M.R.O. 1—77,006—8-6-37.

(1) Number of pages 20.

(2) Date of repair 5-5-43

(3) Initials of the Referencer

MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. 3242 — Press Mis.

329-331

Dated 17-6- 1867.

Not to be folded or roughly handled

Read the following letters :—

No. 329. From the Acting Superintending Engineer, 4th Division, to the Secretary to Government, Public Works Department, dated Madras, 21st June 1867, No. 1,438.

1 Plan.
1 Estimate.

G. O. No. 2,000. dated 25th June 1866.
" " 2,344, " 24th July "
" " 2,597, " 18th Aug. "
" " 755, " 3rd March 1867.
" " 1,516, " 20th May "

1. Government in Orders as per margin, sanctioned the construction of a filtering cistern at the Seven Wells, and the work has been completed, including a store godown, at a cost of Rupees 3,039-9-9.

2. The Executive Engineer of the Northern Range, Presidency, now reports that the surface of the water rapidly becomes foul, and that it is found if the sun's rays are excluded the scum on the surface disappears. On these grounds he recommends the construction of a corrugated iron roof over the cistern at a cost of 1,760 Rupees, or, deducting the value of materials to be obtained from the Mint and Public Works Stores, Rupees 470.

3. I beg to enclose plan and estimate for this work, and to recommend its sanction, if no other funds are available, from the balance of the sum of Rupees 2,000 allotted for Minor New Works, Military Buildings, at the Presidency, and which now amounts to Rupees 435, the remainder being obtained from transfers later on in the year.

Referred to the Sanitary Commissioner, for his opinion on the nature of the scum alluded to.

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

27th June 1867.

No 330. From the Secretary for the Sanitary Commissioner, Madras, to the Secretary to Government, Department Public Works, dated Madras, 7th October 1867, No. 465.

* Covering one enclosure herewith returned.

1. In reply to your reference* under date 27th June, regarding the nature of the scum found upon the water in the filtering cistern at the Seven Wells, I have the honor to report that it consisted of vegetation, such as usually forms upon stagnant water in tropical climates.

2. As, however, I was of opinion that its existence was chiefly due to a radical fault of construction in the cistern itself, and as it was extremely difficult to say whether the proposed roof suggested by Captain Goddard, and approved by Colonel Bean, would ensure the desired end, I considered it advisable to submit to Government a complete statement as to the best means for improving the water to be supplied to the troops in Fort St. George.

3. I regret that illness and my absence from Madras on inspection duty, and the subsequent illness of the Sanitary Commissioner, have delayed the preparation of this report.

4. Government are aware that the erection of the filter was first suggested by Captain Tulloch, R. E., and I may add that this Officer's recommendations were approved by Government. They were as follows:—"As to the means which should "now be adopted to secure good water for the Fort and General Hospital, they "seem to me to be very simple. It should cost very little to make the supply as "good in quality as it originally was. The water at present is raised by two pecot-"tahs. The first lifts it to the surface of the ground, and the second from the "surface into the high cistern, from which it flows to the Fort. Nothing would be "simpler than to construct an artificial filter bed of sand (say two or three feet thick) "on the surface of the ground. Let the water as it is lifted from the well flow on to "this filter. After it has been filtered let it enter a small clear water basin, and "there be raised, as it now is, into the high level reservoir. The cost of this "ought to be very trifling as compared with the object to be gained. One "square-yard of filter bed of the kind I propose would purify at least 500 gallons "in twenty-four hours. Suppose the population of the Fort to be 3,000 and the "inmates of the Hospital 1,000, and suppose 20 gallons are required per head, "then the total number of gallons required for the Fort and General Hospital "would be $4,000 \times 20 = 80,000$ gallons. The area of the filter bed would be "$\frac{80,000}{500} = 160$ square-yards, or 16 yards long by 10 wide. It might be built as "per sketch.

"The flooring of the filter might be of square bricks set in hydraulic "cement on a bed of concrete. On the flooring ordinary bricks might be laid "down on edge, about one or two inches apart. On these bricks a layer (a few "inches thick) of broken granite stones or gravel might be thrown, and over the "stones pure sand. The thickness of the stones and sand together might be "three feet."

5. Captain Tulloch clearly contemplated that the receiving cistern of No. 1 well, which is fed by all the other wells, and from which the water is raised for ultimate delivery to the Fort, should alone have been used to supply the filtering cistern. This, however, has not been done. The cistern has been erected between the feeding wells and the receiving cistern, from which the collected water is raised for final discharge. The object of this arrangement was, I believe, to obviate the cost of the "clear water basin" contemplated by Captain Tulloch. In fact the existing receiving cistern of No. 1 well was made to perform the part of a clear water basin, and for this its position rendered it peculiarly suitable.

6. In consequence of the facts, that several of the wells now supplying the filtering bed only raise the water to the level of about two or three feet above the ground, and that iron piping could not conduct this water to the surface of the filtering bed, Captain Goddard adopted the principle of upward-filtration, which, I am constrained to observe, does not appear to me to be suited to the requirements of the present case.

7. The filter bed is a masonry chamber 48 by 30 feet and 6 feet deep, and the filtering medium is charcoal and sand. The inlet pipes are below, and the outlet pipe is above. The deposit of the solid filtrate takes place at the bottom of the filter, and can only be removed by taking out the whole of the contents. The

frequency with which this might become necessary may be inferred from the experience of an artificial sand filter, which in the first week yielded ten volumes of water, in the second week yielded nine, in the third week six, and in the fourth only two.

8. Ordinary downward filtering beds require to have the surface sand removed at intervals varying from two to fifteen days, and the whole of the sand must be removed twice a year. As at the Seven Wells there are no means of judging of the condition of the lower strata of the filter bed; it is impossible to say how frequently the whole should be cleared out, but probably not less frequently than once a fortnight.

9. Under these circumstances, unless Government is prepared to abandon the present filtering chamber, and to construct one with clear water basin and lifts, &c., it becomes necessary either to abandon the system of filtering or to erect a second lift at each of the feeding wells, and conduct the water by converting the present pipes into syphons inverted, which would empty themselves above the newly arranged filter. The cost of this should not be very great, as the only new material to be provided would be the iron pipes required, and additional labor for the second lift.

10. The advantages to be gained by this alteration of the now practically useless filtering chamber are,

1st. Facility of clearing the filter.

2nd. Greater rapidity in filtration from downward pressure.

3rd. The surface water would be in constant agitation, which would in all probability prevent the formation of vegetation.

11. In conclusion, and in support of the latter expectation, I may explain that it is to the stagnation of the surface film of the water (between the air above and the level of the exit pipe), about six inches deep, that the vegetation is due; this water being exposed freely to light and air. Darkness does not *remove* the scum, as reported by Captain Goddard, but the absence of light prevents its appearance.

12. As I cannot but regard the filtration of the Seven Wells water as of extreme importance to the health of the troops in Fort St. George, I trust that the recommendations contained in this report may meet the approval of Govern-ment. I must add that on revising the estimate for the proposed roof, it was found that the cost would be not 470 Rupees nett, but 1,138 Rupees nett.—(*Vide* revised estimate).

13. Should it be found necessary eventually to roof in the filtering chamber, I think that the diminution of the number of pillars (15), shown in the first plan by Captain Goddard, should be insisted on, and not more than nine substituted for them. The accompanying revised plan shows how this can be done.

[illegible] and Public Works Stores, Rs. 470

Proceedings of the Madras Government, Public Works Department.
17th October 1867.

No. 331. ORDER THEREON, 17th October 1867, No. 3,212.

MILITARY WORKS, No. 27.

Ordered that the foregoing letter from the Sanitary Commissioner be communicated to the Superintending Engineer of the 4th Division, who will submit the requisite plans and estimates for giving effect to the recommendations contained in paragraphs 9 to 12.

(True Extract.)

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

To the Sanitary Commissioner.
" Superintending Engineer, 4th Division, with two Plans and one Estimate
" Military Department.

Superint.g Engrs Office 4th Divn
Madras 21st June 1867.

No. 1438

From,

Lieutenant Colonel J. Dean R.E.
Acting Sup.g Engineer 4th Divn

To,

Colonel C. A. Orr R.E.
Secretary to Government P.W.D.
Fort Saint George

Sir,

Inclosure
1 Plan
1 Estimate

Government in Orders as per margin, sanctioned the construction of a Filtering Cistern at the 7 Wells, and the work has been completed including a Store godown at a cost of Rupees 3,039-9-

G.O. No. 2000 dated 25th June 1866.
G.O. No. 2344 dated 24th July 1866.
G.O. No. 2597 dated 18th August 1866.
G.O. No. 756 dated 3rd March 1867.
G.O. No. 1516 dated 20th May 1867.

2 The Executive Engineer of the Northern Range Presidency now reports that the surface of the water rapidly becomes foul, and that it is found if the Sun's rays are excluded the scum on the surface disappears. On these grounds, he recommends the construction of a corrugated iron roof over the Cistern at a cost of 1,760 Rupees, or, deducting the value of materials to be obtained from the Mint and Public Works Stores, Rs. 170

I

3

I beg to enclose plan and estimate for this work, and to recommend its sanction, if no other funds are available, from the balance of the sum of Rupees 2,000 allotted for Minor New Works Military Buildings at the Presidency and which now amounts to Rupees 435, the remainder being obtained from transfers, later on; in the year.—

I have the honor to be
Sir
Your Most Obedient Servt
W. Caine Lt. Col. R.E.
A. F. Supt. Engr. 1st Div.
Supt. Engrs Office 1st Div.
Madras 21 June 1867

To,
Colonel C. A. Orr R.E.
Secretary to Government P.W.D.
Fort Saint George

7-

Esp

3 Recd to enclose plan and estimate

Rec'd from Govt. for October
No 2329.
From
The Acting Supg Engr
4th Division

To
The Secretary
to Government P.W.D

Dated 21st June 1867
Recd 22nd June 1867.

No. 1438.
Ex. 2 P.W. 3212/67

Submitting with remarks
a Plan & an Estimate
Amounting to Rs. 176 for
Constructing a Corrugated
Iron Roof over the Cistern
at the 7 Wells or deducting
the value of Materials to
be obtained from the
Public Works
Store Rs. 47.
No. 3212 - 175 dated 24th 1867

Referred

27th June 1867
To The Sanitary Commissioner for his opinion as to the nature of the scum alluded to.
Colonel
Secy to Govt

Received 29th June 1867
Replied 1st July 1867 R. No
Recd 26th June 1867 R. 27

(over)

No. 465 2

OFFICE OF SANITARY COMMISSION,
Madras, 7th October 1867.

From 9

The Sanitary Commissioner, Madras,

To, Colonel C. A. Orr R. E.
Secretary to Government
Department Public Works

Sir,

I am reply to your reference under date 27th June, regarding the nature of the scum found upon the water in the filtering Cistern at the Seven Wells, I have the honor to report that it consisted of vegetations such as usually form upon stagnant Water in Tropical climates.

2. As however I was of opinion that its existence was chiefly due to a radical fault of construction in the cistern itself, and as it was extremely difficult to say whether the proposed roof suggested by Captain Goddard and approved by Colonel Beaw would ensure the desired end, I considered it advisable to submit to Government a complete statement as to the best means for improving the Water to be supplied to the Troops in Fort Saint George.

3. I regret that illness and my absence from Madras on inspection duty and

* covering one enclosure herewith returned.

3 and the subsequent illness of the Sanitary Commissioner have delayed the preparation of this Report.

4. Government are aware that the erection of the filter was first suggested by Captain Tulloch R.E. and I may add that this Officer's recommendations were approved by Government. They were as follows.—

"As to the means which should now be adopted "to secure good Water for the Fort and the "General Hospital, they seem to me to be "very simple. It should cost very little "to make the supply as good in quality as it "originally was. The Water at present is raised "by 2 persons. The first lifts it to the surface "of the ground and the second from the "surface into the high cistern from which "it flows to the Fort. Nothing would be "simpler than to construct an artificial "filter bed of sand (say 2 or 3 feet thick) "on the surface of the ground. Let the "Water as it is lifted from the well flow "on to this filter. After it has been filtered "let it enter a small clear water basin "and there be raised as it now is into "the high level reservoir. The cost of this

"this ought to be very trifling as compared "with the object to be gained. One square "yard of filter bed of the kind I propose "would purify at least 500 gallons in 24 hours. "Suppose the population of the Fort to be "3,000 and the inmates of the Hospital 1,000 "and suppose 20 gallons are required "per head; then the total number of "gallons required for the Fort and General "Hospital would be 4,000 × 20 = 80,000 gallons. "The area of the filter bed would be "$\frac{80,000}{500}$ = 160 square yards or 16 yards long by "10 wide. It might be built as per sketch."

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case.

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8. Ordinary downward filtering beds pequire to have the surface sand pemoved at intervals varying from two to fifteen days and the whole of the sand must be pemoved twice a year. As at the Seven Wells there are no means of judging of the condition of the lower strata of the filter bed it is impossible to say how frequently the whole should be cleaned out, but probably not less frequently

frequently than once a fortnight.

9. Under these circumstances, unless Government is prepared to abandon the present Filtering chamber and to construct one with clear Water basin and lifts &c., it becomes necessary either to abandon the system of filtering or to erect a second lift at each of the feeding wells and conduct the Water by converting the present pipes into syphons inverted which would empty themselves above the newly arranged filter. The cost of this should not be very great as the only new material to be provided would be the iron pipes required, and additional labour for the second lift.

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12. As I cannot but regard the filtration of the Seven Well Water as of extreme importance to the health of the Troops in Fort Saint George, I trust that the recommendations contained in this Report may meet the approval of Government. I must add that on revising the Estimate for the proposed roof it was found that the cost would be not 470 Rupees nett, but 1138 Rupees nett (Vide revised Estimate)

13. Should it be found necessary

necessary eventually to proof in the filtering chamber, I think that the diminution of the number of pillars (15) shown in the first plan by Captain Goddard should be insisted on and not more than 9 substituted for them. The accompanying revised plan shows how this can be done.

I have the honor to be

Sir

Your most obedient Servant

Secretary for Sanitary Commissioner.

Accompaniments.

1 Letter with order of Government.
1 Plan of Roof.
1 Revised do.
1 Estimate with pencil in pencil.

dlc 5/2 18/10/67

1

19

Public Works Department.

No 3212

PROCEEDINGS of the MADRAS GOVERNMENT.

Under date the 17th Octr 1867

Read the following

From the Acting Supg Engr 1st Div (WG. No. 1438 d/ 21st June/67
From The Sanitary Commissioner (Here enter No. 465 dated 7th October 1867
Madras

Ordered that the
foregoing letter from
the Sanitary Commissioner
be communicated to
the Supg Engineer of
the 4th Div, who will
submit the requisite
plans and estimates
for giving effect to
the recommendations
contained in paras 9
to 12.

To Sanitary Commr. ✓
To Supdg Engr 4 Div with two plans & one estn ✓
2 Encls
To Fins Dept ✓
Desp 18/10/67

From E. Bell Esq for Offg
Secretary to Govt
The Sanitary Commissioner
Madras

Dated 7th October 1867
Despatched 8th October 1867
Received

No 465
Enclosures 4.

Submits observations with certain
recommendations relative to the
drainage of the area found upon
the Maidl in the following Calendar
the Town Wells.

No 3212 - 17th Octr 1867 -

Rs 330
2. 11th Oct/67 R. 14th

P. W. 1867. Department.

Pro: of Govt. for October

No. 3212

PROCEEDINGS OF GOVERNMENT. of Madras

Dated 17th October 1867

Instructing the Supg. Engr. of the 1st Division to submit Plans and Estimates for giving effect to the recommendations of the Sanitary Commissioner for alterations to the Filtering cistern at the Seven Wells Presidency.

A. 329 @ 331

A. 11th Octr 1867 Q. 14th