(1) பக்கங்களின் எண்ணிக்கை 64
(2) புதுக்கித் திருப்பிய நாள் 18.7.88
(3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம்

# தமிழ்நாடு ஆவணக் காப்பகம்.

தமிழ்நாடு அரசு

P.W.D துறை

அரசாணை எண். / மு. கோப்புத் தாள் எண். 2507W அச்சகம் / பலவகை

நாள் : 16.8.1888 ~~198~~.

அமர

கவோ கண்டபடி கையாளவோ கூடாது

1—18,006—15-6-87.

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Buildings and Roads.
### Civil Works.

Read—the following papers :—

From Surgeon-Major J. A. LAING, Officiating Sanitary Commissioner, to the Chief Secretary to Government, Public Department, dated Madras, 13th March 1888, No. 507.

In forwarding the accompanying letter from the Collector of Nílgiris, I have the honor to state that I quite concur in the remarks made by Dr. VanGezzel, Chemical Examiner to Government, in connection with the analyses of the water from the Marlimund reservoir.

---

From L. R. BURROWS, Esq., Collector of the Nílgiris, to the Chief Secretary to Government, Public Department, (through the Officiating Sanitary Commissioner, Madras), dated Ootacamund, 9th March 1888, No. 13.

With reference to G.O., dated 11th January 1888, No. 30, Public Department, I have the honor to forward, for the information and orders of Government—

(1) a copy of a letter from the Acting Chemical Examiner, to the Executive Engineer, Nílgiri Division, forwarding analysis of eight samples of water taken from the Marlimund reservoir and its affluents, and dated 23rd February 1888, No. 132;

(2) analysis of water taken from the Marlimund reservoir by the Collector under the order above quoted.

2. The analyses are said to indicate contamination by vegetable organic matter.

---

From W. B. de WINTON, Esq., Executive Engineer, Nílgiri Division, to the Superintending Engineer, IV Circle, Coimbatore, dated Pandalur, 8th June 1888, No. 1054.

With reference to your endorsement No. 164 N.I., of 21st April 1888, I have the honor to report as follows :—

1. In the report which accompanied the estimate for the Ootacamund northern water-supply, it was stated that 188·65 acres of the catchment area of Marlimund reservoir would be cut off, because they were planted with tea, and therefore presumably contaminated with manure, and would be supplemented by 200 acres on Snowdon, whose rainfall would be conveyed to Marlimund in a masonry duct. Rs. 1,000 were provided in the estimate for excluding the contaminated area, and Rs. 30,750 for bringing in the new supply from Snowdon.

2. This latter part of the scheme has been carried out with the result that up to date, instead of the 15 cubic feet per second which was the anticipated discharge, we have only obtained 5 cubic feet per second; and I am of opinion that we shall never get anything approaching the anticipated discharge from this area, and that it will never compensate for the area which it is proposed to exclude at Marlimund.

3. I may mention here that I accompanied the Chief Engineer last month on an inspection of the available catchment area on the northern slopes of Snowdon, when it was decided that no further supply could be obtained from that quarter, and that I have since inspected the southern slopes with a similar result.

4. No expenditure has as yet been incurred on the sub-head "excluding contaminated area of Marlimund reservoir, Rs. 1,000," and I propose that none should take place for the following reasons:—

(*a*) The Chemical Examiner's analysis goes far to prove that the amount of animal organic matter in the Marlimund water is infinitesimal.

(*b*) It also proves that the Snowdon water is very little superior in quality to the Marlimund water.

(*c*) The cost of excluding the area will be Rs. 6,825 instead of Rs. 1,000 made up as follows:—

| | RS. |
|---|---|
| 55,200 cubic feet earth-work, at Rs. 10 ... ... ... ... | 552 |
| 955 running feet of Vengay wood trough on blue gum piles, at Rs. 2½ ... ... ... ... ... ... ... ... | 2,388 |
| 890 running feet of masonry duct, at Rs. 4 ... ... ... | 3,560 |
| Petty supervision and contingencies ... ... ... ... ... | 325 |
| Total ... | 6,825 |

The plan and longitudinal sections herewith sent will explain this estimate. The red-dotted line on the plan from A to B, B to C, C to D, E to F, F to G, shows the lowest margin of the tea all round the lake. The portions from C to F and G to H are swamps which will have to be crossed by troughs, because they are the principal affluents of the reservoir, while the length from H to K crosses area which is to be retained, through which the catch-drain must be tunnelled.

The longitudinal section A to K shows the line a catch-drain would have to take, if it excluded all the tea, and only the tea; while the sections D, C and E, F show branch channels which would join the main channel at D and F, respectively.

It would, I think, be impossible to go down to the point B, which is a foot lower than the swamp C, F, and some area of tea would here have to be purchased and uprooted.

I have provided channel, trough, and duct 3 feet wide, and for the former an average depth of excavation of 3 feet.

(*d*) The plan and section above referred to show how difficult and expensive it would be to cut off the tea, and I do not believe the desired object would be attained. I have been frequently over the ground, and have never seen manure being laid; and I understand that, when it is laid on tea estates, it is always buried 2 feet under ground, so that no mere surface catch-drain would be of any use in arresting percolation from it.

(*e*) The water-supply from Snowdon will never compensate for the area excluded at Marlimund, and there will always be danger of a water famine.

5. My objection to the exclusion of the tea may therefore be summed up as follows:—

(1) It probably does no harm;
(2) Snowdon water no better than Marlimund;
(3) Difficulty and expense of exclusion;
(4) Doubt as to effectiveness of any possible attempt at exclusion;
(5) Resulting scarcity of water.

6. I will now state what I propose to do instead—

(*a*) I believe the injurious elements in the water, which the analysis has brought to light, to be due chiefly to vegetable matters brought in from the peat bogs, through which every affluent of the reservoir flows, and that the relatively large quantity of this matter is due partly to the subsidence in November last of Mr. Wapshare's peat bog into the reservoir, and partly to the custom of cutting peat all round the reservoir for the Ootacamund market. Wherever this peat cutting is in progress the water flowing therefrom to the reservoir is always very turbid.

The subsidence was unavoidable, and may not occur again; but I propose that all peat cutting on the margin of the reservoir should be prohibited. (The sheds on the margin are not cattle sheds but sheds for stacking peat). This would involve the purchase of the peat bogs which might be effected, I believe, at a moderate cost.

(*b*) I would fence in the whole catchment area and prohibit all grazing of cattle therein. This would involve some compensation to owners of land on the margin who have now the right of grazing.

(*c*) I would prohibit the construction of dwelling houses or buildings of any kind within the catchment area.

(*d*) If the medical advisers of Government consider it necessary, I would construct filter beds at Snowdon service reservoir, the cost of which would amount to something like Rs. 40,000.

7. I therefore beg that you will be good enough to lay the matter before Government, and obtain orders thereon. Until then I will delay the submission of the revised estimate, which, unless filter beds are adopted, will not exceed the sanctioned estimate.

---

## ENCLOSURE.

From J. L. VANGEZZEL, Esq., M.B., Acting Chemical Examiner, to the Executive Engineer, Nilgiri Division, dated Madras, 23rd February 1888, No. 132.

I have the honor to forward analysis of eight samples of water received with your letter, dated 12th February 1888, No. 3197, and to inform you that all the waters contain Albumenoid Ammonia in such amount as would place them in the class of "suspicious waters." The small amount of Chlorine and relatively small free Ammonia tends to negative the probability of the pollution being other than of vegetable origin; but chemical analysis alone cannot decide the *nature* of the pollution, and it is this consideration, which is all important, in condemning a water or passing it as fit for consumption. If the affluents of the reservoir are open to pollution from animal organic matter, such as manure and town sweepings, &c., obviously the water must be condemned. In the positive absence of such sources of pollution, the results of the chemical analysis, as furnished in the table appended hereto, would indicate that the waters are rain-water tainted by vegetable matters, for, in other respects, they are wholesome enough.

I would, however, point out that waters polluted by vegetable matter, though they are considered less dangerous than those polluted by animal matter, are not considered harmless.

Waters Nos. 3, 5, 7 and 8 are more suspicious than the rest.

---

### No. 242 E.W.

Submitted to the Chief Engineer for favor of orders with reference to G.O., dated 16th April 1888, No. 1150 W.

(Signed) J. W. MARTIN,
Ex. Engr., in charge IV Circle.

OOTACAMUND,
14th June 1888.

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### No. 403 D.

Referred to the Surgeon-General with the Government for favor of remarks.

(Signed) J. O. HASTED, Colonel, R.E.,
Chief Engineer, P.W.D.

OOTACAMUND,
12th July 1888.

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From G. BIDIE, Esq., M.B., C.I.E., Surgeon-General with the Government of Madras, to the Secretary to Government, Public Works Department, dated Ootacamund, 2nd August 1888, No. 0/388.

I have the honor to return, with remarks, the papers regarding the Ootacamund northern water-supply, referred to me under your No. 403 D of 12th July 1888.

2. As regards the quality of the water feeding and stored in the Marlimund reservoir, I quite agree with the Chemical Examiner that if the organic impurities which exist in it were due to pollution from animal excreta, it would be unsafe.

3. The actual amount of solid matter which it contains is very small, and it is a soft water. The neighbouring cultivated land is, of course, objectionable, as the washings of the soil may possibly carry down both organic matter and salts; but, as noted by the Chemical Examiner, the small quantities of Chlorine and free Ammonia found in the water are against the probability of contamination from manure.

4. So far as I can learn, the amount of manure applied to the tea land is small, and is almost exclusively cattle manure from the estate, and no town poudrette and sweepings have been used. When put out the dung is dug in and incorporated with the soil, and for a time there would be the risk, during heavy rain, of some of it reaching the lake, where it would remain active for a considerable period owing to the slow process of oxidation in stagnant water. This risk, however, is merely stated as a possibility, as hitherto, so far as I know, there have been no signs of such contamination; and the manurings, according to my own observation, have been few and far between. For many years the water has been liable not only to this but to more serious pollution during delivery in an open channel, but apparently without inducing in the people who use it any of those ailments which are caused by drinking impure water. This is a practical test, which, taken in conjunction with the chemical analysis, is so far assuring.

5. With regard to the proposal to have a catch-drain to carry off the surface wash of the tea garden, it seems to me undesirable to spend so much money on what would after all be a very doubtful expedient for the protection of the reservoir. The most perfect safeguard would be to buy up the whole of the tea garden that drains into the lake, and to put the land under strict conservancy. But before advising such an expensive measure, it seems desirable to watch carefully the chemical condition of the water for a further period, and to take measures to remedy other sources of pollution.

6. In my opinion the organic matter now found in the water is mostly, if not entirely, of vegetable origin, and derived from the neighbouring peat deposits and swamps which drain into the lake. Both of those sources of pollution might be rendered less obnoxious by deep drainage, the bogs being purchased so as to render their better conservancy practicable. It need hardly be said that vegetable matter in water is not always innocuous, but if the expedients proposed did not reduce it to a harmless amount in the Marlimund water, it might be further disposed of by filtration.

7. With regard to the expected supply to the reservoir from the northern side of Snowdon, it appears to me that the channel might be greatly improved, for although a considerable body of water enters it at its eastern extremity, from the hill stream which it taps, nearly the whole of this is lost by leakage in transit.

---

ORDER—dated 16th August 1888, No. 2507 W., Public Works.

The letter from the Surgeon-General will be communicated to the Executive Engineer, whose special attention will be called to the last paragraph.

2. The Government are of opinion that no provision need be made in the revised estimate either for catch-drains below the tea plantation or for filtering beds. To drain the peat bogs by deep cutting, as proposed, or to prohibit peat cutting, would involve the purchase of the peat bogs, and the Government are not prepared to sanction this at present.

(True Extract.)

Captain, R.E.,
Under-Secy. to Govt., P.W.D.

To the Superintending Engineer, IV Circle.
" Public Department.
Exd. F. R. Bantleman.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

# Govt. of {1888} Madras.

PUBLIC WORKS.

*Dated August, 16th.*

*Recd.* *Encl.*

**G.O., 16th Aug. 1888, No. 2507 W.**

**AUGUST.**

## Ootacamund Water-Supply Scheme

Communicating to the Executive Engineer, Nílgiri Division, letter from the Surgeon-General on the subject of the — with instructions for the preparation of a revised estimate.

---

12

NILGIRI COLLECTOR'S OFFICE,
OOTACAMUND, 9th March 1888.

2507/4

No. 13

FROM
L. R. Burrows Esqr.
COLLECTOR OF
NILGIRIS.

TO
THE CHIEF SECRETARY
TO GOVERNMENT
Public Department
through the Officiating
Sanitary Commissioner, Madras

SIR,

With reference to Government Order dated 11th January 1888 No. 30, Public Department, I have the honor to forward for the information and orders of Government.

(1) a copy of a letter from the Ag. Chemical Examiner to the Executive Engineer Nilgiri Division forwarding analysis

of 8 samples of water taken from the Marlimund Reservoir and its affluents and dated 23rd February 1888 No. 132.

(2) Analysis of water taken from the Marlimund Reservoir by the Collector under the order above quoted.

2. The analyses are said to indicate contamination by vegetable organic matter.

I have the honor to be,
Sir,
Your most obedient Servant,

Collector.

SUPG: ENGINEER'S OFFICE
No. 11252/11
19 APR. 88
P. W. D.
FOURTH CIRCLE

SUPG: ENGINEER'S OFFICE
No.
13 JUN. 88
P. W. D.
FOURTH CIRCLE

EXECUTIVE ENGINEER'S OFFICE
Genl. No.
7 JUN 1888
P. W. D.
NILGIRIS

To

1
2 Public No. 1463/88

---

Recd: No letter No. 12
9-8-88
from the Collector of Nilgiris

Chemical Examiner's Office
Madras 23rd February 1888

No. 132.

2807
5

2 sp

From,

J. L. Van Gezzel Esqr. M. B.
ag. Chemical Examiner
Madras.

To,

The Executive Engineer
Nilgiri Division

Sir,

I have the honor to forward analysis of 8 samples of water received with your letter dated 12th February 1888 No. 3197 and to inform you that all the waters contain Albumenoid Ammonia in such amount as would place them in the class of "Suspicious waters". The small amount of Chlorine and relatively small free Ammonia tends to negative the probability of the pollution being other than of vegetable origin but Chemical analysis alone cannot decide the nature of the pollution and it is this consideration which is all important in condemning a water or passing it as fit for consumption. If the affluents of the Reservoir are open to pollution from animal organic matter such as manure and town sweepings &c. obviously the water must be condemned. In the positive absence of such sources of pollution the results of the chemical analysis as furnished in the table appended hereto would indicate that the waters are Rain water tainted by vegetable matters, for in other respects they are, wholesome enough.

I would however point out that waters polluted by vegetable matter, though they are considered less dangerous than those polluted by animal matter, are not

considered

considered harmless.

2507/6 3 sp

Waters Nos. 3, 5, 7 and 8 are more suspicious than the rest.

I have &c.

(Signed) J. L. Van Geyzel M.D.
Ag Chemical Examiner

(True Copy)

(Initialled) W. B. de W.
Executive Engineer N. Dn.

(True Copy)

Collector

SUPG: ENGINEER'S OFFICE
NO.
13 JUN. 88
P.W.D.
FOURTH CIRCLE

SUPG: ENGINEER'S OFFICE
NO. 5/3169 W.
19 APR. 88
P.W.D.
FOURTH CIRCLE

EXECUTIVE ENGINEER'S OFFICE
GEN'L NO. [illegible]
7 JUN 1888
P.W.D.
NILGIRIS.

8/07

Enclosure 5 to Supg.
Engineer's No 242/E.E.

2
G. Public No 1060/88

---

2807/7 4P

No 507

Office of Sanitary Commissioner
Madras 13th March 1888

1060.

From

Surgeon Major J. A. Laing
Offg Sanitary Commissioner

To

The Chief Secretary to Government
Public Department

Sir,

4 Enclosures

In forwarding the accompanying letter from the Collector of Nilgiris, I have the honor to state that I quite concur in the remarks made by Dr. Van-Geyzel, Chemical Examiner to Government, in connection with the Analyses of the water from the Marlimund Reservoir.

I have the honor to be, Sir,
Your most obedt Servant
Jas. Anderson Laing.
Surgeon Major
Offg Sanitary Commissioner
for Madras

SUPG: ENGINEER'S OFFICE
NO.
13 JUN. 88
P. W. D.
FOURTH CIRCLE

SUPG: ENGINEER'S OFFICE
NO. 1/369 H
19 APR. 88
P. W. D.
FOURTH CIRCLE

EXECUTIVE ENGINEER'S OFFICE
GEN'L NO. 2/1152
7 JUN 1888
P. W. D.
NILGIRIS.

[illegible] 1 to Supg.

[illegible] No. 242 of [illegible]

---

No. 1054

2807
8 S.P.

P. W. D.

NILGIRI DIVISION OFFICE,

STATION Camp Sandalur 8th June 1888.

N.B.—*Please quote the number and date of this letter in future communication on this subject.*

Enclosures. 27
1 Survey
1 Sheet Levels.
5 Origl. Enclosures
(will follow)

From

W. B. de Winton Esq.,
EXECUTIVE ENGINEER, NILGIRI DIVISION,
OOTACAMUND,

To

THE SUPERINTENDING ENGINEER,
FOURTH CIRCLE,
COIMBATORE.

SIR,

With reference to your Endorsement No. $\frac{164}{N.I.}$ of 21st April 1888, I have the honor to report as follows:—

(1) In the report which accompanied the estimate for the Ootacamund Northern Water Supply, it was stated that 188.65 Acres of the Catchment area of Marlimund Reservoir would be cut off, because they were planted with tea, and therefore presumably contaminated with manure, and would be supplemented by 200 Acres in Snowdon, whose rainfall would be conveyed to Marlimund in a masonry duct — Rs 1000/ were provided in the estimate for

Including

excluding the contaminated area, and Rupees 30750 for bringing in the new supply from Snowdon.

2. This latter part of the scheme has been carried out, with the result that, up to date, instead of the 15 Cft. per second which was the anticipated discharge, we have only obtained 5 Cft. per second, and I am of opinion that we shall never get anything approaching the anticipated discharge from this area; and that it will never compensate for the area which it is proposed to exclude at Marlimund.

3. I may mention here that I accompanied the Chief Engineer, last month on an inspection of the available Catchment area on the Northern slopes of Snowdon, when it was decided that no further supply could be obtained from that quarter, and that I have since inspected the Southern slopes with a similar result.

4. No expenditure has as yet been incurred on the sub head "Excluding Contaminated area of Marlimund Reservoir. Rs 1000/-" and I propose that none should take place, for the following reasons.

(a) The Chemical Examiner's Analysis goes far to prove that the amount of Animal Organic matter in the Marlimund water is infinitesimal.

(b) It also proves that the Snowdon water is very little superior in quality to the Marlimund water.

(c) The cost of excluding the area will be Rs 6,825 instead of Rs 1000/-, made up as follows:-

| | |
|---|---|
| 55,200 Cft. Earthwork @ Rs 10/- | Rs 552 |
| 955 Rft of Vengay wood trough on Blue gum piles @ Rs 2½ | " 2,388 |
| 890 Rft. of Masonry duct @ Rs 4/- | " 3,560 |
| Petty supervision & Contingencies | " 325 |
| Total | Rs 6,825 |

The plan and longitudinal sections herewith sent will explain this estimate. The red dotted line on the plan from A to B, B to C, C to D, E to F, F to G, shows the lowest margin of the tea pit round the Lake. The portions from C to F and G to H are swamps which will have to be crossed by troughs because they are the principal affluents of the Reservoir, while the length from H to K crosses area which is to be retained, through which the Catch drain must be tunnelled.

The longitudinal section A to K shews the line a Catch drain would have to take, if it excluded all the tea, and only the tea; while the sections D. C. and E. F. shew branch channels which would join the main channel at D and H respectively.

It would I think be impossible to go down to the point B, which is a foot lower than the swamp C.F. and some area of tea would have to be purchased and uprooted.

I have provided Channel, trough and duct 3 feet wide, and for the former an average depth of excavations of 3 feet.

(d) The plan and section above referred to, show how difficult and expensive it would be to cut off the tea, and I do not believe the desired

desired object would be attained. I have been frequently over the ground and have never seen manure being laid, and I understand that, when it is laid on tea estates, it is always buried 2 feet under ground, so that no mere surface catch drain would be of any use in preventing percolation from it.

(e) The water supply from Snowdon will never compensate for the area excluded at Marlimund, and there will always be danger of a water famine.

5. My objections to the exclusion of the tea, may therefore be summed up as follows:—

(1) It probably does no harm.
(2) Snowdon water no better than Marlimund.
(3) Difficulty and expense of exclusion.
(4) Doubt as to effectiveness of any possible attempt at exclusion.
(5) Resulting scarcity of water.

6. I will now state what I propose to do instead:—

(a) I believe the injurious elements

in which the water, which the analysis has brought to light, to be due chiefly to the vegetable matters brought in from the peat bogs, through which every affluent of the Reservoir flows, and that the relatively large quantity of this matter is due partly to the subsidence in November last, of Mr. Wapshare's peat bog into the Reservoir, and partly to the custom of cutting peat all round the Reservoir for the City market. Wherever this peat cutting is in [illegible] the water flowing therefrom to the Reservoir is always very turbid.

The subsidence was unavoidable and may not occur again, but I propose that all peat cutting on the margin of the Reservoir should be prohibited. (The sheds on the margin are not cattle sheds but sheds for stacking peat). This would involve the purchase of the peat bogs, which might be effected, I believe, at a moderate cost.

(b) I would fence in the whole catchment area and prohibit all grazing of cattle therein. This would involve some compensation to owners of land on the margin who have now the right of grazing.

2507/11 8P

(c) I would prohibit the construction of dwelling houses or buildings of any kind within the Catchment area.

(d) If the medical advisers of Government consider it necessary, I would construct filter beds at Snowdon Service Reservoir, the cost of which would amount to something like Rs 40,000/.

7. I therefore beg that you will be good enough to lay the matter before Government, and obtain orders thereon. Until then I will delay the submission of the Revised Estimate, which, unless filter beds are adopted, will not exceed the Sanctioned Estimate.

I have the honor to be
Sir
Your most obed^t Servant.

Executive Engineer N. D.

WDC/7/6.

SUPDG. ENGINEER'S OFFICE
No. 373 W
12 JUN. 88
P. W. D.
FOURTH CIRCLE

No. 242 / E.W.

Submitted to the Chief Engineer for favor of orders with reference to G.O. dated 16th April 1888, No. 1150 W.

E W Martin
Ex. Engineer in charge
IV Circle.

Camp Ootacamund
14th June 1888

Enclosures 7.

From

THE EXECUTIVE ENGINEER,
NILGIRI DIVISION,

To

THE SUPERINTENDING ENGINEER,
4TH CIRCLE.

Dated 8
Despatched 11
Received
June 1888

No. 1054

Enclosures. 7.

Subject.

Ootacamund Water Supply Scheme — Reports ~~the~~ regarding the question of cutting off the objectionable area which would contaminate the —

2507/12

8107

PWC No ~~5804~~

16 P

No. 0/187.

No 403 D.

P. W. Department.

Ootacamund 12th July 1888.

Referred to the Surgeon General with the Government for favor of remarks

Colonel R.E.

Chief Engineer P.W. Dept.

To

The Surgeon General with the Government to be returned —

6. 3. 7. 88

From, (3)

The Supg. Engineer,
Fourth Circle.

Dated 14th }
Despd 16th } June 1888.

Rg 18. 6. 88

No 242/E.W.

E. 1 / P.W. 8107

Enclosures 7.

(+ 2 plans)

Subject

Ootacamund Water Supply Scheme.

Submits report from the Executive Engineer, Nilgiri Division, regarding cutting off the objectionable area which would contaminate the —

Referred

---

111

OFFICE OF SURGEON-GENERAL
WITH THE GOVERNMENT OF MADRAS,
Ootacamund ~~Fort St. George~~, 2d August 1888.

No. 0/388

2507/13

FROM
G. Bidie Esq. M.B., C.I.E.
~~The~~ SURGEON-GENERAL WITH THE
GOVERNMENT OF MADRAS,
~~Fort St. George~~,
Ootacamund.

To
The Secretary to Government
Public Works Department
Ootacamund.

SIR,

I have the honor to return with remarks, the papers regarding the Ootacamund northern water supply, referred to me under your No 403 D of 12 July 1888.

2. As regards the quality of the water feeding, and stored in the Marlimund reservoir, I quite agree with the Chemical Examiner, that if the organic impurities which exist in it were due to pollution from animal excreta it would be unsafe.

3. The actual amount of solid matter which it contains is very small and it is a soft water. The neighbouring cultivated land is of course objectionable, as the washings of the soil may possibly carry down both organic matter and salts, but as noted by the Chemical Examiner the small quantities of chlorine and free ammonia found in the water are against the probability of contamination from manure.

4. So far as I can learn the amount of manure applied to the tea land is small and is almost exclusively cattle manure from the estate, and no town poudrette and sweepings have been used.

2507/14 128

When put out the dung is dug in and incorporated with the soil, and for a time there would be the risk during heavy rain of some of it reaching the lake, where it would remain active for a considerable period owing to the slow process of oxidation in stagnant water. This risk, however, is merely stated as a possibility, as hitherto, so far as I know, there have been no signs of such contamination; and the manurings, according to my own observation, have been few and far between. For many years the water has been liable not only to this but to more serious pollution during delivery in an open channel, but apparently without inducing in the people who use it any of those ailments which are caused by drinking impure water. This is a practical test, which taken in conjunction with the Chemical Analysis, is so far assuring.

5. With regard to the proposal to have a catch drain to carry off the surface wash of the tea-garden, it seems to me undesirable to spend so much money on what would after all be a very doubtful expedient for the protection of the reservoir. The most perfect safe-guard would be to buy up the whole of the tea-garden that drains into the lake, and to put the land under strict conservancy. But before advising such an expensive measure it seems desirable to watch carefully the Chemical condition of the water for a further period, and to take measures to remedy other sources of pollution.

6. In my opinion the organic matter now found in the water is mostly if not entirely of vegetable origin, and derived from the neighbouring peat deposits and swamps which drain into the lake. Both of those sources of pollution might be rendered less obnoxious by deep drainage, the bogs being purchased so as to render their better conservancy practicable. It need hardly be said that vegetable matter in water is not always innocuous, but if the expedients proposed did not reduce it to a harmless amount in the Marlimund water it might be further disposed of by filtration.

7. With regard to the expected supply to the reservoir from the northern side of Snowdon it appears to me that the channel might be greatly improved, for although a considerable body of water enters it at its Eastern extremity, from the hill stream which it taps, nearly the whole of this is lost by leakage in transit.

I have the honor to be
Sir,
Your Most Obedt. Servant
Bidie M.B., C.I.E.
Surgeon-General
c Govt. of Madras

P. W. D. No. 8107

( 188 ) DEPARTMENT.

No. 1921W of 17-1-88
1150W of 16-4-88

From E. Bidie Esq. M.B., C.I.E.
THE SURGEON GENERAL WITH THE
GOVERNMENT OF MADRAS,
~~Fort St. George.~~
Ootacamund.

No. 0/388

Dated 2d } August 1888.
Recd. 16 }

Enclos. 8
No.
× 2 plans

SUBJECT.

Returns with remarks correspondence regarding the Ootacamund northern water supply.

5/VIII/88

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A

No. 2507

B & R
Civil works

PUBLIC WORKS DEPARTMENT.

2507/13

13 P.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the

READ the following

| | | |
|---|---|---|
| Letter from the Collector, Nilgiris, R.E. No. 13 | dated | 9th March 1888. |
| to the Chief Secretary to Government | | |
| Letter from the Sanitary Commissioner to the Chief Secretary to Government } | " " 507 | " 13th March 1888. |
| From the Executive Engineer Nilgiri Dn to the Supdg. Engr. IV Circle } | " 1054 | " 8th June 1888 |
| Endorsement from the Superintending Engineer IV Circle. } | " " 242/E.W. | " 14th June 1888 |
| Letter from the Surgeon General with the Govt. of Madras. } | " " 0/388 " | 2nd August 1888. |

The letter from the Surgeon General will be communicated to the Executive Engineer whose special attention will be called to the last paragraph.

The Government are of opinion that no provision need be made in the revised estimate either for catch drains below the Tea plantation or for filtering beds. To drain the peat bogs by deep cutting, as proposed, or to prohibit peat cutting, would involve the purchase of the peat bogs, and the Government are not prepared to sanction this at present.

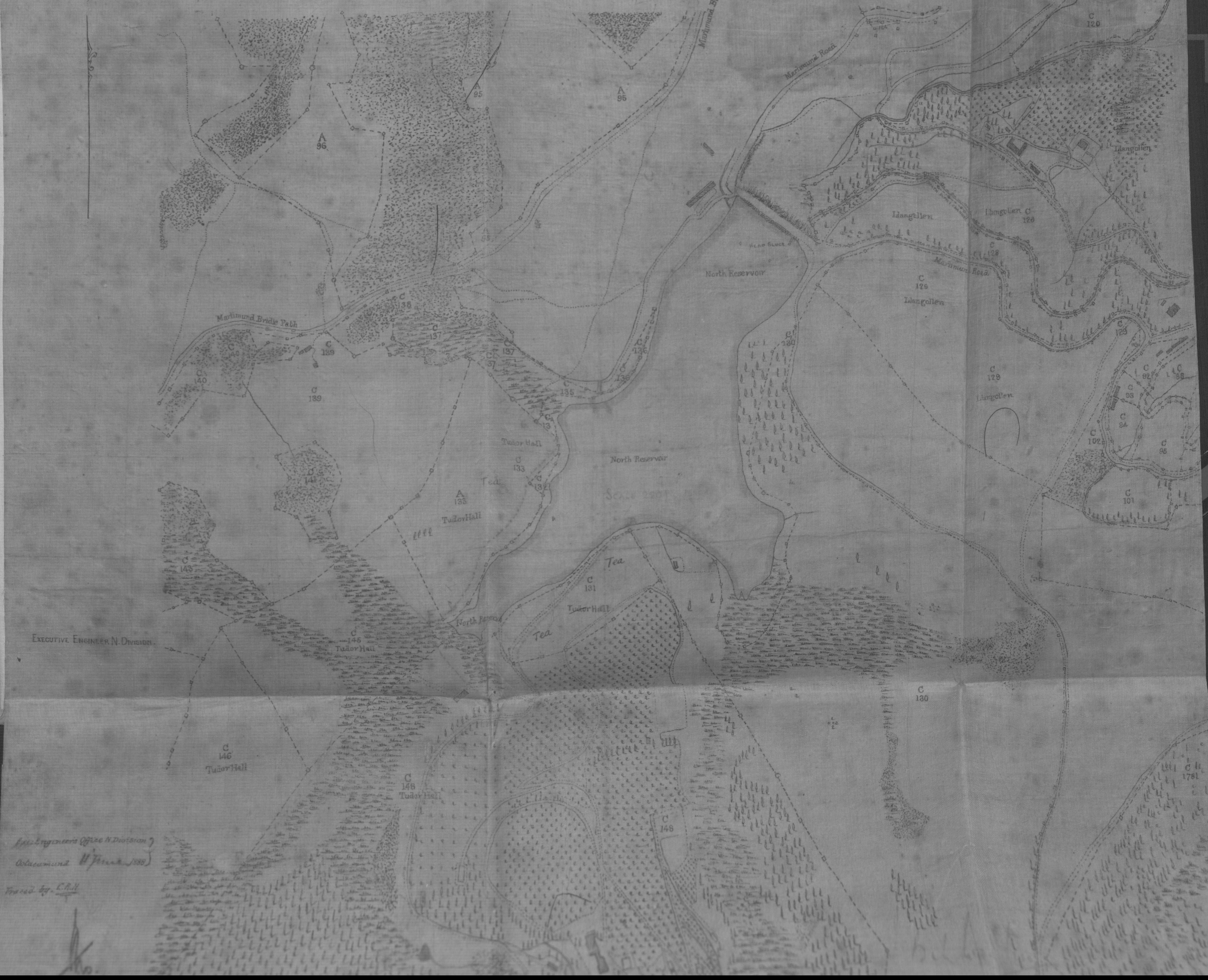
File
14/8/88

7
JV
16/8

R C

To
The Supdg. Engr. IV Circ.
Public Deptt.

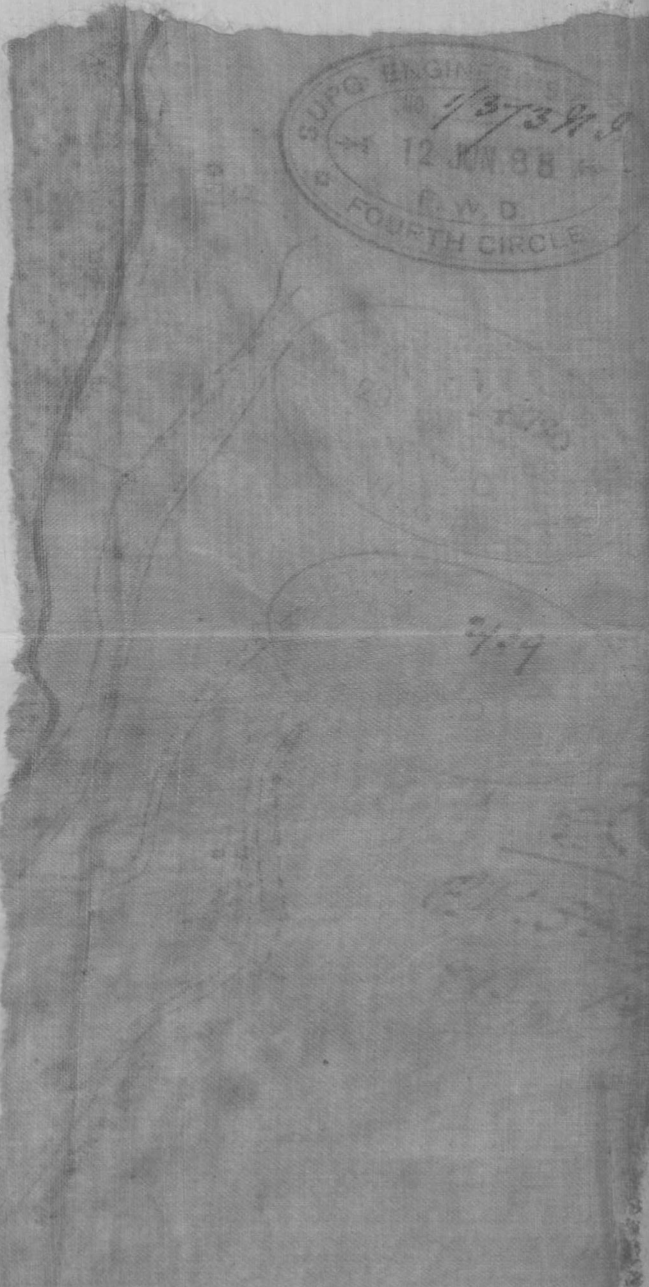
# TRACING FROM OOTY SETTLEMENT MAP



Exe: Engineer's Office N Division
Ootacamund 11 June 1885

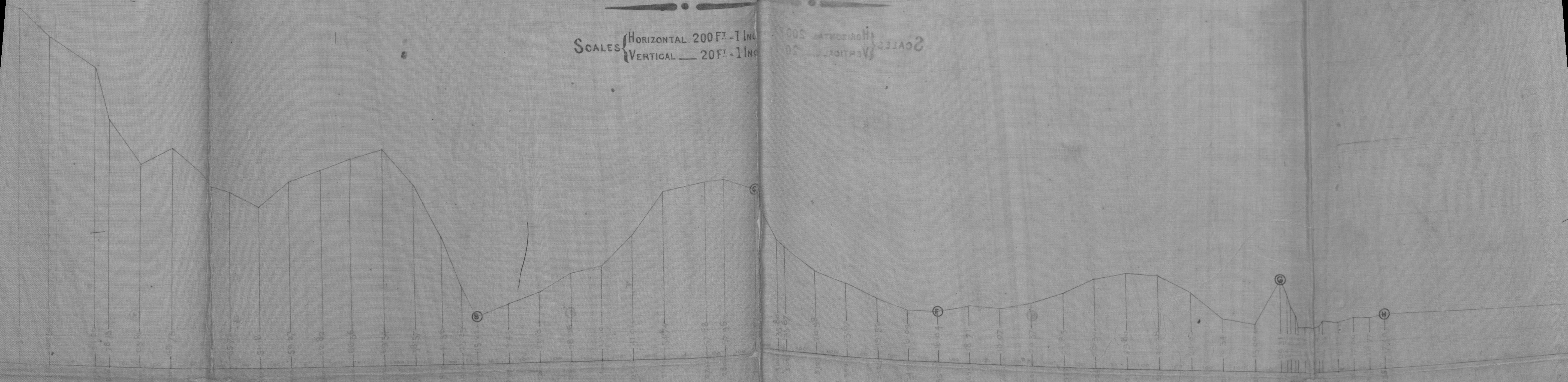
Traced by. C.R.H

SUPG. ENGINEER
No. 13/73 H.G.
12 JUN 88
P.W.D.
FOURTH CIRCLE

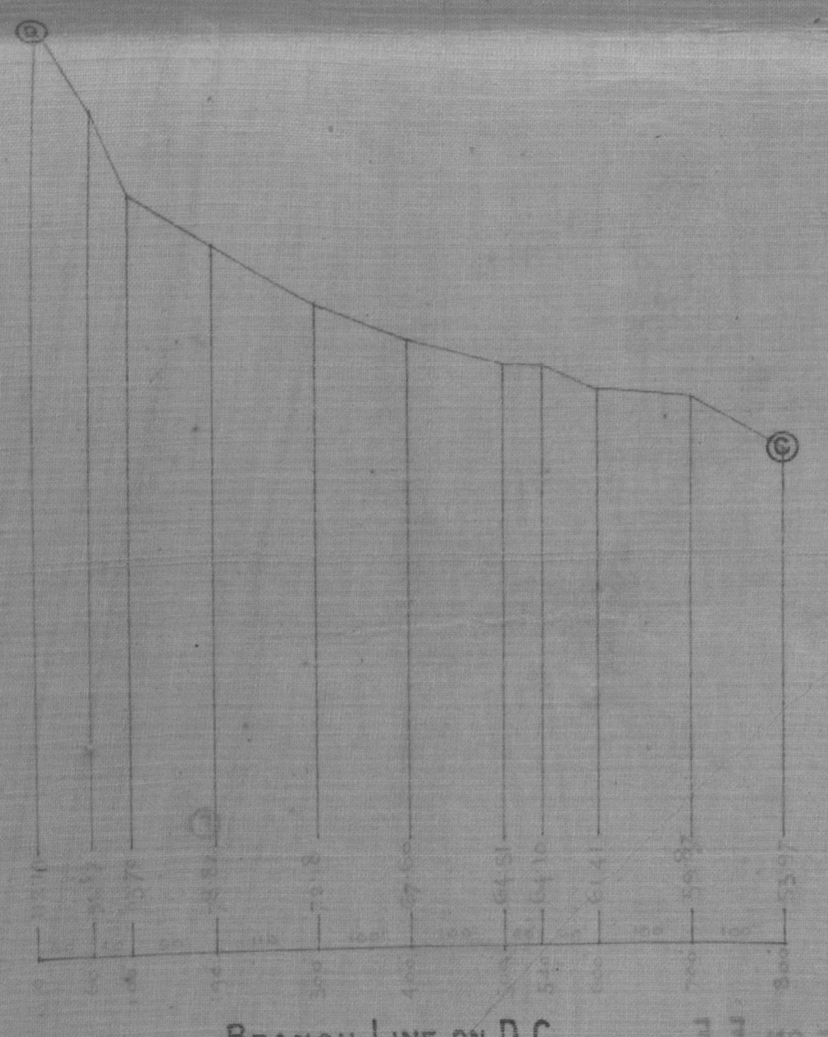


# LEVELS ALONG LOWER EDGE OF TEA PLANTATION
# ON MARLIMUND CATCHMENT.

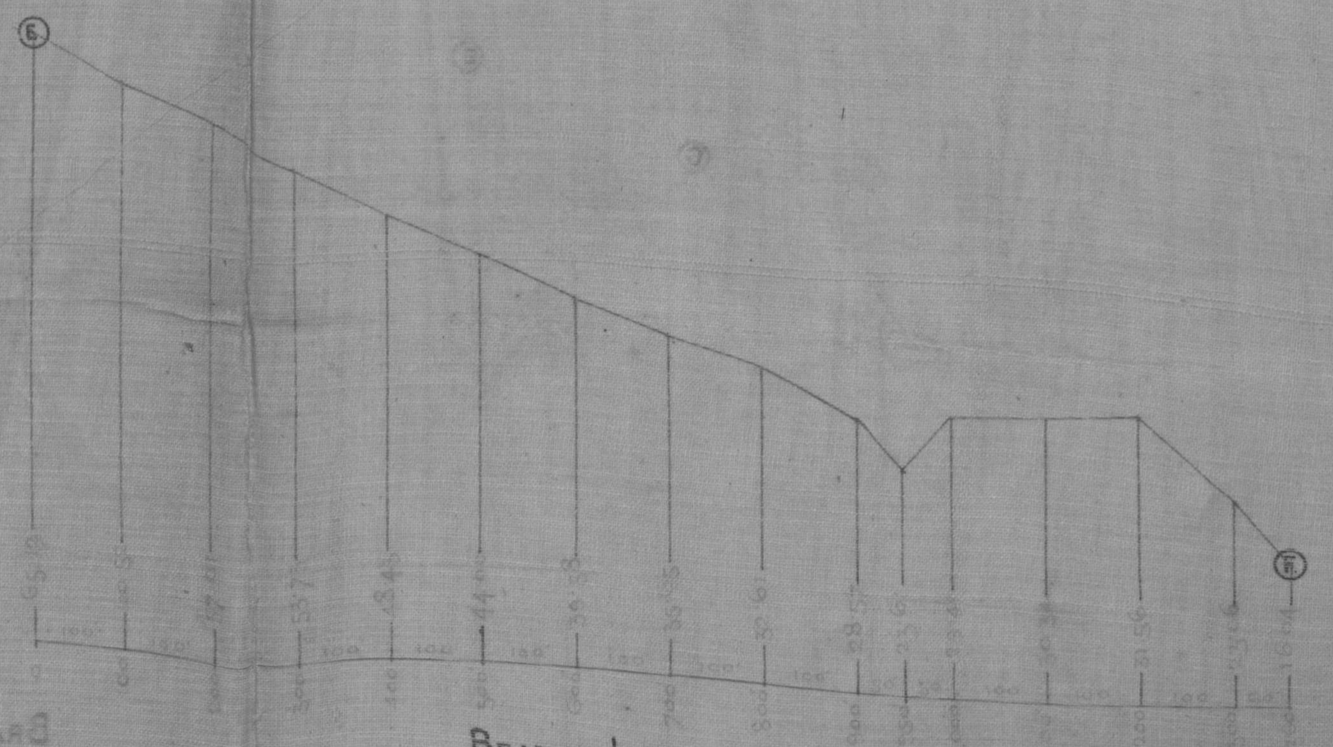
SCALES { HORIZONTAL. 200 FT = 1 INCH
VERTICAL ___ 20 FT = 1 INCH



LONGITUDINAL SECTION ON A. B. C. F. G. H. K.



BRANCH LINE ON D.C.



BRANCH LINE ON E.F.

EXECU

SUPG: ENGINEER'S OFFICE
NO. 2/3/53
12 JUN. 88
P. W. D.
FOURTH CIRCLE

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8107

Enclosure 1 to ~~Supg~~ Engineer

Analysis of water (8 samples) taken from the Marlimund Reservoir and its affluents by the Ex: Engineer Nilgiri Division –

| | Snowdon North supply | Snowdon South supply | Marlimund near sluice | Marlimund No 1 North affluent | Marlimund No 2 & 3. North affluents at head of lake | | Marlimund Wapshare's peat bog | |
|---|---|---|---|---|---|---|---|---|
| | No 1. | No 2. | No 3. | No 4. | No 5 | No 6. | No 7. | No 8. |
| Total Solids .. Grms per litre | 0·040 | 0·050 | 0·060 | 0·070 | 0·040 | 0·040 | 0·060 | 0·120 |
| Volatile — Do — Do | 0·010 | 0·030 | 0·020 | 0·040 | 0·030 | 0·030 | 0·030 | 0·040 |
| Chlorine — Do — Do | 0·007 | 0·007 | 0·005 | 0·005 | 0·005 | 0·005 | 0·005 | 0·005 |
| Total hardness — Clark's scale | 0°·875 | 0°·525 | 0°·700 | 0°·700 | 0°·350 | 0°·700 | 1°·050 | 0°·525 |
| Permanent do — Do — Do | 0°·700 | 0°·350 | 0°·525 | 0°·525 | 0°·350 | 0°·625 | 0°·700 | 0°·350 |
| Free ammonia. Milgrms per litre | trace | trace | 0·040 | trace | 0·040 | trace | 0·040 | trace |
| Albumenoid do — Do — Do | 0·120 | 0·160 | 0·240 | 0·200 | 0·160 | 0·240 | 0·160 | 0·280 |
| Nitric acid — Do — Do (as Ammonia) | 0·600 | 0·150 | 0·150 | 0·150 | 0·150 | 0·300 | 0·150 | 0·150 |
| Apparent quality of the water as inferred from the results obtained on examination | Vide letter attached No. 132 dated 23rd February 1888. | | | | | | | |
| Remarks. | slight deposit of vegetable debris | slight deposit of vegetable debris Infusoria & pollen grain | Water cloudy deposit of vegetable debris. Many infusoria, pollen grains & angular mineral particles | Much vegetable debris Absence of animal life | Water cloudy slight deposit of vegetable debris few diatoms & desmids. | Deposit of vegetable debris. | Water cloudy granular deposit (Vegetable) | Water very cloudy deposit of masses of vegetable debris & granular (vegetable) matter |

2807/28

(True Copy)

(Signed) W. K. de Winton
Executive Engineer

(Signed) J. L. Van Geyzel

Collector

SUPG. ENGINEER'S OFFICE
No. 3/269
19 APR. 88
P.W.D.
FOURTH CIRCLE

EXECUTIVE ENGINEER'S OFFICE
JUN 1888
P.W.D.
NILGIRIS

SUPG. ENGINEER'S OFFICE
13 JUN. 88
P.W.D.
FOURTH CIRCLE

Enclosure 3 to Supdg Engr's

# Analysis of water taken from the Marlimund Reservoir by the Collector

| | | Water of the Marlimund Reservoir | |
|---|---|---|---|
| Total Solids .. | Grms. per litre | 0·070 | The amount of Free Ammonia and Albuminoid Ammonia are high and point to Contamination by organic matter. The small amount of chlorine present tends to negative the source of contamination being animal organic matter. A careful inspection should be made of the catchment area drained by this water source, otherwise it is a good soft water. |
| Volatile solids .. | do do | 0·040 | |
| Chlorine .. .. | do do | 0·005 | |
| Total hardness .. | Clark's scale | 0°·875 | |
| Permanent hardness .. | do do | 0°·700 | |
| Free ammonia .. | Milgrms. per litre | 0·320 | |
| Albuminoid Ammonia | do do | 0·240 | |
| Nitric acid .. | do do (as Ammonia) | 0·300 | |
| Apparent quality of the water as inferred from the results obtained on examination | | | |

Remarks. Sediment contains vegetable debris and few particles of sand.

(Signed) J. S. Van Geyzel M.B.
Ag. Chemical Examiner

(True Copy)

Collector.

2807/29

A.S.

SUPG. ENGINEER'S OFFICE
No. 2/3691
19 APR. 88
P.W.D.
FOURTH CIRCLE

EXECUTIVE ENGINEER'S OFFICE
GEN'L No. 3/116
7 JUN 1888
P.W.D.
NILGIRIS.

SUPG. ENGINEER'S OFFICE
No.
13 JUN. 88
P.W.D.
FOURTH CIRCLE

Enclosure to the Supg. Engineer

No. 249/315 of 14-4-88

No 614
12-3-88

SUPG: ENGINEER'S OFFICE
NO.
13 JUN. 88
P.W.D.
FOURTH CIRCLE

From
the Collector of Nilgiris

SUPG: ENGINEER'S OFFICE
NO. 2/369
19 APR. 88
P.W.D.
FOURTH CIRCLE

EXECUTIVE ENGINEER'S OFFICE
GEN'L NO.
7 JUN 1888
P.W.D.
NILGIRIS.

To
the Chief Secretary to
Government
Public Department
thro' the Sanitary Commr
Madras

Dated 9 }
Recd } March/88

No 13

Encl: 3

Subject

Marlimund Water

Forwarding for information & orders of Government Copies of Analyses of received from the Chemical Examiner Madras

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PUBLIC WORKS DEPARTMENT.

2507
31

READ the following: —

Letter from the Supdg Engr IV Circle No. 242/EW dd June 14, 1888.
" " Surgeon General with the Govt of Madras } " 9/388 dd Augt 2, "

FOR ORDERS.

Then to drain by deep cuttings or to [illegible] cutting [illegible] [illegible] [illegible] of the peat bogs. [illegible] catch drains below the tea plantation [illegible] [illegible] [illegible] for att[illegible] [illegible] [illegible]

13 Aug

The Surgeon General's letter leads me to think there is no occasion either to exclude the tea plantation from the gathering ground, or to buy up the peat bogs. and for the present at all events I think this part of the scheme may be left in abeyance.

Filtering also may be left for future consideration and I think a revised estimate may be prepared with these omissions

JOU 11/8/88

Order accordingly

JOU
13/8/88

25074

OLS 5.VIII
Hlu 12.VIII.88

50 1
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Govt. of (1888) Madras.

PUBLIC WORKS.

18/8

Dated

Recd.

Recd.

G.O. 16th Augt 1888, No. 2507 W.

Ootacamund Water Supply Scheme.

Communicating to the Executive Engineer Nilgiri Dn. letter from the Surgeon General on the subject of the — with instructions for the preparation of a revised estimate.

95/6

8/19/8