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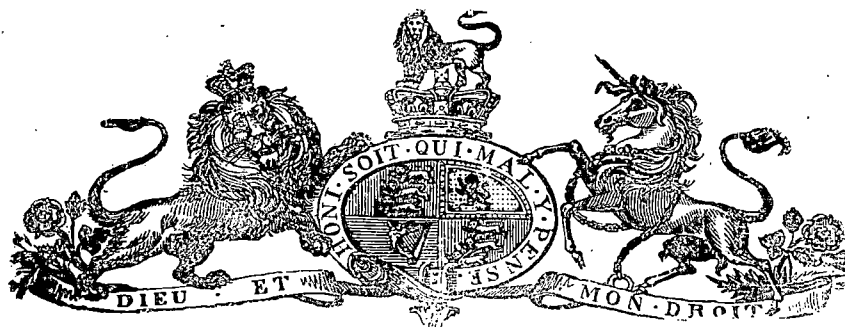
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WATER SUPPLY OF TRIABUNNA, SPRING BAY :

REPORT BY MR. A. MAULT.

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Presented to both Houses of Parliament by His Excellency's Command.



## WATER SUPPLY OF TRIABUNNA, SPRING BAY.

*The Honourable the President and the Members of the Central Board of Health.*

GENTLEMEN,

I HAVE the honour to inform you that, in accordance with your instructions, Minute No. 49, 1890, I have visited the town of Triabunna, and examined the neighbouring country, with the view of advising as to the best means of supplying the place with water for domestic purposes; and to report to you as follows:—

### TRIABUNNA.

1. The occupied portion of the township of Triabunna is situated at the north end of Spring Bay, upon a flat alluvial plain overlying sandstones, shales, and other strata of the coal measures. This plain is from ten to twenty feet above sea-level. The present population is about 150, living in some thirty houses, which, as shown on the accompanying plan, are scattered over a comparatively large area. The rateable value of the private property of this part of the town is given as £448 a year in the Assessment Roll of the Municipality for the year 1890.

### *Present Water Supply.*

2. Spring Bay is in the drier zone of the Island, and has, probably, a mean yearly rainfall of about 24 inches, though for the last twelve months this has been greatly exceeded. It is subject to long spells of dry weather, which render the supply of water to be obtained by storage in rain-water tanks a very precarious one; so in dry weather the supply is virtually dependent upon the water of Maclaine's Rivulet. This rivulet, though apparently consisting in such weather of but a series of disconnected water-holes, has evidently a constant underground flow, as these water-holes maintain a pretty uniform level of water, though they are then the only source of supply of a considerable district for domestic purposes and for cattle-watering. The quality of the water has a good reputation; when there was a considerable amount of whale-fishing on the coast, the whalers are said to have preferred the water from this rivulet to any other in the neighbourhood, on account of its superior keeping properties. It will be seen from the analysis given further on that it fairly merits its reputation.

### *Available sources of Supply.*

3. I carefully examined the whole neighbourhood to find, if possible, some source from which a water supply of good quality might be obtained in a manner within the means of the comparatively small community at Triabunna. Several sources were suggested; but a cursory examination showed that only three were worth further study. These were Maclaine's Rivulet, at a place whence water could be taken to supply the town by gravitation; the same rivulet close to the town, at a place whence the water would have to be pumped; and Vicary's Rivulet.

### *Vicary's Rivulet.*

4. At Rostrevor, on this rivulet, at about three-quarters of a mile from the township, and at a height of about 60 feet above the sea-level, there is a very suitable place for making a reservoir, and where a comparatively small embankment would suffice to impound a large body of water. The rivulet drains about 8 square miles of country, but in summer time there is little or no flow of water. There are then a number of brackish lagoons; but it was suggested that, if the fresh water of the heavy winter rains was conserved, it could be kept free from contamination by the water of these lagoons. There was very heavy rain while I was in the neighbourhood, so a sample of the water then passing down the rivulet was taken. It was apparently quite clear, but the following analysis will show that even at its best the water is not fit to be used for a domestic supply:—

|                             |                           |
|-----------------------------|---------------------------|
| Free ammonia.....           | 0·04 parts in a million.  |
| Albumenoid ammonia .....    | 0·66       "              |
| Nitrogen in nitrates .....  | Traces.                   |
| Chlorine in chlorides ..... | 16·00 grains in a gallon. |
| Total solid matter .....    | 41·00       "             |

The Government Analyst remarks that, the water "contains a large quantity of dissolved vegetable matter. The amount of sediment is very small, and resembles that of ordinary creek waters when examined under the microscope. A re-examination of the sample, cleared by long standing, showed that no appreciable diminution in the substances yielding albumenoid ammonia had taken place. The composition of the water suggests slight admixture with sea-water." As the water was taken from a place 60 feet above the sea, no such admixture was possible. The fact is that the whole soil of the country near Mount Murray seems to be impregnated with saline matter, so that not only the stagnant water of the lagoons in summer, but the water flowing over it immediately after heavy rain, is affected. The analysis clearly showed that any further consideration of this source of supply was useless.

*MacLaine's Rivulet.*

5. The following is the analysis of a sample of the MacLaine's Rivulet water taken from the usual watering-place of the township :—

|                             |                          |
|-----------------------------|--------------------------|
| Free ammonia .....          | Trace.                   |
| Albumenoid ammonia.....     | 0·08 parts in a million. |
| Nitrogen in nitrates .....  | 0·10                     |
| Chlorine in chlorides ..... | 3·20 grains in a gallon. |
| Total solid matter .....    | 12·00                    |

Mr. Ward added, "This would appear to be a very good specimen of an unfiltered creek water, the excess of chlorine being doubtless due to the proximity of the sea." It will be interesting to get an analysis of this water when apparently stagnant in summer, and I will take care to have this done. But the public supply of the district is practically limited to this rivulet as its source. There are two ways in which this source may be taken advantage of, in addition to the present plan of carting it from the town watering-place to the houses. One is by pumping it into a tank sufficiently large to contain a supply for a given period, and sufficiently high to give the necessary pressure for fire extinction and other purposes; and the other is, to form a reservoir in the rivulet itself, at a place sufficiently high to give the necessary pressure.

*General Preliminary Considerations.*

6. As before mentioned, the present population of Triabuuna is about 150, and at least 30 gallons a day should be provided for each of them to allow for all needs, including the extinguishing of fires. For the latter purpose especially, though incidentally for all purposes, this water should be delivered at a pressure of at least forty feet above the general level of the town. For such part of the work as can be conveniently enlarged at any time, such, for example, as storage capacity, it is not desirable, from motives of economy, to greatly exceed present requirements; but for other descriptions of work all probable increase of population in the comparatively near future should be anticipated. These considerations have determined the character of the works hereinafter proposed. It must also always be borne in mind, in weighing these proposals, that the task imposed was not to determine in the abstract what could be done to supply the place with water, but what could be done within the means of a community the yearly rateable value of whose property is about £500. The schemes herein propounded are the result of a careful examination of the locality, but this examination was a preparatory one, undertaken to show, *primâ facie*, that it was practicably within the means of the community to obtain a water supply. But before any work is undertaken a proper engineering survey must be made.

**SUPPLY BY PUMPING.**

*Pumping Station.*

7. The daily working cost of pumping by steam-power puts it out of consideration as a motor; and there is no constant stream from which water-power could be obtained. The following scheme is therefore based upon pumping by a windmill. The best situation for such a mill is that shown on the plan. It is adjoining a large water-hole that is never dry; it is upon a raised bank that is never covered by flood water; and it is well exposed to the prevailing winds. In the following estimates the prices are based on the assumption that one of Messrs. Booth and MacDonald's 10-feet iron windmills, with 3½-in. double action force-pumps, will be fixed in this station. These, with derrick, intake, &c., would cost about £60.

*Delivery Main.*

8. The course shown for the delivery main has been determined by the necessity to avoid risk of injury by floods—an injury almost sure to occur should the pipe be taken straight across from the pumping station to the street in which the church is situated. The cost of the delivery main would be about £115 10s. Way-leave is allowed for.

*Storage Reservoir.*

9. On several accounts, apart from cost—which would be increased thereby—it is not desirable to have the storage reservoir at the pumping station. A good site for it would be near the Public Offices. But this is a detail that can be afterwards determined, and its position will not much affect

the following estimates. It should be capable of storing at least a week's full supply at the rate before given—that is, there should be at least 3325 cubic feet of storage capacity—and this should be raised at least 40 feet from the ground level of the plain on which the town is built. The estimates are framed upon the details of such a storage reservoir given on the plan. A boiler-plate circular tank, 20 feet in diameter and 10 feet deep, covered over, and with an overflow pipe giving nine feet of water, is raised on a frame staging 40 feet high. Of course, such a storage capacity would, in case of necessity, supply the purely domestic requirements of the place for a much longer period than one week. When necessary, and when funds allowed, the framed staging could be enclosed to form waterworks stores, &c. The cost of the tank, &c. as shewn would be about £333.

*Service Mains, &c.*

10. The estimates are framed upon a distributory service, principally of 2-inch cast-iron pipes, laid down as shewn on plan, with the necessary valves, fire-plugs, and service pipe from the mains to the boundary of each property to be supplied—the distributory service on private property being at the charge of the proprietor. These service mains would be the same whether a pumping or a gravitation scheme were adopted, and their cost would be about £559.

*Total and Yearly cost of Scheme.*

11. The total cost of all the above works is thus estimated at £1072 10s., or, with 10 per cent. added for contingencies, £1180. The yearly cost of working it would be, on the supposition that the money could be obtained from the proposed Works Loan Fund at 5 per cent., including interest and sinking fund; that the cost of looking after the pumps, mains, tanks, &c., making slight repairs, and of collecting the water-rate, would be 13 shillings a week, or £33 16s. a year; and that stationery, oil, &c. would cost £4 a year, as follows:—

|                                        | £          | s.        | d.       |
|----------------------------------------|------------|-----------|----------|
| Five per cent. on £1180.....           | 59         | 0         | 0        |
| Management and incidental repairs..... | 33         | 16        | 0        |
| Stores .....                           | 4          | 0         | 0        |
| <i>Total</i> .....                     | <u>£96</u> | <u>16</u> | <u>0</u> |

Renewals are not provided for in this estimate, as it is probable that with a good water supply the rateable value of the town would be so increased as to yield more than sufficient to meet all requirements.

*Yearly Income.*

12. The following estimate of yearly income is based on the assumption that in rating premises for water all occupied houses assessed at less than £10 of yearly value will be reckoned as being of £10 yearly value; this is usually done, and would raise the total yearly rateable value to £507; that hotels would be specially rated or supplied by meter; that the Municipal Council would pay for the water for the public offices, public conduits to be used by the neighbouring districts in time of drought, &c.—a sum of say £10 a year from the Municipal Funds; that the Government would pay a similar sum for the public school, police station, &c.; and that the yearly rate would be fixed at a sum sufficient to pay the remaining annual charge. The income account would then, I estimate, be as follows:—

|                                           | £          | s.       | d.       |
|-------------------------------------------|------------|----------|----------|
| Municipal Fund .....                      | 10         | 0        | 0        |
| Government .....                          | 10         | 0        | 0        |
| Shipping .....                            | 5          | 0        | 0        |
| Churches, gardens, meter customers.....   | 15         | 0        | 0        |
| Rate of 2s. 3d. in the pound on £507..... | 57         | 0        | 9        |
|                                           | <u>£97</u> | <u>0</u> | <u>9</u> |

Though this shews but a small balance after meeting the yearly cost, the yearly increase of rateable value consequent upon the introduction of a water supply would certainly soon improve matters.

SUPPLY BY GRAVITATION.

*Storage Reservoir.*

13. At the place on Maclaine's Rivulet beyond the junction of Brady's Rivulet, where the proposed reservoir is marked on the plan, the bed of the rivulet is a little over 100 feet above the sea level, and is on the great greenstone dyke that traverses the country here. It is proposed to make this reservoir capable of holding at least four months' supply for the present population of Triabunna, and at the place chosen a weir, whose greatest height will be under six feet, will be sufficient to impound the necessary quantity. The outer face of the weir will be of masonry supporting a clay lining covered with a timber apron. The line of weir would be such as to relieve it of strain of timber brought down by floods, which would be thrown towards the overflow. The bed of the reservoir would have to be completely cleared of scrub and timber. The cost of forming the reservoir in this manner would be about £200.

*Delivery Conduit and Main.*

14. From the reservoir a closed wooden conduit, with a proper sluice, would take the water to a silt-box to be fixed at a slightly lower level near the crossing of Brady's Rivulet. As this wooden conduit, though laid with a slight inclination, would carry more water than the delivery main, the over-flow from the silt-box might be utilised for irrigation purposes—and at a little increased expenditure this irrigation might be made an important feature of the water supply, especially as the MacLaine's Rivulet usually has a fair flow of water till towards the end of January. From the silt-box the iron delivery main would pass by the line shewn. The cost of the conduit, main, &c. would be about £450, including way-leave.

*Service Mains.*

15. The distributory service would be the same as before described for the pumping scheme, as costing £559.

*Total and Yearly Cost of Scheme.*

16. The total cost of the gravitation scheme is thus shown to be about £1209, or, with 10 per cent. added for contingencies, £1330. For obtaining the capital it is assumed that the same arrangements as before described (Sect. 11) would be made. The other working expenses would not be so great, as no pumping machinery, &c. would have to be looked after; and the yearly charge would probably be—

|                               | £   | s. | d. |
|-------------------------------|-----|----|----|
| Five per cent. on £1330 ..... | 66  | 10 | 0  |
| Management, &c. ....          | 20  | 0  | 0  |
| Stores .....                  | 3   | 10 | 0  |
| Total .....                   | £90 | 0  | 0  |

*Yearly Income.*

17. The yearly income would be as before, except that a rate of two shillings in the pound would be sufficient. The account would, therefore, stand thus :—

|                                         | £   | s. | d. |
|-----------------------------------------|-----|----|----|
| Municipal fund and Government.....      | 20  | 0  | 0  |
| Shipping, gardens, and meters, &c. .... | 20  | 0  | 0  |
| Rate of 2s. in the pound on £507 .....  | 50  | 14 | 0  |
| Total .....                             | £90 | 14 | 0  |

## SCHEME RECOMMENDED.

18. It will be seen that the gravitation scheme would entail a less yearly charge, and consequently a less yearly rate than the pumping scheme, and is therefore preferable on that account. I have no hesitation in advising its adoption on many other accounts also. The supply could be always depended upon, whereas with a windmill it is probable that should calms occur they would happen in hot weather, just when water would be most needed. The quantity supplied by gravitation would be much larger than that by pumping; it would be large enough to supply Rostrevor and Woodstock—a supply that would probably raise the yearly revenue by £20 for an outlay of £150. And by gravitation the water would be delivered at a much greater pressure—a matter of much consequence in connection with fire extinction. In this connection the advantages of having a constantly available water supply should be taken into account, as fire insurances would be granted at town rates—a saving to the insured ratepayers of from 30 to 50 per cent. on their insurance premiums.

## ORFORD.

19. The question of how best to supply the township of Orford was put to me while in the neighbourhood. From the slight examination I was able to make I have no doubt a supply could be obtained by gravitation from a reservoir to be constructed on the Orford Rivulet. I think any pumping scheme would be so expensive as to be practically beyond the means of the community.

20. In conclusion, I have to express my hearty thanks for all the kindness and assistance I received from his Worship the Warden and the Councillors of the Municipality of Spring Bay; from Mr. Salmon, of Woodstock, who gave up much time to accompany me in my examination; from Mr. Robinson, Government Inspector; and from the Council Clerk.

I have the honour to remain,

Gentlemen,

Your faithful Servant,

Hobart, 26th July, 1890.

A. MAULT.

Sketch Map of Triabunna to accompany Report on Water Supply,  
showing alternative Schemes.

Scale of Chains 10 0 10 20 30

The pipe tracks of each alternative scheme are shown by dotted lines,  
those common to both schemes by full black lines

A. Mault.  
July, 1890.

