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(1) Number of pages 56

(2) Date of repair 2/87

(3) Initials of the Referencer

TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

P.W.D DEPARTMENT

G.O. No. / B.P. No. 1408 -W Press. / Mis.

Dated 6-6-1881 ~~19~~.

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1408
1

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

6th June 1881, No. 1,408 W.

Buildings and Roads.
Civil Works.

Read the following papers :—

No. 13. Proceedings of the Government of Madras in the Financial Department, dated 17th May 1881, No. 874.

THE attention of the Right Honorable the Governor in Council has been very forcibly directed to the existing state of things in the Ootacamund station, more especially from a sanitary aspect, and with a view to very early improvement he desires that the President of the Municipality will, without delay, inspect the ground beyond Kandal carefully in order to determine, and to some extent lay out, the sites to which existing objectionable occupation of the station area may be transferred.

2. The Government further desire the President to impress on the Municipal Commissioners the very great importance which is attached to the improvement in every possible way of the sanitary condition and appearance of Ootacamund—a subject which strongly needs, and should receive, their early and careful consideration. It will be too late to apply a remedy when the station has acquired an unenviable notoriety as absolutely unhealthy.

(Signed) R. DAVIDSON,
Chief Secretary.

No. 13-A. Endorsement of the Financial Department, dated 14th May 1881, No. 851.

From N. A. ROUPELL, Esq., President, Ootacamund Municipality, to the Chief Secretary to Government, dated Ootacamund 26th April 1881, No. 58 (Current No. 1,027).

I HAVE the honor to submit herewith true copy of letter No. 266, dated 25th March 1881, from the Ootacamund Municipal Engineer giving cover to the plans and estimates noted in the margin for the drainage of the Ootacamund main bazaar. Extract from minutes of a meeting of the Ootacamund Municipal Commissioners held on the 1st April 1881 is also enclosed.

Plan of Bazaar, three sheets.
Sections of Streets and Lanes, one sheet.
Plans of Drains, four sheets.
Estimates of Drains, four sheets.

2. The scheme forwarded by Major Morant has been supplemented by providing—

1st,—for the backyards of 500 houses at Rs. 15 each involving a charge of Rs. 7,500;

2nd,—for metalling the streets and lanes at a cost of Rs. 4,595.

These items are common to all the estimates.

3. There are further charges (omitted by Major Morant) for tools, plant, and sundries at 5 per cent. on the estimate, contingencies at 5 per cent., and temporary superintendence at 5 per cent.

4. The estimates range from Rs. 54,000 to Rs. 86,400. In spite of the large additional cost I would strongly recommend the adoption of No. 1 estimate, the construction therein provided being of a permanent character and, in the long run, far the most economical. Under this every portion of the drain is stone faced. No other material will in the same degree resist cleaning out by mamooties, and these may

occasionally be used in spite of all orders to the contrary. Were the drains to be cleaned with india-rubber brooms made to fit them, one of the cheaper estimates will suffice. But all, with the exception of No. 1, will suffer from lapse of time and other injuries, and the cost of renewal will be heavy.

5. It would probably take two years to carry out No. 1 estimate, owing to the large amount of stonework.

6. It will be observed that the work has been divided into sections which can be taken up independently of each other.

7. The efficient working of the bazaar drainage scheme must of course depend upon proper facilities for flushing the drains. To allow of such flushing, say once in twenty-four hours, a reservoir on jail hill above the bazaar, involving an outlay of at least Rs. 5,000, will be necessary. This will form part of the improved water-supply scheme which will shortly be laid before Government for favorable consideration and should precede the main bazaar drainage system now submitted for approval.

8. I would invite attention to the remarks at the close of the penultimate paragraph of Mr. J. O'Shaughnessy's letter. Allusion was made to the same subject in my letter, No. 14, dated 12th February 1881, paragraph 29 (c). The effect of carrying out any of the schemes now proposed will be to bring the drainage of the main bazaar into the lake. I venture to doubt if this will be an unqualified improvement; I will go further and express my opinion that the collection of so much impurity, for every house will contribute its quota in the shallow portion of the lake, may prove a more fruitful source of sickness and disease than the present inefficient drainage. In connection herewith I have the honor to enclose a memorandum by Surgeon-Major James Smith, one of the Medical Officers here and a Municipal Commissioner, showing clearly that in his opinion the schemes now under consideration stop short of what is really needed. Surgeon-Major L. C. Nanney's letter (copy enclosed) No. 21, dated 14th instant, is to the same effect. In these views I concur, and regard a main sewer to carry off the drainage to the western end of the lake as a necessary part of any scheme having for its object improved sanitation. If these suggestions are well founded, the construction of the main drain should take place at least concurrently with, and might precede, the main bazaar drainage.

From J. O'SHAUGHNESSY, Esq., C.E., Local Fund Engineer of the Nilgiris, to the President, Local Fund Boards, Nilgiris, dated Ootacamund, 25th March 1881, No. 266.

I HAVE the honor to submit herewith the plans and estimates noted in the margin for the drainage of the Ootacamund bazaar.

Plan of Bazaar, three sheets.
Sections of Streets and Lanes, one sheet.
Plans of Drains, four sheets.
Estimates of Drains, four sheets.

The history of the several schemes and proposals regarding this work that have been made during the past fifteen years or more is so well known that beyond mentioning it with a view of inducing some definite action in regard to it now, there can be no necessity to describe it to any considerable extent in this letter.

There have been three distinct schemes proposed for this work—

1st,—Major Tulloch's scheme, which would cost probably two lakhs of rupees;
2nd,—Major Farewell's scheme, if it can be called a scheme, estimated to cost Rs. 10,000; and
3rd,—Major Morant's scheme, intended to improve and complete Major Farewell's scheme estimated to cost Rs. 32,900.

Major Tulloch's scheme was put aside on the score of being too expensive.

Major Farewell's scheme was partly carried out in 1870 at a cost of about Rs. 6,000, and Major Morant's scheme was returned to him for modification by the Honorary Secretary of the Municipal Commission about two years ago.

The estimates now submitted are based on Major Morant's scheme of open surface drains to carry sewage and storm water into the lake. They provide for the modifications required by the Honorary Secretary of the Municipal Commission in Major Morant's estimate, and for grading and metalling the lanes and byeways which were not, it is thought, sufficiently provided for in previous estimates and which will bear without injury the flow of so much of the storm water that cannot be carried by the sewage drains.

These estimates provide for four distinct descriptions of drains of which plans and sections are also submitted.

The first description provides for drains the exposed surface of which is entirely stone and the total estimate Rs. 86,400.

The second description provides for drains, the tops and sides to be of stone and the bottom cement, the cost being Rs. 65,300.

The third is Major Morant's plan in which the drains are formed of cement tiles and saddles laid on the natural ground, the cost of which would be Rs. 54,000.

The fourth is the pattern of drain now adopted in Madras of concrete and brick lined with cement and would cost Rs. 57,200.

It will be seen at once that, for efficiency and durability, the drains that are entirely faced with stone are the best and, though necessarily more expensive, I would strongly recommend their adoption.

The bottoms of the second description would be liable to injury by the reckless use of mamooties or other iron tools in the progress of cleansing; while Major Morant's tiles and the Madras brick pattern, however well constructed, would be liable to decay and constant injury by passers by as well as by scavengers and would be a constant source of trouble and expense. The stone drains would be permanent; once done they may be said to be done for ever, and, considering the length of time the execution of the work has been under consideration, it should, I think, if done at all, be done well at last.

It has, I think, been admitted, if not actually decided, that open surface drains are the best suited to this work, and I feel therefore that I am not called upon to give any opinion on the contested question of open *versus* covered drains. I wish to state however that, although any of the plans now proposed will provide for what is required in the bazaar, I do not consider any scheme complete that provides for merely moving the sewage and filth of the bazaar into the neighbouring lake only a few yards distant, and I am of opinion that so much of Major Tulloch's scheme as provided for a main sewer to catch the drainage and to convey it beyond the lower end of the lake must sooner or later be carried out.

I am of opinion also that works for the supply of water to flush the proposed drains should be executed concurrently if not before the drainage works are constructed.

Extract from Proceedings of a Meeting of the Municipal Commissioners of Ootacamund held on the 1st April 1881

PRESENT:—

N. A. ROUPELL, Esq., President.
W. E. SCHMIDT, Esq., Vice-President.
A. S. COWDELL, Esq.
SILLAMANSAIB.

* * * *

No. 13.

The plans and estimates of the bazaar drainage scheme were submitted by the Municipal Engineer.

To be submitted to Government for approval. The Commissioners are in favor of No. 1 plan.

* * * *

Memorandum on the Bazaar Drainage Scheme, Ootacamund.

A good water-supply for every household in Ootacamund and proper system of drainage for the bazaar are projects the necessity for which do not admit of doubt. The two schemes ought to go hand in hand; a system of drainage which could not be efficiently flushed daily would be only useful for helping to carry off storm water and would be a waste of money. With regard to this question the late Dr. Parkes says—"If the supply of water be sufficient and sewers properly constructed, this is by far the readiest and most inexpensive way of sewage disposal, the sewage is at once diluted and washed away to a distance. On the other hand, if sewers are badly made and if the amount of water be insufficient, they are worse than useless, as they have the appearance of efficiency without the reality." The final disposal of the sewage is perhaps a more important matter than the foregoing. Whichever mode of removal is adopted—by carts, by a barge, or by a sewage channel along the north shore of the lake leading westward—I trust it will not be thought proper to deposit it in any portion of the lake, particularly in the shallow, and all but stagnant, part above the Willowbund. On this point I again quote the greatest of hygienists, Parkes—"Sewage must never be discharged into a tideless sea, unless it can be thrown into a current which may sweep it away. Otherwise it accumulates near the shore, and being covered only by shallow water, soon becomes little better than a cesspool."

OOTACAMUND,
6th April 1881.

(Signed) JAMES SMITH, Surgeon-Major,
South District.

From Surgeon-Major L. C. NANNEY, Senior Medical Officer, Ootacamund, to the President of the Municipal Commission, Ootacamund, dated Ootacamund, 14th April 1881, No. 21.

WITH reference to your demi-official letter of the 11th April calling upon me for my views with reference to the proposed drainage scheme, I am of opinion that to discharge the drainage of the main bazaar into the lower portion of the lake would prove eventually most detrimental to public health and a source of disease; in fact it is in my opinion doubtful whether any portion of the lake being almost stagnant with only a small outlet is suited to receive the drainage of the bazaars.

TRANSFERRED to the Department of Public Works for disposal.

(Signed) G. S. FORBES,
Ag. Under Secy.

No. 13-B. *Note by the Chief Engineer, Public Works Department.*

ON examination of the papers and plans sent up with letter from the President of the Ootacamund Municipality, No. 58 of the 26th ultimo, the Chief Engineer has no hesitation in giving his strong support to the so-called scheme, No. 1, amounting to Rs. 86,400, for providing stone-lined drains for the Pettah.

2. The reasons assigned by the Executive Engineer for adopting stone in preference to cement are precisely those which were, it is feared, urged in vain on the Madras Municipality (see Chief Engineer's memorandum of 3rd November 1880, paragraphs 13 to 23, printed with G.O., 28th December 1880, No. 2,953 W.,) but the validity of which is still considered incontestable.

3. The remarks on house connections and the generally foul state of the back yards (paragraphs 6 to 10 of the same memorandum) are also considered applicable in this case.

4. The Chief Engineer's remarks might here close were it not that both the Medical Officers and the President are naturally anxious that this scheme, good in itself, should only be regarded as part of the much more general use for carrying away the whole of the filth by means of an intercepting sewer which shall deliver below the lower tank bund.

5. To effect this object a sewer (with pipes perhaps crossing one or two arms of the lake), if given only just sufficient capacity to discharge actual sewage plus a certain amount of flushing water, might be economically designed; and associated with this two other objects of great importance to Ootacamund might be estimated for, the whole to be treated as one scheme, viz.—

(1) The formation of a reservoir in the valley immediately below and west of Government house, which should afford an ample supply of water to all the lower portions of Ootacamund including the bazaar, and the daily flushing of the main sewer as above.

(2) The reclamation of the greater portion of the upper part of the lake east of the Willowbund, which is becoming a very foul receptacle for all the sewage and which ere long must become very pestiferous.

6. No money could be better laid out than in a comprehensive scheme of this character, which in the opinion of the Chief Engineer would go further to insure the salubrity of this the Queen of Hill-stations than anything else.

OOTACAMUND,
24th May 1881.

(Signed) R. H. SANKEY, Colonel, R.E.,
Chief Engineer, Public Works Department.

No. 14. ORDER THEREON, 6th June 1881, No. 1,408 W.

THE Honorable the Governor in Council is satisfied that of the schemes submitted for improving the minor drains of the Ootacamund bazaar, No. 1 amounting to Rs. 86,400 holds out the best prospects of success, but he cannot disguise from himself that taken by itself this project is merely a palliative, and that in order to effect in any adequate manner the improvements so essential to the health of this important sanitarium, it must form portion of, and be preceded by, a sufficiently comprehensive water-supply and drainage scheme with the other requirements upon which so much stress has rightly been laid by the President of the Municipality and the Medical Officers.

2. In order that the Government may be placed in a position to form an opinion both with reference to the character of the measures so urgently needed and the approximate cost of the same, the papers and plans will now be considered and reported on in the light of the above remarks by a Committee composed as follows under the presidency of the Chief Engineer, viz.—

Mr. N. A. ROUPELL, President, Municipal Commission and Commissioner of the Nílgiris.
Major-General H. MORGAN.
Major-General BAKER.
Lieutenant-Colonel J. O. HASTED, R.E., Acting Chief Engineer for Irrigation and Joint Secretary to Government.
Deputy Surgeon-General M. C. FURNELL, Sanitary Commissioner to Government.
Major H. R. MEAD, R.E., Superintending Engineer, Second Circle.
Surgeon-Major L. C. NANNEY.
Surgeon-Major J. SMITH.
Mr. G. T. WALCH, M.I.C.E., Executive Engineer, Godávari.
Mr. J. O'SHAUGHNESSY, Executive Engineer to the Municipality and Local Fund Board.
Mr. W. E. SCHMIDT, Vice-President, Ootacamund Municipality.
Mr. J. MINCHIN.

(True Extract.)

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

To the Chief Engineer, Public Works Department, with enclosures. N. A. Roupell Esq
,, Major-General H. Morgan.
,, Major-General Baker.
,, Lieutenant-Colonel J. O. Hasted, R.E.
,, Deputy Surgeon-General M. C. Furnell.
,, Major H. R. Mead, R.E.
,, Surgeon-Major L. C. Nanney.
,, ,, ,, J. Smith.
,, G. T. Walch, Esq.; M.I.C.E.
,, J. O'Shaughnessy, Esq.
,, W. E. Schmidt, Esq.
,, J. Minchin, Esq.
,, the Financial Department.

Exd. E. C. Shunker.

Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of 1881 Madras.

PUBLIC WORKS.

To

THE CHIEF ENGINEER, PUBLIC
WORKS DEPARTMENT,
&c., &c., &c.

Dated June, 6th

Issued

Recd. *Encl.*

G. O., 6th June 1881, *No.* 1,408 W.

JUNE.

Nos. 13-14.

Ootacamund water supply and *Drainage Scheme.*—A Committee appointed for considering and reporting on the —.

P. 1

1408/4

GOVERNMENT OF MADRAS,

FINANCIAL DEPARTMENT.

17th May 1881, No. 874.

Municipal—Sanitary.

Proceedings of Government, 17th May 1881, *No.* 874.

The attention of the Right Honorable the Governor in Council has been very forcibly directed to the existing state of things in the Ootacamund Station, more especially from a sanitary aspect and with a view to very early improvement, he desires that the President of the Municipality will, without delay, inspect the ground beyond Kandul carefully in order to determine, and to some extent lay out, the sites to which existing objectionable occupation of the station area may be transferred.

2. The Government further desire the President to impress on the Municipal Commissioners the very great importance which is attached to the improvement in every possible way of the sanitary condition and appearance of Ootacamund—a subject which strongly needs and should receive their early and careful consideration. It will be too late to apply a remedy when the station has acquired an unenviable notoriety as absolutely unhealthy.

(True Extract.)

Chief Secretary.

To the President of the Municipal Commission, Ootacamund.

Exd. T. O'Connor.

Govt. of (1881) Madras.

FINANCIAL.

To

THE PRESIDENT OF THE
MUNICIPAL COMMISSION,
Ootacamund.

Dated May, 17th.

Issued

Recd. *Encl.*

G.O., 17th May 1881, No. 874.

MAY.

Municipal—Sanitary.—The President of the Ootacamund Municipality directed to inspect the ground beyond Kandul carefully in order to determine, and to some extent lay out, the sites to which existing objectionable occupation of the station area may be transferred.

Ootacamund
Muni: Commissioners Office
26th April 1881

No. 58

CURRENT No. 1027

From
A. W. Rossell Esq
President Ootacamund
Municipality

To
The Chief Secretary
to Government,
Ootacamund

Plan of Bazaar 3 Sheets
Sections of streets & lanes 1 Sheet
Plans of drains 1 "
Estimates of drains 1 "

Sir,

I have the honor to submit herewith true copy of letter No. 266 dated 25th March 1881, from the Ootacamund Municipal Engineer giving cover to the plans and estimates noted in the margin for the drainage of the Ootacamund Main Bazaar. Extract from minutes of a meeting of the Ootacamund Municipal Commissioners held on the 1st April 1881 is also enclosed.

2 The scheme forwarded by Major Morant has been supplemented by providing, 1st, for the backyards of 500 houses @ ₨ 15 each involving a charge of ₨ 7,500.
2nd for metalling the streets and lanes at a cost of ₨ 4,595.

These

These items are common to all the estimates,

3. There are further charges (omitted by Major Morant) for tools plant and sundries at 5 per cent on the estimate, contingencies at 5 per cent, and temporary superintendence at 5 per cent,

4. The estimates range from Rs 54000 to Rs 86400 - Inspite of the large additional cost I would strongly recommend the adoption of No 1 estimate, the construction therein provided being of a permanent character and in the long run, far the most economical. Under this every portion of the drain is stone faced. No other material will in the same degree resist cleaning out by mamoties and these may occasionally be used in spite of all orders to the contrary - Were the drains to be cleaned with india-rubber brooms made to fit them one of the cheaper estimates will suffice - But all with the exception of No 1, will suffer from lapse of time and other injuries and the cost of renewal will be heavy,

5. It would probably take two years to carry out No 1 estimate owing to the large amount of stonework.

6. It will be observed that the work has been divided into sections which can be taken up independently of each other,

7. The efficient working of the Bazaar Drainage Scheme must of course depend upon proper facilities for flushing the drains - To allow of such flushing say once in 24 hours a reservoir on Jail Hill above the Bazaar, involving an outlay of at least Rs 5000 will be necessary. This will form part of the improved Water Supply Scheme which will shortly be laid before Government for favorable consideration and should precede the main Bazaar Drainage System now submitted for approval,

8. I would invite attention to the remarks at the close of the penultimate paragraph of Mr J. O'Shaughnessy's letter, Allusion was made to the same subject in my letter No 14 dated 12th February 1881 para 29(c). The effect of carrying out any of the Schemes now proposed will be to bring the drainage of the main Bazaar into the Lake - I venture to doubt if this will be an unqualified improvement, I will go further and express my opinion that the collection of so much impurity, for every house will

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will contribute its quota, in the shallow portion of the Lake, may prove a more fruitful source of sickness and disease than the present insufficient drainage. In connection herewith I have the honor to enclose a memorandum by Surgeon Major James Smith one of the Medical Officers here and a Municipal Commissioner, showing clearly that in his opinion the Schemes now under consideration stop short of what is really needed. Surgeon Major L. C. Ramsay's letter (copy enclosed) No. 21 dated 12th instant is to the same effect. In these views I concur and regard a main Sewer to carry off the drainage to the Western end of the Lake as a necessary part of any scheme having for its object improved sanitation. If these suggestions are well-founded the construction of the main drain should take place at least concurrently with and might precede the main Bazaar drainage.

I have the honor to be
Sir
Your Most Obedt. Servant

A. A. Roupell

President
Ootacamund Municipality

Sub.

Bn3335/81

Enclosure No. 1

No. 5

No. 266.

Local Fund Engineer's Office
Nilgiri District
Ootacamund 25th March 1881

(14)

From,

J. O'Shaughnessy Esq. C.E.
Local Fund Engineer
Nilgiris,

To,

A. A. Roupell Esq.
President, Local Fund
Board, Nilgiris

Sir,

Plan of Bazaar 3 Sheets.
Sections of Streets & Canes 1 Sheet
Plans of drains 4 "
Estimates of drains 4 "

I have the honor to submit herewith the Plans and estimates noted in the margin for the drainage of the Ootacamund Bazaar.

The history of the several schemes and proposals regarding this work that have been made during the past 15 years or more is so well known that beyond mentioning it with a view of inducing some definite action in regard to it now, there can be no necessity to describe it to any considerable extent in this letter.

There have been 3 distinct schemes proposed for this work.

1st Major Tulloch's Scheme which would cost probably two Lacs of Rupees.

2nd Major Farewell's Scheme, if it can

can be called a scheme, estimated to cost R 10000.

& 3rd. Major Morant's scheme intended to improve and complete Major Farewell's scheme estimated to cost 32,900 Rupees.

Major Tulloch's scheme was put aside on the score of being too expensive.

Major Farewell's Scheme was partly carried out in 1870 at a cost of about 6000 Rupees and Major Morant's Scheme was returned to him for modification by the Honorary Secretary of the Municipal Commission about two years ago.

The estimates now submitted are based on Major Morant's scheme of open surface drains to carry sewage and storm water into the Lake. They provide for the modifications required by the Honorary Secretary of the Municipal Commission in Major Morant's estimate and for grading and metalling the lanes and byways which were not, it is thought sufficiently provided for in previous estimates and which will bear without injury the flow of so much of the storm water that cannot be carried by the sewage drains

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The 2nd description provides for drains ~~the~~ tops and sides to be of stone and the bottom cement the cost being 65,300

The 3rd is Major Morant's plan in which the drains are formed of cement tiles and saddles laid on the natural ground the cost of which would be 54,000.

The 4th is the pattern of drain now adopted in Madras of concrete and brick lined with cement and would cost 57,200.

It will be seen at once that for efficiency and durability, the drains that are entirely faced with stone are the best and though necessarily more expensive, I would strongly recommend their adoption.

The bottoms of the 2nd description would be liable to injury by the reckless use of mamoties or other iron tools in the

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progress of cleansing. While Major Morant's tiles and the Madras brick pattern, however well constructed, would be liable to decay and constant injury by passers by as well as by scavengers and would be a constant source of trouble and expense. The stone drains would be permanent. Once done they may be said to be done for ever and considering the length of time the execution of the work has been under consideration it should, I think if done at all, be done well at last.

It has, I think, been admitted, if not actually decided, that open surface drains are the best suited to this work and I feel therefore that I am not called upon to give any opinion on the contested question of open versus covered drains. I wish to state however that although any of the plans now proposed will provide for what is required in the Bazaar, I do not consider any scheme complete that provides for merely moving the sewage and filth of the Bazaar into the neighbouring lake only a few yards distant and I am of opinion that so much of Major Tulloch's scheme as provides for a main sewer to catch the drainage and to convey it beyond the lower end of the lake must sooner or later be carried out.

I am of opinion also that works for the supply of water to flush the proposed drains should be executed concurrently if not before the drainage works are constructed.

I have &c
(Sd) J. O'Shaughnessy C.E.
Local Fund Engr
Nilgiri District

(True Copy)

President
Ootacamund Municipality.

Co.

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See Encl. 1027-81

Enclosure No II

1408
10

Extract from Proceedings of a meeting of the Municipal Commissioners of Ootacamund held on the 1st April 1881.

Present

N. A. Roupell Esq. President
W. E. Schmidt Esq. Vice President
A. S. Cordell Esq.
Sillaman Sait.

+ \+ \+ \+

No 13. The Plans and Estimates of the Bazaar Drainage Scheme were submitted by the Municipal Engineer.

To be submitted to Government for approval. The Commissioners are in favor of No 1 Plan.

+ \+ \+ \+

(True Extract)

E. A. Roupell

President
Ootacamund Municipality

Lb.

Pr 3335/84
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In Ansl: 1027 — 81

Enclosure No. III

Memorandum on the bazaar Drainage Scheme – Ootacamund by Surgeon Major James Smith,

A good water supply for every household in Ootacamund and proper system of drainage for the bazaar are projects the necessity for which do not admit of doubt – the two schemes ought to go hand in hand, a system of drainage which could not be efficiently flushed daily, would be only useful for helping to carry off storm water, and would be a waste of money. With regard to this question the late Dr. Parkes says – "If the supply of water be sufficient and sewers properly constructed this is by far the readiest and most inexpensive way of sewage disposal. The sewage is at once diluted and washed away to a distance, On the other hand if sewers are badly made and if the amount of water be insufficient, they are worse than useless, as they have the appearance of efficiency without the reality." The final disposal of the sewage is perhaps a more important

matter

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Nr 3335/1
2

(Sd) J. Smith
Surgn Major
South District.

Ootacamund
6th April 1881

(True Copy)

President
Ootacamund Municipality

ds.

Lu Finl. 1027-81

Enclosure No IV

No. 21

Ootacamund
14th April 1881

From,

The Senior Medical Officer
Ootacamund

To,

The President of the
Ootacamund Municipal
Commission
Ootacamund

Sir,

With reference to your Semi official letter of the 11th April calling upon me for my views with reference to the proposed drainage scheme - I am of opinion that to discharge the drainage of the main bazaar into the lower portion of the lake would prove eventually most — detrimental to public health and a source of disease; in fact it is in my opinion doubtful whether any portion of the lake being almost stagnant with only a small outlet is suited to receive the drainage of the bazaars.

I have the honor &c
(Sd) L. C. Nanney
Surgn Major
Senior Medl. Officer
Ootacamund

(True Copy)

ds.

President
Ootacamund Municipality

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P. W. C. No. 3335

Fuel (1881) Dept

(Munl. – Water supply Ootacamund

Municipal Office

From

The President

Ootacamund Municipality

No. 58

Dated 26th } April 1881
Recd [illegible] }

Recd: 6th June 1881

CURRENT No. 1027

No. 16
enclosures.

Subject.

Submitting Plans and Estimates of the Ootacamund Main Bazaar Drainage Scheme with certain other papers relating thereto for Sanction.–

Recd for [illegible]
10/5

No. 851

Transferred to the Depart. of Public Works for disposal

E. J. Forley
Ag. Under Secretary
14.5.81

14/5/81

R. 6.6.81
O.L.S. 14/5.

P. W. D.
24th May/81.

Note.

On examination of the papers and plans sent up with letter from the President of the Ootacamund Municipality No. 58 of the 26th ultimo, the Chief Engineer has no hesitation in giving his strong support to the so called Scheme No. 1 amounting to Rs. 86,400 for providing stone lined drains for the Pettah.

2. The reasons assigned by the Executive Engineer for adopting stone in preference to cement are precisely those which were it is feared urged in vain on the Madras Municipality (see Chief Engineer's Memo: of 3d November 1880 paras 13 to 23 printed with G.O. 28th December 1880 No 2953 W) but the validity of which is still considered incontestable.

3. The remarks on house connections and the generally foul state of the back

back yards (paras 6 to 10 of the same Memo) are also considered applicable in this case.

4. The Chief Engineer's remarks might here close were it not that both the Medical Officers and the President are naturally anxious that this scheme, good in itself, should only be regarded as part of the much more general one for carrying away the whole of the filth by means of an intercepting sewer which shall deliver below

the lower tank bund.

5- To effect this object a sewer (with pipes perhaps crossing one or two arms of the Lake) if given only just sufficient capacity to discharge actual sewage + a certain amount of flushing water might be economically designed; and associated with this two other objects of great importance to Ootacamund might be estimated for, the whole to be treated as one scheme vizt:-

(1) the formation of a reservoir in the valley immediately below and west of Government House, which should afford an ample supply of water to all the lower portions of Ootacamund including the Bazaar, and the daily flushing of the main sewer as above

(2) the reclamation of the greater portion of the upper part of the Lake east of the Willow bund which is becoming a very

foul receptacle for all the sewage and which ere long must become very pestiferous.

6. No money could be better laid out than in a comprehensive scheme of this character which in the opinion of the Chief Engineer would go further to insure the salubrity of this the Queen of Hill stations than anything else.

(Signed) R. H. Sankey Col. R.E.
Chief Engineer
P. W. D.

Fair copy for the Press
R. S.
3/6.

1408/17

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 16½ 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~~ Suppleme 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

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.

* 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.

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

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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 cess-pits, 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.

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.

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.

	RS.	TOTAL RS.
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.

	RS.	TOTAL RS.
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.

	RS.	TOTAL RS.
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.

	RS.	TOTAL RS.
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 7½ 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.

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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* 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.

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, C.B., R.E.
(„) M. C. FURNELL, M.D., Dy. Surgeon-General.
(„) N. A. ROUPELL, Commissioner of the Nilgiris.
(„) R. J. BAKER, Major-General.
(„) H. MORGAN, Major-General.
(„) J. O. HASTED, Lieutenant-Colonel, R.E.
(„) N. C. NANNEY, Surgeon-Major.
(„) J. SMITH, Surgeon-Major.
(„) H. R. MEAD, Major, R.E.
(„) G. T. WALCH, M.I.C.E.
(„) J. O'SHAUGHNESSY.
(„) W. E. SCHMIDT.

OOTACAMUND,
25th October 1881.

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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 Dôdabetta 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 3	1,980 4,290	Branch No. 2, population. Do. „ 3, „ All between Westbury road and Kandal nullah, and whole of Kandal	505 1,240 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 1½	1,980 3,960	Branch No. 4, population. Seventeen European houses	942 298
	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 $\frac{3}{16}$ths of a mile) to Muttachari.	3 1½	1,650 990	Roman Catholic establishment ... ... European houses and whole of Muttachari.	942
			2,640		
5	From service reservoir new line to jail and thence to bazaar (Lake road).	5 4	1,650 3,630	Branches Nos. 6, 7, and 8, population ... ... Public offices, Jail, Police Lines, &c.	3,814 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 M'Carmel and thence to Allanby's stables.	3	3,300	Thirteen European houses, Allanby'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		

ABSTRACT.

—	Diameter of Pipe	—	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) ... ... Part of No. 4 (1,650 feet), and whole of Nos. 6, 7, 8, 9, and 10	3	23,760	1	6	0	32,670	0	0	
Part of No. 3 (3,960 feet), and part of No. 4 (990 feet) (*wrought* iron) ...	1½	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 1½	3,630 2,970 6,600	All branches.
	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 Shars-ham and ~~Shartham.~~ o/c 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 $\frac{11}{16}$ths of a mile of main to brewery, &c.	1½	1,320	Brewery, Stellinberg, A.B.C. ground, &c.
6	From $\frac{3}{8}$ths of a mile of main to Bakir house, &c. /c	1½	1,320	Bakir house, &c. /c
7	From 1$\frac{1}{8}$th of a mile of main to St. Thomas' church with branch to "~~Mobarnans.~~" Moborane	1½	4,620	Oaklands. Birdwood, Cotissa Woodcot, &c.
8	From 1$\frac{11}{16}$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 — 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

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, &c., 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.

~~*See Appendix* (*A*).~~

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-~~fourth~~ inch, one-~~fifth~~ inch, and one-~~third~~ 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. 4/ 5/ 9/

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 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 Dódabetta 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.

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* "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.

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

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No. 1408 W d/6th June 1881

B R
Works

(1 H.E. G.O. 874 d/17 May. 81. Forwarding

(2) H.E. Letter No 58 d/o 26 April 1881 from the President of the Ootacamund Municipality with Enclosures

(3) Note by the Chief Engineer P.W.D. dated 21st May. 1881.

The Hon. the G. in C. is satisfied that of the schemes submitted for improving the minor drains of the Ootacamund Bazar No 1 amounting to Rs 86,400 holds out the best prospects of success but he cannot disguise from himself that taken by itself this project is merely a palliative, and that in order to effect in any adequate manner the improvements so essential to the health of this important Sanitarium, a much

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№ 1408 W

SOUTH SIDE OF LAKE.

ITEM 1.—*Raising bund, &c., of Dâdaetta 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
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estimate provides for
and rainfall

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

form portion of, and be preceded by a sufficiently comprehensive water supply and drainage scheme with the other requirements upon which so much stress has rightly been laid by the President of the Municipality and the Medical Officers.

In order that the Government may be placed in a position to form an opinion both with reference to the character of the measures so urgently needed and the approximate cost of the same the papers & plans will now be considered and reported on in the light of the above remarks, by a Committee

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constituted as follows under the Presidency of the Chief Engineer viz:

Mr. N A Russell
President Mun. Comm & Commissioner of the Nilgiris

Major Genl H. Morgan

Major Genl Baker

Lt. Col. J. O. Hasted R.E.
Chief Engr. for Irrigation & Jt. Secy. to Government

Surgeon Major M. C. Furnell
Sanitary Commissioner to Government

Major H. R. Mead R.E.
2nd Superintending Engineer 3rd Circle

Surgeon Major L. C. Nanney

Surgeon Major J. Smith

Mr. G. T. Walch M.I.C.E.
Executive Engineer Godavari

Mr. O'Shaughnessy
Exr. Engineer to the Municipality & Local Fund Bd.

Mr. W. E. Schmidt
Vice President Ootacamund Municipality

W J Minchin

1/6/81

To
The Chief Engr. P.W. Dept. ✓
Major Genl H. Morgan with enclos ✓
Major Genl Baker ✓
Lt. Col. J. O. Hasted R.E. ✓
Surgeon Major M. C. Furnell ✓
Major H. R. Meade R.E. ✓
Surgeon Major L. C. Nanney ✓
Surgeon Major J. Smith ✓
G. T. Walch Esq. M.I.C.E. ✓
J. O'Shaughnessy Esq. ✓
W. E. Schmidt Esq. ✓
J. Minchin Esq. ✓
Finl: Dept. ✓

despd at [illegible] 11-6-81

Govt. of (1881) Madras.
PUBLIC WORKS.

To

Dated

Issued

Recd.

Encl.

Immediate

6-6

G.O. 6th June 1881, No. 1408W

Nos. 13–14

water ~~supply and~~
Ootacamund drainage scheme

A committee appointed for
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