Govt. of {1894} Madras.

LOCAL AND MUNICIPAL.

Issued

Recd. Encl.

G.O, 4th May 1894, No. 578 M.

MAY.

Cochin Experimental Boring.

Ordering that the crab-winch referred to in the Assistant Sanitary Engineer's report on the — be supplied by the Public Works Department, and stating that the question of providing the additional funds now required for the work will be considered in the Financial Department.

No. 1405 W. dy 7th June 1894.

Communicated to the Supty. Engineer V Circle for the necessary action.

(Id.) J. P.

W.

EJ
5-6-94

S. E. V Circle
Exr. P. W. Accts.

Cochin Experimental Boring.

STATEMENT showing the nature, depth, &c., of strata traversed by the shaft.

Month and date.	Depth of shaft in feet.	Number of feet bored.	Depth of water below the surface of ground.	Time taken for boring.	Description of strata passed through.
			FT.	DAYS.	
1893.					
Nov. 13 ..	32	32	4½	2	Smooth sand and shells.
,, 15 ..	44½	12½	..	1	Coarse sand, shells and black clay.
,, 24 ..	95	50½	38	8	Black clay mixed with shells and vegetable fossils.
,, 27 ..	105	10	30	2	Smooth sand and clay.
Dec. 4 ..	140	35	12	6	Black clay and smooth sand.
,, 5 ..	150	10	30	1	Sand.
,, 11 ..	160	10	1′ above	6	Coarse sand and water with pebbles.
,, 12 ..	168	8	10	1	Lignited vegetable soil 6′ and plastic clay 2′.
,, 13 ..	176	8	5½	1	Plastic clay mixed with sulphuret of iron.
,, 14 ..	180	4	5½	1	Plastic clay and sand with sulphuret of iron.
,, 16 ..	200	20	5	2	Green sand and pebbles 15′. Plastic clay and sand mixed with iron pyrites 5′.
,, 28 ..	200	2′ 9″	6	9	Dark clay and lignited vegetable.
,, 30 ..	210	7′ 3″	25	2	Dark blue clay with sulphuret of iron.
1894.					
Jan. 2 ..	215	5	Dry.	1	Dark black clay with sulphuret of iron and lignited vegetable.
,, 3 ..	220	5	100	1	Dark black clay mixed with sand and iron pyrites.
,, 4 ..	225	5	5	1	Blue clay mixed with sulphuret of iron and sand.
,, 5 ..	228	3	10	1	Grey clayey sand with micacious hard quartzose sandstone and sulphuret of iron.
,, 6 ..	230	2	Dry.	1	Dark clay with lignited vegetable soil.
,, 8 ..	238	8	,,	1	Dark clay with lignited vegetable soil (for 3 feet) and black peat or decayed wood (for remaining 5 feet).
,, 9 ..	245	7	,,	1	Decayed wood mixed with rosin (for 2 feet) and micacious black clay with rosin, very hard (for remaining 5 feet).
,, 13 ..	250	5	,,	4	Micacious dark clay and iron pyrites.
,, 15 ..	255	5	,,	1	Lignited wood and rosin.
,, 16 ..	260	5	,,	1	Earthly lignites and rosin.
,, 17 ..	265	5	5	1	Dark black clay and coarse sand.
,, 18 ..	270	5	6	1	Do. do.
,, 19 ..	..	..	..	3	Grey sand mixed with lignited wood.
,, 22 ..	275	5	up to the surface.		Grey coarse sand.
,, 23 ..	280	5	5	1	Do. do.
,, 24 ..	285	5	7	1	Do. do.
,, 25 ..	290	5	3	1	Do. do.
,, 30 ..	295	5	10½	4	Clay and sand.
,, 31 ..	297	2	18	1	Do.
Feb. 6 ..	300	3	3	5	Do.
,, 7 ..	303	3	3	0½	Coarse grey sand.
,, 8 ..	310	7	8	1	Do. do.
,, 9 ..	315	5	3	1	Do. do.
,, 10 ..	320	5	6	1	Do. do.
,, 12 ..	325	5	4	1	Coarse grey sand mixed with iron pyrites.

Note.—Work was frequently delayed by the shaft being plugged with running sand which had to be removed before sinking could proceed further.

ORDER—dated 4th May 1894, No. 578 M., Local and Municipal.

The crab-winch referred to in paragraph 14 of the Assistant Sanitary Engineer's report will be supplied by the Public Works Department, and the question of providing the additional funds now required will be considered in the Financial Department.

(True Extract.)

J. F. PRICE,
Chief Secretary.

To the Sanitary Engineer.
,, Public Works Department.
,, Financial Department.
,, Chairman, Municipal Council, Cochin.
Editors' Table.

Exd. A. Raitt.

8. It is curious to note that when the strain was applied to the rod, the water in the bore (which was dry before this) rose suddenly to ground level.

9. The chain was repaired and two jack-screws were also brought into requisition and an attempt was made to lift the rod with the combined help of the crab-winch and the two jack-screws. The total force applied has been calculated at 6 tons, but the rod did not move. At this point one of the jacks showed signs of bending at the neck and it was considered unsafe to increase the pressure on the jacks. The rod was, however, kept at this strain all night, but the result was *nil*. The two jack-screws were obtained on hire from a woman at Cochin.

10. The weight of the rod and the pressure of clay against it is not sufficient to account for the resistance of 6 tons. There must be another explanation for this resistance.

11. It is feared that the end of the rod is bent by the force of the fall and has caught under the tubing as shown on the sketch attached. The shaft, as has already been said, rests on a clayey bed, the thickness of which is apparently very small. Below this bed there must be a very loose, water-bearing stratum overlying a harder stratum as shown on the sketch. These conditions easily explain the position the rod has assumed and also the fact of the water having risen in the bore when the attempt was made to lift the rod.

12. I now propose to lift the tubing bodily a distance of about 10 feet. This will disengage the rod and enable its being pulled up easily.

13. For this purpose two 3-inch jack-screws and a special collar for pulling the pipes are required. It may be necessary to supplement the jack-screws by a 8 or 10 ton crab-winch.

14. The loan of two jack-screws has been obtained from the Public Works Workshops. The special collar will cost about Rs. 50 and it may be possible to obtain a crab-winch also from the Public Works Workshops.

15. If the attempt to raise the pipe as above proves futile, I would suggest the works being suspended temporarily and resumed only after August or September when the south-west monsoon closes, if in the meantime Government sanction the extra appliances necessary. This will form the subject of a separate report if the rod cannot be extricated within a reasonable time with the aid of the tools now available. It should be possible to decide before the end of April whether the rod can be extricated or not.

16. The sanctioned estimate for the work is—

	Rs.
For tools and plant	900
„ conveyance, labour and supervision	3,500
Total ..	4,400

The expenditure incurred under labour and supervision up to 31st March 1894 is Rs. 2,950. The cost of the extra tools and conveyance is, as far as this department is aware, Rs. 1,200, or a total expenditure of Rs. 4,150.

17. The anticipated expenditure is—

	Rs.
Superintendent's pay for April 1894	250
Labour for April 1894	250
Cost and conveyance charges of pipe, pulleys and clamps, hire and conveyance charge of jacks and winch	250
Total ..	750

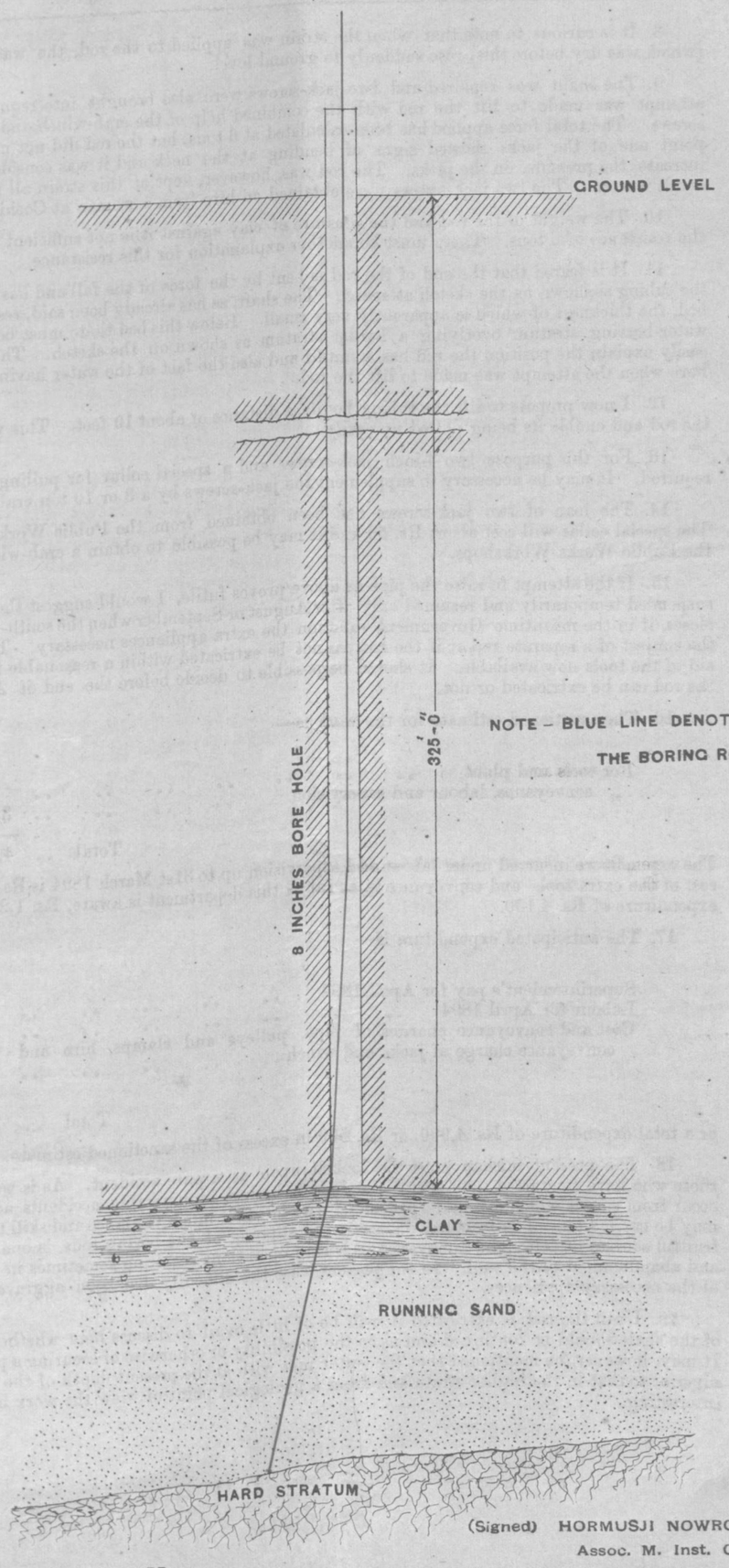
or a total expenditure of Rs. 4,900, or Rs. 500 in excess of the sanctioned estimate.

18. The present mishap must be looked upon as a pure accident. As is well known by those who have conducted such operations in well-boring, innumerable accidents and stoppages occur from causes which cannot be prevented with however much vigilance and skill the operations may be carried on. The fracture, dislocation or slipping of the boring rods is one of the most fruitful sources of delay and annoyance in boring operations resulting sometimes in entire failure and abandonment of the well. In the present case the difficulty has been aggravated by want of the necessary appliances.

19. Until the rod is extricated it will be of little avail to discuss here whether the sinking of the shaft should be continued and as to the possibility or otherwise of securing a potable water. It may, however, be mentioned that the water met with at the present depth of the bore is much superior to that in the higher strata and from a geological point of view the work has been most interesting.

COCHIN EXPERIMENTAL BORING

SKETCH SHEWING SUPPOSED POSITION OF BORING ROD



(Signed) HORMUSJI NOWROJI,
Assoc. M. Inst. C. E.,
Asst. Sanitary Engineer to Govt.

OFFICE OF SANITARY ENGINEER.
FORT ST. GEORGE, 9TH APRIL 1894.

Reg. No. 1418 – Copies 95.
Zinco., Survey Office, Madras.
1894.

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

READ—the following paper :—

From R. E. ELLIS, Esq., ASSOC. M. INST. C.E., Acting Sanitary Engineer to Government, to the Chief Secretary to Government, dated Fort St. George, 13th April 1894, No. 809.

I have the honour to forward a report from the Assistant Sanitary Engineer on the Cochin experimental boring and to request that Government may be pleased to allot the extra Rs. 500 required for the work. In anticipation of the sanction of Government to this amount I am continuing the attempt to remove the rod, as any stoppage in the work may involve considerable loss.

ENCLOSURES.

From HORMUSJI NOWROJI, Esq., B.C.E., A.M.I.C.E., Assistant Sanitary Engineer to Government, to the Sanitary Engineer to Government, dated Fort St. George, 9th April 1894.

With reference to my visit to Cochin and inspection of the experimental boring works there I have the honour to report as follows :—

The boring operations were commenced on the 13th November 1893. The depth of boring provided for in the estimate was 200 feet.

2. The estimate was only approximate as there were no previous works of the kind to guide. The actual cost of boring 200 feet was considerably less than the estimated amount. This depth was reached on the 16th December 1893 and as the water was still brackish and as there was a saving it was decided to sink the shaft to a depth of 400 feet for which pipes and plant were available, and had it not been for the accident which will be described presently, the bore would have been sunk by this time to its full depth of 400 feet (which is double the depth sanctioned) without much exceeding the estimate.

3. On the 12th of February 1894 the shaft attained its present depth of 325 feet and touched an impermeable clayey stratum. In a table appended the nature, depth, &c., of the strata traversed by the shaft are shown.

4. On the 13th the shaft was pumped dry. On the following day on attempting to lower the boring rod to resume sinking operations it slipped from the holding dog and fell to the bottom of the bore. The length of the rod when it fell was 281½ feet including the cutting chisel and weighed about 1·3 tons. The rod fell through a height of about 70 feet and the force of the fall drove it clean through the clayey bed which, in the light of the circumstances that will be presently explained, is, it is presumed, of a very small depth. The rod, it is calculated, has sunk some 10 feet below the shaft. The shaft being 325 feet and the rod only 281½ feet, about 10 feet of which has sunk below the bottom of the shaft, the top of the rod was $325 - (281\frac{1}{2} - 10) = 53\frac{1}{2}$ feet below the top of the shaft.

5. The boring apparatus used does not contain any accident or fishing tools or appliances for pulling the pipes out of the bore.

6. After several unsuccessful attempts with tools made by local blacksmiths, which, as must be expected, were very inferior, the Superintendent of the works succeeded in gripping the fallen rod and connected it with other rods reaching above ground.

7. Next an attempt was made to raise the whole rod, but the chain of the crab-winch snapped. It is a 3-ton crab-winch.