX A.

COMPARATIVE Statement, showing prices of tenders recommended for acceptance by the Works Department, and the prices at which this Department is doing the work, namely, erection of cottage.

District.	*Works Tender.* £ s. d.		*Mines Tender.* £ s. d.
Bourke	93 7 8		60 0 0
Cobar	82 6 0		*55 0 0
Corowa	68 0 0		*40 7 10
Silverton ..	.....	Iron	*50 0 0
Wilcannia	.....	Iron	52 13 0
		Wood	69 0 0
Deniliquin ...	69 10 0		*44 3 6
Condobolin	78 19 9		47 2 0
Coonabarabran	.....		54 3 0
Narrandera	87 10 8		50 0 0
Balranald	.....		59 17 2
Albury	68 0 0	Iron	48 12 2
		Wood	54 10 0
Ivanhoe	114 7 1	Iron	*56 13 0
		Wood	58 4 0
Forbes	.....	Wood	*26 1 6

NOTE.—The estimates are for wooden cottages, and those marked * have been let. Those not marked are still under consideration or have been approved.

APPENDIX B.

FENCING.

OVERSEERS have only been lately asked to furnish specifications and estimates for fencing, in their districts, and replies have not been received from all.

The following have replied, and the price quoted is per mile complete.

	£ s. d.	
Narrandera	59 11 0	per mile.
Silverton	75 0 0	
Cobar	38 0 0	to 45 0 0 according to distance from Cobar.
Deniliquin	69 0 0	
Condobolin	39 19 0	
Wilcannia	52 0 0	

Reply

Reply to Mines' Minutes of 13th May.

1 June, 1887.

In reply to Mines paper of 13th May, I would first remark that Mr. Gilliat is incorrect in stating that my paper of the 10th May is not a reply to the Mines papers; it is not only a reply in full, but contains information necessary to the proper comprehension of the subject, and which also shows that Mr. Gilliat's statements are anything but impartial or correct.

Appendix F does not appear to have been sent on with the papers, but as it would appear, it alludes to cases stated to have been referred to by me. I herewith forward a book kept of the complaints from the Mines officers, which I think will be found to bear out my statement—that harassing and frivolous complaints were made by the officers of that Department. It is inferred that the character of the minutes from this office bear unfavourable comparison with those of the Mines, but when old public servants are accused of incompetence and maladministration, if not worse, it is excusable if they do write plainly.

With reference to economy in construction, it is inferred that tenders have been obtained on the plans and specifications of this office, as prepared to meet the peremptory requisition of the Mines office, and as will be seen by the papers, contrary to the advice of this office, which considered the cottages one of the unnecessary expenses, as the papers will show.

Table appendix A to Mines paper states that a tender has been obtained for such cottages at £26 1s. 6d. This is simply impossible, and serves to throw doubt on all the statements.

The only building on list which has been seen by any officer of this Department is that at Silverton, which I am informed is a two-room corrugated iron building erected by the caretaker and stated to have cost £50. It is contrasted on list with the weatherboard three-room cottages for which tenders were received by this office at Deniliquin. List shows that a cottage has been let for £44 3s. 6d. I append the telegram from Mr. Cronin by which it appears that it is a two-room cottage without paint. As it is not yet built we cannot contrast it with those for which tenders were received by this Department, and it is not clear from Mr. Cronin's message that more than the supply of material has been let; it would also appear that the work is being carried out piecemeal with the help of caretaker.

The question of fencing has been dealt with at length in Mr. Woods' memo., attached. In the instance quoted—the Ivanhoe tank fencing—was an extension of a contract for which tenders had been three times invited, and it was with great difficulty anyone could be got to undertake it. Nearly all the fencing done by this Department under great pressure from the Mines (in order to lease the works) was let in dry weather; they now point out that because we paid the high prices then demanded, that we have been careless and extravagant, but now in this favourable season, tenders only just obtained by Department for work in this vicinity are but £12 a mile or 9 per cent. less. Fresh tenders have been invited.

With reference to the few tanks stated to be under water, two of the sites were supported by Mr. Gilliat, namely, Dry Lake and Cobham—at the former a house built on a slight elevation over the tank was submerged to the eaves. Scavilles and Copago tanks were sunk at sites concurred in by local officer of the Mines, and those on the Paroo were defined in vote to be on that river, and it matters little where they were sunk in that Valley, as all would have been submerged; that they were sunk within easy distance of permanent water is incorrect, as has been disproved before. This work was done more than ten years ago and by an officer not now in the service.

Professional training seems to be objected to, but where the practical experience, ability, and determination for absolute economy exist, I think professional knowledge is at least no drawback. Messrs. Cronin, Stilwell, Hanna, Smijth, Coleman, and Adam are as well able to properly supervise those works as any equal number of officers in the Mines. Fortunately the characters of many of those gentlemen are well-known, and the number is not greater than that proposed by Mr. Gilliat.

Why the squatters' tanks are let at cheaper rates per cubic yard is explained by Mr. Wood. The opinions that the contractors would not ask it if they were properly supervised and properly paid, are both equally baseless. As to the supervision, I have said sufficient; as to the prompt payment, an arrangement was made that 50 per cent. be paid by local officer's cheque, immediately on measuring, and remainder as soon as office routine permitted, in common with all other payments at this office.

I maintain that, all things equal, excavation cannot be done cheaper than by this Department. I believe that public competition is the safest and fairest way of letting work, and we have always understood that any other mode of letting work is illegal, and contrary to a resolution of Parliament.

With reference to the concluding paragraph of Mr. Gilliat's paper—that remarks on the Mines officers were uncalled for or unjust—surely it is not supposed that old and tried officers will permit their work of more than twenty years to be taken out of their hands in this way without some effort to prevent it; and as to those remarks being unjust, I have only stated what I believe to be true.

With reference to the concluding paragraph of Mr. Gilliat's memo. on fencing, as to the careless manner in which contracts have been accepted at exorbitant rates, the records will prove the manner in which this Department was driven to accept such tenders by those who now find fault.

I have obtained from the Railway Department the prices paid for such tanks along the Bourke line as varying from 2s. 6d. to 3s. 6d. Our prices vary from 10½d. to 1s. 9d., and as I have stated the Mines themselves proposed to let seven to one man at 1s. 4d.

W.C.B.

Extracts from Mr. Gilliat's Minutes of 11th and 13th May, 1887, and replies thereto, by Mr. A. P. Wood.

Mr. Gilliat's statements.	Replies.
1. Estimate of fencing "showing that from £35 to £40 per mile has been paid in excessive price given over and above a fair estimate, and about £60 per mile above the current station rates which should not, I think, be exceeded by this Department. In submitting these particulars I may state that from what I understand the prices paid for fencing upon this road, and indeed at most of the public watering places fenced by the Roads and Bridges Branch, are greatly in excess of ordinary rates, but this is the only instance in which I have directed the overseer to endeavour to verify the statements."	I would point out that this is an exceptional case; that in the majority of instances the fencing has not cost more than £80 per mile. The detail prices quoted have been obtained since the breaking up of the drought; and when an officer, anxious, like Mr. Yeo, to prove a case against this Department, has private conferences with contractors,—they, knowing his object, would be quite prepared to give him information calculated to serve his views, though I have little doubt they would at the same time hesitate very much to accept the work, even under existing conditions, at the prices quoted by them: their object being, as can be readily inferred, to assist in a change that must be to their advantage. The work in question, like most of the fencing throughout the western districts was let during and exceptionally severe drought, when the prices would necessarily be considerably in excess of the average rates. Tenders were invited several times, and eventually, as we were constantly being urged by the Mines to have this particular class of work carried out without delay, the lowest received tender was accepted; and it is submitted that the results obtained from public tendering must be accepted as giving the best evidence of the then value of the work, and as being more reliable than the biassed information on which Mr. Yeo's estimate was apparently based. A proof of the correctness of this view is afforded by the fact that in many of the contracts in question it has been difficult to get contractors to accept extensions of their works at the original rates. The comparison between the prices paid by the Crown lessees and by the Government is most inequitable. Station fencing is of a totally different standard to that required for the public watering places, as the latter has to be cattle, sheep, goat, and pig-proof; whereas the station fencing has only to be sheep-proof. And though this Department is accused of extravagance, the fencing adopted is of a much cheaper type than that recommended by the Mines, when these works were initiated. The Crown lessees generally carry out these works in favourable seasons, and afford their contractors every facility in their execution—giving grass and water, very often rations at cost price, providing for repairs to plant, permitting ready and short access through paddocks for haulage of material, and frequently assisting with the loan of draught cattle. It must also be borne in mind that the stations only pay half the usual rates of freight for wire, as it is carried as back-loading during the wool season, and is also delivered to their contractors on the ground, With

Mr. Gilliat's statements

Replies

2. "I have, however, reports from Mr. Boultbee and Mr. Keighran, and a declaration made by the late caretaker of the One Tree tank of a very undesirable, and I may say, unfortunate, concession to some fencing contractors by allowing them to dispense with straining posts."

With Government contractors the conditions are nearly reversed. Where the station contractor finds every facility afforded him, the other finds only obstruction. In dry seasons grass and water is absolutely refused, rations most difficult to obtain, and access by direct routes through paddocks for haulage of material is forbidden; consequently great detours have to be made, proportionally increasing the cost of carrying out the work, and in some cases, leading to the indefinite suspension of the works in hand.

Another point worth consideration as bearing on the increased cost of the fencing is that all these works are carried out on the stock routes, where the grass or herbage is sooner exhausted than it is in the station paddocks.

Again, if, as is alleged, station fencing equal to ours is erected at much lower rates, it would appear strange that station fencers seldom tender for our work, and that when they do, they demand equally as high or higher rates, the work being open to all desirous of tendering. The inference to be drawn from this is that the large profits assumed to be made by Government contractors have no existence, and that the lower-priced station work offers greater inducements to these men than the necessarily higher standard of work we have to adopt for the public watering places.

The papers alluded to as having been received from Messrs. Boultbee and Keighran have not been attached to Mr. Gilliat's minute, but we are supplied with the declaration made by the late caretaker of the "One Tree" tank.

In this, the only case adduced, there is no ground for the assertion that an "undesirable," "unfortunate," or in fact any concession having been made to the contractor. None of the fencing enclosing tanks is provided with other than the corner straining posts, as has been done at the "One Tree," nor do the specifications provide for any beyond these. If the adoption of this course is now considered such an evil, it is strange that this is the first time since the Mines have dealt with these works that any complaint has been made. Had that Department expressed any particular desire for this unnecessary addition the extra posts could have been provided without any increase in the cost of construction.

3. "I append extracts that bear very forcibly upon the existing state of things, and show the necessity of the Government making a stand against the exorbitant prices that the careless manner of accepting contracts have induced contractors now to stand out for."

The extracts submitted have not in any way proved that exorbitant prices have been paid for tank and well works, and I think it would have been wiser to have provided very strong proof before practically accusing this Department of maladministration in carrying out these works, as also of criminal negligence, if not worse, in dealing with the public funds. It is almost unnecessary for me to state that tenders for these works have to pass through the same routine as tenders for other works under the Department, and it is hardly to be expected that a system which has borne the test of time as this has, will be much damaged by the criticism of an officer having a very limited, if any, experience of these matters.

4. "With reference to economy in construction, I must refer to the cost of hutting, as quoted by the Works Department, and the rates now being paid by this Department."

I submit on attached schedule the prices obtained by the "Mines" from their local officers for the erection of caretakers' cottages; when quoting these prices to the prejudice of this Department, it appears to have been forgotten that estimates had been obtained from the same officers during a similar season to that during which our tenders were obtained. These are given in the first column of schedule attached.

In the endeavour to make a strong case against this Department by comparing the Mines quoted prices with the tenders we submitted, it appears that several very important features have been neglected, which, had they received due consideration would have materially altered the relative rates.

In 1883, prior to taking a vote for the erection of caretakers' cottages, we were furnished with a report from the Mines, informing us that from estimates obtained by the local officers of that Department it was found that two-roomed weatherboard cottages would cost from £56 to £100; and in October, 1885, an extra room was recommended, and by minute of the Minister for Mines, the addition was authorized.

Tenders were invited for these works in May of last year (1886), when the season was as bad or worse than that of 1883—when the information was obtained by the Mines on which the estimate of cost of these works was based.

The tenders for three-room cottages ranged from £68 to £117, or from £12 to £17 in excess of the Mines estimate for two-rooms, which reduces our tenders to a more reasonable amount than the Mines Department expected these works to cost.

These tenders were submitted to the Mines for an expression of opinion as to whether, considering the great expense that had been already incurred with the tank works, it was still considered advisable to carry out this particular work. The tenders were, generally speaking, reasonable; but the Mines reported that they could carry out the work at a lesser cost, ignoring the fact that the offers submitted by us were below their own estimate; but on the strength of their statement the work was transferred to them, as it was considered that in the public interest they should have a chance of proving it. It will thus be seen that this so called extravagant expenditure was never undertaken by this Department, as with some few exceptions, no caretakers' cottages have been erected by us.

A schedule is now produced in which the tenders received by us are compared unfavourably with those received by the Mines; but it does not give any information to prove that the comparisons are fair; no word as to the size and accommodation afforded by these huts, nor as to the character of the work required; no information as to whether these tenders were obtained publicly or privately; as to whether they were prepared on a regular plan and specification, or on a vague verbal description. No allowance is made for the difference that contractors would make in their tenders if the work was supervised by the Mines local officers, and it is needless to say that without such elements of comparison being given, no such conclusion as is arrived at can fairly be deduced.

It is patent that the character of the seasons has a very important bearing on the cost of work undertaken in the western districts, but no allusion is made to this, though the statement is said to be impartial.

This alleged impartiality would have been less open to suspicion if when the Mines officers considered we were paying too much for works in connection with tanks and wells, they had through their office drawn our attention to it at the time. The information that has been gathered, and that it is now attempted to use against us, has been available for a very considerable time and on as good grounds as now, should long since have been brought forward and a remedy pointed out.

Mr Gilliat's statements.

5. "With respect to construction of tanks, reference may perhaps be allowed to the Dry Lake, Seavilles, Cobham Lake, and Copaga tanks; the first three new tanks, the latter an old one, but all four under water for the last fifteen months—to the Paroo tanks, three of which are sunk within easy distance of water, more permanent than they afford."

6. "Pastoral tenants construct scores of tanks for one to the Government, comparing favourably in most respects, at cheaper rates per cubic yard, and I fail to see why Government work should be paid so much in excess of private, and I venture to submit the opinion that contractors would not ask it if they were properly supervised and promptly paid."

7. "It will be neither necessary nor desirable, in my opinion, to maintain such a staff as employed by the Commissioner for Roads. Half a dozen active practical men, similar to Mr. Inspector Boultbee, with ample bush experience, who can use a level, will readily do all the work required, ensuring, I have every reason to believe, a marked reduction in prime outlay."

Replies

The Dry Lake and Cobham Lake tanks are sunk on sites supported by Mr. Gilliat's own report on the watering of the road from Wilcannia to Mount Browne; Seavilles and Copago I have not seen, but the very fact of the sites being flooded is a proof that they have been constructed in suitable places; and as the Department was instructed to sink such tanks along the Paroo, much greater fault would have been found if to avoid floods the higher ground had been kept off the reserve, and in places where tanks were not likely to receive any supply but from the heaviest rains. It is well known that the rainfall has been exceptional in these localities, and that the flooding of the Dry Lake has never happened before. It is also well known that there is an unprecedented depth of water in the Cobham Lake, which has quite upset the opinion given in the report I have alluded to. The Paroo tanks I have never seen, but from what I have heard there was water in those works when there was no natural water in the Paroo, to judge of their value at the present time, when there is abundance of water through the country, is barely fair.

The statement that most station or private tanks will compare favourably with the Government work, is incorrect; the latter being acknowledged as the most complete works of the kind in the Colony. The statement that they cost more per cubic yard of earth excavated is quite true, but I will presently prove that water is conserved in them under conditions reversing the difference in cost.

1. The average station tank is much shallower than ours, and is excavated with much flatter slopes, and this makes a great difference in the cost. A tank 18 feet deep, such as ours, and costing say 1s. 6d. per cubic yard, would be put down to a depth of 12 feet with 4 to 1 slopes for 1s. or 6d. per cubic yard less, but the advantage of the extra depth in dry seasons more than compensates for the extra cost. The Government tanks must, as far as possible, give a permanent supply, and very few of these works have failed; whereas in long-continued droughts a very large number of station tanks run dry. The loss due to the flat slopes adopted by the squatters is shown by the following analysis, giving the salient points of difference between two tanks of the same depth and nearly equal capacities, but with 1½ to 1 and 4 to 1 slopes respectively:—

	Depth tanks, 1½ to 1.	Station tanks, 4 to 1.
Capacity	21,226 cubic yards	22,275 cubic yards.
Mean depth	14·3 feet	9·6 feet.
Evaporation area	40,000 square feet	62,500 square feet.
Soakage area	45,530 ,, ,,	64,630 ,, ,,

These figures speak volumes for the advantages of steep slopes, which with increased depth as compared with station tanks, I have stated to be the chief cause of the increased cost. The steep slopes give an increase of 50 per cent. in the mean depth, a decrease of 30 per cent. in the evaporation area, and a decrease of 30 per cent. in the soakage area. These figures are in themselves sufficient to warrant the increased cost, but this increase is further covered by the lessened evaporation due to the formation of a high embankment round the tank with the excavated material; this tends to the increase of cost. This embankment is in many cases utilized for the conservation of water above the surface of the ground, and in these cases the extra cost is covered by this advantage, which as far as it operates by storing 2 yards of water for one of excavation, reduces the cost by one-half.

There are causes which necessarily make Government tanks more costly than station tanks, but as I have already drawn attention to them when dealing with the accusations in regard to fencing, there is no necessity for me to recapitulate them here.

The assumption that contractors would not ask more for Government work than they do for station work if they were "properly supervised and promptly paid," proves that an opinion is advanced without a knowledge of the facts. I have been under the impression that a keen supervision was more calculated to increase than to lessen the cost of carrying out work, and that a loose and inefficient supervision, such as that suggested, would be more calculated to induce that result, as the contractors would then be able to do pretty well what they chose.

The assertion as to the effect of prompt payments also proves ignorance of the real facts. In regard to these particular works, the usual rule of the Department has been departed from, and 50 per cent. of the amount due has been paid at the time of measurement, the balance in the usual course, and as a rule within a very reasonable time. With the large sums of money paid away in this Department a system must be followed or no proper check could be kept on the officers. The moneys are paid as promptly as possible, and as very few cases of dissatisfaction have been reported to the head office, it is a fair assumption they do not exist. Advices of payment are telegraphed, and not a moment is lost in putting the voucher through the due course, and as to the efficiency and promptness of mode of payment, &c., I think the Treasury and Audit Departments will bear favourable testimony.

This is the last paragraph I purpose traversing, and it is a fitting conclusion to this most unusual criticism by one Department of the management of another.

In the preceding paragraph we are practically condemned for an inefficient supervision and want of promptitude in making payments. I can only assume that as it is stated, if the works are transferred to the Mines Department, it "will not be desirable to maintain such a staff" as that now charged with their construction, the proposed appointment of an equal number of new officers is an indirect assertion that our men are not equal to this duty. The only inference to be drawn from this is that Mr. Inspector Boultbee, with six other gentlemen like him, would have more bush experience, more practical knowledge, and more ability for carrying out these works than such officers as Messrs. Stilwell, Cronin, Hanna, Smijth, and Coleman, who, for zeal, energy, and integrity, are equal to any officers in the service. In order to avoid any painful personalities, it may be as well to make no further remarks on this proposal. But it should be noted that the character of the supervision exercised by the Mines over the maintenance of these works by the lessees and caretakers but poorly bears out the claim now made for the transfer of the construction works. It should also be noted that no case has been made out as to the inefficiency of our supervision, and that the proposed transfer means a series of new appointments, without any compensating reduction in salaries to meet the new expenditure, as the officers now charged with this work would still have to be retained in their respective districts to carry out the road works.

ARTHUR P. WOOD.

ABSTRACT showing prices for Caretakers' Huts quoted by Mines in 1883 and 1887, and tenders received by Roads in 1886.

District.	Mines estimate. Two rooms.—1883.	Proportionate estimate for three rooms.—1883.	Tenders received. Three rooms.—1886	Mines tenders.—1887.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Bourke	100 0 0	125 0 0	90 0 0 94 0 0	60 0 0
Cobar	80 0 0	100 0 0	87 0 0	55 0 0
Wilcannia	80 0 0	100 0 0	.....	69 0 0
Hay	80 0 0 90 0 0	100 0 0 112 0 0	83 12 0	.....
Deniliquin	.....	.....	70 0 0	41 3 6
Condobolin	.....	.....	79 0 0 85 0 0	47 2 0
Balranald	73 0 0	91 0 0	117 0 0	59 17 2
Ivanhoe	80 0 0	100 0 0	114 17 1	58 4 0
Albury	.....	.....	68 0 0	54 10 0
Narrabri	90 0 0	112 0 0	75 0 0 80 0 0	.....
Walgett	.....	.....	79 0 0	.....
Forbes	.....	.....	.....	26 1 6
Silverton	.....	.....	.....	50 0 0

NOTE.—The type of building for which tenders were received was determined on information supplied by the Mines, and that Department also, in 1883, furnished an estimate of what two-room cottages would probably cost; but, as they desired, when practicable, to have three rooms, tenders were invited accordingly, and will be found to be under the Mines estimate.

We are now confronted with fresh estimates of value on which a charge of extravagance is founded, but no information as to the nature of the work that the Mines can do for the prices they quote is given. That the conditions are altered is certain from the price quoted for Forbes (£26 1s. 6d.), at which price it would be utterly impossible to erect a cottage under the conditions set forth.

Information has been furnished that, in the Deniliquin District, where the recent Mines estimate is £44 3s. 6d., the work is being done by day-labour; that the material, without carriage, has cost about £50, and that only two rooms are provided for. Under such conditions the comparison made is most unfair. The cottage at Silverton is of iron, contains two rooms, and is of a different type altogether to that submitted for the approval of the Mines. Any comparison on such a basis is not reliable.

V.

EARLIER SPECIFICATION UNDER WHICH TANKS WERE COMPLETED.

Specification of work required for the completion of a Tank at District, contract

Works.—The work for which tenders are to be made, and to which this specification refers, comprises the providing of all materials, tools, labour, scaffolding, implements, workmanship, and every other thing requisite for the full and proper execution of all the excavation, embankment, timber-work, and smith-work, together with the carting and fixing of all machinery, gear, hose, piping, and all appurtenances whatsoever required for the completion and efficient working condition of a tank at in accordance with the plans, specification, and general conditions hereto attached, and to the entire satisfaction of the Commissioner and Engineer for Roads.

Design.—The tank will be excavated in the , at the place specified, or at such other site as may be definitely fixed upon, as hereinafter provided; the excavated material to be placed The high-level water will be drawn by gravitation; the low-level water will be pumped out. Troughs will be constructed for the purpose of watering stock outside the tank. Drains will be made for carrying water into the tank, and silt-tanks will be excavated where required.

Excavation.—As soon as possible after signing agreement, written instructions will be issued to the contractor, and immediately on receipt thereof he must proceed with main excavation on lines previously laid down by the superintendent. The excavation will be yards long by yards wide in the bottom, and feet deep; to have side slopes of to one. If a depth of should prove unavailable, or if from or for any other reason it may be deemed advisable or necessary, the Commissioner for Roads, or other authorized officer, may alter the design accordingly. Tenders must therefore state separate prices per cube yard for all material excavated under this contract for , and feet respectively. If any depth than those mentioned be finally adopted, a proportionate price must be agreed upon before commencement of main excavation, and at a schedule price per cube yard. The contractor must excavate all drains, silt-tanks, or other excavations whatsoever that may be required.

Embankment.—The base of the embankment shall first be ploughed with furrows not less than 5 inches deep. The excavated material is to be placed around the excavation as shown on plan. The inside toe of embankment to 10 yards distant from line of excavation. The embankment will be feet wide at base, with slopes of to one inside and to one outside. The superintendent may order, and the contractor must then use, any particular strata or quality of material obtainable in the main excavation for inside slope of embankment. The embankment to be commenced at the point nearest to where the material is drawn from the excavation, and worked away in such manner as may be satisfactory to the superintendent and as to ensure its being most firmly laid. The material to be spread in layers not more than 1 foot thick; all lumps that will not pass through a 6-inch gauge are to be broken smaller, and in event the sides are to be edged up to facilitate soakage and settling. The top of embankment will have a convexity of inches.

Silt-tanks.—Silt-tanks will be excavated as shown on plan to be feet square at the top feet deep, with side slopes of 1½ to 1.

Drains.—Drains to be feet wide and inches deep, to have a curved cross-section, and to be excavated on lines and to levels laid out or instructed by the superintendent, the material being thrown on the lower or both sides, as may be directed. In graded drains the contractor must be careful that the levels are closely adhered to; any departure will be at his own risk, and the error must be remedied in any way the Commissioner may direct.

Inlet-pipe.—Cast-iron inlet-pipe 12 inches diameter, with valve and wind-bore, will be supplied by the Government, and delivered to the contractor at , from which place he must cart it to the works and fix it to the satisfaction of the officer in charge. The joints to be thoroughly caulked and leaded up.

Fluming.—Flume to be semi-circular in cross section, 4 feet wide, constructed of No. 20 plain galvanized iron supported on 9-inch x 6-inch joists, over which the iron is to lap 4 inches, and be secured there to with three rows of galvanized iron nails. All joints to be transverse, to have a 3-inch lap made perfectly watertight with white leaded felt, and secured with galvanized screw-bolts. The flume to be supported at intervals of 10 feet on timber trestles or on piles, as may be directed. The scantlings of all timbers to be the same as figured in drawings, but the lengths of trestle legs or piles for supporting fluming to be determined by the contractor on the ground. The inlet end of flume where leaving the silt-tank to be protected from scour by a row of sheet piling, as shown in drawings.

Inlet-shoots.—When the tank is fed through an inlet-pipe the shoot is to be 2 feet wide and 2 feet deep in the clear when lined; but when inlet-pipe is dispensed with and the tank is fed through a gap left in the embankment, or when supplied by fluming, then the shoots to carry the discharge are to be 5 feet wide by 2 feet deep, and in the latter case the upper end of the shoot is to be covered in for a distance of 10 feet, with 2-inch boards, as shown in drawings. The frame timbers are to be 6 feet apart and of the dimensions figured; the bottom and sides are to be sheathed with sawn planks 6 inches wide and 2 inches thick, close jointed and securely nailed to the frame timbers, and the shoot to be then lined with No. 20 plain galvanized iron, with transverse joints having a 3-inch overlap, and secured with three rows of galvanized nails with ruffs. In all cases a timber apron 12 feet long by 12 feet wide will have to be constructed as shown in drawings.

Pumping

Pumping Gear.—

Service tank.—This tank will be feet long, by feet wide by feet deep, measurements taken in the clear. To be built on sleepers bedded level and adzed on upper surfaces to give a true bearing for joists—sleepers to be not less than 12 inches diameter at small end. The tank will be built as shown in plan. All frame timbers must be of the full scantling shown, and all tenons and mortices must be clean cut and fit accurately. The timber lining will be of sawn planks 2 inches thick and 6 inches wide, to be close-jointed and securely nailed to the frame timbers. The inside of the tank is to be lined with No. 20 B.W.G. plain galvanized iron (Gospel Oak), having a lap of 3 inches at each joint, to be made watertight with a strip of felt 3 inches wide, white-leaded, and fastened with three rows of 1½-inch galvanized nails, with ruffs white-leaded. Each sheet of iron to receive one coat of coal tar on its under side. The contractor will supply and fix one 4-inch cast-iron cock for supplying troughing, and will make a watertight connection between outlet pipe and service tank.

Troughing.—100 lineal yards of troughing to be built as shown on plan. The iron to be of similar gauge and quality, as specified for service tank, to be secured to side timbers with three rows 1½-inch galvanized nails. Joints to be made perfectly watertight with white-leaded felt in all laps, and secured with galvanized screw-bolts.

Fencing.—Fencing to be erected round tank as shown on plan. Posts to be 7 feet long by 9 inches by 3 inches, sunk 10 feet apart to a depth of 2 feet 6 inches. Top rail 7 inches by 3 inches mortised into posts. Five No. 4 wires to be run through all posts.

Timber.—Where the kind of timber to be used in particular work is not hereinbefore specially mentioned, the contractor is to use gum, and the sizes and dimensions specified and shown on plan are for that timber. The timber throughout is to be of the best description, to be straight and sound, without wave, shake, gum veins, or sun cracks, and to be perfectly free from all other imperfections or defects. To ensure that it will be well seasoned, it must be cut as soon after acceptance of tender as possible, and no advance payment will be made until the whole of the sawn and squared timber is delivered on the ground, notwithstanding any progress with the works, or any clause in the general conditions to the contrary.

Tarring.—All timber throughout, except fencing, to receive three coats of tar and composition, the first coat to be all coal tar laid on hot, the second and third coats to be composed of seven parts coal tar and four parts of Stockholm tar and one part pitch, thoroughly melted together and applied hot. No tar to be applied during or immediately after wet weather, or while surface of timber is wet, and an interval of at least forty-eight hours must elapse between each application.

Time.—All the works specified to be completed within months from date of signing the bond, irrespective of bad weather or any other cause of delay, except a written order be given by the officers in charge not to proceed with the work, or to increase the same, when a proportionate extension of time must be allowed.

Tenders.—Tenders to state a bulk sum for the execution of all the works specified, and schedule of prices at which any deductions or additions shall be valued; such additions or deductions, no matter to what extent ordered, shall not vitiate or set aside the contract.

Conditions.—In all matters relating to this contract not herein specified, contractors shall be bound by the general conditions hereto attached.

VI.

Later Specification under which Tanks were completed.

Specification of work required for the construction of a Tank and appurtenances at , on the road from to .

Works.—The work for which tenders are to be made, and to which this specification refers, comprises the providing of all materials, except those hereafter specified as being provided by the Government, all tools, labour, implements, workmanship, and every other thing requisite for the full and proper execution of all the excavations, embankments, timberwork, smithwork, and stonework, together with the carting and fixing of all machinery, gear, piping, and all appurtenances whatever, required for the completion and efficient working conditions of a tank at , in accordance with this specification and the general conditions and drawings, and to the entire satisfaction of the Commissioner and Chief Engineer for Roads.

Preliminary.—Before commencing the excavation of main tank, the contractor must sink trial shafts to a depth of 18 feet on the site selected, and should the material passed through be considered unsuitable, the road superintendent shall have the power to order, and the contractor must then carry out, the necessary excavation at any other site that may be selected within 2 miles of the first-chosen site. The contractor will be paid 1s. 6d. per foot for all trial shafts put down on any site subsequently abandoned, but will receive no payment for such work where the site is adopted. When the site is finally approved, written instructions will be issued to contractor, and immediately on receipt thereof he must proceed with the works on the lines laid down by the road superintendent.

Clearing.—An area comprising that covered by the excavation, berm, and embankments, and extending 1 chain beyond the fencing enclosing tank, and extending 1 chain on each side of and beyond the line of troughing to be cleared, all trees, stumps, and brushwood to be grubbed and burnt, and holes filled with punned earth.

Excavation.—The excavation will be feet long by feet wide in the bottom and 18 feet deep, to have side slopes of 2 to 1. The bottom of tank to be left perfectly level, and the batters dressed to a regular surface. If a depth of 18 feet should prove unavailable, or if for any other reason it may be deemed advisable, the Commissioner for Roads, or other authorized officer, may alter the design accordingly. Tenders must, therefore, state separate prices per cubic yard for excavation 18 feet, 16 feet, and 14 feet deep, and if any depth other than those be finally adopted, a proportionate price will be fixed by the Commissioner, and contractor paid accordingly. Should the road superintendent consider that the surface, or any other stratum, passed through in the excavation is too porus, the contractor must adopt such steps to puddle the porous ground as the superintendent may direct; the cost of such work to be provided for by a price per cubic yard for puddle being quoted in schedule of prices. Silt-tank to be excavated in position shown on plan, or on such lines as the road superintendent may direct, to be 9 feet deep, 40 feet square in the bottom, with side slopes of 2 to 1. The bottom and sides to be neatly trimmed, as specified for main tank.

Embankment.—The excavated material from main and silt-tanks to be formed into an embankment round main tank, as shown on plans. The inner toe of embankment to be 30 feet distant from line of cutting. The embankment to be 10 feet high, with side slopes neatly and regularly dressed to batters of 2 to 1; the top width to be uniform, and regulated by the amount of material to be excavated. When the design provides for the storage of water above the natural surface of ground, the seat of the embankment must be ploughed, the furrows to be not less than 5 inches deep, and the material in embankment must be thoroughly grafted with the surface. The bank to be commenced at points nearest to where material is drawn from the excavation, and the earth deposited in such way as will ensure the most thorough consolidation by traffic. The earth to be spread in layers not more than 6 inches thick, all clods to be broken down, and, in the event of rain, the edges are to be raised to facilitate soakage and settlement. Should the features of the locality make such a course advisable, the road superintendent may alter the design by running the side embankments out to high ground adjoining excavation, and such alteration shall be carried out by the contractor without any claim for additional payment. When the embankment is trimmed up, the top surface to be neatly dished to the extent of 9 inches, the dishing to be graded so as to give a regular fall to such points as may be directed by the road superintendent, and at these points the contractor will be required to lay 3-inch diameter iron discharge pipes (provided by the Government) in the embankment to carry off all rain water that would lodge on the surface.

Drains.—Ordinary drains are to have a curved cross-section, to be 9 inches deep, and feet wide, and are to be excavated on lines laid out by the superintendent, the material being formed into an embankment on the lower side and 3 feet clear from edge of drain. In graded drains the contractor must closely adhere to the levels, and any departure from them must be at his own risk, and the error must be remedied in any way the Commissioner may direct.

Inlet pipes.—When the design provides for the storage of water above the surface, cast-iron inlet pipes 12 inches in diameter will be supplied by the Government, and delivered to the contractor at from which place he must cart them to the works, and fix them in such position and at such level as the Superintendent may direct. Joints of pipes and valves to be made with white hempen yarn, well caulked in so as to leave a vacancy of 2 inches for the lead, which must be poured in at one running, and caulked up with suitable tools to ¼ inch within the sockets; great care must be taken to keep the spigots concentric with the sockets; great care must also be taken to have the earth thoroughly punned round the pipes.

Inlet shoot.—When the tank is fed through an inlet pipe the shoot is to be 2 feet wide and 2 feet deep in the clear when lined; but when the tank is only intended to contain water to the level of natural surface the inlet shoot is to be 5 feet

feet wide and 2 feet deep, and that portion of it extending under the dwarf embankment must be covered in with closely-fitting timbers 6 feet long and 6 inches thick. In both cases the shoot for 10 feet on its upper fall into tank is to be covered in with 2-inch thick sawn planking, spiked to side planks of sheathing, and further secured by a 4-inch x 2-inch bearing-plate, secured to frame timbers, as shown in drawings. Spaces ½ inch wide to be left between these covering-boards. The frame timbers are to be 6 feet apart from centre to centre, and to be of the scantlings shown in drawings; the bottom and sides to be sheathed with sawn planks 6 inches wide and 2 inches thick, close-jointed, and secured to frame timbers with 5-inch nails; the sheathing boards to break joint on alternate frames. The sheathing to be lined with No. 20 gauge plain galvanized iron of approved brand, all joints to have a 3-inch overlap, and to be secured with three rows of galvanized nails with ruffs pitched 2 inches apart. The side timbers of frames are to be sunk in the ground and securely rammed, three sets in each shoot being cut with a 12-inch diameter butt, as shown in drawings. Spreaders 6 inches x 4 inches to be securely fixed at each set of frames, and after being notched down 2 inches on sheathing boards are to be secured to side timbers with ½-inch diameter bolts. The inlet end of shoots 5 feet wide to be splayed for a length of 10 feet, the width being increased to 10 feet, and the iron lining to be carried 18 inches into the bottom and sides of inlet trench to prevent scouring at the back of or under the timber-work. When the top of shoot is below the level of ground the excavation to be battered at 1½ to 1, a berm of 1 foot between shoot and foot of slope. Where the shoot passes through gap in embankment a berm of at least 3 feet must be left between edge of shoot and toe of bank.

Apron.—A timber apron 12 feet long and 12 feet wide to be constructed at the bottom of shoot, as shown in drawings. Four sleepers 16 feet long and 9 inches square to be let 4 feet into the foot of slope, and to be sunk flush with bottom of tank; sheathing planks 12 feet long, 6 inches x 2 inches, to be close-jointed and secured to sleepers with 5-inch nails; side logs 9 inches square and 12 feet long to be secured to outer sleepers with three driving bolts 16 inches long and ¾ inch diameter. Posts 9 inches square and 5 feet long, exclusive of the 12-inch diameter butt, to be sunk in the ground and well rammed and secured to side logs with ¾-inch diameter bolts as shown.

Pumping gear.—"Special" steam pump with boiler, suction and discharge piping, suction joint, foot valve, and all connections will be supplied by the Government and delivered to the contractor at from which place he must cart them to, and erect them at the works. The foundation plate of boiler and pump to be securely bolted to a timber platform constructed of four sleepers 12 inches square and 10 feet long, firmly bedded in the ground, and covered with sawn slabs 10 feet long, 8 inches wide, and 4 inches thick, secured to sleepers by spikes 7 inches long and ¾ inches diameter, two at each intersection. The level of platform to be 6 inches above level of ground. The suction pipe to be laid under the embankment, and connected with the movable suction joint which is to be supported on timber frame, as shown in drawings, the movable length of suction pipe to be of sufficient length to reach to the bottom of tank, and to be supported by a buoy, as shown. The pipes to be thoroughly cleaned before being laid, and all joints to be white-leaded and screwed tight into the collars. All steam and water connections to be made steam and water tight; all glands to be packed; mud-hole and man-hole covers made steam-tight, and all machinery cleaned and lubricated. The outside of boiler and pump, &c., to be thoroughly scraped, cleaned, and painted; the boiler to receive three coats red lead and oil, the steam and water cylinders three coats green paint picked out in black; all connections three coats black paint. Brass and faced work to be left bright. The contractor will have to fill the boiler with water and get up steam for test trial, and no payment on account of erection will be made by the Road Superintendent until he is fully satisfied that everything is in working order. Amos and Smith's horse-gear pump, with all connections, will be supplied by the Government and delivered to the contractor at , from which place he will cart them to and erect them at the site of the works. The bed-plate of horse-gear and pump to be securely bolted to 12 inches square timber sleepers, as shown in drawings. The suction-pipe and fittings to be laid and fixed, as specified for steam pump *in previous clause*, the movable suction-joint and pipe being supported on similar timber staging. The foundation logs for horse-gear and pump are to be firmly bedded flush with the surface of horse-walk, which is to be 30 feet in diameter, and formed in main embankment, as shown in drawings. The contractor to provide a horse-arm to fit in socket of horse gear, to be 12 feet long, planed and wrought, to receive three coats of red lead and oil. The horse-gear and pump to receive three coats of green paint picked out in black. All brass and faced work to be left bright.

Service tank and troughing.—The service tank to be of , as per specification attached; the troughing of , also as per specification attached. The contractor to fill whichever type of service tank is adopted with water after completion, and no final payment will be made on account of contract until the superintendent is satisfied that it is perfectly watertight.

Weather-shed for engines.—Weather-shed for engine to be framed in accordance with drawings. The walls, roof, and doors to be covered with No. 24 gauge corrugated galvanized iron. The shed to be 12 feet square outside, framing to be supported on eight blocks, 2 feet 6 inches long, sunk 2 feet in the ground and securely rammed. The bottom sills to be 8 inches x 4 inches, halved at the corners, and spiked down to the blocks with 7-inch spikes, ¾-inch diameter; to be morticed to receive the tenons of uprights. Corner uprights to be 4 inches x 4 inches, and intermediate uprights 4 inches x 3 inches, braced, as shown in drawings, with 3 inches x 1 inch diagonals. Wall-plates to be 4 inches x 3 inches, halved at the corners, and morticed to receive the tenons of uprights. Horizontal bearers, 4 inches x 1½ inch, to be let in flush with outer surface of uprights, to carry screws securing iron. Rafters to be 3 inches x 2 inches, secured to wall-plates and ridge-board with nails; ridge-board to be 6 inches x 1 inch; battens, three on each side, to be 3 inches x 1 inch, to be securely spiked to the rafters. Gable studs, 4 inches x 2 inches, to be tenoned into wall-plate and securely spiked to outer rafters. Doors to be 6 feet 6 inches x 3 feet in the clear, framed as shown in drawing, with 3-inch x 3-inch timber, and hung to door-posts with T hinges; the doorway to be opposite the furnace-door of boiler. The galvanized corrugated iron in walls, roof, and door, to be secured with galvanized screws to the entire satisfaction of the superintendent. Opening to be cut in roof for funnel of boiler, and the ridge covered with a galvanized iron ridge cap.

Tank fencing.—Fencing to be erected round tank as shown in drawings. Posts to be 7 feet long x 9 inches x 3 inches, sunk 2 feet 6 inches in the ground, and pitched 8 feet 3 inches apart. Top rail, 7 inches x 3 inches, to be accurately tenoned into mortices. Five No. 6 gauge wires to be run through each post, and strained to corner posts, 12-inch diameter, securely strutted with 8-inch diameter struts, notched into posts, sunk 2 feet in the ground, and footed against a dwarf post, 8 inches diameter, sunk 2 feet 6 inches.

Special lease fencing.—The fencing to be erected on lines laid out by the road superintendent or other authorized officer. The posts to be 7 feet long x 9 inches x 3 inches, sunk 10 feet apart from centre to centre, and to a depth of 2 feet 6 inches. Corner posts to be 12 inches diameter, securely strutted with 8-inch diameter struts, notched into posts, sunk 2 feet in the ground, and footed against a dwarf post, 8 inches diameter, sunk 2 feet 6 inches. Six wires to be run through each post, the top one No. 4 gauge, and all the rest No. 6 gauge, to be spaced as shown in drawings, and each wire to be strained to the nearest post to the end of coil; no wires to be spliced.

Gates.—Field gates to be 12 feet long, constructed in strict accordance with drawings, and of wrought and planed Kauri pine. Eight foot gates, either double or single, to be also constructed of wrought and planed Kauri pine. The iron-work of all gates to be of the best quality and of the full dimensions shown. Each gate to be hung on two double strap wrought-iron hinges, with eyes worked in the solid to take a wrought-iron crook 1-inch diameter, the crook to pass through post and to be secured with nut and 2-inch square washer ¼-inch thick. The whole of the timber to receive three coats of white lead in oil, and all ironwork three coats of Brunswick black. The gates to be fixed where directed and hung on 12-inch square posts sunk and strutted as shown in drawings.

Caretaker's cottage.—Caretaker's cottage to be constructed in such position on the special lease area as the road superintendent may direct, and in accordance with the attached specification.

Timber.—Where the kind of timber to be used in any works on this contract is not hereinbefore specially mentioned, the contractor is to use , which is to be of the best description, straight and sound, without wanes, shakes, or sun cracks, and to be free from other imperfections and defects. To ensure that it will be well seasoned, it must be cut as soon after acceptance of tender as possible, and no advance will be made until the whole of the timber is delivered on the ground, notwithstanding any clause in the general conditions to the contrary.

Tarring.—All timber, except that specified for weather-sheds, caretakers' cottages, gates, and fencing to receive three coats of composition, composed of three parts of coal tar to one part of pitch, thoroughly melted together and applied hot.

Time.—All the works specified to be completed within months from date of signing the bond, irrespective of bad weather or any other cause of delay, except a written order be given by the officer in charge not to proceed with the work, or to increase the same, when a proportionate extension of time must be allowed.

Tenders.—Tenders to state a bulk sum for all the works specified.

Conditions.—In all things relating to this contract not herein contained, the contractor to be bound by the general conditions attached.

VII.

A.—Department of Roads and Bridges—Tanks and Wells.

Specification of work required to be done in the construction of a Caretaker's Cottage at the on the road from to

General.—This contract is for the supply of all tools, labour, and material, necessary for the construction of a three-roomed cottage, in accordance with the drawings and this specification, and to the entire satisfaction of the Commissioner for Roads or other authorized officer.

Site.—The site to be determined by the local officer, who will mark out the lines for the foundations.

Design.—The cottage will contain three rooms of the dimensions shown on drawings, and will be founded on wooden blocks; the walls to be of weather-board, secured to timber studding, except the partitions, which will be of sawn slabs; the roof to be covered with galvanized iron, capped and guttered; the whole of the rooms to be floored.

Foundation.—The foundation to consist of twenty-three blocks, 12 inches in diameter and 3 feet long, the ends to be sawn square and the blocks sunk to an average depth of 2 feet 6 inches, the top surfaces to be accurately levelled, and the earth thoroughly rammed in round them.

Framework.—The bottom wall-plates to be 4 inches x 3 inches, all intersections to be halved, and all other joints square scarfed; the scarfs to be 9 inches long, and must be made over a foundation-block. The plates to be secured to each foundation-block by an iron spike 7 inches long and ¾ inch in diameter. The studs to be of the lengths shown in drawings, to be 4 inches square at all corners, and 4 inches x 3 inches in all other cases; tenons 3 inches x 2 inches x 3 inches, to be clean cut at each end, and accurately fitted into mortices cut in the bottom and top wall-plates. The top wall-plates to be 4 inches x 3 inches, halved at the intersections, and scarfed at the joints as already specified; the end and partition-plates to be the full width of the building. Lintels of windows and doors, and sills of windows, to be tenoned into the studs forming the jambs. The outer walls to be covered with weather-boards, securely nailed to the studding; all joints and cutting ends against jamb-linings, and against corner fillets, to be cut true and to fit close. The weather-boards to be not more than 9 inches wide, and to be ¾ inch thick. The fillets at corners of cottage to be 3 inches x 1 inch, securely nailed to the corner studs. The partition-walls to be filled in between studs with horizontal sawn planks 1 inch thick, secured in position by fillets, 1½ inch square, as shown in drawings.

Floor.—The floor to consist of sawn pine boards 6 inches wide and 1 inch thick, close jointed and securely nailed to joists 6 inches x 3 inches, set 2 feet apart from centre to centre; the boards to be accurately fitted round and up to the face of the weather-boarding.

Roof.—The rafters to be 5 inches x 3 inches, framed as shown in drawings, to be 3 feet apart from centre to centre; collar-beams to be 4 inches x 3 inches, secured to rafters with ½-inch bolts; the ridge-board to be 8 inches x 1 inch; battens to be 2½ inches x 1 inch, three rows on each face of roof. The whole to be covered with No. gauge corrugated galvanized iron, securely screwed to the battens; the ridge to be capped with galvanized iron, as shown. Galvanized iron guttering to be fixed on back and front of main building, and connected to one down-pipe; the roof at back of skillion to be guttered and provided with a down-pipe.

Chimney.—The chimney to be constructed as shown in drawings, the walls to be similar to those of the main building; the hips and flue to be of corrugated galvanized iron, fixed on a timber frame; the hearth to be brought up 6 inches above the level of floor with well-tempered clay, and the chimney-place lined 3 feet 6 inches above the same level with similar material. If stone is procurable within 3 miles of the site, rubble masonry, set in lime mortar, to be substituted for clay.

Doors.—Front door to be framed with four panels as shown, to be hung on 3-inch butt-hinges, and provided with 8-inch rim lock and usual furniture. The jamb-linings to be of 1-inch pine, planed and wrought. The remaining doors to be "proper ledged," hung on two 12-inch T hinges, and provided with 8-inch rim locks and usual furniture.

Windows.—The front windows to be double sashed; the upper sash fixed, the lower sliding. The side window to have one sash hung on pivots, the whole to be provided with brass fastenings. The jambs to be lined with 1-inch pine, planed and wrought.

Timber.—Where the kind of timber to be used in particular work is not hereinbefore specially mentioned, the contractor is to use pine, and the sizes and dimensions specified are for that timber, which is to be of the best description, straight and sound, without wanes, shakes, or sun-cracks, and to be free from all other imperfections or defects. To ensure that it will be well-seasoned, it must be cut as soon after acceptance of tender as possible, and no advance will be made until the whole of the sawn timber is delivered on the ground, notwithstanding any clause in the general conditions to the contrary.

Painting.—The outer face of weather-boarding to receive three coats of white lead, in oil; and the doors, window-sashes, and jamb-linings three coats of dark gray paint.

Time.—All the works specified to be completed within months from date of signing the bond, irrespective of bad weather or any other cause of delay, except a written order be given by the officer in charge not to proceed with the work, or to increase the same, when a proportionate extension of time must be allowed.

Tenders.—Tenders to state a bulk sum for all the works specified.

Conditions.—In all things relating to this contract not herein contained, the contractor to be bound by the general conditions attached.

B.—Department of Roads and Bridges—Tanks and Wells.

Specification of work required to be done in the construction of a Caretaker's Cottage at the on the road from

General.—This contract is for the supply of all tools, labour, and material, necessary for the construction of a three-roomed cottage, in accordance with the drawings and this specification, and to the entire satisfaction of the Commissioner for Roads, or other authorized officer.

Site.—The site to be determined by the local officer, who will mark out the lines for the foundations.

Design.—The cottage will contain three rooms of the dimensions shown on drawings, and will be founded on wooden blocks; the walls to be of half-round timber, fixed in a timber framing, except the partitions, which will be of sawn slabs; the roof to be covered with galvanized iron, capped and guttered; the whole of the rooms to be floored.

Foundation.—The foundation to consist of twenty-three blocks, 12 inches in diameter and 3 feet long, the ends to be sawn square, and the blocks sunk to an average depth of 2 feet 6 inches, the top surfaces to be accurately levelled, and the earth thoroughly rammed in round them.

Framework.—The bottom wall-plates to be 6 inches x 4 inches, all inter-sections to be halved and all other joints square scarfed, the scarfs to be 9 inches long, and must be made over a foundation block. The plates to be secured to each foundation block by an iron spike 7 inches long and ¾-inch in diameter. The studs to be of the lengths shown in drawings to be 6 inches square at all corners, and 6 inches x 3 inches in all other cases; tenons 3 inches x 2 inches x 3 inches, to be clean cut at each end, and accurately fitted into mortices cut in the bottom and top wall-plates. The top wall-plates to be 6 inches x 3 inches, halved and scarfed as already specified; the end and partition-plates to be the full width of the building. Fillets, 2 inches x 2 inches, to be securely nailed along the studs, one edge of each to be flush with the outer and inner faces of studs, leaving a groove 2 inches wide and 2 inches deep on each side to receive the wall slabs. Lintels of windows and doors, and sills of windows, to be tenoned into the studs. The spaces between the studs of outer walls to be filled with half-round sawn pine logs, not less than 4 inches nor more than 9 inches wide, to be adzed to a thickness of 2 inches at the ends, to fit into the grooves on the studs, the upper and lower edges to be dressed to give parallel bearing surfaces not less than 1½ inches wide. The partition-walls to be filled in with sawn slabs 2 inches thick, the whole to be close jointed.

Floor.—The floor to consist of sawn pine boards 6 inches wide, and 1 inch thick, close jointed and securely nailed to joists 6 inches x 3 inches, set 2 feet apart from centre to centre; the boards to be accurately fitted round studs and up the face of the wall-slabs.

Roof.—

Roof.—The rafters to be 5 inches x 3 inches, framed as shown in drawings, to be 3 feet apart from centre to centre; collar-beams to be 4 inches x 3 inches, secured to rafters with ½-inch bolts; the ridge-board to be 8 inches x 1 inch: battens to be 2½ inches x 1 inch, three rows on each face of roof. The whole to be covered with No. gauge corrugated galvanized iron, securely screwed to battens, and the ridges capped with galvanized iron as shown. Galvanized iron guttering to be fixed round main roof and back of skillion, and provided with two down-pipes.

Chimney.—The chimney to be constructed as shown in drawing, the walls to be similar to those in the main building; the hips and flue to be of corrugated galvanized iron, fixed on a timber frame; the earth to be brought up 6 inches above the level of floor with well-tempered clay, and the chimney-place lined 3 feet 6 inches above the same level with similar material. If stone is procurable within 3 miles of the site, rubble masonry, set in lime mortar, to be substituted for clay.

Doors.—Front door to be framed with four panels as shown, to be hung on 3-inch butt-hinges, and provided with an 8-inch rim lock and usual furniture. The jamb-linings to be of 1-inch pine, planed and wrought. The remaining doors to be proper ledged, hung on two 12-inch T hinges, and provided with 8-inch rim locks and usual furniture. The whole of the doors and jamb-linings to receive three coats of dark gray paint.

Windows.—The front windows to be double sashed; the upper sash fixed, the lower sliding. The side window to have one sash hung on pivots, the whole to be provided with brass fastenings. The jambs to be lined with 1-inch pine, planed and wrought, and with the sashes to receive three coats of dark gray paint.

Timber.—Where the kind of timber to be used in particular work is not hereinbefore specially mentioned, the contractor is to use, , and the sizes and dimensions specified are for that timber, which is to be of the best description, straight and sound, without wanes, shakes, or sun-cracks, and to be free from all other imperfections or defects. To ensure that it will be well-seasoned, it must be cut as soon after acceptance of tender as possible, and no advance will be made until the whole of the sawn timber is delivered on the ground, notwithstanding any clause in the general conditions to the contrary.

Time.—All the works specified to be completed within months from date of signing the bond, irrespective of bad weather or any other cause of delay, except a written order be given by the officer-in-charge not to proceed with the work, or to increase the same, when a proportionate extension of time must be allowed.

Tenders.—Tenders to state a bulk sum for all the works specified.

Conditions.—In all things relating to this contract not herein contained, the contractor to be bound by the general conditions attached.

VIII.

Specification for Cottages to be erected under Department of Mines at the Public Watering Places, known as the Silverton well, the Rat Hole tank, Day Dream tank, Purnamoota tank, and Thackaringa tank; five in all.

Size.—Cottage to be 25 feet by 12 feet x 10 feet.

Materials.—To be built of timber and galvanized corrugated iron, 26 gauge.

Blocks.—Cottage to be built on gum or mulga blocks, twenty-seven in number, 2 feet long, 1 foot in ground and well rammed, the blocks to have not more than 3 feet 6 inches centres, and to be 3½ inches at small end.

Plates.—To be 3½-inch by 1½-inch red deal, well nailed to blocks at bottom, and morticed top and bottom to receive studs.

Studs.—To be 3½-inch by 1½-inch red deal, properly tenoned to fit mortices in plates, and skew nailed to plates top and bottom. None of the studs to be more than 3 feet 6 inches apart, and to be twenty-seven in number.

Rafters.—To be nine pairs, and to be 3½-inch by 1½-inch red deal cut to shoulder against side plates and ridge board, and well nailed top and bottom with wire nails.

Ridge board.—To be 6-inch by ¾-inch flooring boards, and to stand up ½ inch above rafters, so that roof iron can butt up against it.

Iron on roof and sides.—The whole of the building to be covered with 26 gauge galvanized corrugated iron, Emu brand. The iron on end and sides to be horizontal, well nailed to studs with galvanized screws. The screws to be put in at ends and centres of each sheet at each lap; to be 2 inches by 12 inches, with galvanized washers. Roof iron to be nailed with 2-inch by 12-inch screws and washers to a purline at the top and centre, and to the top wall-plate at bottom, and to have 3 inches lap.

Ridge capping.—To be 12 inches, to have 3 inches lap at each joint.

Doors.—To be three in number; one at back, one in front, and one in partition. To be made of 6-inch by ¾-inch T and G flooring boards, beaded and well nailed to three cross pieces, hung with 14-inch T hinges, and fastened with an American lock, No. 450½.

Windows.—To be two pairs of 6-inch casement, 10 by 12, hung with butt hinges, and properly stopped and fastened.

Floor and joists.—To be thirteen in number, spaced 2 feet apart, and resting on the wall-plates at each side and on a bearer on blocks in centre, to be 6 inches by ¾ inch, well dogged up and double nailed.

Partition.—Studs to be 3 inches by ¾ inch, spaced 3 feet apart, and carried up to collar ties. To be covered by 6-inch by ½-inch matchboard, and door hung as described.

Angles.—The corners, windows, and doors to be stopped with 2-inch by 1¼-inch battens nailed to studs.

Chimney.—To be galvanized iron, bricked up 3 feet inside, and of a pattern similar to those used about Silverton.

Collar ties.—One to each pair of rafters, to be 3 inches by 1½ inch, nailed on 4 feet above wall-plates.

IX.

Specification of Gates for Watering Places—Recommended by Chief Inspector of Stock in a report dated 19th March, 1883.

1. The gates to be double of the shape shown in the accompanying sketch, each 10 feet wide, and 5 feet 6 inches high, with a post between, and stay at back.

2. The posts to be sound river gum or ironbark, 10 feet long, 1 foot diameter, 4 feet in the ground, and to rise 6 above ground.

3. A ground plate of river gum or ironbark, not less than 9 inches diameter, to be laid between and morticed into each pair of posts.

4. The back of the gate to be 6 x 4, river gum or ironbark, 8 feet long, and the front to be 4 x 3 of same material, 6 feet in length.

5. The whole of the rest of the gate to be made of 3 x 1½ hardwood battens.

6. The rails to be five in number (battens) set at the following gauge:—The first, 9 inches from the ground; the second, 9 inches from the first; the third, the same from the second; the fourth, the same from the third; and the fifth, 12 inches from the fourth.

7. There will be three stays to each gate as shown, the long stay to be double battens, with the rails passing between—the others single crossing with the rails between.

8. All the joinings and intersections to be made with bolts well nutted up.

9. The hooks of the hinges to be made of 1½ inch round iron, to be hung on the inside (not the front of the post as shown on the sketch) right through the post with shoulder in front, and fastened at the back with screws and nuts; and the eyes to have clamps extending 2 feet 6 inches along rails (which will be double for that length) fastened by four bolts and nuts to the rails.

10. The fastening on the gate to be by wooden latch, working on middle rail, falling into groove cut on the faces of the post.

X.

X.

Report of the Inspector of Public Tanks and Wells on Repairs and Alterations recommended as urgent.

Sir, Department of Mines, 16 October, 1883.

I beg to hand you my report with the annexed statement of repairs and alterations, recommended as urgent, for the consideration of the Honorable the Secretary for Mines.

I have considered it desirable to urge the application of machinery for lifting water into troughing at all the tanks. This plan it has been decided to adopt in the construction of future works, and from which great advantages may be anticipated in economising water and the protection to the tank.

I have to recommend that gauges, indicating the depth of the water, may be placed in all tanks where not already erected.

With reference to the fencing of the special leases, immediate action is recommended to secure the leasing of many of the works. I beg leave to submit the following recommendations :—

1. That the fencing should be of a substantial character, and sheep-proof posts not more than 8 feet 6 inches from centre to centre; five wires, and a top rail where timber is plentiful; seven wires, the top ones of No. 6 gauge, where timber is not obtainable.
2. That the fencing of the lease should include as much as possible within its limits of the surface water collecting in the neighbourhood.
3. That provision may be made for increasing the size of the special leases.
4. That the Surveyor-General may be informed of the importance attached by this Department to the early survey of these leases—both at Works,—now approved for construction by the Secretary for Mines, and at the completed works, where such survey has not yet been made.
5. That the Department of Public Works may be requested to furnish the Surveyor-General with the defined position of new works, as soon as convenient after the decision has been made.
6. That the Surveyor-General may be requested to furnish tracings of the surveys when completed, for the information of the Commissioner and Engineer for Roads and Bridges, as well as to this Department.

I have, &c.,
HARRY GILLIAT,
Inspector, Public Tanks and Wells.

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

The Chief Inspector of Stock.—I beg to recommend, as these repairs are urgent, that, on the approval of the Hon. the Secretary for Mines, they should be forwarded to the Works Department: also that a copy should be forwarded for the information of the Surveyor-General. Description of the approximate position of the leases, so as to include the greater portion of surface water in the neighbourhood, will be submitted in a day or two.—H.G., B.C., 31/10/83.

Instructions for the different officers connected with these works herewith.—A.P.W., 8/12/83.

XI.

Consideration of Repairs and Alterations for 1883, proposed by the Inspector of Public Tanks and Wells, 20th January, 1883; including appliances for raising water from Tanks and Dams; troughs, supply tanks, windmills, drawing-pipes, and syphons, enclosing the Works, and fencing in the 200 acres lot to tenant.

Mr. Gilliat here recommends that some £6,560 be laid out during the current year in alterations and repairs to the public tanks and wells under his supervision; and as there is a good deal of other work to be done besides that specified by him, I believe that his estimate is understated by at least £2,000, and that a sum of from £8,000 to £9,000 will be required to meet the cost of repairs and alterations during the current year.

As this is the case, and as it will take some time to prepare the necessary specifications and call for tenders, I would suggest that the subject be now fully considered, and the works to be carried out during the year decided upon; when instructions could be given to Mr. Gilliat to prepare the necessary plans and specifications, with a view to their completion with the least possible delay.

Taking then the estimate in the accompanying list of the alterations proposed at the One Tree tank, on the road from Hay to Wilcannia, as a fair sample of the rest, and dealing with the items in the order in which they stand, the first is :—

The Double Whip.—This mode of raising the water from the main tank into the supply tank, which was suggested by Mr Gilliat, has been submitted to the Commissioner for Roads, and has, so far, met with his approval (see II, 82-402, 17/5/82 herewith), as the most efficient, least expensive, and most easily repaired horse-power for raising water in the interior at a distance from a foundry.

The Troughing.—Mr. Gilliat is in favour of iron or steel troughing, but the Commissioner for Roads prefers the sort now in use—wood—lined with galvanized iron. (See papers III, 82–410, herewith).

The troughs now in use answer well, but require a good deal of repairs; and, if made in this way, they have to be constructed in two sets—one placed low down for the sheep, and the other higher up for the cattle; for, if these troughs were set so as that both sheep and cattle could water at them, the cattle would very soon destroy them; whereas the one set, of either 2-inch red-gum, or of the steel or iron troughs, would be strong enough to water both cattle and sheep, and thus make the red-gum, or steel, or iron troughs, cheaper than the wood and galvanized iron. The former would also need fewer repairs than the latter.

Red-gum troughs, properly made, would cost about 10s. per foot in position; and iron and steel, if the cost of carriage is not very heavy, about the same; while the wood and galvanized iron, at present prices, could not be made for less.

The Supply Tanks.—The description of supply tank has been under consideration, and the papers. See IV, 83-388, herewith, which were sent on to Mr. Gilliat for his report, have now been returned.

It will be seen from these papers that he is in favour of puddle supply tanks for roads where the traffic is comparatively light, and not more than 10,000 gallons of water required to be stored; and of either steel or iron, or wood and galvanized iron, where the traffic is heavy, and 20,000 gallons required.

He was also asked to say whether it would not be safer, and in the end more economical to make the supply tanks of larger capacity than 7,000 gallons. The size he here proposes to make the puddle supply tanks, and his views on this point are also stated in the report referred to above :—

There should, I think, always be sufficient water in the supply tank to water the heaviest lot of sheep which travels; and there are at times as many as 15,000 in one lot. It is thought, therefore, that the capacity of the supply tanks on the main roads should not be less than (say) 20,000 gallons; for it is a bad thing to delay travelling sheep in watering, especially if they are in low condition, and there might be two different lots following so close on, or crossing each other, that there was not time to replenish the supply tank.

Windmills.—Since it was decided to lift the water from the main tanks and supply it in troughs, it has occurred to me that the most economical mode of doing so would be by the windmill.

From

From the inquiries I have recently been making as to the cost and efficiency of these mills, I find that a good mill including stand, pump, piping and all complete, would cost in Sydney (where the whole could be put together with bolts and nuts taken down and packed ready for transmission and re-erection) about £75.

The construction of the mill is simple, the parts substantial, and all easily replaced from duplicates.

It is self-regulating and requires little or no attention, beyond oiling, and with a person living on the spot, cannot possibly get out of order, except through gross neglect; for it is so constructed as to throw itself out of gear in very high winds, and offer a minimum resistance to a storm.

A mill of the size mentioned—14 feet—will, it is said, with a good strong wind, raise some 1,800 gallons an hour, to a height of from 20 to 25 feet.

Mr. Russell, the astronomer, has no returns of the average duration and power of the wind in the different parts of the colony, but he thinks that an average of at least five or six hours a day might be counted upon on the salt bush plains, where windmills would mostly be required.

What I would suggest, therefore, with respect to these mills is,—that where the water is at present supplied to the stock from drinking tanks, instead of erecting there the double whip recommended by Mr. Gilliat (which he estimates will cost £130 each; considerably more than a windmill, stand, pump, and all complete), a 14 feet mill and pump be erected (the supply tank would be the same in either case) and should it ever happen, which it very seldom would, that the water in the supply tank ran short, the stock could, as they now do, water at the drinking tank.

This double arrangement would insure a constant available supply for travelling stock and travellers; and as it would only be on very rare occasions that the stock required to use the drinking tank, the water in it would not become polluted, nor would the entrance "get potched or boggy," or the connecting pipes silted up, as they now do, mainly through the watering of cattle.

With care, horses and cattle could always be supplied from the troughs; for when the water in the supply tank became low, it could be kept for the large stock, or a sufficient supply for them could be raised by a good hand-pump worked by two men, and the sheep could be watered at the drinking tank,—which they could of course be without cutting up the entrance or polluting the water, as large stock do.

It seems, therefore, if windmills are as serviceable as represented, that they should be used for raising the water into the supply tanks, and, that instead of doing away with the drinking tanks, the proper course will be to retain them; and in constructing tanks in future to do so with drinking tanks, as they will not only be a reliable stand-by, in case of failure in the wind or any accident to the mill or pump (which would very seldom occur), but they will also conserve a large additional quantity of water.

In this way a constant supply of good clean water can always be guaranteed at a minimum cost—that in fact this will be the solution of the vexed question how the water should be supplied to stock from public tanks.

Drawing Pipe and Syphon.—With the view to drawing from the surface of the water in main tanks and keeping the pipe which carries it from that to the pump from choking, or the pump from being clogged or stopped with mud or other foreign matter, I would suggest that the following plan be adopted:—

Let a cast-iron pipe of the right size be carried through the embankment from the main tank to the place where the mill and pump are to be erected—opposite, of course to, and at the proper height for, pumping the water into the supply tank; and let this pipe be carried out on a stage erected on the bank, and into the main tank until it is over the deep water. Then fit on to the end of the pipe a double V joint; attach to that a piece of pipe of the same size with a bend or knee near the joint, and a straight shank somewhat longer than would be sufficient to reach the bottom of the tank, and at the end of the straight shank fix a pine float, letting the end of the pipe (to which a rose would be attached to keep anything but the water from getting into it) protrude so far through the bottom of the float as to draw water from (say) 18 inches from the surface.

In this way the joint in the pipe will allow the float to rise or fall with the water in the tank without interfering in the least with the flow, and only clean surface water will be drawn, so that the pump will seldom or never choke, and will, of course, last very much longer. The joint is simple and substantial, and not at all likely to become deranged or leak.

This plan will also answer in using syphons, and get rid of the trouble and expense of knees and bends now required in carrying syphons up to and over the embankments, while the other end of the syphon, which delivers the water into the drinking tank, could be made a fixture, and be so fitted with three or four taps, so as that the discharge of the water into the drinking tank would be always above the level at which it was desired the water in the drinking tank should stand, and thus never get choked.

In fact, where a pump and drinking tank are to be used together, the one float and jointed piece of pipe will answer for both pump and syphon, as the pipe for the drinking tank can be made to branch off a short distance from the pump, and, with a cock on the syphon branch, and another on the pipe leading to the pump, either could be used as required, and would work efficiently.

Should the proposal here made with respect to the employment of windmills be entertained, Mr. Gilliat might perhaps be asked to report upon it, after which the papers might be forwarded for the opinion of the Commissioner for Roads on this and the other unsettled questions here brought under consideration.

Fencing in the Works.—It is very essential that the works should be properly enclosed with a secure and substantial fence, say a fence with six wires and a top rail; and it should, where practicable, include not only the tank or dam, but also the surface or back water, which lies for a long time after rain around the tank, or the back water from the dam, so as to prevent stock from watering without payment.

Watering lane or yard and gates.—It is also essential both for the sake of stock, and also for saving the works from damage, that there should be a wide lane or yard with wings and gates so constructed as that the stock can be admitted to the troughs or drinking tank by a gate at one side in such numbers as could be conveniently watered without crushing or crowding, and passed out after drinking at the opposite, and the gate then closed to prevent them from coming back—as shown on the accompanying sketch (VI)—of a main and drinking tank lane, gates, and wings.

The expense of this would not be great, and it is very necessary that such an arrangement should be made, for stock are at times (after a 15 or 20-mile stage without water) very thirsty, and apt to rush the water and knock themselves about, as well as damage the works, more particularly where the water is supplied from drinking tanks, it being impossible for the drover to have the control over his stock which he would have with lanes or yards and gates, as here suggested.

A plan of a double gate for the watering lane is submitted for approval, as being light, durable, and easily repaired (see plan and specification VII herewith).

Fencing in land let with the Works.—The Minister for Mines has decided that the 200 acres let to the tenant is to be enclosed, and this will no doubt be a great inducement to suitable tenants leasing the works and paying fair rental. The fence in this case, too, should be six wires, with top rail, unless where the timber is very scarce, in which case the top rail might be dispensed with and a double wire substituted.

A.B., 19/3/83.

The Under Secretary for Mines.

XII.

Tanks and Wells.—New Works proposed for 1884.

No.	Road.	Locality.	Work.	Class.	Size.	Remarks.
1st ...	*Cobar to Wilcannia.....	6½ miles from Cobar	Tank	A	C. yds. 20,000	By purchase from Miss Dickson and Leslie Bros. See report and plan.
	* ,, ,, ...	Near 23-mile post	,,	,,	,,	See tracing herewith.
	* ,, ,, ...	Between 38 and 39-m. posts	,,	,,	,,	,, ,,
	* ,, ,, ...	Exact site not yet defined	,,	,,	,,	Plan of survey not yet received from the Surveyor-General. Report and plan showing sites will be submitted before the end of the year.
	,, ,, ...		,,	,,	,,	
2nd...	Byrock to Gongolgon	Exact site not yet defined...	,,	,,	,,	New line. Site will be selected and report and plan furnished as soon as road survey is completed.
3rd...	Mosgiel to Paddington	Carowra Swamp, Res. 817	,,	,,	,,	Report and plan. Awaiting receipt of particulars connected with special lease.
4th...	Wilcannia, *via* Mount Gipps to Thackeringa	A line of borings 15 miles apart.	Wells	,,	...	.....
5th...	Gongolgon to Brewarrina ...	Exact site not yet defined ...	Tank	,,	20,000	This site might be conveniently selected at the same time as the one between Byrock and Gongolgon.
6th...	Balranald to Ivanhoe.....	9 m. northerly of Clare	,,	,,	,,	.....
	,, ,, ...	10 m. southerly of Kilfera...	,,	,,	,,	
7th...	Urana to Corowa	At Coreen or Daysdale	,,	,,	15,000	See report and plan.
8th...	,, ,, ...	At Lowesdale	,,	,,	,,	
8th...	Jerilderie to Tocumwall.....	At Murray Hut	,,	,,	,,	See report and plan.
9th...	Whitton to Etabalong	T.S.R. 1,167	,,	,,	,,	See report and plan.
	,, ,, ...	,, 2,084	,,	,,	,,	
	,, ,, ...	Reserve 2,059	,,	,,	,,	
10th...	Parkes to Condobolin.....	,, 1,015	,,	,,	...	Report and plan will be furnished shortly.
11th...	* Cobar to Louth	Near 64-m. post from Cobar...	,,	,,	20,000	.....
12th...	Collarendibri to Angledool...	T.S.R. 162	Well	,,	...	See report and plan.
13th...	Bangate to Goodooga	Reserve 941.....	Tank	,,	20,000	.....
14th...	* Cobar.....	T.S.R. 591	,,	,,	,,	See report and plan, and memo. of 10/10/83.

*Tanks in Cobar District.

HARRY GILLIAT,
Inspector, Public Tanks and Wells.

XIII.

Abstract of Reports on Tanks and Wells in Hay District.

Til Til tank.—Report of 21st January, 1885 (85-118): That Mines caretaker was without a horse to work the McComas lifter, and without oil for bearings; that the public worked the pumps with own horses when requiring water, and it had thus sustained considerable damage. Report of 3rd April, 1885 (85-578): Found caretaker absent on leave, only a lad in charge: sheep and cattle had been admitted inside tank enclosure to water at silt-tank, and the embankment was thus being damaged; fence rails were missing, apparently used for fuel by travellers. Report of 1st May, 1886 (86-643), as to pumps. Holman horse-power being reported by caretaker as out of repair and quite ineffective; that there was no defect except that bucket leathers required renewal, and this should have been done by caretaker instead of requiring mechanic to be sent from Hay, 100 miles; also that much negligence was evinced in keeping drains and fence in repair, and that sheep had been allowed inside tank fence, damaging the embankment. Mr. M'Leod, Mines overseer reported in reply to this, that caretaker had been told by travelling mechanic never to open the pump for repairs, and that the sheep had been removed from tank enclosure soon as observed. Report of 6th August, 1886 (86-1,165): That statement of caretaker as to repair of pump was incorrect; had not been directed not to touch it by mechanic, but the mechanic had found that caretaker did not know how to overhaul the pump, and that there was no other defect than as to leathers being worn. That Mr. Nicholson reports that sheep had remained inside fence by caretaker's admission for some days until they were too weak to walk out.

Youkl Plains tank.—Report of 3rd April, 1885 (85-580): That on this as on previous visit in January, caretaker was absent rabbiting; no protection to the tank or appliances. The public helping themselves to water, or to fence rails for fuel as they require them. The drains choked with silt and vegetation.

Dolmorere well.—Report of 8th August, 1887 (87-656): Travelling mechanic reports well-rope broken, and centring below the water level forced out by fall of bucket; great difficulty with assistance of men and horses in lowering water, effecting repairs and recovering buckets, new rope and bucket had been sent out; breakage of rope had apparently been occasioned by the end near bucket being injured by action of water in well, in which it had been left during the intervals of baling. Mechanic also reports that on first going to the well on this occasion he could obtain no assistance from caretaker, owing to his absence for several days at an inn 7 miles away where he was drinking, and that he finally returned in a state of intoxication.

Tom's Lake tank.—Reports of 20th March, 1887 (87-253): Pump housing damaged, pump-well contained a foot of water, rusting pump had been in this state some considerable time. The main drain remained as reported in October, 1886 (86-1,417), quite obstructed by silt and vegetation. The embankment across creek 1 mile to northward to divert water into drain still remained broken through, and all water escaping, and that any water the drain had brought down had escaped into the swamp before reaching the tank, through a gap which had not been repaired. Report of 29th July, 1887 (87-634), that the embankment is damaged by rain flow down batters and repair neglected, pump requires cleaning and silting, housing still out of repair, and main drain and bank across creek still remain in same state as reported above.

Dry Lake well.—Report of 13th November, 1886 (86-1,525): Service tank not half full, no baling done for some time, caretaker had no horse, said he had lent it to a man for a few days, when he returned it he would fill the tank. This neglect will probably lead to obstruction of bore in well. Report of 7th March, 1887 (87-303): Mines overseer having reported to me that the supply had failed, went out with him and tested it. After lowering water a few feet so as to bring pressure in the bore it freed itself, and two hours baling could not lower the water—1,300 gallons an hour being taken out. The temporary obstruction of the bore was caused by want of the most ordinary attention, the service tank being nearly empty, showing that no water had been raised for some weeks, and the man in charge is incapable from old age.

Lignum

Lignum Hut Well.—Report of 22nd October, 1886 (86-1,429): Connecting rod of pump broken, pump does not receive due attention from caretaker, having a ladder put in well so that caretaker should have no excuse as to want of access to pump. Report of 8th November, 1886 (86-1,499): Breakage of plunger rod. Report of 5th December, 1886 (86-1,593): Breakage of windmill connections. It is evident that there is much want of attention on part of caretaker. Report of 22nd December, 1886 (86-1,680): Windmill had not yet been painted, in very dirty state, water level in service tank too low, showing that pump had not been kept working. Report of 29th March, 1887 (87-255). Pump working badly, not throwing full stream. Caretaker absent, three days afterwards found pump in same state. Caretaker made absurd excuses as to not keeping pump packed, and leathers renewed, &c. Service tank liable to damage from getting dry; ladder had previous to this been fixed in the well. Windmill not yet painted. Report of 28th April, 1887 (87-343): Another breakage in connections; duplicate castings from Sydney required; frequent breakages owing to negligence on part of caretaker. Mines overseer informs me he will discharge him and get more diligent and competent man. Report of 29th July, 1887 (87-625): Caretaker (same man) absent; pump not at work, although plenty of wind; from what I could gather, pump has only worked about a week during the last three months; only about 2 feet of water (should be 6 feet) in service tank. Caretaker apparently keeps mill out of gear and pump idle to prevent necessity of packing and repairs, &c.

Boonoona tank.—Mr. Wood's report of 11th June, 1886 (86-917): Pump reported by Mines overseer and caretaker as quite inefficient; that it took two and a half days to fill the service tank, working the pump as fast as a horse could fairly walk. Tested accuracy of this, and the result was that pump was found to deliver at rate of nearly 3,000 gallons an hour, which would fill service tank in little over six hours. The caretaker was found to be working machinery with dry bearings and appeared to be surprised to hear they required oiling. My report of 29th October, 1886 (86-1,408): Found that pump had been taken apart to renew bucket leathers six weeks previously, and in the interim had been left so with some of the parts lying embedded in mud on the horse-walk. Caretaker said he had not proper tools for the job and could not manage it, or put pump together again, but with the tools found there I put all right within an hour, and the pumps worked well. The caretaker said he had been told by his overseer to leave the pump as I found it until I came or sent up, as he could not put it right. The Government had thus quite unnecessarily the discredit of insufficient works for this period, owing to incompetence of the Mines officials. Report of 31st July, (1887-87,644): That Mr. Yeo, Mines overseer, had recently caused 2 feet of water to be run out of tank, because he thought embankment was endangered. There was still from five to six feet in height of bank above water level, so that this was a most absurd waste of water.

Mount Manara tank.—Report of 20th October 1886 (86-1,406): That the steam pump is in a disgracefully dirty state. Caretaker admits he has not overhauled it since Mr. Wood did so, four months before, when it was found in a similar state; had again to take it apart and clean it. Report of 1st August, 1887 (87-643): Seven of the outer concrete piers of the tank have the edges and corners scaled off, the interior of the piers remaining quite sound, a slight defect easily repaired by the mechanic, and not all impairing stability of the tank. Mr. Yeo's report that tank was unsafe, and his action in running off the water, were equally absurd and uncalled for.

Ivanhoe tank.—Report of 29th March, 1887 (87-260): Drains a good deal silted up; this would, as I suspected at the time, account for the loss of water the Mines overseer attributed to inadequacy, and of the inlet on the lower or western side of the tank. Report of 30th July, 1887 (87-626): Drains show evidence of neglect; the alteration made in dwarf fence of troughing by Mines overseer apparently renders that side of troughing inaccessible for sheep, the rail being inclined over the trough; the steam-pump had not evidently, and by admission of the caretaker, been cleaned for some months; and the pump weathershed is used as a kitchen and store-room by caretaker, to judge from appearances.

One Tree tank.—Report of 25th November, 1885 (85-1,563): Fence wires around tank slack; caretaker might easily have remedied this, but appeared to think it no part of his duty; found him at the inn, instead of being in charge of the tank. Report of 25th November, 1886: Caretaker said he was quite ignorant of, and appeared to be equally indifferent as to, the working or the keeping in repair of the pumps; the plunger gland had been fractured through carelessness in screwing it down, but he said he knew nothing about it; the pump consequently disabled, service tank not half full, and the troughing contained only some liquid mud. The pump was, in addition, in a most dirty and neglected state, the bearings being almost dry; sent out the following day and put pump in repair. Mr. Nicholson's report of 2nd July, 1887 (87-519): In consequence of Mines reporting pump disabled, he was sent out to inspect; that nothing was amiss, except that the piston-rod had become disconnected, owing to the pin falling out; put it right in 5 minutes, and pump then worked well. Caretaker's incompetence had occasioned an unnecessary journey of 50 miles in wet weather.

Pulletop tank.—Report of 6th December, 1886 (86-1,601): Embankment in bad repair generally and damaged by scour at two corners, some 30 cubic yards of earth being displaced; wires in surrounding fence very slack; service tank not full; and the lessee in charge appeared to know little about, care, or working of the steam-pump. Memo. of 9th February, 1887 (87-119): In reply to statement by Mines overseer that I had forbidden their lessee to repair embankment in accordance with his instructions, and also to minute of Mr. Gilliat's, complaining of interference with officers of his Department; that the lessee's statement was not true, made to screen his gross negligence in performing a most urgent work, and apparently accepted by the Mines officers as a sufficient excuse for him, and also for throwing the onus on this Department. Report of 7th March, 1887 (87-199): Embankment still remained unrepaired, fence wires slack, troughing foul, drains neglected.

Mowgiel tank.—Report of 30th July, 1887: Embankment batters scoured by rain flow; negligence in keeping in repair; horse has been admitted inside fence and on the embankment, destroying the vegetation which it is so desirable to protect; that caretaker had taken up the dwarf fence from troughing, leaving the post-holes open; had evidently been so for a long time, were full of rain-water, impairing stability of trough sleepers. The fence was being used to construct a rail laid on the posts, as bearers, along the middle of trough.

Jumping Sandhill well.—Mr. Wood's report of 5th June, 1886 (86-903): The buckets, one left at bottom, the other at top of well; the caretaker should be instructed to leave them midway out of reach of water, and save corrosion of the the iron rope. Service tank only half full, in which state it has been for some time, no regular baling having been carried on. My report of 22nd October, 1886 (86-1,432): Caretaker's horse inside sheep trough enclosure; had put his foot through iron of troughings rendering it useless till repaired. No baling done for some time; regular baling very necessary to prevent destruction of bore. Report of 22nd December, 1886 (86-1,697): Hole made in sheep trough by caretaker's horse has now been repaired by our mechanic, after being left by caretaker nearly two months. Grass in paddock had been burnt off, no satisfactory account as to origination of it. Report of 24th February, 1887 (87-181): That Mr. Boultbee, Mines inspector, reported: Whim spindle shrunk from drum carriers, &c., presumably the cage arms of whim referred to, the bolts of which, as in all cases, occasionally require tightening up. A spanner in hands of a competent and diligent caretaker would remedy this in a few minutes, and without the necessity for a visit from our mechanic, who has since overhauled this whim. Mr. Boultbee also says: "The stays from the horse and balance arms are vertical, &c., and consequently useless." This is obscure. It is possibly the cage struts are here referred to, and it is not of any disrepair, but of a principle of construction or design that complaint is here made, as I think hardly called upon to discuss this with Mr. Boultbee. He next reports that a gate in progress in the hands of a contractor under this Department, and not yet finally inspected by me, should be condemned. Would save me much trouble and responsibility if he would similarly say when work carried out by contractors with this Department should be passed. Report of 29th March, 1887 (87-263): Had visited on 17th and 20th instant. On first occasion caretaker said he was just about to start filling service tank, which was empty; on second occasion he said he had half filled it and run water out again to cleanse tank; on examination this proved to be false, no baling had been done.

Box Creek tank.—From Mr. Wood's report of 21st June, 1886 (86-964): Pump could not be tested as the caretaker, or rather his deputy, he being a publican living some distance from the work, had no horse in. The pump had not been worked for a month, and the service tank was nearly empty. This is most objectionable. Mr. Crummer's report of 28th July, 1886 (86-1,151): The new Mines caretaker, though he reached the inn, 2½ miles off, on the 23rd (five days ago) has not yet gone near the tank. My report of 24th February, 1887 (87-149): In reply to Inspector Boultboe's complaint that foot-valve of pump was suspended from suction-joint, and should have staging out in tank for suspension and elevation; that Mr. Boultbee has misapprehended the purpose with which these stages are provided at other places; here the foot-valve is suspended vertically in well of disused McConnas lift; no stage is required, and the only alternative to be made will be to substitute an ordinary pipe-bend for the movable joint, which is in this case superfluous.

Hulong

Hulong tank.—Report of 13th September, 1886 (86-1,293): When there on 8th instant, found caretaker at his camp reading his newspaper, although his drains were much in need of attention. Report of 8th November, 1886 (86-1,511): The drains, for want of attention during rainfall, had allowed a considerable quantity of water to escape into the swamp. Report of 9th December, 1886 (86-1,616): The drains require much more attention during wet weather than the old man stationed here as caretaker gives them; the wires in fence around tank were slack. Report of 7th March, 1887 (87-201): The tank batter had been damaged by caretaker discharging water from the berm down it. Report of 1st July, 1887 (87-530): Caretaker and family residing in pump watershed; use boiler fire for domestic purposes.

A. W. STILWELL,
20/8/87.

XIV.

Composition for Service Tank, &c., and General Control of Tanks and Wells.

Silverton, 28 March, 1887.

The objections raised by the Mines officers to the use of the composition referred to in the enclosed papers, I am not in a position to traverse, as I have seen none of the service tanks or troughing that have been coated with it—but I may state that the receipt was given to me by Mr. M'Kinney as being one that produced a good coat for the purpose sought, and until further information is available I would, with all deference to Mr. Boultbee's opinion, feel inclined to accept that of a gentleman of Mr. M'Kinney's engineering experience as being more reliable.

There can be no doubt that protecting the service tanks and troughing is one of the duties of the Mines caretakers, as stated, but the experience of our officers is that the men do not in all cases do their duty, and this being the case, I am decidedly of opinion that any necessary work so neglected should be done by us rather than the public interest should be prejudiced—on this account Mr. Stilwell has doubtless instructed the travelling mechanic to do such necessary work when visiting the tanks for the purpose of carrying out his more particular and immediate duties.

I still maintain, Mr. Gilliat's opinion to the contrary notwithstanding, that the Department is responsible for repairs, and this being the case I cannot understand exception being taken to such repairs being carried out as soon as they are found to be necessary by our officers, instead of waiting, with a chance of the necessity being overlooked, for the red-tape routine involved in sending notices from the Mines Department, a course which often causes dangerous delay and a great increase in the cost of repairs. I would have thought that the necessity of studying the public interest would have been equally recognised by the Mines as by this Department, and would have been considered to have a premier claim to that of red tape.

The effect of a divided control is decidedly objectionable—the entire control of the works should be vested in this Department, a course which would eliminate many of the evils which now exist. The experience of our officers has led them to form opinions adverse to the character of the maintenance under the Mines, and as the expenses connected with these works should be reduced as much as possible that end would be gained by the entire control being handed over to our local officers, who, whether charged with this duty or not, would have to be retained in their respective districts. Such a course involves no extra expense for supervision, as would be the case if the Mines employed a separate staff and created a number of new and quite unnecessary appointments, with a corresponding increase in the public expenditure. This course would also avoid any chance of "friction," as deprecated by Mr. Gilliat.

ARTHUR P. WOOD.

The Commissioner and Engineer for Roads, &c., &c.

All this correspondence relates to the use of a composition on the tanks, which is just referred to in report of Water Conservation Commission thus:—"It is found that the mixture applied assumes a glassy surface, and does not affect the taste of the water." This is a specimen of the friction complained of in minute asking that execution of works be handed over.—W.C.B., 21/4/87.

Hay District.—As to Composition used for Coating Service Tank and Troughing.

The Commissioner and Engineer for Roads,—

Sir,

Hay, 23 March, 1887.

In reply to your attached telegram, the composition used for protecting inside of troughing from action of water, &c., is a mixture of 2 lb. of pitch and 2 lb. of tallow to 1 gallon of tar.

It has been used at three tanks only, viz.:—Mount Manara, Boonoona, and Gunnaramby. Doubtless—as almost any composition would—it affected the first water put into the troughing after it was applied, but this should have been run to waste by the caretaker instead of being supplied to the public to save them a little additional pumping.

At Gunnaramby, where it was first applied, it no longer injures the water. At the two other places there has been no demand for water owing to the rains, but if the water were run out of the tanks, and they were re-filled, there would be no valid grounds for complaint.

No composition is being used by the Mines Department in this district.

I have, &c.,
A. W. STILWELL.

Telegram from Sydney to Mr. Stilwell, Road Superintendent, Hay.—Objection taken by Mines to your coating tanks with tar and grease. Report very fully *re* this, and do not coat any more. Report on composition used by them.—W. C. BENNETT.

Telegram from Hay to Commissioner for Roads.—Will send in full report *re* composition used for service tanks and troughing after inspection next week.—A. W. STILWELL, Assistant Engineer.

Coating insides of Tanks and Troughing with a Composition.

Sir,

Public Watering Places, Mines Department, 24 February, 1887.

Referring to your blank cover communication of 10th instant, relative to the coating of the inside of service tanks and troughing with a composition, at several of the public watering places, and to the minute thereon, I now have the honor to forward for your information a copy of a minute dealing with the matter.

I have, &c.,
HARRIE WOOD,
Under Secretary for Mines.

The Under Secretary for Public Works.

Copy of this paper having been sent to me at G.P.O., Melbourne, the original should be sent to Mr. Stilwell for full report. I may state that the mixture that has been applied was recommended by the Engineer to the Water Commission, branch apparently of the Mines.—A.P.W., 28/2/87.

Tarring

Tarring the inside of Troughing, &c.

Department of Mines, Public Watering Places, Sydney, 12 February, 1887.

Mr. Inspector Boultbee's return from his last inspection, &c., reported an objectionable composition of pitch and tar and tallow was being used for coating a portion of the inside of service tank and troughing at some of the watering places by a man in the service of the Works Department, acting under instructions through the local road superintendent. Repairs of this nature are carried out by our own caretakers, who are paid for the service; the employment of a skilled mechanic for the purpose appears, therefore, unnecessary.

Mr. Inspector Boultbee states:—"A composition of tallow, tar, and pitch, and the water was, after standing a short time most objectionable and undrinkable, bearing a greasy and prismatic scum on top."

Mr. Overseer Yeo states:—"It melts and forms a scum on top of the water which prevents stock from drinking. Boonoona and Mount Manara troughing had already been done. There have been several complaints about it."

Objection has been taken to the use of the composition referred to (*vide* Mr. Boultbee's memo.), and I need hardly point out that it is apparently even more unsuitable when the water may at any time be required in considerable quantities for domestic purposes, as at the Ivanhoe tank.

Our own officers are instructed to use boiled coal tar and pitch for coating service tanks and joints of troughing when required. This forms a hard glaze, and has so far been found suitable.

I am in doubt whether Mr. Wood is correct in assuming that the Department of Public Works is responsible for repairs until they are authorized by the Hon. the Secretary for Mines; and I am equally in doubt whether it is desirable for that Department to take such steps as it may deem necessary to protect or render the works more efficient without reference to the Department responsible for their maintenance and control under the Act.

The effect of a divided control can only tend to confusion and lowering of the standard of efficiency, as well as to create friction between the Departments; and any steps taken, I would respectfully suggest for the consideration of the Honorable the Secretary for Mines, would preferably be in the direction of relieving the Works Department entirely of all repairs in future.

HARRY GILLIAT,
Chief Inspector, Public Watering Places.

If the use of the composition renders the water unfit for the purpose for which it is conserved, it is not clear how the use of it can be said to render the works more efficient. It is very desirable in the public interest that when the works have been taken over by this Department they should not be interfered with by the officers of another Department; and it is to be hoped the question of construction, control, &c., will be dealt with at an early date.—H.W., 16/2/87. Submitted. Approved.—F.A., 21/2/87.

Ivanhoe Tank.—Stilwell A. W., 29/1/87.

Mines overseer would not permit troughing to be tarred in accordance with Mr. Wood's instructions, as he had received instructions from Sydney not to have it done.—A.W.S.

Mr. Wood's Minute.—It appears to me that this Department is responsible for repairs and renewals; that no objections should be raised to such steps being taken as we consider necessary to protect the works or to make them more efficient.—A.P.W., 7/2/87.

Commissioner's Minute.—I think the instructions of this Department should be carried out for the protection of this iron. Mr. Wood gave these orders after consulting on the matter, and the work is absolutely necessary.—W.C.B., 7/2/87. Under Secretary, for transmission to Mines.

XV.

Letter from A. H. Doudney to F. A. Franklin, C.E.

Steam Scoop Camp, Government Tank Works,
29-mile Peg, via Nyngan, 15 February, 1885.

Dear Mr. Franklin,

I read with very great interest the *Herald's* reports of the meetings of the Water Conservation Commission, and it has often struck me, that perhaps a few lines occasionally on the subject of tanks might prove acceptable to you.

Outside my personal connection, I take the deepest interest in the matter of water conservation, and if any of my suggestions should in the slightest degree prove of use, I shall consider myself well repaid for the trouble taken in the matter.

I think I might be useful, because you, as a Commissioner, can only take evidence, examine, and see things from one point of view, whereas I as a contractor, and actually carring out works for the conservation of water, observe matters from an entirely opposite, and, so to speak, more practical point of view.

I cannot lay before you any elaborate scheme for conserving water, not being a scientific man—no doubt you can get plenty to do that—but I can give you my practical experience, especially in the matter of details which possibly might prove of some value to you.

I should imagine one of the greatest difficulties the Commission have to contend with, is conflicting evidence. One witness for instance favours dams, another condemns them altogether—and both witnesses from the same district—and equally reliable men.

Now, with all that sort of thing, I wish to have nothing to do. What I propose is to point out a few existing evils, and to answer practically any questions you might consider me capable of answering, that may occur to you from time to time.

I should say the first principle to be applied in the matter of water conservation, is economy, and a judicious expenditure of the public money.

As the system is carried out at present, there is no economy observable, and the judiciousness of the expenditure is ver questionable.

To make the scheme self-supporting, the system should be worked on a strictly commercial basis, and many alterations must be effected before that can be established.

When a new road is opened, the Stock Inspector for that district, and the Chairman of the Local Land Board or other reliable authority, should be asked to report on the road—what the traffic consists of chiefly, and what it is likely to consist of for (say) five years to come.

Many roads are used solely by teams, others again by teams and travelling stock, and according to the report the road should be classed as either A, B, C, or D. The size of the tanks, and the distance to be placed apart should be determined by the class under which the road is recorded as follows:—

Class A.—Heavy traffic of teams and stock requires 20,000 yard tanks every 15 miles, or as near the distance as the catchment will allow of.

Class B.—Heavy traffic of teams, and occasional heavy traffic of stock requires 15,000 yard tanks every 15 miles.

Class C.—Heavy traffic of teams, and light traffic of stock requires 10,000 yard tanks every 18 miles.

Class D.—Traffic of teams and vehicles only; requires 8,000 yard tanks every 18 miles.

To show the necessity for this classification of roads, and making the size of the tanks to suit the quantity of the traffic, I shall point out the Condobolin to Nyngan road, for example.

On the above mentioned road during the past two years the Government have had six tanks put down at an average cost of £2,400 each tank, making a total expenditure of £14,400.

Now the traffic does not amount to fifty teams per annum, and the travelling stock is absolutely nil.

The drought has not prevented the passage of stock on this road, and good seasons will make but little difference. The road is cut off for travelling stock by the Nyngan railway and will never be used again by stock.

Such a road as this, I would put under class D. 8,000 yard tanks, every 18 miles would amply meet the requirements.

Now, I will take another road, the Nyngan-Nymagee one. On this road I have already excavated a tank, 20,083 yards, and am about completing another of 16,800 yards. Ahead of me, again, a 15,000 yard tank has just been started.

The

The traffic on this road consists solely of teams and vehicles. I estimate an average of four teams per day and one vehicle.

This road I should also place under class D.

I am quite aware of the necessity in a new country, when making improvements, of looking well ahead—that in watering a new road the chief thing to consider is, how will a railway affect the traffic in time to come?

Trucking is so obviously preferable to driving the stock, that once a railway penetrates a district the roads are abandoned for the trucks, and the elaborate and expensive tanks are of use only to occasional mobs of cattle and flocks of sheep, vehicular traffic, and to the lessee of the run on which the tanks are sunk.

The present specifications for the 15,000 and 20,000 yard tanks, I would not not alter to any great extent.

I should suggest, however, that in places where much wash is likely to be met with, two silt-tanks be put down instead of one, so that the water in passing through the two tanks would be altogether clear of deposit before entering the main excavation.

I know instances of silt-tanks filling right up after one heavy fall of rain. This happened to the tank I put down on Melrose, eighteen months ago.

And in every case, I would recommend that between the excavation and the embankment, a gutter, at least 9 feet wide, and from 2 to 3 feet deep, according to the soil, be made right around the tank, and filled in again with clay taken from the excavation.

My reason for making it 9 feet wide is so as to allow the drays to go into it when filling the gutter up and thereby consolidating the new material.

The stamping weight of a horse and loaded dray I calculate roughly at 2 tons. A contractor would do this work at the same price as the excavation.

This matter is of great importance, as the tank would, with the gutter, hold water right up to the surface.

As it is, the water in every tank I have done has soaked away for the first 2 or 3 feet, and I have noticed the same thing happen at every Government tank I have been to.

On a 20,000 yard tank, it would take 300 yards to put a gutter round the excavation, 3 feet deep and 9 feet wide. 800 yards at (say) 1s. 6d., equals £60.

And for this small outlay we save 440,836 gallons, allowing the soakage at 2 feet, and 661,168 gallons at 3 feet of soakage.

In many tanks the water soaks away considerably more than 3 feet.

Now, as regards the 10,000 and 8,000 yard tanks, I would construct them in a different manner.

The heavy expense in connection with the troughing, service tank, pumping machinery, &c, I would avoid by having none of those extras, and allowing the stock to drink out of the tank itself; and the shape I would alter, so that these small tanks would be excavated cheaply and expeditiously.

Three of the slopes, 2 to 1, and the remaining slope, 3 to 1, which would be the roadway, allowing ingress and egress to and from the water.

Embankment would be formed in the shape of a horse-shoe, or across as a dam, according to the nature of the surface.

At the edge of the excavation I would erect a strong three-railed fence around the three steep sides, and down to the water at each side of the roadway.

As watering the stock from the tank itself would tend to pollute the water, I would, to supply drinking water for human consumption, sink a well 4 feet by 2 feet 6 inches, about 3 feet away from edge of excavation, on one of the steep slopes, and to a depth 3 feet below that of the main tank. At the bottom level of the tank I would put a drive 3 feet x 3 feet 6 inches, through from the well to the tank, and then, after slabbing, fill the drive with sand firmly rammed.

This would act as a filter; the water would percolate through from the tank into the well, and rise to the level of the water in the excavation.

I estimate the cost of sinking the well, putting the drive, and timbering the lot at £40 bulk sum.

Planking would be fixed on the top of the well, and a small hand-pump would complete the concern.

In conclusion I would like to say a word or two with regard to the officials in charge of the construction of Government tanks.

In the selection of inspecting officers enough care has not been exercised by the Roads Department.

When a tank has to be put down, instructions are given to the road superintendent of the district in which the tank is situated, and visit the work monthly to report progress. When the tank is completed, the officer measures it, and the Government are got at for hundreds of yards. And, because the inspector knows little or nothing about what he is sent to do, and consequently the contractor gets the best of him at every turn.

I know of no other business where a contractor has so many opportunities of—to use a seafaring term—getting to windward of his employer.

I am, &c.,

F. A. Franklin, Esq., C.E. A. H. DOUDNEY.

XVI

An Act to regulate Public Watering Places and to protect certain Reserves from trespass. [Assented to, 21st October, 1884.]

Preamble. WHEREAS it is expedient to provide public watering places and to regulate the management thereof and also to protect travelling stock and other reserves from trespass Be it therefore enacted by the Queen's Most Excellent Majesty by and with the advice and consent of the Legislative Council and Legislative Assembly of New South Wales in Parliament assembled and by the authority of the same as follows:—

Short title. 1. This Act may be cited as the "Public Watering Places Act of 1884" and shall come into force on the first day of January next.

Interpretation 2. In this Act if not inconsistent with the context—

"Governor" means the Governor with the advice of the Executive Council.

"Minister" means the Minister charged with the administration of this Act.

"Reserves" means all such places as shall be declared to be travelling stock and camping reserves.

"Public Watering Places" means all such reserves as shall be declared to be public watering places under this Act.

"Inspector" means any person who may be appointed an inspector under this Act.

"Stock" means any horse mare gelding colt filly ass mule bull cow ox heifer steer calf ram ewe wether or lamb goat or pig.

"Travelling Statement" means any statement required by the "Registration of Brands Act of 1886" and the "Diseases in Sheep Act Amendment Act of 1878" or any Act amending the same.

"Permit" means any permit required by the "Sheep Diseases Act of 1866" the "Diseases in Sheep Act Amendment Act of 1878" or any Act amending the same.

"Travelling Stock" means any stock the driver of which is required to be provided with a permit or travelling statement.

Power to proclaim reserves for public watering places. 3. The Governor may from time to time make and again revoke reserves for the purpose of establishing public watering places and for the accommodation and agistment of travelling stock Such reserves shall be made by notification in the *Government Gazette* but shall not be withdrawn from pastoral lease except by a special notification to that effect.

Governor may appoint inspectors and overseers. 4. The Governor may from time to time appoint inspectors and overseers for the purpose of this Act and such inspectors and overseers may exercise the powers hereby conferred upon them in any part of the Colony and shall be *ex officio* inspectors of stock.

Power to construct tanks and dams. 5. It shall be lawful for the Ministers to construct tanks dams or other works for storing or for providing water adjacent to any roads or upon any reserves or public watering places.

Governor may lease tanks and dams for term of years 6. The Governor may from time to time let by auction by tender or otherwise for a term not exceeding five years any such tanks dams or other works for storing water and any such public watering places upon such terms and conditions as may be deemed expedient and the lessees thereof shall supply water to such persons and such stock at such rate as shall from time to time be fixed by regulations for that purpose.

The Minister may appoint caretakers of tanks and dams. 7. It shall be lawful for the Minister from time to time to place such tanks dams or other works for storing water and any public watering places in charge of caretakers who shall supply water to travelling stock at such rate as shall from time to time be fixed by regulations for that purpose.

8.

8. The Governor may place any public watering place for any period not exceeding three years under the control of trustees who shall supply water to travelling stock and to all persons who may require the same upon such terms as shall be prescribed by regulations for that purpose. Watering places may be vested in trustees.

9. It shall be lawful for any person duly authorized by the Minister to impound in the nearest pound any stock found trespassing upon any public watering place or upon any reserve and to charge thereon the damages mentioned in the first Schedule to this Act together with the driving and other fees imposed by the Impounding Acts And the owner or person having charge of any stock who shall wilfully allow the same to trespass upon any such watering place or reserve may be prosecuted by any such person and upon conviction shall for the first offence be liable to a penalty not exceeding the sum of five pounds and for any subsequent offence to a penalty not exceeding twenty pounds Provided that trespass a second time by stock belonging to the same owner shall be deemed to be a wilful trespass for the purposes of this Act. Power to impound stock found trespassing in watering places or reserves.

10. If any person shall obstruct travelling stock in the lawful use of any public watering place or in the use of any pasture or water to which such stock are entitled under this Act or any regulation thereunder or under any other Act shall be liable to a penalty not exceeding twenty pounds. Obstruction of travelling stock in the use of reserves.

11. Every owner or person in charge of stock shall produce and show to the lessee caretaker or person in charge of any dam tank or well or public watering places or reserves when he shall require to use the same his proper permit or travelling statement on demand and any person failing to do so shall be liable to a penalty not exceeding five pounds. Owner of stock to produce permit or travelling statement.

12. If any person shall wilfully destroy or injure any public dam tank or any structure or other work connected therewith in any public watering place or wilfully destroy or injure any part thereof or any machinery used in connection therewith or wilfully pollutes diverts or interferes with any water flowing into or in any such dam tank or well shall be liable to be fined by any two Justices any sum not exceeding one hundred pounds or to be imprisoned for any term not exceeding six months. Penalty for destroying or injuring dams tanks or other structures.

13. Any lessee caretaker or trustees who shall refuse or neglect to comply with the regulations to be framed under this Act shall be liable to a penalty not exceeding ten pounds for every such breach of such regulations. Penalty on lessee caretaker or trustee neglecting to comply with regulations.

14. The Governor may make regulations for the purpose of carrying out this Act and of regulating the management maintenance and control of such dams wells tanks public watering places and reserves as aforesaid and may impose any penalty not exceeding the sum of two pounds for the breach of any such regulations And all such regulations shall on being published in the *Gazette* have the full force of law and copies thereof shall be laid before Parliament forthwith if then sitting and if not within one month after the commencement of the then next Session. Power to frame regulations.

15. Any person who shall think himself aggrieved by any penalty under this Act imposed upon him or by decision of any Justices under or concerning the provisions of this Act may appeal against such penalty or decision to the Court of Quarter Sessions according to the law in force for the time being for the general regulation of appeals of such or the like nature. Appeal.

16. All penalties for any breach of this Act or of any regulations made under the same and all charges expenses and sums due and payable thereunder may be recovered in a summary way before any two Justices of the Peace by any inspector overseer lessee caretaker or trustee or by any person authorized by the Minister to do so. Penalties.

SCHEDULE.

Rates of Damages to be charged for Trespass.

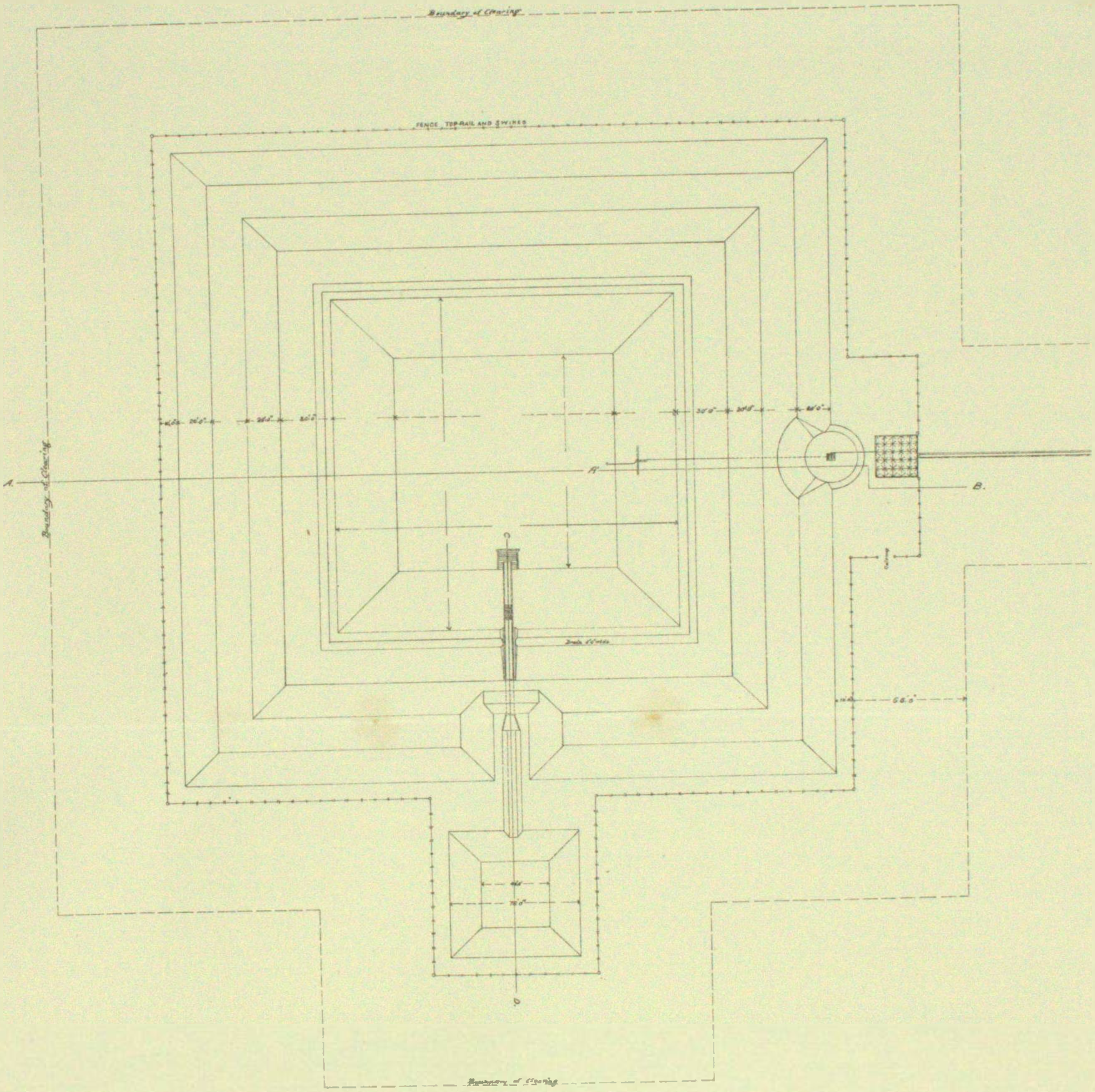
Description of Animals trespassing.	Damages.
For every horse mare gelding colt filly ass mule bull cow ox heifer steer calf	Threepence per head.
For every ram ewe sheep or lamb	One half-penny per head.
For every goat	Sixpence per head.
For every pig	Sixpence per head.

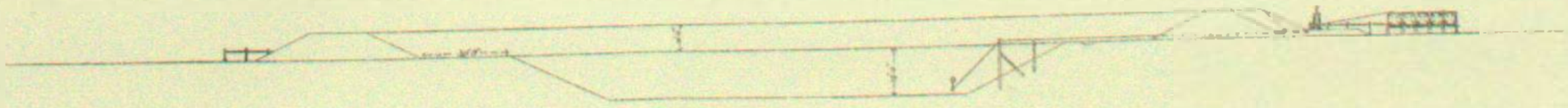
[Six Plans and one Map.]

Sydney: Charles Potter, Government Printer.—1886.

GENERAL TYPE PLAN & SECTION OF TANKS.

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





SECTION ON A-B

(Sig 34)

PLAN OF CARETAKERS COTTAGE

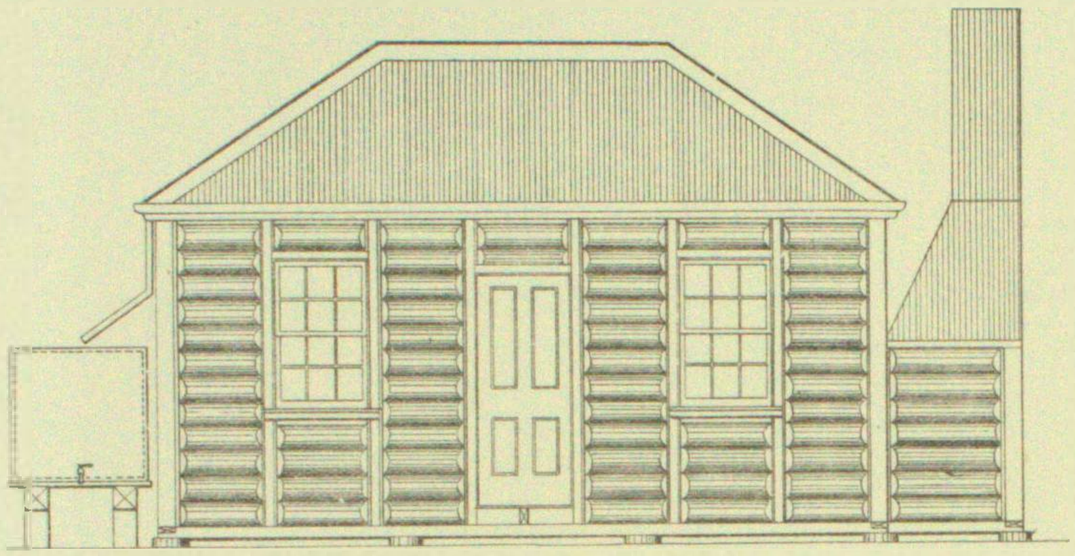
CONSTRUCTED UNDER ROADS DEPARTMENT

/ APPENDIX XVIII.

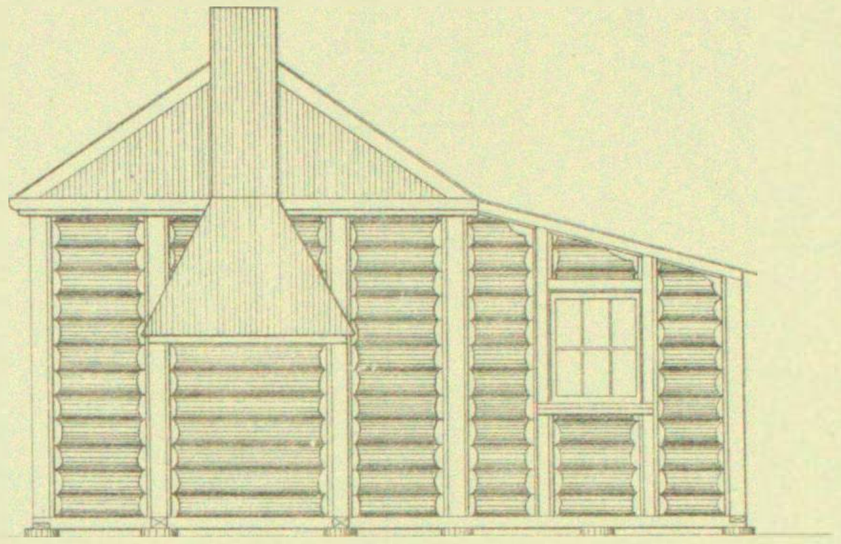
B

Scale

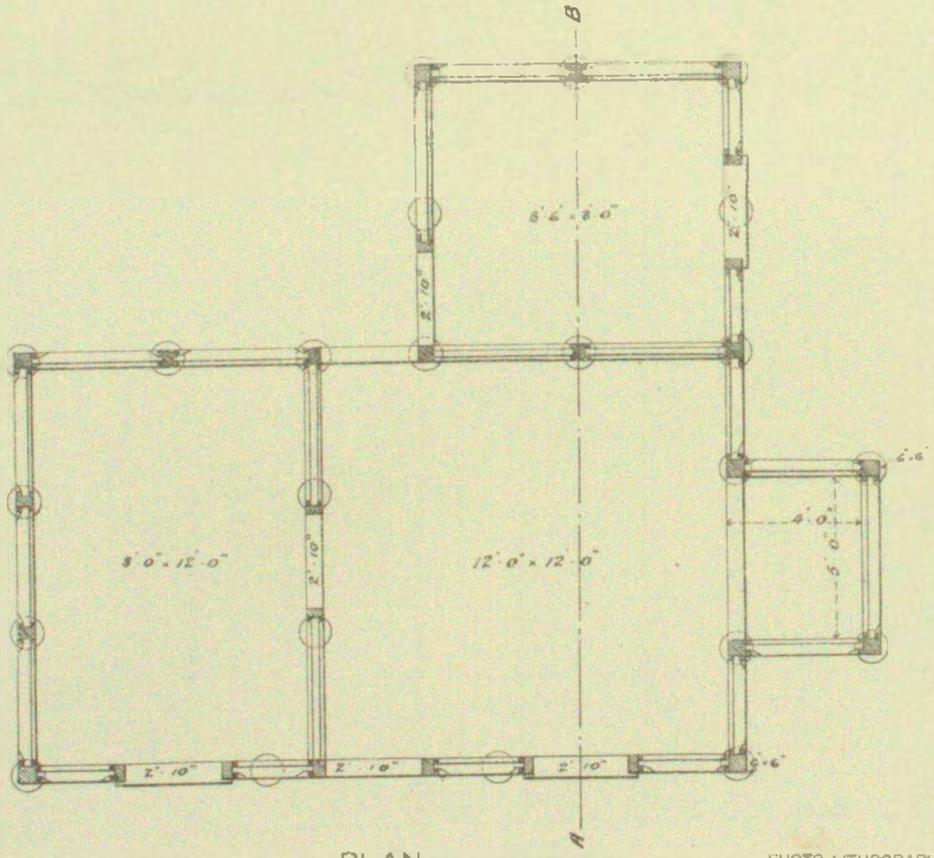
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Ft



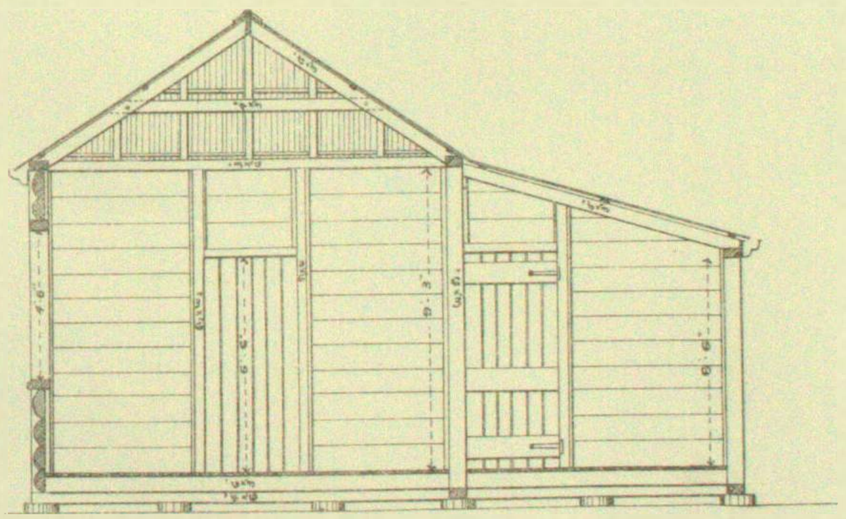
FRONT ELEVATION



END ELEVATION



PLAN

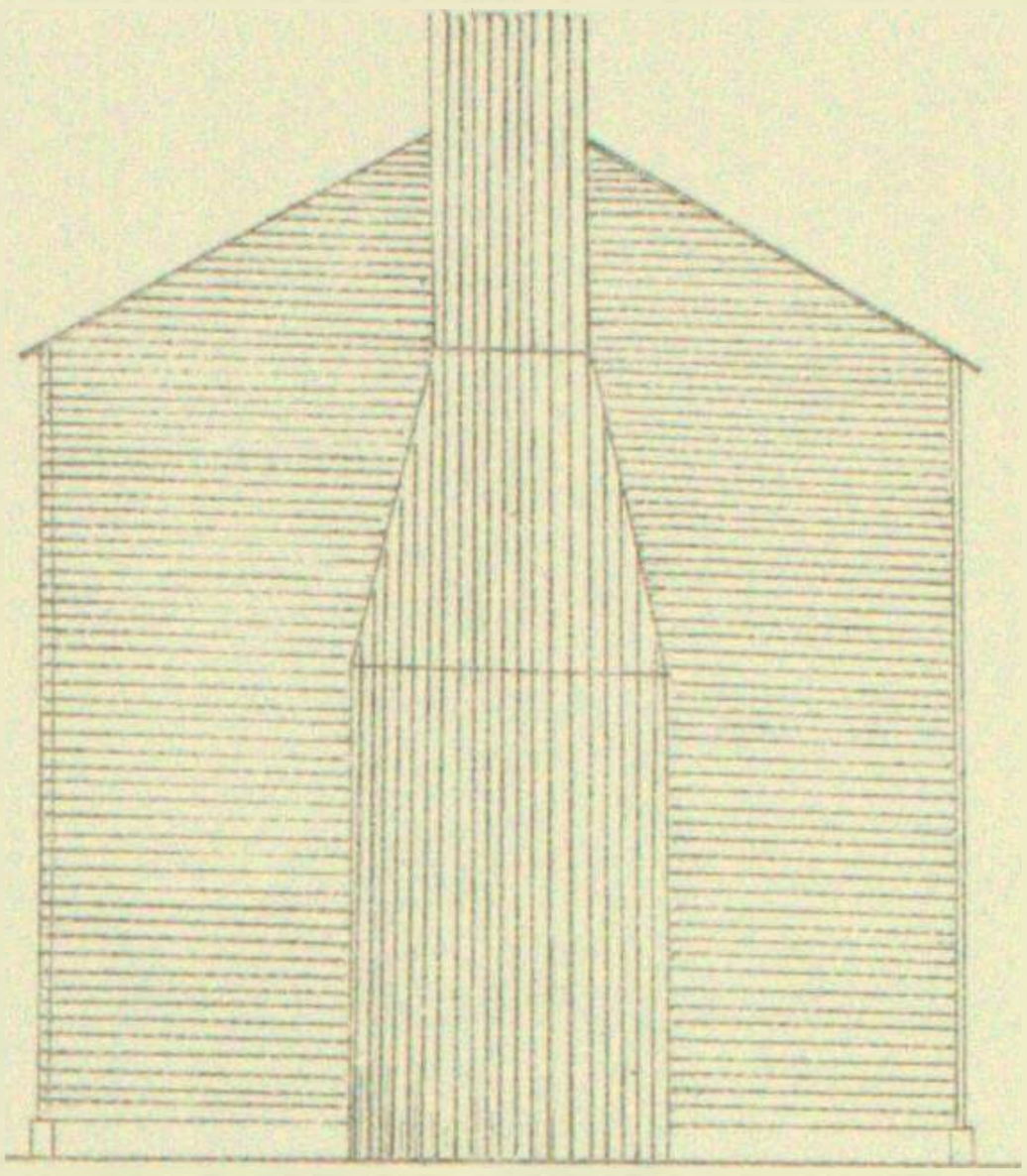


SECTION THROUGH A.B.

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

(Sig. 34)

APPENDIX XIX.



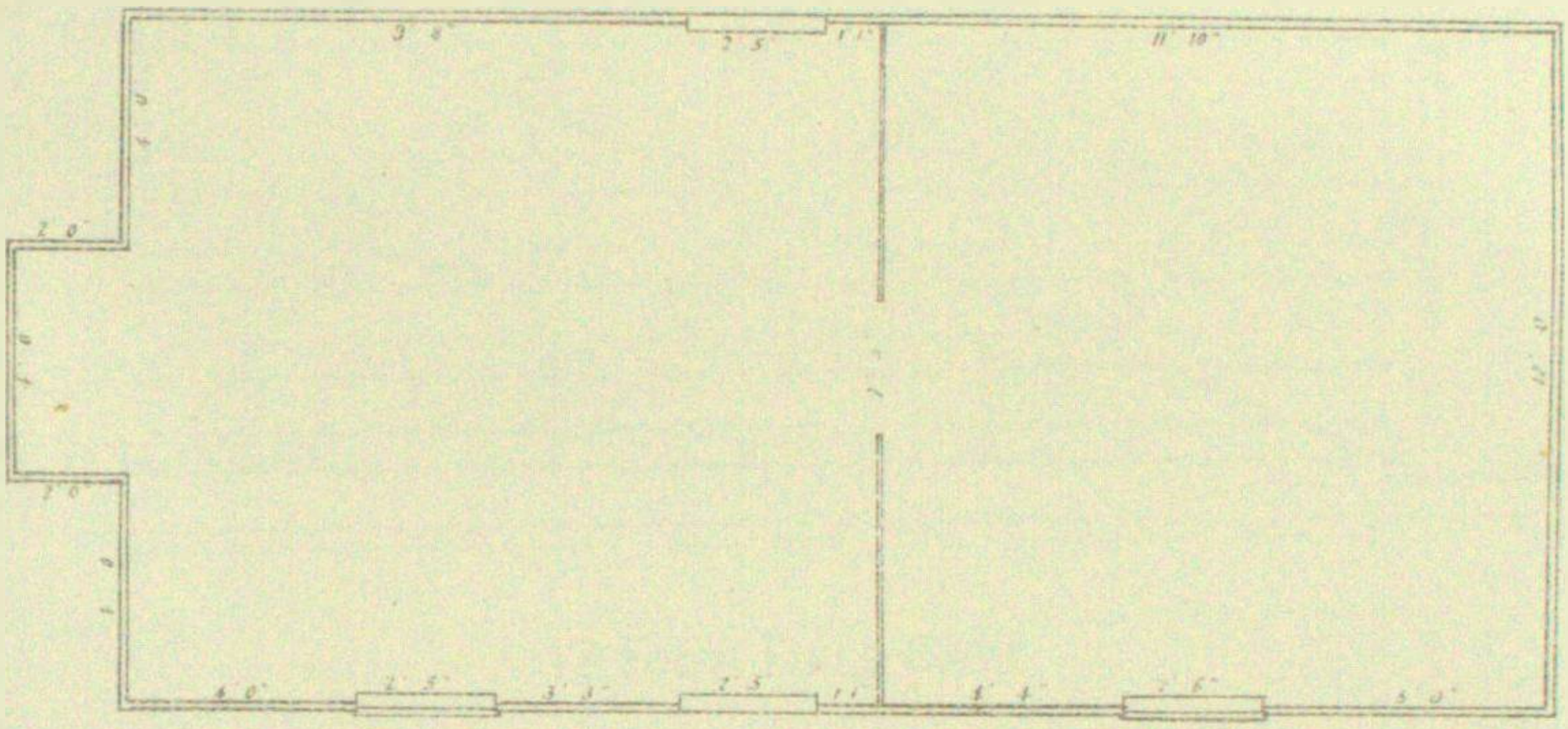
End Elevation

Sketch
— of —
CARETAKERS COTTAGES
— in the —
— Silverton District —
— Scale ¼ inch to one foot —

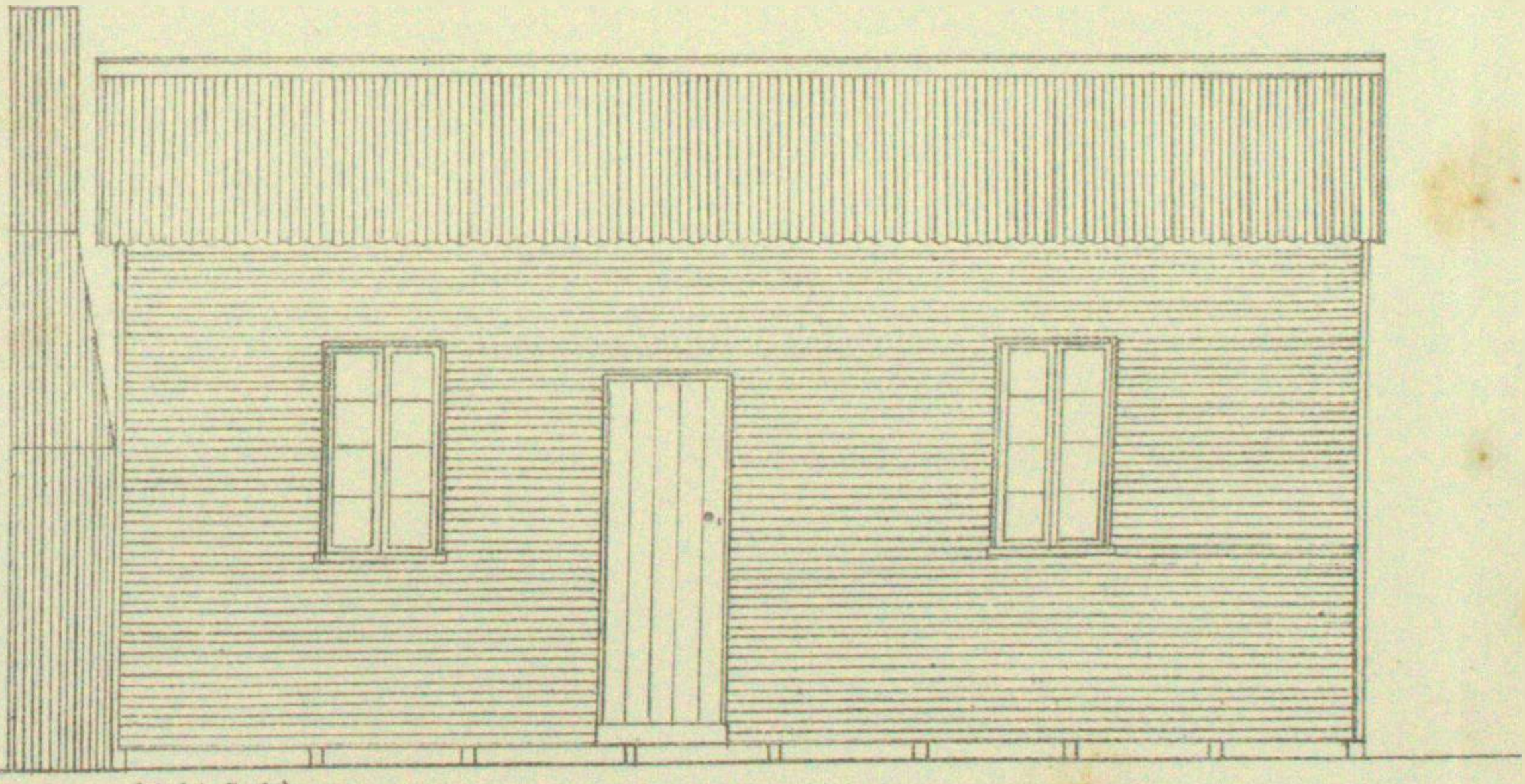
Scale.

0 1 2 3 4 5 6 7 8 ft

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



Plan

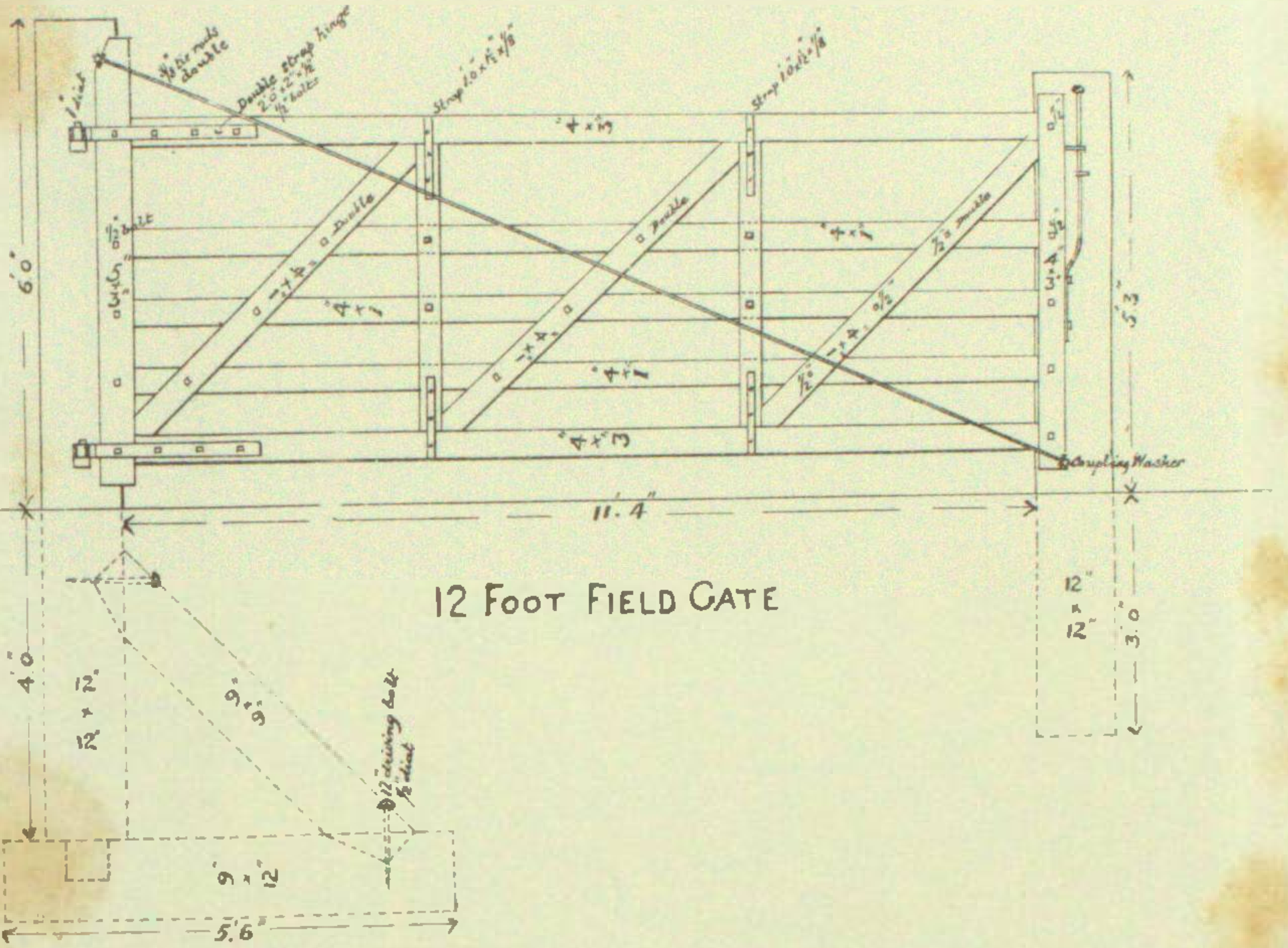


(Sig 34.)

Front Elevation

APPENDIX XX.

12 Foot Field Gate, erected by
Works Department at Public Watering Places.



12 FOOT FIELD GATE

(S1934.)

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

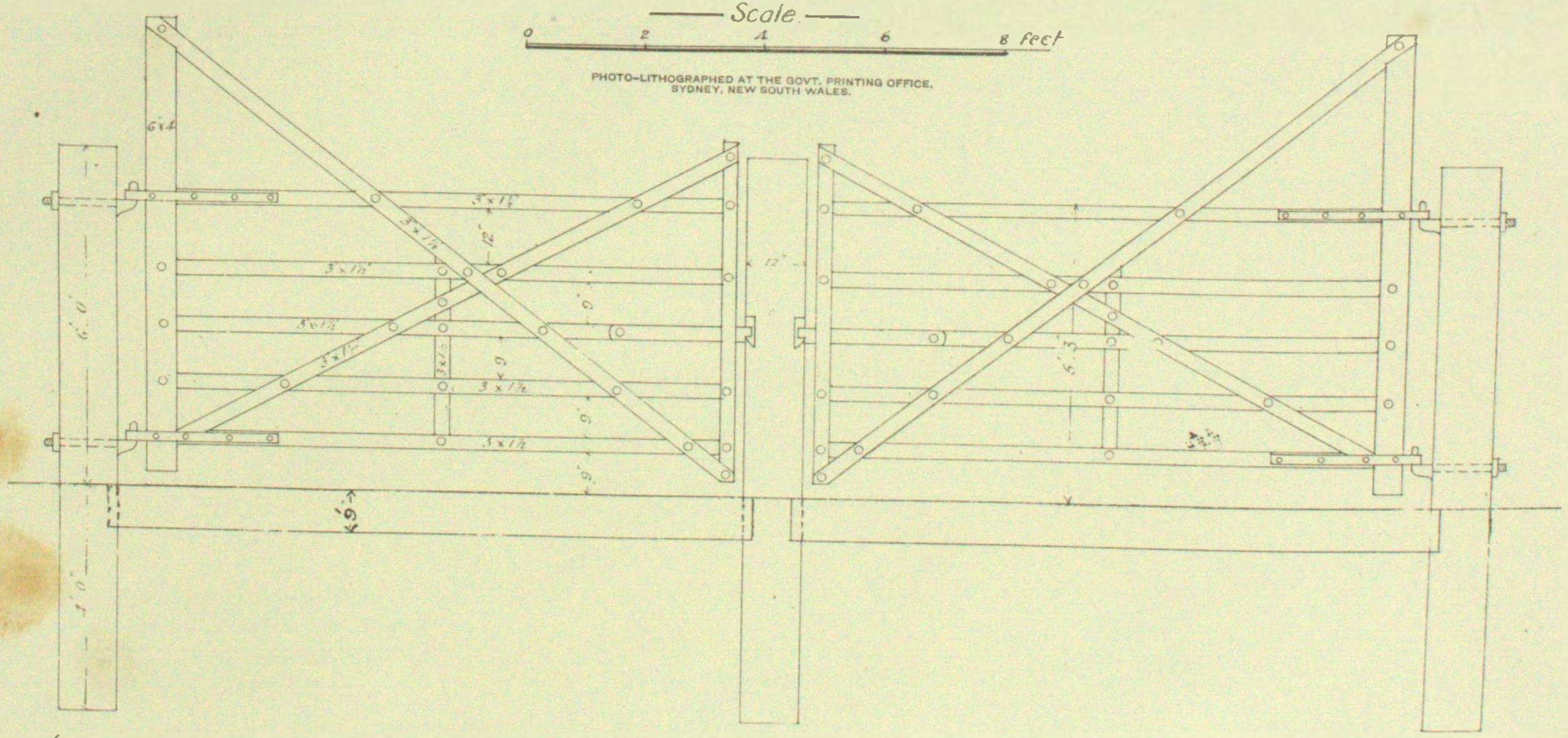
GATES FOR WATERING PLACES

Recommended by Chief Inspector of Stock

Scale.

0 2 4 6 8 feet

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



(Sig 34.)

APPENDIX XXII.

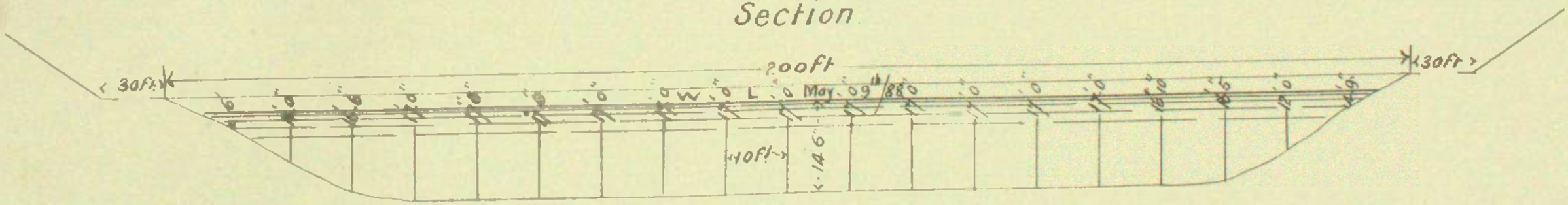
TOMS LAKE TANK

Scale.

0 20 40 60 80 ft.

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

Section.



The mean depth of the tank is 17ft. below the beem level; and the batters of the excavation have not materially altered from 1½ to 1. –

(Sig 34.)

J. G. Carew-Gibson
May 9th 188

Wm Stokwell
12.5.88