

INDEXED. *NBS*

Local & Munl. (1897) Department.

MISCELLANEOUS.

G.O., No. 539 M.

DATED 15-3-97

DISPATCHED.

[Despatch Abstract.]

Salem water supply scheme

Recording G.O. P. B. D., awaiting a further report, promised by Mr. Middlemiss as to whether an artesian well would succeed in the locality proposed in connection with the —, directing the Superintending Engr. to submit estimates for sinking the two additional experimental wells suggested by him & Commr. & the papers on the subject to the Officer & despatch: Concurred.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

LOCAL & MUNICIPAL DEPT

CURRENT No. 661 M

BUILDINGS AND ROADS.
CIVIL WORKS.

Government 1897 of Madras. PUBLIC WORKS.

Recd.

Enclosures

Regd.

1897.

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G.O., No. 147 W., 19th January 1897.

SECRETARY TO GOVERNMENT
16 FEB-1897
LOCAL & MUNICIPAL DEPARTMENT

JANUARY.

Ref.
Please find
up the papers
4/3/97

Salem Water-supply Scheme

Awaiting the further report promised by Mr. Middlemiss as to whether an artesian well would succeed in the locality proposed in connection with the —, directing the Superintending Engineer to submit estimates for sinking the two additional experimental wells suggested by him, and communicating the papers on the subject to the officer and department concerned.

order 539 mis, 15.3-97
Recorded!

Copy to the Chairman, M.C. Salem.
17/1/97
17/1/97
17/1/97

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following papers:—

From H. H. O'CONNELL, Esq., Executive Engineer, Salem Division, to the
Superintending Engineer, IV Circle, dated Salem, 13th August 1896,
No. 297 S.E.

With reference to your No. 92/S.L., dated 1st April 1896, I have the honour to
submit herewith a report on the trial well sunk in connection with the Salem water-
supply scheme.

I have not been able to ascertain whether the surface and spring waters finding
an outlet near the Kannimar temple in rear of the Gurramalai range could be used,
as since April no water has been flowing here.

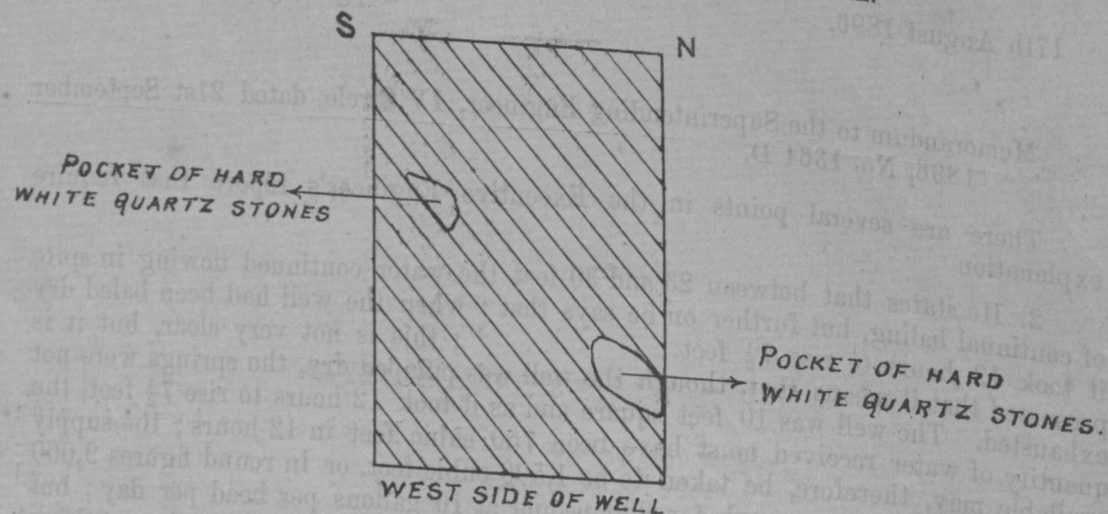
ENCLOSURE.

Salem Water-supply Scheme.

REPORT on the trial well dug at the foot of the Namamalai Hill.

Notes during construction.—The excavation of this well was commenced on the 15th May
1896, and sub-soil water was met with at 5 feet below ground level; baling was commenced at
this level and when the well had been sunk to 10½ feet it was found that this sub-soil water
ceased to flow. From 10½ feet to 23 feet further springs were met with, but they disappeared
after continual baling. From 23 to 30 feet stronger springs were met with and continued
flowing in spite of continual baling. The work was practically completed on 1st August.

2. *Geological features.*—The first 7½ feet sunk through was ordinary soil mixed with small
kunker, and from 7½ feet downwards the well was sunk through decomposed gneiss. The strata
dipped down very steeply, the inclination being from south towards the north.

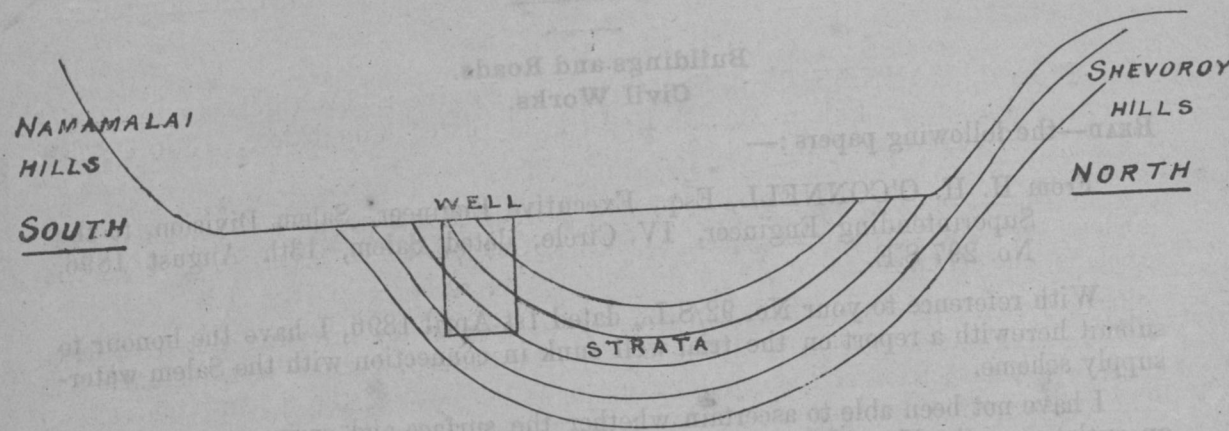


Several packets of hard smooth white quartz were met with.

3. *Flow of water into well.*—The springs between 23 feet and 30 feet from surface were
mostly situated on the north face of the well; there were three strong and two weak springs on
this face. There were, besides these, one spring on the west and one on the east face and a
small spring in the south-east corner. When the well had been baled dry it took 12 hours for
the water to rise to 7½ feet, 24 hours to rise to 12½ feet, and 48 hours to rise 21 feet.

4. The water eventually rose to 24 feet. The well is 10 feet square.

5. *General remarks.*—From the dip of the strata and the fact that the strongest springs
are situated on the north face of the well, it is surmised that the sub-soil water is received from
the Shevaroy Hills; and



that if the well were sunk deeper, better springs would be obtained and that it is possible that
an artesian well would answer if sunk here.

6. The wells in the vicinity which are only 15 feet were not affected when the well was
baled out, which leads to the supposition that the water they received ran in from other strata.

No. 403/W.

Copy submitted to the Chief Engineer, Public Works Department, with refer-
ence to his memo. No. 1727 C., dated 27th March 1896.

(Signed) J. HANNAN,
Supg. Engineer, IV Circle.

17th August 1896.

Memorandum to the Superintending Engineer, IV Circle, dated 21st September
1896, No. 1364 D.

There are several points in the Executive Engineer's report that require
explanation.

2. He states that between 23 and 30 feet the water continued flowing in spite
of continual baling, but further on he says that "when the well had been baled dry
it took 12 hours to rise 7½ feet"; this is not very clear, but it is
presumed that it means that, though the well was pumped dry, the springs were not
exhausted. The well was 10 feet square and as it took 12 hours to rise 7½ feet, the
quantity of water received must have been 750 cubic feet in 12 hours; the supply
available may, therefore, be taken to be 1,500 cubic feet, or in round figures 9,000
gallons in 24 hours, or enough for 900 people at 10 gallons per head per day; but
this information is of no use unless the Executive Engineer states the date on which
the experiment was tried and whether there had been much or little rain previously.

3. Again the Executive Engineer states that it is possible that an artesian well would answer if sunk here, but he gives no reason; a previous stratum receiving water from a high level and lying between the impervious strata is necessary for the formation of an artesian well and these conditions are apparently not fulfilled in the present case as far as has yet been ascertained.

4. It would have been well if the Superintending Engineer had given his opinion on the subject.

(Signed) D. McNEIL CAMPBELL, Col., R.E.,
Chief Engineer.

From J. HANNAN, Esq., Superintending Engineer, IV Circle, to the Chief Engineer, Public Works Department, dated Coimbatore, 13th October 1896, No. 504/W.

With reference to your memo., No. 1364 D. of 21st September 1896, I have the honour to submit a further report by Mr. O'Connell which seems to give all the explanations called for.

2. I think that Mr. O'Connell gives good reasons for inferring that if a deep well be sunk at this place a plentiful supply of water will be obtained. I enclose a tracing of this portion of the country known as the head of the Salem-Atur valley. The valley across here consists of layers of gneissic rocks of varying degrees of compactness from soft finely laminated schistone to hard granite gneiss. The former would, I imagine, be pervious; the latter impervious to water. The strike or outcrop of these strata runs in an easterly direction along the face of the Shevaroy Hills on the north and Jerugumalai Hills on the south. The geological formation would, therefore, appear to more or less fulfil the conditions required for an artesian well. But on this point the opinion of Mr. Middlemiss of the Geological Survey Department should be taken.

3. The alternative to an artesian well would be driving a horizontal tunnel, say 30 feet, below ground level, to tap the sub-soil water. This tunnel would have to run east and west or parallel to the outcrop. Assuming that the minimum yield from the well will be half what was actually obtained and that from a tunnel, say 10' x 10", will be in proportion to the yield from the well, the tunnel would have to be 1,000 feet long to give a supply of 10 gallons per head per diem to the town of Salem with its 50,000 inhabitants. The water can easily be supplied by gravitation.

4. At present the data available are totally inadequate to form any idea of the water available. I would propose that two more experimental wells similar to the one already constructed be sunk—one at 500 feet east, and the other at the same distance to the west of the existing well; and that all three wells should be continuously pumped out from, say, the 1st April to the 1st June next. If this be done, a fairly approximate forecast can be made of the water available. The pumping can be done by bullocks. The cost of these proposals will be Rs. 6,000, including cost of the well already constructed.

ENCLOSURE.

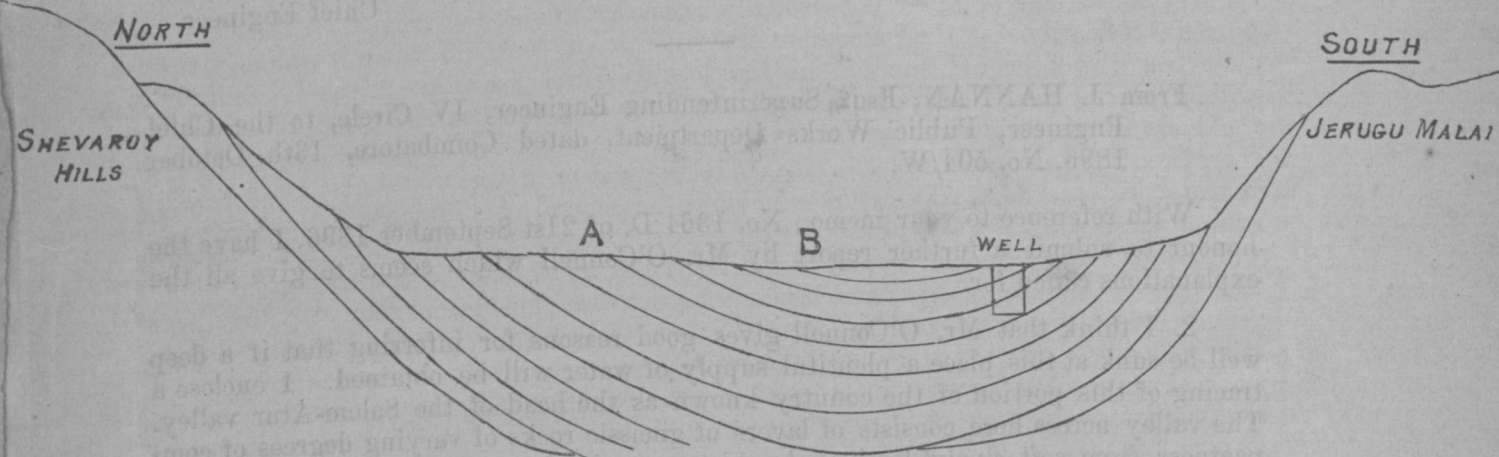
From H. H. O'CONNELL, Esq., Executive Engineer, Salem Division, to the Superintending Engineer, IV Circle, dated 1st October 1896, No. 355 S.E.

With reference to your No. 273 S.L., dated 26th September 1896, I have the honour to state that the presumption in paragraph 2 of the Chief Engineer's memo., No. 1364 D., dated 21st September 1896, is correct. The date on which the experiment was made for the full 12 hours by the sub-division officer is 20th July 1896, and I tested this on the 12th August 1896 by timing the rise of water in one hour and multiplying it by 12.

2. The rainfall previous to the experiments was very small and a long way behind the average rainfall. Nearly all the wells in Salem were dry, but the two wells which are situated within 200 yards of the trial well, had an ample supply of water. It is stated that these two wells have only failed once, and that was in 1878, the great famine year.

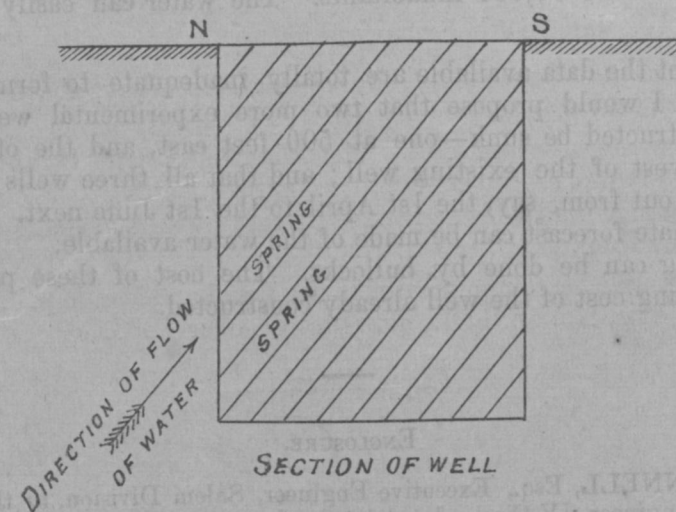
3. The previous rainfall had no effect on the results obtained and the experiments were made at a time when it was most difficult to obtain water elsewhere.

4. With reference to paragraph 3, I think I gave a reason why an artesian well would answer in this locality. I described how the strata dipped from south to north in the well



and how the strong springs were all situated on the north face of the well:

FIG. II.



The water therefore must be running up the strata. I presumed, therefore, that the water is gathered between A and B, Fig. I, and running down the strata between A and B, runs up again and finds its own level in the well. If the well were sunk deeper, I presumed that strata would be tapped, whose gathering ground would be at a high level in the Shevaroy Hills.

5. I think the conditions for an artesian well are fulfilled, for there are a series of pervious strata lying between a series of impervious strata.

From C. S. MIDDLEMISS, Esq., B.A., Superintendent, Geological Survey of India, to the Secretary to the Government of Madras, Revenue Department, dated Mathur, 5th January 1897, No. 70/F.S.

In reply to G.O., Mis. No. 4975 of 5th December 1896, with papers enclosed, which only reached me at the end of last month, I have the honour to say that the country to the east of Salem is personally unknown to me; but from the nature of the gneissic formations in the immediate neighbourhood, I should deem it unlikely that an artesian well would succeed in the locality proposed. As far as I can judge without seeing the place, I should say that if the well were carried much lower down, the beds of gneiss would become more undecomposed and less porous; and that, therefore, after a certain level is reached, the yield of water would also be less than in the more superficial rock-layers—which is the general rule in rocks of this class. I cannot agree with Mr. O'Connell in thinking that the springs of water in the present well are derived from the distant Shevaroy Hills; and I should think it more likely that they are due to fissures (which may take any direction) rather than to porous beds arranged in a synclinal basin between two impervious beds. For the latter condition, stratified sands and clays, or equivalent rocks, are required, *not* crystalline gneissic and schistose rocks, which at a good depth become equally impervious (practically speaking) to water, except along fissures.

I shall take an early opportunity of seeing the well for myself and examining the surrounding country, after which I will supplement this letter by another giving more warranted conclusions. Meanwhile, nothing better could be done than sinking the two wells, as proposed by Mr. Hannan in his note of 13th October 1896.

I return the enclosures.

Mis. No. 111, Revenue.

Transferred to the Public Works Department, with reference to its endorsement No. 4494 C., dated 28th November 1896.

8th January 1897.

(Signed) LIONEL DAVIDSON,
Under Secretary to Government.

ORDER—No. 147 W., dated 19th January 1897.

The letter from the Superintendent, Geological Survey, above recorded, will be communicated to the Superintending Engineer, IV Circle.

2. The further report promised by Mr. Middlemiss will be awaited, and meanwhile the Superintending Engineer should submit estimates of the cost of sinking the two additional experimental wells suggested in paragraph 4 of his letter, No. 504/W., dated 13th October 1896.

3. The papers will be communicated to the Local and Municipal Department, with reference to G.O., Mis. No. 1581 M., dated 1st October 1895.

(True Extract.)

C. S. Middlemiss
Under Secretary to Government.

To the Superintending Engineer, IV Circle.

„ Revenue Department.
„ Local and Municipal Department. ✓
„ Secretary, Sanitary Board.

Exd. T. K. Narayana Aiyangar.

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READ AGAIN G.O., No.

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