(1) பக்கங்களின் எண்ணிக்கை 18

(2) புதுக்கித் திருப்பிய நாள் 10/89

(3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம் Roya

தமிழ்நாடு ஆவணக் காப்பகம்.

தமிழ்நாடு அரசு

73

PWD துறை

அரசாணை எண். மு. கோப்புத் தாள் எண்.	1351	அச்சகம் பலவகை
நாள் :	20 - 5 - 1889	~~198~~ .

மடிக்கவோ கண்டபடி கையாளவோ கூடாது

9 sheets

ஆவண, சா-1—18,000—15-8-87.

5 Feb/89:

My dear Mead

Your note about the Tuticorin papers arrived when I had a bad headache, & I put it aside & forgot it; hence my delay in replying.

All the papers I referred to are in the Collector's office at Tinnevelly: the

account & diagram
of the boring were Lowrie's
copies, I think; the
originals seemed to be
in the "Civil Engineer's
Office, wherever that may
be: I did not ask
Russell Lowrie, as the
diagram and accompanying
report served my purpose
I believe I sent a copy
of the sectional ~~diag~~ diagram
with my letter.

Lowry drew out for me
a rough estimate of a
deep well, 50 feet deep;
8 feet diam. to about
32 feet with steining of
segmental well bricks laid
in P. cement; from 32' to
50' of 5' diameter without
steining, being in the solid
~~st~~ sandstone. Total cost
about Rs. 800. I have
suggested to the Commissioners
that they might very well

try this, & even go to 60 feet.

Yours sincerely

F.A. Nicholson.

1354

Enclos. 6 (1 Sketch)

P.W.C. Nº 858 - Endt. Nº 89 of

25-1-87 by the L & M. Dept.

Forwarding letter from the Collector of Tinnevelly for favor of remarks on the two suggestions made in the letter viz (1) that the services of a Compt. Sanit. Engineer shd. be made available for preparing a water supply scheme for Tuticorin, & (2) that an experiment shd be undertaken by Govt. to test the possibility of obtaining an underground supply of water, the cost of the experiment being repayable [illegible] Munl. Council in the eve[illegible]nt of success.

2

2

× so called Laudatum

2A

2

[illegible] 1855

I consider it would be [illegible] for the [illegible] of any Europeans being allowed sent to Tuticorin to purchase a cotton screw for that town [illegible] until the Commissioners clearly [illegible] what they require and decide whether they intend shifting their supply to [illegible] Trade or elsewhere.

If they decide to take [illegible] from [illegible] or [illegible] considered [illegible] Mr Rutherfurd has [illegible] given the Commissioners the information necessary to enable them [illegible] an estimate [illegible] their establishments [illegible] them as regards [illegible] and [illegible] them [illegible] difficulties [illegible] the necessary [illegible] estimates [illegible] to them [illegible] Commissioners [illegible]

[illegible] sink in an artesian
system the borings
at those distances with
allow them to [illegible]

The Sub Collector gives
his opinion that the
permeability would not
at the extent [illegible]
more than [illegible] a tract
of miles. If this is
the case I am no believer
of Tuticorin having
a fair water supply
and all that could be
done with that money
would be to slightly
[illegible] the present [illegible]
[illegible]
[illegible]
[illegible] of no other
[illegible] supply that
[illegible] to commence
[illegible] excep
[illegible]
[illegible] Wells
[illegible]
may [illegible] writes
for [illegible] possibility regarding
Artesian wells and
[illegible] the wells could
[illegible] an [illegible]
[illegible] quick
I cannot [illegible] think
I think the [illegible]

[illegible] by [illegible]
[illegible] [illegible]
[illegible] regard to Artesian
I do not [illegible]
[illegible] to give an
[illegible] I think it
[illegible] as well to ask
Geological [illegible]
their opinion as
to the probability of
[illegible]
[illegible] no record of
[illegible] Mr Nicholson
[illegible] ~~[illegible]~~ made
1848 but if the
[illegible] sand stone
[illegible] at 200 ft [illegible]
~~[illegible]~~
[illegible] be extended to
[illegible] of 600 ft [illegible]
[illegible] sand stone
not think that
[illegible] that a shaft could
[illegible] sand stone would
anything [illegible] any
[illegible] and the
~~[illegible] that the [illegible]~~
~~[illegible] probability~~
~~[illegible] existing supply~~
~~of 600 ft [illegible]~~
~~the supply would be~~
~~[illegible] any [illegible]~~
[illegible] will was carried
[illegible] this sand stone
[illegible] water [illegible]

[illegible] be consulted only
with the opinion of
the Geological Dept
might be asked as
regards the probability
of the sand stone bed
being of a reasonable
thickness and the probable
likelihood of water being
found below it with
sufficient pressure to
cause it to rise to or
near the surface.

I see no reason why
a trial well sh^d not
be made through the
sand stone and shells
down to the ~~sand Rock~~
say a depth of 2 to 3 ft
and probably there would
be but little difficulty
in reaching the junction
of the bottom of the Well
& the Rock & thereby ascertaining
if there is there a rock
until the [illegible] water
and probably thereafter
the sand stone and thus
would show whether a
flowing water good water
in sufficient quantity
could be obtained from
[illegible] at Tuticorin D.A
[illegible] would cost [illegible]

Rp 9

to [illegible] say R. 1000
it might be done by
the Municipal Commission
the ~~Rd~~ officers of
their Dept giving their
advice and assistance

I would not recom-
-mend Gov^t undertaking
this [illegible] being the
work unless the Geological
Dept gave a favourable
opinion on the [illegible]

W.M.

£350

9/2/87

Rs

35

4

A

1351

Transferred to the
Local & Municipal Dept.
with reference to its
Endt No 79 dated 5th
January 1889, herewith
received with enclosures.

D 13/2 11/2/89

Coll

13/2/89

Dw. 1358 4307.

139

The Korvalayar Valley Boring plant is not just now available as sanction has recently been accorded to continue the boring to 450'. If water is not then found the plant will be available for transfer and if S.E. cannot carry out the Experiment Mr. de Closets might be asked what he wd. do it for -

F.B.

13/v/89.

5

26th April 1889, No. 463 M., Local and Municipal.

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

Read—the following papers:—

From F. A. NICHOLSON, Esq., Acting Collector of Tinnevelly, to the Chief Secretary to Government, dated Tinnevelly, 23rd November 1888, No. 708.

I have the honor to forward herewith the marginally-noted papers regarding a water-supply scheme for Tuticorin.

(1) Council's Resolution, dated 4th October 1888.
(2) Chairman's letter to Government, No. 422, dated 16th October 1888.
(3) Sub-Collector's endorsement, No. 601, dated 27th October 1888.

2. The Council have had before them several plans kindly worked out by the Executive Engineer, Mr. Russell, but these were, of course, not working plans, but suggestions for future development. The Council have therefore decided to ask for the services of a special Engineer to work out the problem of a town water-supply in all its details.

3. I am not aware whether a Sanitary Engineer is as yet available in this Presidency, but, if so, I would respectfully urge (subject to my suggestions in paragraphs 4 to 12 below) that Tuticorin should have the benefit of his services at an early date. The town is an important seaport; it is growing apparently at the rate of 50 per cent. per decade, while its water-supply is of the worst possible description, the whole town being supplied during many months of the year either from surface town wells or from shallow pits dug in a particular locality (Melúr); the waste of time and labor is almost incredible, and the supply miserable. It is a pitiful sight to see crowds of women ladling out surface water from a shallow sand-hole a teacupful at a time, and after half an hour's labor to return, perhaps a mile, with a single potful of water, and yet this goes on for many months in every year. A water-supply scheme has been talked of for above 40 years, and is now precisely where it was at the beginning. With the recent completion of the uppar odei works, and the large additional supply thus made available at the Korampallam tank, and with the interest now displayed in the matter by the Town Council, there is every prospect of a gravitation scheme being carried out successfully, if the Council can only get a thoroughly good working plan and estimate drawn up by an Engineer who has the time necessary to examine the problem throughout, and who could decide as to the merits of the Korampallam scheme, the best method for utilizing Korampallam water, and the precise cost of the supply.

4. Personally, however, I much regret the abandonment of the artesian well experiments, and consider that the possibility of supplying the town with abundant perennial and absolutely pure water has not yet been dealt with. The recent experiment was not an experiment at all, as any well-sinker knows; it was abandoned as soon as the borer got to a hard stratum, and the bore never advanced beyond a few feet. The fact that an impermeable stratum was met with was not a bad sign, but the reverse, being one of the conditions of success; it was not gneiss that was met with, which would, of course, have concluded the experiment, being over bottom rock, but apparently coral. The lie of the country read with the experiments at Pondicherry and Karikal seem to presage success; it slopes down from the west with a regular and gentle dip, the gneiss being first overlaid by the products of its decomposition,

viz., the red soils, the red soils again disappearing apparently under the black soil as we get east of Tinnevelly, and this again being overlaid within a few miles of Tuticorin by the marine formations of the coast. I see no reason, therefore, to doubt that a bore at Tuticorin would, at no great depth, tap a water-bearing stratum having the suitable conditions for artesian success, viz., an impermeable stratum of gneiss below it, and impermeable strata of sandstone above it.

5. Since writing the above, I have obtained a paper giving the opinion of Mr. Bruce Foote, and other papers giving an account of borings at Tuticorin in 1848—1851. Mr. Bruce Foote, after giving an unfavorable opinion for the uplands of Tinnevelly, states as follows:—

> "Below the Puthugudi (Srivaikuntham) anicut, where the Tambraparni alluvium begins to widen out and probably becomes much thicker, deep wells might very likely tap water-bearing strata that would yield a large supply not reached by the ordinary shallow country wells. The same will most likely be the case all along the boundary of recent deposits which fringe the seaboard of the Tenkarai and Otapidaram taluks."

He goes on to say that, as the tract is covered with blown sand and pluvial deposits, the real disposition of the underlying strata can only be ascertained by borings.

6. The records of the attempts to make a well at Tuticorin in 1848—1851 supply this information, and exactly corroborate Mr. Foote. In 1848, the Public Works Department bored to the depth of 42 feet, and the strata passed through are as marginally noted. On reaching this depth, the experiment was abruptly ended by the removal of the Assistant Engineer, but, fortunately, though abortive, it was not inconclusive. The appended diagram shows the boring in section: down to 25 feet, sand, clay, shells, &c., were met with; at 25 feet, coral and soft sandstone (in that order) occupied 3 feet; at 28 feet, the borer entered hard sandstone. Up to this time salt and brackish surface water was met with, but, on reaching 31 feet, *the water changed*, and results at 42 feet "satisfied the Civil Engineer that fresh water was procurable at about 42 feet from the surface."

Loose sand	to 6 feet.
Blue clay, white clay, sand and shells	to 21 feet.
Do. with gravel and petrified shells	to 25 feet.
Coral rock and soft sandstone ..	to 28 feet.
Hard sandstone	to 42 feet.
(Boring ceased.)	

7. The great point here is that the hard sandstone was permeated with fresh water; that the fresh water was not at the top of the sandstone, but was only met with after sinking a yard into the hard sandstone; that the deeper the boring went the greater were the indications of good water; that therefore the fresh water was from below, not from above: that as the stratum of sandstone was pretty thick, the water from below was probably, though not necessarily, at some degree of pressure. Hence it is clear that the sandstone, as in England, was charged with water, and that that supply must be pressing upward from an underground source. Hence a deep well into the sandstone would yield abundant fresh water, and probably might prove to be a true artesian well on passing through the sandstone, which, being merely a marine formation and overlying strata which gently slope from the west, is probably of no such great thickness that a boring could not easily traverse it.

8. Anyhow the conclusion of 1848 was that a deep well would give an abundant supply of good water, and from the facts I believe that, even putting artesian wells out of sight, it may be perfectly possible to supply the town with the finest possible water, viz., that filtering upwards through pure sandstone from a natural subterranean source fed by rain on the uplands, while it is very probable that the well would become artesian if driven a little deeper.

9. The Collector accordingly obtained sanction for a deep well of 20 feet diameter, and this was begun, but owing to its having been dug on the beach (apparently within 50 yards of the sea), the sea water simply poured into the excavation, and as the only attempts at steining were made with rough sandstone, and pumps were not available, it was impossible to keep out the water; the attempt was accordingly abandoned apparently from want of real local interest in the matter. I need hardly say that it is perfectly easy to keep out surface water if the well be of moderate dimensions, dug at some distance from the sea, and if either segmental well bricks laid in cement or iron curbs be used.

10. In view, therefore, of the facts that good and absolutely pure water can be got from the sand-stone, if not artesian water from below it, at a moderate depth; that half-a-dozen such wells would cost but a fraction of the expense of merely making the main conduit from the Korampallam tank; that Korampallam water in itself is not very satisfactory, especially after passing along an open conduit; that in any case the supply of Korampallam water can not be guaranteed for the whole year; that the Korampallam water taken for Tuticorin town at only 50,000 cubic feet per day (allowing for loss on the way) would irrigate 80 to 100 acres for a single crop, thus improving Government revenue and adding to the food-supply of the country. In view of these and other considerations, I would strongly urge a moderate expenditure on a thoroughly carried out experiment in well boring or sinking.

11. I do not think the experiment would be costly; a shallow well dug to below the loose sand—say, 18 or 20 feet—would give an easier start to a bore than a bore from the surface, would avoid surface staging and reduce the boring depth; from this to 60 or 75 feet is a mere trifle for modern boring tools, it being certain that nothing harder than sandstone will be met with. Moreover, it seems clear that after 30 or 36 feet, no piping will be required, as the bore will be in solid sandstone; hence all that is wanted is a couple of 9-foot length of pipe from the bottom of the surface well. If the local Engineers would undertake this matter, say in March next (to avoid surface water as much as possible), the work might be done by an overseer or by Mr. Blake, the local supervisor, with the superintendence of the Executive Engineer, at a very moderate expense and within three months. The bricks or iron curbs for the surface well might meanwhile be got ready. If considered desirable, a well may be driven to the full depth, instead of a shallow well *plus* a boring. It is no great matter to dig a 50-foot well, and steining would only be required to about 30 feet, the remainder being driven through solid sandstone. I am not sure that a well would not be as cheap as a boring to so moderate a depth as 50 feet; after that it would, I presume, be better to bore.

12. The Council are disinclined to spend more money on what appears to them a hazardous experiment, and from one point of view they are possibly correct. But there is a time when money must be generously used in pure experiment, and I submit that this is one of them; the cost of a real experiment as described would be far less than an Engineer's commission on a small water-supply scheme, and it might obviate nearly the whole cost of such a scheme. It is a matter of much importance, not merely to Tuticorin, but to other towns, and, if successful, would repay Government by a saving of water applicable to irrigation. I would therefore respectfully suggest that the experiment should be undertaken by Government on the condition that, if successful, the Municipal Council should repay the cost.

ENCLOSURES.

From M.R.Ry. J. M. B. ROCHE VICTORIA, Avargal, Rao Sahib, Chairman, Tuticorin Municipality, to the Chief Secretary to Government, dated Tuticorin, 16th October 1888, No. 422.

Under a resolution of the Council, dated 4th instant (copy enclosed), I have the honor to address Government as follows.

The question of an unfailing supply of water to this town has, for many years, engaged the attention of the Municipal Council and higher authorities, and we have not as yet come to a definite conclusion regarding it. In G.O., dated 17th January 1888, No. 188 W., Public Works, communicated by G.O., dated 14th February 1888, No. 381 L., Local and Municipal, the Government were pleased to instruct the Superintending Engineer, VI Circle, to afford every assistance in his power to the Municipality for the preparation of a water-supply scheme.

In accordance with this order, a copy of the proposed scheme at first, and subsequently that of a modified one prepared after some discussion with the council in a special meeting, were furnished by Mr. Russell, Executive Engineer, Tinnevelly. It is upon this latter scheme that the Council's resolution now under communication is based.

In the absence of definite plans and estimates, the Council are unable to judge for themselves if the scheme would be feasible and if they are able to undergo the expenses connected with it. The Public Works Department would not undertake to prepare the necessary plans and estimates—*vide* copy of the memorandum of the Chief Engineer enclosed.

In this crisis, that the question of the water-supply may not stand pending for a considerable time further, the Council have now resolved to solicit the Government once for all to depute a Special Engineer to make a detailed report (with plan and estimates) on the whole question of supplying the town with water.

I therefore beg respectfully that the Government will take into their favorable consideration the importance of the matter, and be kindly pleased to depute a Special Engineer for our water-supply scheme.

No. 601.

Submitted to Government through the Collector.

2. I strongly urge the importance of deputing an Engineer who has made the subject of water-supply to towns a special study, to make a full report with plans and estimates as requested by the Municipality on a water-supply scheme for Tuticorin.

3. I do not think that the financial position of the Municipality would admit of an expenditure at the outset of more than half-a-lakh of rupees, the greater part of which it would be necessary to borrow. This would probably not be more than what would be required for constructing from Korampallam tank to the service reservoir close to the town—a distance of 4 miles—a masonry or concrete open channel, or for laying down pipes. The improvement of the distribution in the town could not be undertaken for the present, but the probability of its being carried out, and the possibility of storage of water being necessary, should be provided for in determining what plan should be adopted for bringing the water to the town service reservoir. Of the two plans proposed to which I have referred, the system of having the water brought in in pipes would have many advantages. The water would be protected from pollution, and the water could be drawn from the tank at a lower level—thus making almost the last gallon in the tank available for the town supply, and only necessitating pumping when the water in the tank fell almost to the level of the town distribution pipe. If this plan is feasible—an objection to it that the pipes would silt up has been raised—the question of having iron pipes, or earthenware pipes, as has been proposed, has to be decided. But all these questions are such that I cannot but think that an Engineer who has made the subject a special study could answer almost off hand.

Tuticorin,
27th October 1888.

(Signed) W. C. HOLMES,
Ag. Sub-Collector.

No. 89.

Referred to the Public Works Department, for favor of remarks on the two suggestions made in the letter, viz., (1) that the services of a competent Engineer should be made available for preparing a water-supply scheme for Tuticorin, and (2) that an experiment should be undertaken by Government to test the possibility of obtaining an underground supply of water, the cost of the experiment being repayable by the Municipal Council in the event of success.

(By order.)

Madras,
25th January 1889.

(Signed) W. S. MEYER,
Assistant Secretary.

No. 731-C.

Note by the Chief Engineer, Public Works Department.

I consider it would be useless for any Engineer being sent to Tuticorin to prepare a water scheme for that town until the Commissioners clearly lay down what they require, and decide whether they intend taking their supply from Korampallam tank or elsewhere.

2. If the [illegible] to take it from Korampallam tank, a masonry channel is considered necessary. Mr. Russell has already given the Commissioners all the [illegible] necessary to enable them to have an estimate framed, and has doubtless [illegible] advise [illegible] as regards distribution, &c., and this should enable them to prepare without difficulty or delay the necessary approximate estimates, and for the Commissioners on them to decide what system the funds at their disposal will allow them to adopt.

3. The Sub-Collector gives his opinion that the Municipality could not at the outset expend more than half-a-lakh of rupees. If this is the case, I see no hope of Tuticorin having a fair water-supply, and all that could be done with that money would be to slightly improve the present arrangements.

4. I know of no other sources of supply that are likely to answer for the town except that from the Tambraparni or from wells.

5. Mr Nicholson writes very hopefully regarding deep wells and artesian wells, and urges that an experimental well should be bored. I cannot say that I think the facts brought forward by him promise success.

6. With regard to artesian wells, I do not feel competent to give an opinion. I think it would be as well to ask the Geological Department for their opinion as regards the probability of success.

7. I have no record of the well Mr. Nicholson describes as having been made in 18[illegible], but if the hard sandstone described as found at 28 feet depth, and which extended to a depth of 42 feet, was really hard sandstone, I do not think it is likely that a deep well in the sandstone would yield anything but a very small supply. If a well was carried through this sandstone, a good water-bearing strata might be reached, and I think the opinion of the Geological Department might be asked as regards the probability of the sandstone bed being of a reasonable thickness, and the likelihood of water being found below it with sufficient pressure to enable it to rise to or near the surface.

8. I see no reason why a trial well should not be sunk through the sand, clay and shells down to the so-called sandstone, say, a depth of 26 feet, and probably there would be but little difficulty in making the junction of the bottom of the well and the rock fairly watertight. If this is done, a hole could be bored through the sandstone, and this would show whether good water in sufficient quantity could be obtained from wells at Tuticorin. This work could probably be done for less than Rs. 1,000; it might be done by the Municipal Commissioners, the officers of this department giving them advice and assistance.

9. I would not recommend Government undertaking to pay for this work unless the Geological Department give a favorable opinion on the experiment.

1[illegible] *February* 1889.

(Signed) H. R. MEAD, Col., R.E.,
Ag. Chief Engineer. P.W.D.

Transferred to the Local and Municipal Department, with reference to its endorsement, No. 89, dated 25th January 1889, herewith returned with enclosures.

(Signed) H. R. MEAD, Col., R.E.,
&c. Ag. Secy. to Govt., P.W.D.

No. 241.

Referred to Mr. Bruce Foote, for favor of his opinion.

(By order.)

Madras,
[illegible] *March* 1889.

(Signed) W. S. MEYER,
[illegible] Under Secretary.

From R. BRUCE FOOTE, Esq., F.G.S., Superintendent, Geological Survey of India, to the Chief Secretary to Government, dated 18th March 1889, No. 1271.

In reply to a reference (No. 241) to me from your office of certain correspondence on the subject of the probability of obtaining a good supply of water for the town of Tuticorin from the sandstone on which it is built, I have the honor to inform you that, in my opinion, an important body of water will be reached by sinking to a depth rather greater than that reached by Captain Horsley in his experimental boring in 1848, and I quite agree with Mr. Nicholson in urging the sinking of one or more large wells to a depth of not less than 50 feet from the surface. As seen at the surface, the geological features of the country west of Tuticorin are unfavorable to the successful execution of an artesian boring, *i.e.*, the finding of a strong perennial head of good water, yet were such borings at Pondicherry, where somewhat similar geological conditions prevail, so singularly successful that it seems a pity that a boring to a moderate depth should not first be made at Tuticorin to test the water-bearing capacity of the formations underlying the marine sandstone above referred to. The cost of such a boring to a moderate depth—say, 100 or 150 feet—cannot be very great in rocks of medium hardness such as are likely to be met with under Tuticorin, and the boring, if successful, would be of incalculable benefit to the town.

2. Whatever the result of the boring, it should not be continued after the gneiss is reached.

ORDER—dated 26th April 1889, No. 463 M., Local and Municipal.

The Government will undertake the experiment of boring an artesian well at Tuticorin on the conditions proposed in the concluding paragraph of the Collector's letter. The necessary action will be taken in the Public Works Depart

(True Extract.)

for Chief Secretary.

To the Public Works Department.
" Chairman, Municipal Council, Tuticorin,
through the Collector of Tinnevelly.

Exd. A. Raitt.

9

9

Govt. of {1889} Madras.

LOCAL AND MUNICIPAL.

(2)

Issued

Recd. 11.5.89 Encl.

G.O., 26th April 1889, No. 463 M.

APRIL.

Water-supply.

Stating that Government will undertake the experiment of boring an artesian well at Tuticorin on the condition that, if successful, the Municipal Council should re-pay the cost, and adding that the necessary action will be taken in the Public Works Department.

B

Comd. to the Supdg. Engr. VI Circle who will ~~at once~~ report the arrangement he proposes to ~~make~~ to carry out the Experimental boring.

13.5.89

15.5.89

(9)

2 copies to

S.E. VI Circle 21/5/89

S.E. VI Circle

C.&S. 65/5

With order

21/5

28/5