

# MADRAS RECORD OFFICE.

**Government of Madras.**

*Industrial* **DEPARTMENT.**

|          |         |                 |
|----------|---------|-----------------|
| G.O. No. | 1564    | Press           |
|          |         | <del>Mis.</del> |
| Dated    | 30-9-18 |                 |

Not to be folded or roughly handled

*Proceedings of the Madras Government, Judicial Department,  
30th September 1867.*

No. 297. Read the following Proceedings of Government in the Public Works Department, dated 21st September 1867, No. 2940.  
Communicating a Report by Captain Tulloch on the drainage of Ootacamund. } (Vide Proceedings, Public Works Department, dated 21st September 1867, Nos. 531—536).

No. 298. ORDER THEREON, 30th September 1867, No. 1564.  
Communicated to the Inspector General of Jails.  
(Signed) A. J. ARBUTHNOT,  
*Chief Secretary.*

To the Inspector General of Jails.

Exd. J. Tulloch.

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*Proceedings of the Madras Government, Public Works Department,  
21st February 1867.*

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No. 407.

*Dated 21st February 1867, No. 519.*

CIVIL WORKS, No. 61.

1. As the question of the manner in which the drainage of the native town of Ootacamund can be improved, by the provision of means for the conveyance of all the sewage beyond the basin of the lake, will, it is believed, ere long, come under the consideration of Government, His Excellency the Governor in Council thinks it desirable that Captain Tulloch, who has devoted much attention to the subject of drainage, should proceed at once to Ootacamund and there confer with the Executive Engineer on the subject.

2. Captain Tulloch's attention should be specially given to a scheme for carrying off the sewage of the town through an iron pipe to be laid either under the water of the lake or along its margin, and, with reference to the relative levels of the town and the outfall, he should carefully consider the dimensions and character of the conduit which, in his opinion, will be most suitable for effecting the object in view.

3. The Superintending Engineer of the 5th Division will accordingly relieve Captain Tulloch, and direct him to proceed to Ootacamund on the duty above assigned him.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,  
*Secretary to Government.*

To the Superintending Engineers, 5th and 7th Divisions.  
,, Captain Tulloch, Executive Engineer.  
,, the Controller of Public Works Accounts.

Exd. S. T. Augustin.

Read the following papers:—

No. 531. From Captain H. TULLOCH, R. E., Executive Engineer on special duty, to the Secretary to Government, Department Public Works, dated Madras, 5th June 1867.

1. I have the honor to submit the accompanying Report and Plans in connection with the Main Drainage of Ootacamund.

2. If the Government propose to begin the work this year, I think it would be best to confine the work to the manufacture of materials. It is possible that an inspection of the drainage systems in the different countries of Europe may suggest to me valuable modifications in the details of the work, so that perhaps it might be better to wait till I return from Home before carrying out the work.

*Report on a Project for the Main Drainage of Ootacamund.*

1. The following drawings accompany this Report:—

- (1.) General Plan of Ootacamund.
- (2.) Detail Plan showing the direction of the Main Sewer.
- (3.) Detail section of Main Sewer.

2. The Datum Line, to which all the levels are referred, is the crest of the waste weir of the Ootacamund lake, *i. e.*, the level of the water when the lake is just full.

Datum Line.

3. The Sanitarium of Ootacamund is situated on the inner slope of a series of hills which stand on either side of a great valley. The lower portion of the valley is formed into a long narrow lake by a dam which has been thrown across a gorge between two hills. From the bottom of the valley the ground rises on either side at a considerable slope, and most of the dwellings are built on the slopes of the hills.

4. The most thickly populated neighbourhood is the village of the General Barar, which stands near the margin of the lake on the northern side of its upper end. It contains about 750 dwellings. On the lower side of the slope of the hill, on which this village has sprung up, the floors of some of the houses are raised two or three feet only above the level of the lake, and in heavy rains some of the houses are partly submerged. The fall from the upper to the lower part of the town is so considerable that the street drainage can be designed and carried out with the greatest facility.

5. To the west of the General Barar, on the slope of another hill, stands Mootoocherry, which merely contains a number of small detached huts, scattered about in all directions, built without reference to any general plan, and presenting the appearance of a neglected and dilapidated native village. It offers the same facilities for subsidiary drainage as the General Barar.

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about in all directions, built without reference to any general plan, and presenting the appearance of a neglected and dilapidated native village. It offers the same facilities for subsidiary drainage as the General Barar.

6. The only other thickly populated neighbourhood, which it is proposed to drain at present, is the small Brahmin village called Agraharam. It lies to the north-east of the General Barar, and contains about sixty houses. Being situated near the bottom of the valley, and being raised many feet above its level, its drainage will be a simple matter.
7. There are still two native villages which require to be mentioned, although the present project does not contemplate the drainage of either of them.
8. One of these is known as Dhoby's Pettah, and lies at the upper end of the Ootacamund valley, more than a mile away from the other thickly populated neighbourhood mentioned above. I will hereafter show how easily it can be drained; but while the most important part of the town remains undrained, I think it will be unadvisable to go to the expense of draining Dhoby's Pettah.
9. The only remaining native town is Kandal. This village does not lie in the Ootacamund valley. The Kandal and Ootacamund valleys are separated by high hills, and no system of drainage, therefore, which would answer for one could be made to answer for the other. The drainage of Kandal must be taken up as a project by itself. It has not been considered by me, as the Order of Government plainly refers to the drainage of the Ootacamund valley only. I have inspected Kandal, and consider that I should inform the Government that its drainage would present no difficulties. It is, however, a much more important village than it is generally thought to be, and if Ootacamund is to be rendered free from all obvious sources of sickness, the drainage of Kandal should be undertaken as soon as that of the Ootacamund valley has been accomplished.
10. The mere fact of Ootacamund being situated on the slopes of hills will at once enable the Government to understand that there is abundant slope in every neighbourhood for the effectual drainage of the streets and houses. The case of Ootacamund is the very opposite to that of Madras. Madras for all drainage purposes is as level as a table. Ootacamund has the slope of a mountain. In order to obtain a proper inclination for the street sewers and drains in Madras, it is a matter of absolute necessity to create it artificially. In order to obtain a proper slope in Ootacamund, nothing is required but to use the slope which nature has given us. In fact the subsidiary drainage of every neighbourhood in Ootacamund is extremely easy. By subsidiary drainage is here meant the drainage of the streets and houses, and it must not be confounded with the main drainage of Ootacamund, which is a totally different thing.
11. The subsidiary drainage of a neighbourhood is dependent on the natural slopes of the streets in that neighbourhood only, but the main drainage of a town is dependent on the relative levels of the lowest inhabited parts in all the districts of the town. However favourably situated every district in a town may be with regard to its own subsidiary drainage, the main drainage of the town may be a most difficult matter. There might be a dozen districts within the space of a few square miles, the drainage of each of which treated by itself might be exceedingly

easy, yet the connection of all the districts by one system of main drainage may demand the greatest care and consideration from the Engineer. As main drainage does not depend on the facilities, however great they may be, offered by each neighbourhood considered as a drainage area *by itself*, but is dependent on the relative position of all the different neighbourhoods themselves, it must be considered from an entirely different point of view to that from which the subsidiary drainage of each district is regarded.

12. My object in making the above remarks is to illustrate the position of Ootacamund, the subsidiary drainage of which is extremely easy, while at the same time there are undoubtedly difficulties in its main drainage, which can only be overcome by skill.

13. A glance at a Map of Ootacamund will at once satisfy the Government that the only out-fall for the main drainage of this Sanitarium is the extreme end of the valley where the dam stands. Had the town stood at the lower end of the lake instead of at its upper end, of course the main drainage would have been very easy. As it is, however, the town is situated at its upper end, and between the town and the out-fall is the lake, more than a mile in length. The difficulty to be overcome is to convey the sewage to the out-fall in spite of the obstacle which the lake presents. I will here mention the propositions which I have heard made to meet this difficulty. The Government will then be in a better position to judge of the project, submitted with this report.

14. One proposition is, as I understand it, to run the Ootacamund lake dry, and to lay the main sewer along its bottom which would undoubtedly be very easy, but it would be a barbarous way of trying to get over a difficulty. In fact it would simply be getting over one difficulty to create another and a far greater one. The slightest consideration should show that although the main sewer could be very easily built if the lake were run dry, yet to keep it in order after the lake had been filled again, would be attended by almost unsurmountable difficulties. Sewers should always be built in such a manner that they can be easily kept under perfect control. But to keep under control a sewer lying at the bottom of a lake which is in some parts more than 50 feet deep would require most expensive arrangements. Every time the drain leaked it would be necessary to run the lake dry in order to get at the sewer to repair it, and every time the lake were run dry the most dreadful consequences might arise from the exposure of so extensive an area of swampy land. I could mention several other grave objections to this proposition, but the Government will, no doubt, agree with me at once that the idea of a sewer at the bottom of the lake is utterly out of the question.

15. The second proposition which I have heard made is to buy up the lower portion of the town, and to run the main sewer at a considerable elevation above the lake, and with such a slope that it should issue at the lower end of the lake on a level with the water. The object of this proposition is to overcome the difficulty of building a sewer at a great depth below the surface of the lake. Now it will be manifest to Government that if a sewer is built at a high level, no houses situated below that level could be drained into it. Now although the lower portion of the town could be brought up at the probable cost (at a rough calculation) of about a lac of Rupees, there would still remain an extensive tract of land lying higher up in the

Ootacamund valley which it would be also necessary to purchase, and the cost of this has not been considered. Moreover, as the sewer at a high level could run along one side only of the valley, it is clear that no drainage from the other side of the valley could be received into it, as of course in that case the sewage would require to be taken across the valley which would lie below the sewer. In fact if this proposition were carried out, two systems of main drainage would be ultimately required, one system for one side of the Ootacamund valley, and another for the other. I calculate the cost of the property that would have to be bought up for such a scheme at certainly not less than a lac of Rupees, and probably more. In fact such a proposition if carried out would entail an enormous expenditure.

16. Since my report on the drainage of Madras was submitted to Government, further consideration of the subject has convinced me that the views I have therein expressed, regarding the advisability of separating sewage and rain-water in this country, are correct. From information I have gathered I am inclined to think that even in England it may be found necessary hereafter to carry sewage by itself, and to let rain-water escape by open surface channels to the natural out-falls in the immediate neighbourhood. There is no doubt now that many Engineers in England are inclining to this view of the question. But arguments in favor of the separation of sewage and rain-water apply with three and four times as much force when town drainage in this country is considered. The arguments in favor of my views being already before Government in the report on the drainage of Madras, I shall not here enter upon the subject again, but shall at once assume that the Ootacamund sewers should be constructed for the removal of sewage only, and that the rain-water should be allowed to escape as it now does into the natural out-falls in each district.

17. The sewer which I propose for the main drainage of Ootacamund is an egg-shaped one, 2½ feet high by 1½ feet wide, this, at the slope that I have given it, will discharge more than twice the total quantity of sewage calculated at twenty gallons daily per head of the population. Although this is an exceedingly small sewer for a main one, I have purposely made it larger than might be thought necessary for the present wants of Ootacamund, as the station is a growing one and may in the course of some years increase very rapidly in population.

18. As the cost of an iron pipe of nine inches only in diameter would be more than four times that of the brick sewer proposed above, while the latter would, at the same time, discharge nearly ten times as much sewage as the former, the idea of an iron pipe has been abandoned by me.

19. By reference to the drawings which accompany this report the general direction of the main sewer, and the details in connection with its proposed construction, will be understood. I propose to lay the sewer by the margin of the lake. The main stream which feeds the lake from the east, and which is never dry during any part of the year, runs along the bottom of the Ootacamund valley, and has a slope of more than ten feet a mile. From a point near its junction with the lake I propose to start the main sewer, at a slope of three feet per mile. It maintains this slope until a creek of the lake is reached, under which I propose to take the sewer in the form of an iron pipe. The inclination for this small portion of the

sewer is increased, as I wish to prevent all chance of accumulation of deposit in it. From the creek the sewer is then continued to the out-fall, at the uniform slope of three feet per mile.

20. The slope of three feet per mile would, under ordinary circumstances, be too little for so small a sewer, but considering the command of water that we shall have along the entire length of the sewer, I do not anticipate that there will be any obstruction in it. It will be necessary to make arrangements to flush the sewer at every hundred yards of its length, and manholes, lampholes, and ventilators will also be required.

21. As the sewer starts at three feet below the level of the stream which feeds the lake, so it should be continued up the valley to the furthest neighbourhood which it may be considered necessary to drain—the sewer always running parallel with the surface of the stream, but three feet below it. The advantage of building the sewer in this position will be that along its entire length there will always be an abundance of water with sufficient pressure to keep the sewer clear of deposit. It so happens in this particular case that the stream itself has a considerable fall; the sewer will therefore also have a good fall.

22. Now if it should be considered advisable hereafter to drain Dhoby's Pettah, the village which lies more than a mile from the General Barar, all that would be required would be to continue the sewer up the valley until Dhoby Pettah was reached. There would be abundant fall for the sewer and abundance of water to flush it with, as the sewer would always be three feet below the surface of the stream.

23. The advantage of laying the sewer along the natural drainage line of the country is that the whole of Ootacamund, with the exception of the southern side of the Ootacamund lake, could be drained into it. The southern side of the lake has only a few European houses, and will not require to be drained.

24. The street drainage of the different districts will be a very simple matter so far as engineering is concerned. I would recommend the use of six inch earthenware pipes running generally parallel with the surface of the roads, and placed about three feet below it. The earthenware pipes should be connected with the houses in the same manner as proposed by me in the report on the drainage of Madras.

25. In connection with the drainage of Ootacamund, I propose also the reclamation of the swamp at the head of the lake. This is a work of great necessity and might be commenced at once. I propose to make a channel (wide enough for two boats to pass each other), from the lake to the head of the swamp. The earth should then be excavated from the upper portion of the lake and should be taken by boats and deposited at the head of the swamp. As the swamp on each side of the channel became filled up, the channel for the boats should at the same time be gradually closed, and the work of reclamation continued till no swamps were left. There are other ways of reclaiming the swamp into which I need not enter, but the one I propose has the advantage that the swamp would be reclaimed in the shortest time. The prisoners in the Ootacamund Jail might well be employed on the work of reclamation. When the swamp is entirely reclaimed the margin of the lake should

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be well defined and no encroachments on the lake permitted. The reclaimed land might be formed into a Public Garden or Park, a great want in Ootacamund, as the present Botanical Gardens are so far distant from the centre of the town.

26. I beg to inform the Government that the out-door survey work from which the Plan of the Main Sewer has been plotted, was done by Major Hessey's Department.

Referred to the Acting Sanitary Commissioner for any observations that he may have to offer.

(Signed) J. H. M. SHAW STEWART, Major, R. E.,  
FORT SAINT GEORGE, Under Secretary to Government.  
1st August 1867.

No. 532. From the Acting Sanitary Commissioner for Madras, to the Secretary to Government, Department of Public Works, dated Cannanore, 29th August 1867, No. 260.

- 2 Plans of Ootacamund Drainage, by Bangby post.)  
1 Letter from Captain Tulloch, R. E., to Secretary to Government, Public Works Department.  
1 Report on a Project for the Main Drainage of Ootacamund.  
1 Estimate.  
1 Abstract.

1. In reply to your reference to me of the plan proposed by Captain Tulloch, R. E., for the drainage of Ootacamund, I have the honor to state that the scheme appears in every way suitable for that station.

2. I would, however, respectfully direct the attention of Government to the desirability of refraining from the definite sanction of the expenditure contemplated by Captain Tulloch (74,000 Rupees) for the carrying out of this drainage scheme until an estimate has been made of the cost of constructing the house-drains and street-drains (not apparently estimated for by Captain Tulloch), and until it is settled by whom these are to be constructed.

3. Until these matters are settled the construction of a system of main drainage may prove to be a cause of useless expenditure of money.

No. 533. Minute by the Right Honorable the President.

(Here enter — September 1867.)

No. 534. Minute by Sir T. PYCROFT, K. C. S. I.

(Here enter 27th July 1867)

No. 535. Minute by the Honorable H. D. PHILLIPS.

(Here enter 11th September 1867.)

No. 536. ORDER THEREON, 21st September 1867, No. 2,940.

CIVIL WORKS, No. 56.1

1. With his letter above recorded, Captain Tulloch, Special Executive Engineer, submits in compliance with the Orders of Government of the 21st February 1867, No. 519, a report, accompanied by plans and estimates,\* on the subject of the Main Drainage of Ootacamund.  
\* Rupees 74,000.

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2. After describing the great natural facilities which exist for the effectual drainage of the streets and houses in this Sanitarium, and discussing the merits of the several proposals which have been made for its main drainage, Captain Tulloch states that a long and careful consideration of the subject has confirmed him in the opinion that in devising any scheme for this latter object, complete separation of sewage and rain-water should be maintained. Assuming the correctness of this principle, Captain Tulloch proposes to construct an egg-shaped sewer (2½ feet high and 1½ feet wide) starting from a point near the junction of the main stream with the Ootacamund lake, and carried, at a slope of three feet per mile, until "a creek of the lake is reached," under which he proposes to take the sewer in the form of an iron pipe, but with an increased inclination to prevent accumulations of deposit. From the creek the sewer will be continued to the out-fall at the uniform slope of three feet per mile, which, looking to the large quantity of water available, Captain Tulloch considers will be amply sufficient. The sewer will run parallel with the surface of the main stream, but three feet below it, the advantage of constructing the drain in this position being that along its entire length there will always be abundance of water with sufficient pressure to keep the sewer clear of deposit.

3. The Government approve generally of the scheme submitted by Captain Tulloch. The unsightly and filthy condition of the lower parts of the Native town and principal bazaar at Ootacamund and of the streets above them is such as to call urgently for immediate remedy, and looking to the importance of that station as the seat of many charitable and other public institutions, with an English population exceeding that of any Civil Station in this Presidency, Madras excepted, and as the great Sanitarium of the South of India resorted to by Government servants from the three Presidencies, and bearing in mind that the local municipal revenue will be required for the execution of the minor or street drainage works subsidiary to Captain Tulloch's scheme for the opening out and repair of roads, and for the water supply and general conservancy of the town, the Government are of opinion that the outlay necessary for the main drainage may fitly be borne by the State. The plans submitted by Captain Tulloch will accordingly be forwarded to the Government of India, with the recommendation of His Excellency in Council that sanction may be given for the commencement of the work from such funds as may be at the disposal of this Government, to be supplemented, if necessary, by a further special grant for the purpose.

4. Captain Tulloch suggests that in the event of it being considered desirable to commence the work projected by him this year, operations should be confined to the preparation of materials, and his inspection of the drainage systems of Europe may possibly suggest valuable modifications of the plan which he has submitted. The Government approve of this suggestion, and they request the Superintending Engineer of the 7th Division to instruct the Executive Engineer at Wellington to take measures, in anticipation of the sanction of the Government of India, for the manufacture, by means of convict labor, of the quantity of bricks that is likely to be required. Colonel Walker will report, now that the Lawrence Asylum scheme of buildings has been reduced, whether a large quantity of the bricks in store for those works could not be made available for the Ootacamund drainage.

5. The reclamation of the swamp at the head of the Ootacamund lake, referred to in paragraph 25 of Captain Tulloch's report, is a very desirable project, and one

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which should be taken up at once. The Superintending Engineer will obtain and submit a detailed plan and estimate of the work to be executed in the manner sketched out by Captain Tulloch. The work should be wholly carried out by the convicts confined in the Native Jail, assisted by an additional gang chosen with proper care after provision has been made for their lodging, health and security. Colonel Walker will lose no time in communicating with the Inspector General of Jails upon this subject, and in completing the necessary arrangements.

6. Ordered that the following letter be sent :—

(Here enter No. 2,941, dated 21st September 1867.)

(True Extract.)

(Signed) J. H. M. SHAW STEWART, Major, R. E.,  
Under Secretary to Government.

To the Superintending Engineer, 7th Division.

- .. Accountant General.
- .. Controller of Public Works Accounts.
- .. Public Department.

*all 15/9/67.*

*Communicated to the Inspector-General of Jails.*

*To the Inspector-General of Jails.*

*Communicated to the  
Capt. Tulloch  
with the necessary  
instructions.*  
Exd. T. O'Connor

*21/9/67*

*Recd. Genl. P. W. Stewart  
21/9/67*

*Indicated 18/9/67  
1/10/67*

*21/9/67*