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TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

Public Works DEPARTMENT

G.O. No. / B.P. No.	3059 — W / B	Press. / Mis.
Dated	29-X. 1883	198 .

Note

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3059-W
1

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following papers:—

From T. K. ROGERS, Esq., M.B., F.R.C.S., and F.C.S., London, Chemical Examiner, to the Secretary to Government, Public Works Department, dated Madras, 27th September 1883, No. 1277.

I have the honor to enclose the analyses of the six samples of water referred to in your letter, No. 334 E., dated 6th September 1883.

ENCLOSURE.

	1. Lake east of Willow Bund.	2. Upper Bazaar west filter, Marlimund water.	3. East filter near market, Marlimund water.	4. From sluice channel immediately under the bund, Marlimund reservoir.	5. Marlimund reservoir.	6. From the swamp close south of Shoreham.
Total solids .. Grms. per litre	0·21	0·11	0·05	0·06	0·07	0·06
Volatile solids .. do. do.	0·03	0·07	0·03	0·04	0·04	0·04
Chlorine .. .. do. do.	0·007	0·004	0·004	0·005	0·002	traces.
Total hardness .. .. .. Clark's scale ..	2°·45	1°·75	1°·05	2°·1	1°·4	1°·05
Permanent hardness. .. .. do. do. ..	1°·75	1°·05	0°·35	1°·4	0°·7	0°·7
Free ammonia .. Milgrms. per litre ..	0·8	0·04	0·12	0·24	0·16	0·08
Albumenoid ammonia do. do.	0·2	0·95	0·8	0·64	0·4	0·28
Nitric acid do. do. (as ammonia).	0·9	0·30	0·30	0·15	1·05	0·15
Apparent quality of the water as inferred from the results obtained on examination.	Bad.	Bad.	Usable.	Usable.	Usable.	Usable.

REMARKS.—No. 1. Very abundant deposit, composed of vegetable débris. Numerous infusoria.
" 2. Very abundant deposit, composed of vegetable débris. Nematoid worm observed.
" 3. Very abundant deposit, composed of vegetable débris. A few infusoria.
" 4. Very abundant deposit, composed chiefly of vegetable débris and argillaceous matter. No infusoria observed.
" 5. Abundant deposit, composed chiefly of vegetable débris. No infusoria observed.
" 6. Scanty deposit, composed of vegetable débris and argillaceous matter.
" 6 is the best sample, and No. 5 is the next best, whilst No. 1 is the worst sample.

From Deputy Surgeon-General M. C. FURNELL, M.D., F.R.C.S., Sanitary Commissioner for Madras, to the Secretary to Government, Public Works Department, dated Dindigul, 16th October 1883, No. 1261.

Report of the Octacamund water-supply project Committee together with appendices A and B.
G.O., No. 286 W., Public Works, of 1st February 1882.
Chemical Examiner's letter, No. 1277, of 27th September 1883.

I have the honor, with reference to your memorandum, No. 431 E., Public Works Department, of 8th October 1883, to forward my opinion, as requested, and to return the papers, &c., as per margin.

ENCLOSURE.

Proceedings of the Sanitary Commissioner for Madras, dated Dindigul, 16th October 1883.

Read—memorandum, No. 431 E., Public Works Department.

Read—letter from Chemical Examiner, Madras, No. 1277, of 27th September 1883.

Read—note by Major-General Sankey, C.B., R.E.

Read—again report of the Committee appointed under G.O., 6th June 1881, No. 1408 W., on the improvement of station of Ootacamund.

In the memorandum, No. 431 E., Public Works Department, the Sanitary Commissioner is requested to state his opinion respecting the necessity for carrying out in full the various recommendations made by the Ootacamund Improvement Committee in paragraphs 8 to 18 of their report, recorded with G.O., No. 286 W., dated 1st February 1882.

2. There cannot be, it is imagined, any difference of opinion on this point, that the water-supply of so important a place as Ootacamund should be as absolutely pure as it is possible, and this certainly can never be the case if a portion of the catchment area is a ground manured for cultivation. I therefore think the recommendation in paragraph 10 of excavating a catch-drain immediately below Tudor Hall, to carry off the impure supply from this source and deliver it below the reservoir into a waste channel, should be carried out.

To make good the area thus cut out, the recommendation in paragraph 11 should be given effect to.

3. The recommendations contained in paragraphs 14 and 15 refer to the reservoir on the south side of the lake below Dodabetta. I think these will ultimately have to be carried out, but the necessity here is not so urgent as on the Marlimund side. It is observed that no analysis of the water of the southern side has been made.

4. The recommendations in paragraphs 16, 17 and 18 require the most careful attention. But all this will be of no use unless the water is conveyed from the reservoir to Ootacamund by piping. As previously remarked in the report "On the sanitary condition of Ootacamund prepared in accordance with the order of Madras Government, No. 716, dated 23rd May 1877," p. 99, "a water-supply upon the system of open channels and without most rigid conservancy of the gathering grounds and filteration will prove to be money merely wasted."

(Signed) M. C. FURNELL, M.D., F.R.C.S.,
Sanitary Commissioner for Madras.

ORDER—dated 29th October 1883, No. 3059 W., B Public Works.

In his proceedings recorded above, the Sanitary Commissioner recommends that the proposals of the Ootacamund Improvement Committee, contained in paragraphs 8 to 18 of their report recorded with G.O., No. 286 W., dated 1st February 1882, should be carried out; and the Superintending Engineer will arrange accordingly for the requisite detailed plans and estimates being prepared as soon as possible, those for the Marlimund supply being taken up first.

2. Orders will issue in the Financial Department as to the measures of conservancy recommended by the Committee.

(True Extract.)

Major, R.E.,
Under Secy. to Govt., P.W.D.

To the Superintending Engineer, Fourth Circle.
" Financial Department.

Exd. E. Fernandez.
Spare Copies

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BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1883} Madras.

PUBLIC WORKS.

Dated October, 29th.

Read. *Encl.*

G.O., 29th Oct. 1883, No. 3059 W. / B

OCTOBER.

Ootacamund Improvement Committee

The preparation of the requisite detailed plans and estimates ordered for carrying out the proposals of the —.

3059/3

APPENDIX A.

OOTACAMUND WATER-SUPPLY PROJECT.

THE MARLIMUND RESERVOIR.

The present catchment area is 268 acres, of which 188·65 acres are to be cut off and 79·35 acres retained as follows :—

Owner of Land.	Area.	Area to be cut off.	Area to be retained.	—
	ACRES.			
General Baker	189·69	186·23	3·46	
Mr. Frend	7·02	2·42	4·60	
„ Wapshare	47·73	...	47·73	Uncultivated.
Total, Private lands ...	244·44	188·65	55·79	
Government waste	23·56	...	23·56	
Total ...	268·00	188·65	79·35	

The area that can be added north of reservoir is 35 acres, as follows :—

Private land (Mr. Taylor's)	8
Government waste	27
Total ...	35·00

and on the south of reservoir 53·42 acres, as follows :—

Private lands—	
Mr. Frend	13·27
„ Cowdell	5·0
„ Griffiths	5·15
Total, Private ...	23·42
Government waste ...	30·00
Total ...	53·42
Total, area available west of Snowdon Saddle ...	167·77

The probable cost of securing the retained and added area will be—

	RS.
Retained area, private land, 55·79 acres at Rs. 100	5,579
Added on north side do., 8· at „ 50	400
Do. on south side do., 23·42 at „ 100	2,342
Total, compensation for land 86·21 acres ...	8,321

The cost of diverting the drainage of the area cut off will be—

One mile of channel	500
Culvert under Marlimund road	1,000
Total ...	1,500
Total for compensation and works ...	9,821

or say Rs. 10,000.

The catchment area of 167·77 acres set apart as above for the sole use of the reservoir can be supplemented to any extent up to from 500 to 600 acres on the Snowdon Hill, of which about 10 acres value about Rs. 1,000 is private property.

The cost of conveying this drainage will be approximately as follows :—

	Rs.
Catch drain round Snowdon Hill	1,000
One thousand feet of 24-inch main pipe along Snowdon Saddle ...	15,000
Cisterns at head and mouth of pipe 1,500 each	3,000
Channel from saddle to reservoir 500, superpassages of road drainage 500, inlets for hill drainage 500, culvert under Marlimund road 750	2,250
Compensation for land on Snowdon Hill	1,000
Do. do. in course of channel to reservoir	500
And for the removal of huts above proposed line of channel ...	1,000
Total ...	23,750
Add for compensation and work on Marlimund side as detailed above	10,000
Total cost of project ...	33,750

It must be observed that the 24-inch main pipe along Snowdon Saddle is calculated to carry the drainage of only 200 acres of the catchment area available on the Snowdon Hill, and more than this is not likely to be required for very many years to come. Should it be necessary to increase the supply from the Snowdon catchment area at any future time, another pipe of the required dimensions can be laid alongside of the 24-inch pipe now proposed.

DODABETTA RESERVOIR.

The present catchment area of this reservoir is 172·72 acres, of which 80·72 acres are private property and 92 acres Government waste and forest reserve. This area is a great deal more than what is required, and it will be reduced to 74 acres by cutting off 78·72 acres of the private land and 20 acres of the Government reserve as follows :—

Owner of Land.	Area.	Area to be cut off.	Area to be retained.
	ACRES.		
Mr. Misquith	5·00	5·00	0·00
„ Cowdell	75·72	73·72	2·00
Government waste and reserve	92·00	20·00	72·00
Total ...	172·72	98·72	74·00

The 20 acres of Government land which is to be cut off lies beyond the private lands, and there is no necessity to incur the expense of leading its drainage to the reservoir; because the present capacity of the reservoir is 3,000,000 gallons, or 480,000 cubic feet. This capacity is to be increased to 6,000,000 gallons or to 960,000 cubic feet. The rainfall is 42 inches per annum, and, supposing half of it reaches the reservoir, the discharge from 74 acres would be 5,641,020 cubic feet, or sufficient to fill the reservoir seven times in the year.

	Rs.
The cost of cutting off the surplus area and of securing the selected basin of 74 acres for the sole use of the reservoir will be compensation for 2 acres of private land (cultivated)	500
Catch drains to carry away the drainage of the lands cut off ...	1,000
A small viaduct to carry this drainage under the supply channel of the reservoir	500
Total ...	2,000

The position of the reservoirs of the lands and of the works referred to is shown on the accompanying map.

The position of the proposed distributing pipes is for convenience of reference shown also, but this part of the project is explained in another paper.

OOTACAMUND,
12th October 1881.

(Signed) J. O'SHAUGHNESSY, C.E.,
Local Fund Engineer, Nilgiri District.

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APPENDIX B.

IMPROVEMENT OF OOTACAMUND WATER-SUPPLY.

SKELETON ESTIMATE.

No. of Item.	Description of Work.	Reference.	Cost of each Item.	Total.
	North side of Lake.		Rs.	Rs.
1	Fencing round Marlimund reservoir, length 5,750 feet.	Explanatory memorandum.	4,500	
2	Widening bye-wash, by moving back road, by 15 feet.	Do. ...	2,400	
3	Catch channels to bring extra water to Marlimund reservoir (about 4 miles at Rs. 500).	Do. ...	2,000	
4	Masonry conduit from Marlimund reservoir to Snowdon tunnel (see Captain Morant's report No. 206, 1st June 1877, paragraph 11).	Explanatory memorandum and Captain Morant's report No. 206, 1st June 1877, paragraphs 11 and 12.	14,646	
5	Cement piping (12 diameter) from tunnel to proposed service reservoir near St. Stephens', 6,000 feet at Rs. 1⅛ per running foot (say).		7,000	
6	Service reservoir (to hold three days' supply) near St. Stephens'.	Explanatory memorandum.	35,000	
7	Distribution piping as per detail list	Do. and map.	54,000	
8	Fountains (three) and stand-pipes (thirty), "fountains" Rs. 1,200 each = Rs. 3,600, and stand-pipes Rs. 200 each = 6,000.	Do. ...	9,600	
				1,29,146
	Total, north side of lake (say) ...	...	...	1,29,000
	South side of Lake.			
1	Raising by 6 feet the bund, &c., of Dodabetta reservoir.	Explanatory memorandum and plan.	1,700	
2	Fencing round reservoir (1,400 feet)	Explanatory memorandum.	1,050	
3	Iron piping (4 inch diameter) to service reservoir west of Elk-hill aqueduct and fencing along cascades.	Do. ...	16,070	
4	Service reservoir to hold three days' supply ...	Do. ...	8,500	
5	Piping (as per detail list) for distribution ...	Do. and list and map.	38,000	
6	Stand-pipes (five at Rs. 200)	Do. ...	1,000	
				66,320
	Total, south side of lake (say) ...	...	...	66,000
	Grand Total ...	...	...	1,95,000

DETAIL LIST OF PROPOSED MAIN DISTRIBUTION PIPING.

Distinguishing No.	Lines of Pipe.	Diameter of Pipes.	Length in	To supply.	
	North of Lake.	IN.	FT.		
1	From service reservoir to Club road and by Westbury road to Kandal (Pykara road).	4	1,980	Branch No. 2, population.	505
				Do. „ 3, „	1,240
		3	4,290	All between Westbury road and Kandal nullah, and whole of Kandal	1,681
	Total, Length No. 1 ...	...	6,270	Total ...	3,426
2	From No. 1 (at $\frac{1}{4}$th of a mile) along present channel.	3	2,640	All between it and Westbury road, population.	505
3	From No. 1 (at $\frac{3}{8}$ths of a mile) at Hadfield's roads and along that road to Westlake.	3	1,980	Branch No. 4, population.	942
		$1\frac{1}{2}$	3,960	Seventeen European houses	298
	Total, Length No. 3 ...	...	5,940	Total ...	1,240
4	From No. 3 (at $\frac{3}{8}$ths of a mile) at Sandrock along Whiphurst road with three minor branches (in all $\frac{1}{16}$ths of a mile) to Muttachari.	3	1,650	Roman Catholic establishment	942
		$1\frac{1}{2}$	990	European houses and whole of Muttachari.	
			2,640		
5	From service reservoir new line to jail and thence to bazaar (Lake road).	5	1,650	Branches Nos. 6, 7, and 8, population	3,814
		4	3,630	Public offices, Jail, Police Lines, &c.	1,214
	Total, Length No. 5 ...	...	5,280	Total ...	5,028
6	From near end of No. 5 along middle bazaar road to market.	3	1,980	Part of bazaar (say) ...	2,000
7	From end of No. 5 along Lake road to Lady Hobart's school.	3	1,320	Do. do. do. ...	1,029
8	From No. 5 (at $\frac{5}{16}$ths of a mile) near library, along Telegraph lane and along Commercial road both ways to market and Charing cross.	3	3,960	Whole of Agraham, Tonga Company's stable, Alexandra Hotel, &c. ...	785
9	From service reservoir along Snowdon road to Mt. Carmel and thence to Allamby's stables.	3	3,300	Thirteen European houses, Allamby's stables, Engineer's office, &c. ...	398
10	From pipe between Snowdon tunnel and service reservoir starting near Stover cottage and along St. Ann's Hill to near Ottley.	3	2,640	Eleven European houses and Bandy shola ...	700
	Total, Running Feet ...	...	35,970		

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ABSTRACT.

—	Diameter of Pipe.	Lineal Feet.	Rate per Lineal Foot.	Total each size.	Grand Total.
	IN.	FT.	RS. A. P.	RS. A. P.	RS.
Part of No. 5	5	1,650	2 10 0	4,331 4 0	
Part of No. 1 (1,980 feet), and part of No. 5 (3,630 feet)	4	5,610	2 0 0	11,220 0 0	
Part of No. 1 (4,290 feet), whole of No. 2, part of No. 3 (1,980)	3	23,760	1 6 0	32,670 0 0	
Part of No. 4 (1,650 feet), and whole of Nos. 6, 7, 8, 9, and 10					
Part of No. 3 (3,960 feet), and part of No. 4 (990 feet) (*wrought* iron) ...	$1\frac{1}{2}$	4,950	1 2 0	5,568 12 0	
Total, Running Feet ...	...	35,970	...	...	53,790
Total, north of lake (say) ...	...	...	...	...	54,000

DETAIL LIST OF PROPOSED MAIN DISTRIBUTION PIPING.

Distinguishing No.	Lines of Pipe.	Diameter of Pipes.	Length in	To supply.
	South of Lake.	IN.	FT.	
1	Main from service reservoir to Woodstock	4	3,630	All branches.
		3	2,970	
		1½	6,600	
	Total, Length No. 1 ...	...	13,200	
2	From $\frac{3}{16}$ths of a mile, 11 main near Elk-hill house.	1½	2,310	Elk-hill house, Little Shoreham and Shoreham.
3	From No. 2 to bank and houses near lake.	1½	1,980	Bank, &c.
4	From No. 2 at same point as No. 3.	1½	2,310	Abdul Khader's shop, &c.
5	From $\frac{1}{4}$ths of a mile of main to brewery, &c.	1½	1,320	Brewery, Stellinberg, A.B.C. ground, &c.
6	From $\frac{1}{4}$ths of a mile of main to Bakie house, &c.	1½	1,320	Bakie house, &c.
7	From 1$\frac{1}{4}$th of a mile of main to St. Thomas' church with branch to "Mobornane."	1½	4,620	Oaklands. Birdwood, Cotissa Woodcot, &c.
8	From 1$\frac{1}{4}$ths of a mile of main to Barton cottage, &c.	1½	1,320	Barton cottage, &c.
9	From 2$\frac{1}{8}$th of a mile of main to Blackwood cottage.	1½	1,650	Geranium cottage, West cottage, Blackwood cottage, &c.
	Total, Running Feet ...	...	30,030	

ABSTRACT.

——	Diameter of Pipe.	Lineal Feet.	Rate per Lineal Foot.	Total each size.	Grand Total.
	IN.	FEET.	RS. A. P.	RS. A. P.	RS. A. P.
Part of No. 1 (3,630 feet)	4	3,630	2 0 0	7,260 0 0	
Do. of „ 1 (2,970)	3	2,970	1 6 0	4,083 12 0	
Do. of „ 1 (6,600 feet) and whole of all other branches (*wrought* iron) ...	1½	23,430	1 2 0	26,358 12 0	37,702 8 0
Total, Running Feet ...	...	30,030	...		
Total, South of lake (say) ...	...	...	..		38,000 0 0

3059/6

EXPLANATORY MEMORANDUM TO ACCOMPANY ESTIMATE FOR WATER-SUPPLY IMPROVEMENT.

North side of Lake.

Item 1.—*The fencing round the reservoir* is intended to be of four lines of galvanized iron wire 1 foot apart running through tarred teak uprights 9 feet apart, of a total height of 6 feet, of which 2 feet buried in the ground. This will prevent cattle from getting to the water and fouling it by droppings and wallowing. It will also keep out human trespassers who now frequently use the lake to wash themselves, and cattle in partly from ignorance and partly from the temptation afforded by unobstructed facility. Of course a watcher will be required, no matter what may be the character of the enclosing fence.

Item 2.—*Widening Bye-wash.*—On the sufficiency of the surplussing arrangements depends the safety of the reservoir; those in existence, though they have proved sufficient for the present catchment basin, are, according to theory, perilously small, and when the catchment basin is increased, as proposed, they must be widened by 15 feet.

Item 3.—*Catch Channels.*—Though the existing* reservoir when full holds enough† for a five months' supply, its present catchment basin does not suffice to frequently fill it, and it is therefore proposed that, if found necessary, water from other gathering grounds should be led to the reservoir. See Appendix A.

* Capacity 50,000,000 gallons.
† 20 Gallons per head per diem × 12,000 population × 152 days + 10,000,000 gallons evaporation = 46,480,000 gallons.

Item 4.—*Masonry Conduit from Reservoir to Snowdon Tunnel.*—It has been decided that, on the score of both cleanliness and economy of water, it is necessary to enclose the channel, and the fall available being small, a masonry conduit will be much cheaper than iron pipes; such a conduit has been already designed and estimated for by Captain Morant.—See paragraph 11 of his report No. 206, 1st June 1877, the cost being Rs. 14,646.

Item 5.—*Cement piping from Snowdon Tunnel to proposed "Service" Reservoir near St. Stephens' Church.*—For the same reasons as those given as regards Item 4, this portion of the channel should be enclosed, and, as the fall is considerable, a 12-inch pipe will be sufficient to discharge all that is required (240,000 gallons in twelve hours) running three-fourths full. An iron pipe of that diameter would cost about Rs. 6-4-0 a running foot, but as with proper surplussing arrangements at the service reservoir there need be no pressure on the pipe, a cement pipe, as proposed in paragraph 12 of Captain Morant's report, No. 206, dated 1st June 1877, will do, and this according to his estimate will cost only about Rs. 1-2-0 a running foot, or a total for the 6,000 feet of Rs. 6,750, (say) Rs. 7,000.

Item 6.—*Service Reservoir near St. Stephens' Church.*—From this it is proposed to lead off the distributing mains; it will serve as the pressure reservoir, and it is thought that to prevent inconvenience in the event of stoppage of supply from the Marlimund reservoir for a time to admit of repairs to that reservoir or to the channel from it, it would be advisable to make this service reservoir of a capacity to hold three days' supply, *i.e.*, 720,000 gallons. With a depth of water in it of 8 feet, which has been adopted, the area of the reservoir would have to be 14,400 square feet. It would have to be cut out of the side of the hill, and this would, if it were made square, necessitate such a great depth of cutting over part of the area that it is considered advisable that it should be 60 feet broad × 240 feet long, therefore the *walls* would have to be 9 feet high, and where not built into the sides of the excavation, of a mean thickness of about 4 feet, where merely face walls to the excavation they might be of a mean thickness of 2 feet; they should be of best brickwork in cement and coated on exposed faces with cement. The *floor* and foundation of walls, a 1 foot 6 inches thick platform of cement concrete. Surplus might be provided by a 9-inch iron pipe leading for about one-eighth mile to either of the natural streams east or west of Church Hill. From this reservoir would take off one 4 inch, one 5 inch, and one 3 inch main (Nos. 1, 5 and 9 in detail list of distribution piping) with the necessary controlling valves. The total cost at rates furnished by Mr. O'Shaughnessy would be approximately Rs. 35,000.

Item 7.—*Distribution Piping.*—The system of mains proposed is indicated in the "detail list" of distribution piping and on the plan herewith. The sizes of the pipes would probably require rearrangement (almost always in the direction of reduction) when detail levels are taken for working the system out with accuracy. It has been assumed that the pipes should be able to carry the full daily supply in *twelve* hours. The rates have been arrived at from those again in the attached letter from the Ashley Works, Coonoor.

Item 8.—It is considered that there should be provided three additional *street fountains* and thirty "*stand-pipes*" fitted with "self-closing lever valves" which will only allow a certain quantity of water to pass each time the knob or handle is lifted, and with caps from which a water-cart can be filled into which a hose may be attached. The former, will cost probably Rs. 1,200 each, and the latter Rs. 200 each.

SOUTH SIDE OF LAKE.

ITEM 1.—*Raising bund, &c., of Dodabetta Reservoir.*—The population south of the lake is 1,800; taking it as 2,000, the total storage required is 2,000 × 20 gallons × 150 days = 6,000,000 gallons. The existing reservoir is said* to hold 3,000,000 gallons (this is probably under the mark), and I have ascertained from a survey (plan herewith) that by raising the full water-level by 6 feet, the contents would be increased by about 3,375,000 gallons, and the estimate provides for such raising of the bund, water tower, bye-wash, &c. The catchment basin and rainfall are ample.

* See paragraph 27 of Colonel Mullins' memorandum, No. 216 W., printed with Proceedings of Madras Government, No. 105 W., 8th January 1878.

ITEM 2.—*Fencing round Reservoir* to be of same character as described for *Item* 1, *north side*.

ITEM 3.—For the reasons given under *Item* 4, *north side*, it is proposed to *enclose the whole channel from the reservoir* (with the small exception named below); the fall available being great a small iron pipe (4-inch diameter) will suffice and be the cheapest arrangement. The estimate therefore provides for such a pipe to the "service" reservoir, excepting along two cascades (700 feet in length) which it is proposed only to *fence*, leaving the water to be aerated and oxygenized by the exposure to the air and the tumbling down the cascades, a total height of about 200 feet.

ITEM 4.—*Service Reservoir* to hold three days' supply equal 120,000 gallons, 2,400 square feet required. There is a capital site between "Pepbrook" and "Elk-hill Lodge" (or "Cottage") and on the general lines indicated under Item 6, *north side* (except that this reservoir might be square and the surplus pipe only a few feet long), the cost would probably not exceed Rs. 8,500.

ITEM 5.—*The remarks on Item* 7, *north side*, are applicable to this.

ITEM 6.—*It is considered that* "five stand-pipes" of the character and cost mentioned under Item 8, *north side*, should be provided.

(Signed) G. T. WALCH,
Executive Engineer, P.W.D.

N.B.—It will be observed that all the arrangements and calculations in the above estimate have been made for a supply of 20 gallons per head per diem; but *first* as in excessively dry years the quantity intercepted may be rather short of this; *second* as the population do not really require more than half this amount; and *third* as there are wells and springs to supplement the supply, the Committee in their report have adopted 10 gallons per diem as the standard. As, however, in all years of ordinary rainfall, 20 gallons may safely be distributed, they prefer not to alter the estimate framed by Mr. Walch.

Enc: 1693
Rec'd 10-10-83

3059/7

REPORT.

THE Committee appointed under G.O., 6th June 1881, No. 1408 W., to consider and report on the measures deemed to be urgently required for the improvement of the station of Ootacamund, and to give an approximate estimate of the cost of the needful works, have now the honor to submit their views for the favorable consideration and orders of Government.

2. Before doing so they beg to explain that the delay which has occurred in submitting their report, has chiefly been due to the necessity for personal examination of the various localities, and discussion of details of plans for water-supply and drainage, before a final decision could be arrived at.

3. It may also be mentioned that Colonel Hasted, Major Mead, and Mr. Walch, owing to the calls of their respective duties, have been obliged to absent themselves from the later meetings; they, however, afforded valuable assistance to the Committee in the early stages of the inquiries. Mr. Minchin also had to leave for England without taking part in the discussions.

4. The work of the Committee was confided to two Sub-Committees, who, in addition to minute personal inquiry, have thoroughly considered all the important reports bearing on the sanitation of Ootacamund which have previously been submitted to Government; and the following conclusions, in which the members are unanimously agreed, will, for the sake of convenience, follow much the same order in which the various subjects of inquiry have been taken up by the Sub-Committee alluded to:—

I.—SUITABILITY OF THE EXISTING SUPPLY OF WATER IN QUANTITY AND QUALITY.

5. Ootacamund is divided into two distinct areas, each of which has its storage reservoir, one the Marlimund tank, north, with a calculated capacity of 50,000,000 gallons; the other the Dodabetta tank, south, capable of containing 3,000,000 gallons.

6. Allowing 10 gallons per head per diem, and under the supposition that it is necessary to store a five months' supply to meet the requirements of exceptionally dry seasons, the Committee consider the storage capacity of the Marlimund reservoir ample for the present inhabitants, about* 11,000, and for reasonable future increase, as $16\frac{1}{2}$ million gallons is all that would be consumed in that time.

* By the last census the total population *north* and *south* of Ootacamund has been shown to be 12,396.

7. Major Morant has, it is true, in his report, as per margin, calculated that the supply is inadequate, and with a view to counteract this suggested the construction of another reservoir below Snowdon House, but adds that at least nine-tenths of the volume is now wasted in distribution. If, as will presently be shown, the drainage of not less than 300 acres can be counted on for storage, 68 millions of gallons would be received each year by the reservoir, assuming that only 10 inches out of the average annual rainfall of 42 inches be intercepted, and the Committee therefore are satisfied that with due precautions the existing supply should prove ample.

See page viii and ix, Appendix XIX. Report prepared under G.O., No. 716, dated 23rd May 1877.

8. The quality of the water collected in the reservoir is not, however, satisfactory. A large proportion of the area of the catchment, even at the time of its construction, was under tea cultivation, which, as the plants need considerable manuring, renders this part of the supply unfit for drinking.

9. To buy out the owner of the Tudor Hall estate would prove too expensive, but the Committee have had under consideration an alternative plan which, though not worked out in all its details, affords *primâ facie* evidence of a less costly solution of the difficulty.

10. By excavating a catch-drain immediately below the Tudor Hall tea estate, it is hoped that all the impure supply from this source can be led off and delivered below the reservoir into the waste channel.

11. At the same time, in order to make good the area thus cut out (188·65 acres of the catchment, 268 acres in all) and if necessary add considerably to the supply, it is proposed to collect the drainage of not less than 200 acres of the upper part of Snowdon Hill (an area which is probably more free from all sources of contamination than any other) and lead it past Snowdon House in the manner indicated in the annexed survey and estimate, *Appendix A*.

12. To the Snowdon area will also be added the drainage from 35 acres immediately north, and 53·42 acres south, of the reservoir, to be led in by simple catch-drains.

13. The total catchment area thus secured will be as follows:—

			ACRES.
From present catchment	...	...	79·35
From Snowdon (available)	...	...	150·00*
From the new area North	...	35	
Do. do. South	...	53·42	
		———	88·42
Total Acres (say)...			318·00

* One-fourth of the Snowdon area is thrown out as the 24 inch diam. pipe would not pass the whole drainage of the 200 acres on that side. At any future time by simply adding one or more pipes the drainage of an additional 150 acres or as much more as may be needed can be added to the catchment.

14. As regards the reservoir on the south side below Dodabetta, although the number of inhabitants which it will have to supply will probably not exceed in future 2,000, the present capacity, 3,000,000 gallons, is considered insufficient, and the Committee propose to increase this by 3,375,000 gallons, raising the bund 6 feet. *See Appendix B.*

15. But here again much of the catchment area being under high cultivation, such portion as cannot be readily acquired or effectively controlled must be cut out, and a fresh supply from a thoroughly reliable source brought in. Fortunately there will be neither difficulty nor any appreciable expense in effecting this. *See Appendix A.*

16. The Committee would here venture to express an opinion that the measures above recommended for insuring a perfectly pure source of water-supply for Ootacamund will have but little practical effect, unless the most stringent rules are not only laid down but enforced, for preventing in future all contamination of the catchments.

17. Already injunctions on this subject have been issued by Government; but it is feared that owing to various causes, these have not been complied with so strictly as could be desired, and it would appear essential that in the yearly Administration Report of the Municipality, the manner in which the purity of these areas is maintained, should be invariably and specially dwelt on for the information of Government.

18. Not only should the catchment areas be properly fenced off, but even grazing of cattle should be prohibited.

19. In immediate connection with the supply of water for the station, and as a possible substitute for storage reservoirs, the Committee have had under consideration proposals for an extensive construction of wells, both public and private, and in reply to a circular addressed to house-holders with this object have elicited the fact that there exist already not less than 208 wells and 69 springs of water, many of the latter being perennial. Although this points to the existence of a large supply of drinking water in ordinary years, the Committee are inclined to think that neither on the score of purity nor of permanency in exceptionally dry seasons, can either or both of these sources be implicitly relied on.

20. From evidence before them the Committee consider that well water in Ootacamund is not always† pure, and as regards quantity and permanency of supply, several wells, which on first construction gave good promise, are shown to have subsequently run dry.

† Well water in the bazaar is very impure. These wells will have to be filled in or permanently covered over.

21. Whether special encouragement should be held out to construct wells may be a matter for future consideration; but for the present the Committee think on the whole that the construction of wells may be left to private individuals.

II.—Best means for economising the Supply of Water.

22. There can be no doubt that, as at present distributed in open channels, an immense percentage of the water, estimated as shown by Major Morant at no less than nine-tenths of the total volume, is lost. The remedy for this is simple, and the Committee are of opinion that the only proper way to conserve the water, which in addition to loss in volume is subject to all kinds of contamination, is to conduct the supply to its destination in masonry conduits and pipes.

23. The general features and probable cost of the scheme are given in Appendix B, from which it will be observed that, as regards the northern area, the water is to be conveyed in a closed masonry channel from the Marlimund reservoir to a point immediately above St. Stephen's Church. Here there will be a pipe head reservoir, from which the distribution will be made in iron pipes of varying capacities, to all the most suitable points.

24. For the southern area the distribution would be wholly by iron pipes carried from the Dodabetta reservoir to the most distant points of supply.

III.—Drainage Works required.

25. Under this head the drainage of the bazaars claims first attention. In the opinion of the Committee the scheme framed by Mr. O'Shaughnessy for the drainage of the main Ootacamund bazaar, estimated to cost Rs. 86,400, if supplemented by gullies with gratings, and with short lengths of pipe, to drop the scourings of the houses and backyards into the street drains, will prove suitable, particularly if everywhere stone surfaces are provided as a protection against the rough usage to which all such drains are necessarily exposed in effecting the daily cleansing, &c.

26. There is every reason to hope that, after the proper levelling and sloping of all the backyards, as contemplated by Mr. O'Shaughnessy's scheme, the provision at intervals throughout the streets of receptacles for filth and rubbish, and the strict enforcement of all conservancy rules by the municipal servants under the lately appointed Health Officer, the formation of a rotten soil should be impossible in future.

27. In addition to the special drainage works above for the main bazaar, analogous but less costly measures must be carried out for Kandal Town, which is now in a very filthy state.

28. The drainage also of one or two small localities like Bandi Shola, which cannot conveniently be brought into any large system, should be dealt with by cesspits, which will have to be cleaned periodically.

29. Next in importance to the proper provision of surface drains for the several bazaars, &c., is the removal of the sewage, which is at present, with the exception of that from Kandal, discharged into the lake, the water of which thus becomes more foul year by year. The upper portion, east of the Willow Bund, is now in great measure a sedgy pond, covered with much floating weed, and with sewage accumulations at the extremity of all the bazaar drains. Instead of the beautiful feature which it might easily, with a little care and taste, be made, the lake is rapidly becoming a disgrace to Ootacamund.

30. Some slight modifications in the details of Captain Tulloch's project have been recommended by the professional officers on our Committee, and it is also thought that instead of commencing the sewer near the head of the lake, a sewage pipe of small capacity, (preferentially of iron,) should be carried up as far as the Madras Carrying Company's premises, as a good deal of foul matter is now discharged into the supply channel from that quarter, which it would otherwise be difficult to dispose of. These slight modifications would approximately raise the estimated cost from Rs. 74,000 to Rs. 90,000.

IV.—Objectionable Occupations.

31. At various places throughout Ootacamund objectionable occupations have been allowed to spring up. Though the removal of such is only matter for compensation, as the provisions of the Land Acquisition Act can be put in force, the cost will be heavy, and should be undertaken with discrimination, and be only resorted to in the most urgent cases.

32. Among the most needful measures in this respect will, the Committee consider, be the following :—

(1) The acquisition for public purposes of Toppa Moodelly's lines and bungalow (at foot of Bombay House hill) and the land attached thereto.
(2) Do. do. Tom's bungalow and site at foot of Shoreham hill.
(3) The acquisition, drainage, and cleansing of—
(*a*) Joachim Petta, a collection of filthy houses.
(*b*) Charcoal village, do. do.
(*c*) The long unused Forest Department timber-yard, near Charing Cross, a great eye-sore in the heart of Ootacamund.
(*d*) Tirroovangadam Moodelly's land near Crewe Hall, most unsightly in its present condition.
(*e*) Other objectionable spots in scattered localities.

33. For the persons removed under (1), (2), and (3), fresh buildings sites, &c., should be found in Kandal and the necessary compensation paid. In most of these cases the amount of the latter has been sufficiently ascertained.

34. As a rule the future extension of native occupation should be allowed only in the last-named locality—Kandal town—where land may be acquired by the Municipality and laid out on a well-arranged plan.

35. In immediate connection with this subject, the Committee desire to bring to notice that the municipal authorities have apparently no sufficient powers, under the existing Act, to prevent the erection of unsightly tenements, and that if expenditure is now to be incurred as recommended for the removal of objectionable occupations, it would appear equally necessary to legislate with this object for the future.

V.—Objectionable Vegetation and neglected Lands.

36. The excessive growth of the Australian acacia ("*wattle*") has become a most serious evil in Ootacamund, and from the fact that in the form of a jungle or dense "bush", it has proved itself of value to house-owners as fire-wood, the nuisance threatens to be perpetuated indefinitely.

37. The Committee are satisfied that nothing short of complete extirpation of the "*wattle*" from the station will answer or should be aimed at, and they beg to press the necessity of this most earnestly on the consideration of Government. The medical officers are very pronounced in their condemnation of this overgrowth, which, stops the free circulation of air, and affords shelter for nuisances of all descriptions.

38. The Municipal Commissioners are understood to have under contemplation, the necessity of imposing such a rate on the cultivation of the *wattle*, as will prevent the areas so occupied being looked on as a valuable firewood preserve.

39. This measure may be deemed oppressive by house-holders, but the magnitude of the evil is such that, in the public interests, some sacrifice is called for. To minimise as much as possible the objections that may be entertained to the proposed action, the Committee would venture to recommend that Government meet the house-holders half way, by some such arrangement as the following :—

40. It is generally understood that to eradicate the *wattle* costs about Rs. 200 per acre, and that even with this outlay it is difficult for private individuals to ensure that the work is thoroughly done, as coolies on daily hire, unless very closely watched, fail to remove the roots which are the source of the evil.

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41. The work can, in fact, be only done satisfactorily by prison labor, and the Committee would suggest that Government maintain an adequate body of convicts to meet the requirements of private individuals in this respect, and that the jail authorities be prepared to contract for the thorough eradication of the *wattle*, at the rate of Rs. 100 per acre.

42. By this means alone the Committee are convinced can this evil be met, and, should Government adopt the suggestion, they are of opinion that with due notice it would be perfectly equitable to enact that the retention of the obnoxious plant in any compound after a period of ten* years should be illegal, and subject house-owners to penalties, in addition to meeting the full cost of its eradication.

* Some members of our Committee consider that a grace of only *five* years should be granted.

43. In a minor degree other classes of vegetation, allowed to run into excess, are very objectionable, added to which heaps of paper, broken glass or china, with the thousand and one objects which, though not actually injurious to health, are in civilized countries prohibited as nuisances, meet the eye at every turn in parts of Ootacamund. For the removal of these and for securing proper attention to the tidy and neat appearance of the various private properties, the Committee consider the Act requires strengthening.

VI.—Slaughter Houses.

44. The mutton, beef, and pork slaughter houses should, in the opinion† of the Committee, as strongly urged by many medical authorities on previous occasions, be moved from their present site, closely adjoining the Main Bazaar, to a spot beyond Kandal on the Pykara road.

† Some members of the Committee would be satisfied with the less expensive proceeding of simply improving the present slaughter houses.

VII.—A good Daily Market.

45. Public opinion being unanimous as to the necessity for this, as lately evinced by the movement so heartily responded to, of associating the name of the late honored Governor with the work, that the Committee feel it would be superfluous to record their reasons for considering this to be perhaps one of the most urgent necessities of the station. They merely observe that the butchers' shops would all be transferred to this building, and that such removal would put an end to one of the most offensive sights in Ootacamund. Moreover, from information received, the work is certain to be remunerative.

46. Legislation will be necessary to compel butchers and persons of certain other callings to confine the sale of their wares exclusively to this new market.

VIII.—Miscellaneous Buildings, &c., needed.

47. (*a*) A public cattle and bandy-stand with proper shelter for the animals close to the market.
(*b*) Permanent lines for municipal coolies and bandy-men.
(*c*) More public latrines and urinals in various parts of the town.

Some of these works will be remunerative, (*a*) especially so.

IX.—Improvement and Planting of Public Grounds.

48. All the lower parts of Ootacamund suffer both in appearance and in salubrity, from the lodgment of water and imperfect drainage.

49. One of the worst localities in this respect is at present being dealt with in constructing a new road of approach to Government House and the Botanical Gardens, advantage being taken of the work to cut a deep drain which, with other arrangements, should in time have a marked beneficial effect.

50. But all the low ground extending down the valley to the head of the lake has water so near the surface that much of it is in a sedgy condition, overgrown with docks and other rank weeds, and is both offensive to the eye and unhealthy. The A B C ground is from this cause the most notedly catch-cold place in Ootacamund.

51. All the portion of the lake east of the Willow Bund is in the offensive condition previously described under head III above.

52. There are two ways of dealing with the matter, (1) by raising the level of all the affected grounds, or (2) by lowering the level of the water in the lake, which necessarily keeps up the spring level. The latter is obviously by far the cheapest plan, all that is needed being to cut down the level of the waste weir at the bund from 3 to 6 feet as may be desirable; in fact, by just so much as will lay dry the portion east of the Willow Bund. The ground so reclaimed may quickly and at small expense be turned into pleasure and recreation grounds.

53. The latter are much wanted for such purposes as Cricket, Polo, and Gymkana Sports, for which the present A B C grounds are much too restricted.

54. It must be borne in mind that the lake, as it stands, fulfils no useful functions for Ootacamund. It irrigates no ground below its bund, its water is unfit for drinking, unused for boating, and, if not ornamental, is valueless if not worse, as being little better in its present state than a receptacle for sewage.

55. The slope of the margins being very steep, the lowering of the present water-level by 6 feet would not narrow the present spread of the water in all by more than 30 or 35 feet at most; practically therefore this proposal, while pointing to an easy means for improving sensibly the sanitary condition of all east and north of the Willow Bund, and affording scope for improvements otherwise unattainable, would to no sensible degree interfere with the extent of the lake to the west of that point.

56. Instead moreover of leaving this latter portion in its present bald, unplanted, and uncared-for condition, particularly along its northern margin, the Committee strongly advocate all the knolls down to the water's edge being planted with selected trees (conifers chiefly) thereby turning the lake into the most attractive feature in Ootacamund.

57. North and close above the main bazaar it is very desirable that a wide road should be cut out of the hill side leading towards the market place, and the excavated earth used for filling in the unsightly pits, and otherwise bringing into form this most unsightly and neglected portion of ground.

58. The Committee consider that in connection with these and other improvements, to be effected chiefly through the action of the Municipal Commission, it would be highly desirable to enlist the active aid of all house-owners, in effecting judicious clearances of over-planted land, and by planting ornamental trees in groups or singly where such would be most effective.

59. With this object they would strongly recommend that both the Superintendent of the Botanical Gardens, and the Gardens themselves, should be placed much more than has hitherto been the case, at the service of the public.

60. The duties of the former might, with great advantage, be strictly confined in future to the care of all public grounds in Ootacamund, and to affording advice and assistance gratis to all house-owners, who may be desirous of improving their compounds by planting or clearing.

61. He should maintain at the gardens a nursery of such young trees and shrubs as experience has proved to answer best, the plants to be sold to the public (of Ootacamund only) at strictly cost price, instead of as hitherto at practically prohibitory rates. It is not perhaps too much to say that, owing to the present high prices of the plants and to the location of the gardens, the latter have hitherto been of little or of no use to any one.

62. To these duties might with advantage be added the publication from time to time of price lists of all the saleable stock, including seeds procurable from the gardens, and a monthly Gardeners' Chronicle, giving hints regarding the flowers to be put in during the succeeding month, the cultivation of vegetables, fruit trees, &c.

63. As the Committee are given to understand that the present Superintendent has many miscellaneous demands on his time unconnected with Ootacamund, which are incompatible with those above alluded to, they trust the Government may find it feasible to relieve him of all extraneous duties.

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64. X.—Cost of the several Proposals.

Water-supply, North side of Ootacamund.

	Rs.	Total Rs.
Additions to the catchment of the Marlimund reservoir with subsidiary works, &c., see Appendix A.	33,750	
Fencing and distribution generally, see Appendix B ...	1,29,146	
Extra establishment and contingencies at 10 per cent. ...	16,289	
Total, North side ...	1,79,185	

Water-supply, South side.

Alterations to catchment of Dodabetta reservoir, see Appendix A.	2,000	
Fencing and distribution generally, see Appendix B ...	66,320	
Extra establishment and contingencies at 10 per cent. ...	6,832	
Total, South side ...	75,152	
Grand Total for water-supply and distribution (in round numbers).	...	2,55,000

Drainage.

Surface drainage, main bazaar, with certain additions to Mr. O'Shaughnessy's estimate.	90,000	
Do. Kandal town	30,000	
Do. other localities	25,000	
Intercepting sewer as estimated by Captain Tulloch with certain additions to complete the scheme.	90,000	
Total, Drainage	...	2,35,000

Urgently required improvements.

(*a*) *Unremunerative.*

Removal of objectionable occupation	50,000	
Improved lighting for the streets and roads...	7,000	
Additional latrines and urinals	7,000	
Conservancy plant	7,000	
Office for Municipal Commission	10,000	
New road above the main bazaar, lowering the level of the lake, reclaiming same at upper end, &c.	40,000	
Planting public grounds, margin of lake, &c.	25,000	
Unforeseen contingencies	14,000	
Total, Unremunerative requirements ...	1,60,000	

(*b*) *Remunerative.*

New General Market	2,50,000	
Cattle and bandy stand	30,000	
Slaughter houses	25,000	
Scavengers' and bandymen's lines	15,000	
Contingencies	10,000	
Total, Remunerative requirements ...	3,30,000	
Total for improvement ...	...	4,90,000
Grand Total under all heads ...	...	9,80,000

XI.—Ways and Means.

65. As comprehensive improvements on the scale above contemplated by the Committee would unquestionably insure a valuable enhancement to all property in Ootacamund, it is only reasonable that all house-holders should be prepared to undertake a fair share of the charge imposed by the provision of the means needed for their execution.

66. House-holders are now taxed for all municipal purposes to the extent of $7\frac{1}{2}$ per cent. on the rental value of their properties.

67. This is sensibly lower than the incidence of taxation in Madras and other large towns, and the Committee see no reason why, in order to meet as far as possible the objects at present in view, a maximum *consolidated* rate of 12 per cent. on the rental* should not be imposed, *i.e.*, under the proviso that the scheme in its entirety, as now recommended, commands the approval and sanction of Government. It is needless to say that legislation would be necessary for this.

* Two members of the Committee deprecate so high a consolidated tax as 12 per cent. and consider that 10 per cent. should be the maximum.

68. While thus prepared to recommend an increase of taxation to this large amount in the conviction that the resulting benefits will in time well repay the same, the Committee would deprecate very earnestly any increase over and above the limit specified, as such would in all probability tend to discourage permanent residence on the part of those classes, whose presence it is on every account most desirable to encourage, viz., the retired servants of Government and others with limited means.

69. The Committee are given to understand that the Municipality have already addressed Government as to the propriety of raising a loan of four lakhs of rupees at 4 per cent., with a view to carrying into effect some of the most needful improvements specified in this report, and they are of opinion, from statements of the financial condition laid before them, that with a consolidated tax to the limit proposed, the Municipality could not only meet the demand for interest on the loan, but be enabled to create a sinking fund for the eventual extinction of the debt.

70. The total approximate outlay being close on ten lakhs, the Committee see no other means for meeting the difference, viz., six lakhs, than by a Government grant, and, however large the demand, they are encouraged to hope that, taking into consideration the peculiar position which this station occupies, and the functions it fulfils towards not only this Presidency, but it may fairly be said towards the rest of India, such may not be considered unreasonable.

71. They cannot do better than here quote the cogent arguments adduced by Lord Napier when, as Governor, he recorded the following observations in his minute, dated 13th September 1867. "The Government of Madras, acting with the sanction of the Government of India, has created Ootacamund, has beautified it, has rendered it accessible by expensive roads, has made it the seat of various public establishments, such as jails, dispensaries, orphanages, and plantations, has invited the sick and the suffering of all classes to repair hither from all parts of India for the restoration of their health and vigor. The Government has given an imperial character and significance to the place, but while doing so, has marred its benevolent intentions by leaving a source of mischief in the very centre of the cherished spot. I do not think it would be liberal or equitable, at this stage when the evil has just attained proportions which can no longer be concealed or denied, that the Government should create a Municipality and discharge upon it the burthen of remedying an abuse which the Government itself permitted to grow."

72. The time that has elapsed since these eloquent words were penned, and since the more prosaic, but not less accurate and forcible, reports previously alluded to were written by the professional officers of Government, has only served to confirm and intensify the truth of all that has been thus advanced.

73. The Municipality were created at a time, when few or none of the really essential sanitary requirements of this large and growing station, had even received an initiative.

74. With means which were, and still unfortunately are, barely sufficient to meet the most urgent daily demands, and with moreover an Act, the many imperfections of which are only too patent, they were apparently expected not only to initiate but carry out several large measures of reform and improvement most urgently demanded, and the Committee feel bound to submit that prompt measures are needed to rescue this deserving body from a most embarrassing position.

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75. The appeal made by Lord Napier was promptly and liberally responded to by the Supreme Government, who in their Public Works Department letter No. 792 C, dated Simla, 2nd November 1867, conveyed sanction to Rs. 74,000 as an Imperial Grant, on account of Captain Tulloch's estimate for the intercepting sewer. Most unfortunately this grant, owing it is believed to the exigencies of finance, was never availed of, and the work was consequently not carried out.

76. Looking to the foregoing considerations, and the fact that the Government of India has, it is understood, during late years given grants of not less than eight lakhs of rupees for general improvements, and lent seven lakhs more at 4 per cent. to the Simla Municipality for water-supply works, the Committee are sanguine that at least half of the 6 lakhs so urgently needed for Ootacamund may, under proper representation, be conceded as a grant-in-aid from *Imperial* Funds, with the object of carrying out the suggested improvements to this the Queen of hill stations and the finest sanitarium in India; also that the remaining three lakhs may be given from *Provincial*. These grants if conceded might if necessary be spread over the next three or four years.

(Signed) R. H. SANKEY, Colonel, R.E.,
Secretary to Govt., P.W.D.

(,,) M. C. FURNELL, M.D.,
Dy. Surgeon-General, Sanitary Commsr.

(,,) N. ROUPELL,
Acting Commissioner, Nilgíris.

(,,) R. J. BAKER, Major-General.

(,,) H. R. MORGAN, Major-General.

(,,) J. O. HASTED, Lieut.-Col., R.E.

(,,) L. C. NANNEY, Surgeon-Major.

(,,) J. SMITH, Surgeon-Major.

(,,) H. R. MEAD, Major, R.E..

(,,) G. T. WALCH, M. Inst. C.E..

(,,) J. O'SHAUGHNESSY.

(,,) W. E. SCHMIDT.

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GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

1st February 1882, No. 286 W.

Buildings and Roads.
Civil Works.

Read the following paper:—

No. 1. REPORT of the Committee appointed under G.O., 6th June 1881, No. 1408 W., to consider and report on the measures deemed necessary for the improvement of the Station of Ootacamund, and to frame an approximate estimate of the cost of the needful work.

No. 2. ORDER THEREON, 1st February 1882, No. 286 W.

The attention of Government having been drawn to the requirements of Ootacamund, more especially from a sanitary aspect, the consideration of the whole question was by G.O., No. 1408 W., dated 6th June 1881, remitted to a Committee under the presidency of the Chief Engineer.

2. The Committee were engaged on the work from June to the end of October 1881, and having submitted their report recorded at the head of these Proceedings, the Right Honorable the Governor in Council desires that the thanks of Government be conveyed to them for their valuable and complete Report.

3. The proposals of the Committee embrace improved water-supply and drainage schemes, a new market and other town improvements, both sanitary and general, and are estimated to cost in the aggregate nearly 10 lakhs.

4. Of this sum it is suggested that 4 lakhs shall be advanced in the form of a loan to the Municipality, repayment being provided by increasing the present taxation from 7 to 12 per cent. on the rental of properties in the station, and that the balance of 6 lakhs be met by a grant to the Municipality from Imperial and Provincial Funds in equal shares. These grants would be spread over three or four years, as might be requisite for carrying out the works.

5. The Right Honorable the Governor in Council has given the Report of the Committee and the several suggestions contained therein his careful consideration, and after personal inspection of the localities named, by himself and by His Excellency the Commander-in-Chief, has come to the following conclusions.

6. Improved drainage and water-supply works are, in his opinion, most essential, but the former should take precedence of the latter in point of urgency. In this connection he deems it essential to note—

(1) that the Main Bazaar Kandal and other collection of native houses should be given a proper system of surface drains;

(2) that the sewage from the bazaar should on no account be allowed to flow into and contaminate the lake as it does at present; and,

(3) that the level of the lake should be lowered as suggested by the Committee.

This latter measure can, he is convinced, be carried out without creating any perceptible nuisance, and should, when completed, reclaim nearly all the ground east of the Willow Bund, thus adding to the extent and sensibly improving the healthiness of the recreation ground.

7. If the lake level be lowered gradually the small portions of exposed margin would soon be covered by vegetation, and the natural action might be quickened by sowing rapidly-growing water weeds.

8. It may possibly be found desirable hereafter to carry away the sweepings of the bazaars, &c., by a canal taken from the waste weir round the hill at the extremity of the lake to the *poudrette* depôt, but the scheme will be expensive, and will not provide for removal of liquid sewage. Meanwhile, it would appear clear that no nuisance will be created by adopting the plan proposed by the Committee for discharge of the latter into the stream below the bund if, as may fairly be assumed, the tank waste weir or sluice can always furnish a sufficient body of water for flushing.

9. Among the detailed measures of conservancy requiring attention the following may be indicated:—

Where such accessories do not at present exist, owners of houses should at once be required to build latrines according to a plan approved by the Municipality, and of sufficient size to accommodate the number of servants on the premises, as also to provide receptacles which should be removed or emptied daily.

10. Pits for stable-litter which cannot readily be removed should be constructed, the contents of which should be either burnt periodically or used, under the sanction of the Municipality, in gardens or plantations where no contamination to the water-supply is likely to ensue.

11. The measures of sanitary improvement recommended by the Committee and others, which will readily suggest themselves to the Commissioners and the Health Officer of the station, should be kept constantly in view.

12. As regards the water-supply, considerable improvement in the existing state of things is also essential, mainly in the protection of the catchment areas, and in providing closed instead of open channels for conveyance to the points of final distribution.

13. While admitting the extreme difficulty of securing thoroughly satisfactory water-supply, the main source of which is an artificial lake or tank, there is in this instance no other alternative as the natural springs are both too few in number and too uncertain as to their yield. It is all the more necessary, therefore, that the ground forming the catchment areas should be most scrupulously preserved from any possible pollution, and the water carefully conserved in its distribution. The several proposals made by the Committee with those objects appear to be well worthy of adoption.

14. The cost of the water-supply project is approximately estimated at Rs. 2,50,000, and the money would, in the opinion of His Excellency the Governor in Council, be well spent in providing the station with a plentiful supply of pure water if the precautions above adverted can be ensured.

15. The construction of the aqueduct proposed through the Snowdon House property, for increasing the water-supply and the removal of the polluted drainage from the Tudor Hall estate, are both measures which recommend themselves to Government.

16. The expense of distribution by pipes will be considerable, and will probably have to be soon met, but may, nevertheless, come last in order of the proposed works should the grants prove insufficient to meet the whole charges at once.

17. An analysis should be made by the Chemical Examiner at Madras of all water now in use at Ootacamund, from tanks, wells, the lake and the various streams running through the station. Some of these sources of supply will, it is believed, be found quite unfit for use, and such measures as may be feasible should immediately be adopted as will effectually prevent the water being employed for drinking or cooking.

18. One source of contamination is due to dhobies being allowed to wash clothes in the centre of the station and the water thus used flows into the lake. It is essential that this practice should be stopped without delay, and a place assigned

3059
13

to these people at the lowest level of the station, where the water cannot possibly be used for drinking by the inhabitants.

19. As regards the minor improvements recommended by the Committee, the Right Honorable the Governor in Council concurs in the suggestions as to the removal of the slaughter houses and all other objectionable occupations, and remits this subject, together with the other matters dealt with in the Committee's Report, to the early attention of the Municipal Commissioners.

20. He is, however, unable to give his full concurrence to the proposals on the subject of the work to be assigned to the Superintendent of the Botanical Gardens. His Excellency in Council has no doubt that Mr. Jameison will help the society of Ootacamund in horticultural matters as far as may lie in his power, and trusts to his good sense to aid in the improvements indicated by the Committee as being allied to his own special occupation. If it were found feasible for the Municipality to engage the services of a really good landscape gardener, it is considered that the cost would be amply repaid by the enhanced value which would be thus given to property in the station.

21. While approving of the suggestions of the Committee as above specified, it remains to consider what portions of the schemes should be first taken up, and how the requisite funds should be provided.

22. His Excellency in Council has no doubt that the whole scheme of improvements is very desirable, and that the objects in view would be most economically attained by complete action at once, but he is not prepared to admit that the whole is of equal urgency; the Committee, however, propose that the grants, if made, should be spread over three or four years, and that period would, in the opinion of Government, be at least required for carrying out the works.

23. Taken in order of urgency, the Right Honorable the Governor in Council considers that the works stand as follows:—

(1).—*Drainage Works*—
- (*a*) Surface drainage of the bazaar.
- (*b*) Do. do. Kandal town.
- (*c*) Do. do. minor collection of houses.
- (*d*) Main sewer along north margin of lake.

(2).—*Water-supply Works*—
- (*a*) Improvements as recommended for both the Marleymund and Dodabetta reservoirs.
- (*b*) Distribution of supply by closed channels and pipes, do. northern area.
- (*c*) Do. " do. do. southern area.

(3).—The several items included under Remunerative "*urgently required improvements*," page 7 of Report, modified and if possible reduced.

(4).—Do. Unremunerative do.

24. The Inspector-General of Jails will be requested to state his opinion as to the desirability of employing convicts generally on the works of reclamation, &c., and especially with reference to the clearance of "wattle" scrub, paragraphs 36 to 42 of the Report. He should state what number of prisoners might be conveniently accommodated at Ootacamund, and what have been the general results of the clearances of "wattle" in the neighbourhood of the present jail, giving the cost per acre, &c.

25. In the opinion of the Right Honorable the Governor in Council an expenditure of 4 lakhs in the first instance would admit of material improvements being effected, and he is disposed to recommend that half of the amount as a grant-in-aid from Provincial Funds, and the remainder from Imperial, be granted and held available as the progress of the work may render necessary. With this view the Government of India will now be addressed.

26. For the remaining outlay the Municipality might be called on to accept the charges, raising from time to time such small loans as may be needed. This can be done without any additional legislation.

27. Further orders will issue in the Financial Department as to the provision of funds as above alluded to, also regarding any change that may be desirable in the Municipal Act, as advised by the Committee, when this Government have been placed in possession of copies of the Acts relating to the Municipalities at other hill stations in Northern India.

(Here enter No. 287 W., dated 1st February 1882.)

(True Extract.)

(Signed) R. H. SANKEY, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Improvement Committee.
" Superintending Engineer, Fourth Circle.
" Financial Department.
" Judicial do.

Exd. S. T. Austin.
Spare Copies

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14

Gal: 1593

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1882} Madras.

PUBLIC WORKS.

To

THE IMPROVEMENT COMMITTEE,

&c., &c., &c.

Dated February, 1*st*.

Issued.

Recd. 10-10-82 *Encl.*

G.O., 1st February 1882, *No.* 286 *W.*

FEBRUARY.

Nos. 1-2.

Improvement of the Station of Ootacamund. —Passing orders on the Report of the Committee appointed to consider and report on the measures deemed necessary for the —.

Ootacamund

CHEMICAL EXAMINER'S OFFICE,

MADRAS 27th September 1882

No. 1277

From

T. K. ROGERS, Esq., M.B., F.R.C.S. & P.O.S., Lond.

CHEMICAL EXAMINER

MADRAS.

To

THE Secretary

to Government

P.W. Department.

SIR,

I have the honour to enclose the Analyses of the six samples of water referred to in your letter No. 334 E dated 6th September 1882.

I have the honour to be

Sir

Your most obedient servant.

T K Rogers M.B. F.R.C.S.

Chemical Examiner

30/5/16

	1 Lake east of Willow Bund	2 Upper Bazaar west Filter Marlimund water	3 East Filter near Market Marlimund water	4 From sluice channel immediately under the Bund. Marlimund Reservoir	5 Marlimund Reservoir	6 From the swamp close south of shore dam
Total solids .. Grms. per litre	0·21	0·11	0·06	0·06	0·07	0·06
Volatile solids .. do. do.	0·03	0·07	0·03	0·04	0·04.	0·04
Chlorine .. do. do.	0·007	0·004	0·004	0·005	0·002	traces
Total hardness .. .. .. Clark's scale	2°.45	1°.75	1°.05	2°.1	1°.4	1°.05
Permanent hardness .. .. do. do.	1°.75	1°.05	0°.35	1°.4	0°.7	0°.7
Free ammonia .. Mlgrms. per litre	0·8	0·04	0·12	0·24	0·16	0·08
Albumenoid ammonia do. do.	0·2	0·96	0·8	0·64	0·4	0·28
Nitric acid do. do. .. .. (as Ammonia)	0·9	0·30	0·30	0·15	1·05	0·15
Apparent quality of the water as inferred from the results obtained on examination.	bad.	bad	usable	usable	usable	usable.

Remarks

№ 1. Very abundant deposit; composed of vegetable debris. Numerous infusoria

№ 2. Very abundant deposit composed of vegetable debris. Nematoid worm observed

№ 3. Very abundant deposit composed of vegetable debris. A few infusoria

№ 4. Very abundant deposit composed chiefly of vegetable debris and argillaceous matter. No infusoria observed.

№ 5. Abundant deposit composed chiefly of vegetable debris. No infusoria observed.

№ 6. Scanty deposit composed of vegetable debris and argillaceous matter.

№ 6 is the best sample, and № 5 is the next best; whilst № 1 is the worst sample.

1883.

From Ent: 1593

THE CHEMICAL EXAMINER,

Madras,

No.

Dated 27th September 1883.

Received 10th [illegible]

ENCLOSURES.

To

THE *Secretary*
to Government
P.W. Department

REFERENCE.

Your *Letter* No. 334 E. dated
6th September 1883.

SUBJECT.

Analyses of 6 samples of water, forwarded with Chemical Exam'r Letter No 1277 dated 27th Sept 1883

M.B., F.R.C.S.,
Chemical Examiner.

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3057/17

Proceedings of Sanitary Commissioner; Bombay - October 16 - 1883

Read Memo. No 4316 - P. W. Department

Read letter from Chemical Examiner, Madras, No 1277 of 27 Sept. 1883

Read note by Major General Sanitary C. B. R. E

Read again report of the Committee appointed under G. O. 6th June 1881 No. 1402 W on the improvement of stations of Ootacamund.

7

1. *In the memo. No 4316 P. W. Department, the Sanitary Commissioner is requested to state his opinion respecting the necessity for carrying out in full the various recommendations made by the Ootacamund Improvement Committee, in paras 9 & 10 of their report recorded with G. O 286 W dated 7th Feby 1882*

2 *There cannot be, it is imagined, any*

any difference of opinion on this point, that the water supply of so important a place as Ootacamund should be as absolutely pure as it is possible, and this certainly can never be the case if a portion of the catchment area is so grossly manured for cultivation; I therefore think the recommendation in para 10, of excavating a catch drain immediately below Tudor Hall to carry off the impure supply from this source and deliver it below the reservoir into a waste channel, should be carried out.

To make good the area thus cut off, the recommendation in para 11 should be given effect to.

3 The recommendations contained in paras 14 and 15 refer to the reservoir

reservoir on the South side of the Lake below Dodabetta. I think these will ultimately have to be carried out but the necessity here is not so urgent as on the Mariammid side. It is observed that no analysis of the water of the Southern side has been made.

4 The recommendations in paras 16, 17 and 18 require the most careful attention. But all this will be of no use unless the water is conveyed from the reservoir to Ootacamund by piping. As previously remarked in the report "On the Sanitary Condition of "Ootacamund prepared in accordance "with the order of Madras Government "No 716 dated May 23rd 1877 p. 99". "A water "supply upon the system of open chan-

=nels

Dr. No. 9524

"channels and without most rigid con-
"servancy of the gathering grounds
"and filtration will prove to be money
"merely wasted."

M.C. Farnell

M.D. F.R.C.S.

Sanitary Commissioner
for Madras.

Rec'd 31/10/83

Office of Sanitary Commr
Camp Ootacamund 16th Octr 83

Office of Sanitary Commissioner
Camp Ootacamund 16th Octr 1883
Dis: 18th October 1883

No. 1261.

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From

Dr Surgeon General M.C. Farnell M.D
F.R.C.S.

Sanitary Commissioner, Madras

To

The Secretary to Government P.W.D.

Ootacamund

Sir

I have the honor with reference to
your memo No 4316 P.W.D. of October 8th 1883
to forward my opinion as requested
and to return the papers rec'd per margin.

I have the honor to be
Sir
your most obt. Servant

M.C. Farnell

M.D. F.R.C.S.

Sanitary Commissioner
for Madras

Report of the Ootacamund Water Supply Project Committee together with Appendices A and B

Govt. No. 2386 W (P.W.D.) Dated 1st Novr 1883
Chemical Examiners letter No 1277 of 27-9-83.

I have the honor to be
Sir
Your most obedient
Servant
[illegible]
Secretary
Received 24/10/83

P.W.Co. 9525

No. 334 Ed/6.9.83
" 380 Ed/19.9.83
" 467 Ed/25.10.83.
" 431 Ed/8-10-83.

From.

Dep. Surgeon General A. B. Farnell
M.D., F.R.C.S.

Sanitary Commissioner
for Madras

To

The Secretary to Government
Public Works Department

Dated 16th
Recd 18th } October 1883
Recd 31

No 1361

Submits his opinion regarding the necessity of carrying out in full the recommendations of the Octacamund Improvement Committee.

C 29/10.
L 27/10. Cur. 26/10 K 29/10.

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No 334 Ex of 6-9-83

PW. 1883

Rec'd 1873
Read 10-10-83

From

The Chemical Examiner
Madras

To

The Secretary
to Govt.
P. W. Department

No 1277

Dated 27th Sept 1883

Received 29

Enclosures I

Subject.

— Analyses of Six Samples of Water.

No 35-9

B & R
Records

No 3059/B W. P. W. Department

Proceedings of the Madras Government

under date the Octr 29th 1883

Read the following:—

3059/22

Letter from the Chemical Examiner — No. No 1277 of 27th Sept 83

Proceedings of Sanitary Commissioner — of 16th Oct 83

Letter from — do — No 1261 of 16th — do —

In his Proceedings recorded above, the Sanitary Commissioner recommends that the proposals of the Ootacamund Improvement Committee, contained in paras 8 to 18 of their Report recorded with G.O. 286 W of 1st February 1882, should be carried out; and the Supdg. Engineer will arrange accordingly for the requisite

detailed plans and estimates being prepared as soon as possible, - those for the Anarkimmid supply being taken up first.

2. Orders will issue in the Financial Dept. as to the measures of conservancy recommended by the Committee.

Supdg. Engr: Fourth Circle
Financial Dept.
(Chief Secretary for
Counterinitial)

Supdg. Engr. Fourth Circle

3059/23

~~Ten. H. Sullivan~~

2c.

25 c. 5-2-84.

Ho Bark

Stus S. O. only

Cobyto go at once
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H.

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Govt. of [1883] Madras.

PUBLIC WORKS.

Dated

Rcvd. Encl.

G. O., 29th Oct. 1883, No. 3059

Nos.

Octacamund Improvements

Committee

The Engineer

The presumptive

& his requisite detailed

plans & Estimates

ordered for Carrying

out his proposals

& his

5. P M

9031/80