M.R.O. 1—29,000—16-10-29.

# MADRAS RECORD OFFICE.

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## Government of Madras.

Revenue **DEPARTMENT.**

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| G.O. No. | 1594 | Press ~~Misc.~~ |
| 192-193. Dated | 19-10- | No. 1870 |

***Not to be folded or roughly handled***

*Proceedings of the Madras Government, Revenue Department, 19th October 1870.*

No. 192. Read the following Proceedings of the Board of Revenue, dated 26th September 1870, No. 5,862 :—

Read the following letter from the Collector of Cuddapah, to the Acting Secretary to the Board of Revenue, dated Chekatamanipully, 25th July 1870, No. 134.

ADVERTING to the Proceedings of the Board, dated 3rd May last, No. 2,931, I have the honour to subjoin copy of a full and interesting report by my Assistant Mr. Boyle on Norton's Tube Wells. I shall now have them thoroughly tried in the Sub-division, but with little hope of producing better results.

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From J. A. BOYLE, Esq., Assistant Collector, to the Collector of Cudlapah, dated 19th July 1870, No. 195.

HAVING completed several experiments with Norton's Tube Wells, I beg to offer some remarks upon their working.

2. I received from Madras three complete sets of pipes, but only one driving apparatus, so that operations were necessarily confined to one place at a time.

3. The first place I put down a well was in my own garden, at a distance of more than 100 yards from the Buggeru river, and some 20 yards from a well which holds water to within 20 feet from the surface. The soil is at first loose, arable mould, through which the tube passed freely; but after about 10 feet, the driving became more tedious, although there was little or no impediment offered by stones. This was, I believe, owing to the compactness of the stiff clay through which the tube passed, until water was struck at a depth of 20 feet from the surface. Before water was found by plumbing, soft oozy clay adhered to the lead, showing that the perforation in the tube admitted mud from outside.

4. When water to the depth of some six inches was found in the tube (which had then been driven to a depth of 22 feet, and could not be driven further owing to its striking rock) the pump was fixed and efforts commenced to allure the water to the surface. These I regret to say were so far unsuccessful that nothing but a feeble dribble of water, muddy to a degree, was elicited.

5. This was, I conceive, owing not only to the defect of the pump, but to the extreme density of the clay which prevented the free percolation of water through the perforations of the tube. In the published notice regarding the use of these wells in Abyssinia, it is stated that clay formations are very baffling in obtaining a supply of water. The tube in loose water, bearing strata, forms for itself by suction, a small basin round its lower end, in which water is accumulated by percolation, and is then freely drawn up the tube to the pump. This is rendered impossible in clay by the close adherence of the soil to the tube, and also by its oozing through the holes to the interior of the tube.

6. The time occupied in driving the tube to the depth of 22 feet was between 3 and 4 hours, but the coolies were kept pumping away for at least an hour without the least success, and the well was then left for the night. In the morning, the water had risen very considerably in the tube, and the pump having been fixed, water was drawn in a muddy dribble. Pumping was continued for several hours, but the result was still the same, and I am sure that from such soil, drinkable water could not be drawn. I will keep my remarks on the working of the apparatus until I have briefly noticed the successive trials made of them.

7. The next place selected was the compound of a house in the old cantonment; the conditions of which as regards soil and rock formation are very different from those of the Town of Cuddapah. Here the operations were conducted by Mr. O'Ratigan and myself; but the results were purely negative, as in two different places the tube, after being driven to a depth of about 12 feet, struck rock, and could be driven no deeper. The upper soil was here very compact and the driving tedious. The withdrawal of the tubes is a matter of little difficulty, provided ordinary precautions are adopted.

8. One set of pipes with the complete driving apparatus was subsequently sent to Mr. Arundel, the Acting Head Assistant Collector, who conducted two experiments at Pullampet. He has furnished me with notes of his experiments, from which I gathered the following facts:—

9. The first spot selected is not described, but the soil is stated to have been compact and clayey. At a depth of 12 feet, the tube struck a stone which yielded to some strokes of the monkey; but after driving the pipes 16 feet, and failing to find water, the pipes were withdrawn; when it was found that the lowest perforated tube had yielded to the resistance offered by the stone, and was considerably bent. Considering the apparent strength of the pipes and the lateral support afforded by a compact soil, this accident is rather startling, and makes one rather sceptical of the value of the tubes in penetrating compact rock formations. Such an accident would be rendered more likely by the want of care in driving the tubes perfectly straight; but I have no reason to suppose that this cause contributed to the accident described.

10. After the pipes were withdrawn water rose in the hole, and encouraged by this, Mr. Arundel put down the pipes again to the same depth, 16 feet. The pumps were then screwed on, and water poured in; but rigorous pumping had no effect whatever, and water could not be raised. He tried the action of the smaller tubes, which are intended to be used when the larger pipes become choked with mud, but he failed to raise any water except that which was poured down from above, and which in the transit had become extremely muddy.

11. In his second experiment conducted in the bed of the river Cheyeru, Mr. Arundel was, as might have been expected, more successful. It took 1½ hour to drive the well to a depth of 16 feet, an unusually long time, but water was then abundant, and the pump at once brought it to the surface. At first muddy, the water after persistent pumping for 3½ hours became fairly clear, although of a "nasty metallic taste." After the completion of this experiment, the pipes were withdrawn, but before the lower tube had been raised to the surface, the screw and coupling yielded to the strain brought to bear upon it, and broke clean away from the upper pipe. The lower pipe had consequently to be dug out bodily. This second accident made further experiment impossible, and Mr. Arundel returned the apparatus with an account of his trials of it.

12. This accident to the screw, illustrates very forcibly what I had previously found to be the weak point of the tube wells, viz., that these screws (upon which the whole workability, so to speak, of the wells depends) are not wrought with sufficient exactness to fit as well as they must to ensure safety. In no one case did I succeed in making the ends of the screws, male and female, butt closely, and this was in spite of the most persistent efforts conducted by a skilled mechanic, in charge of Messrs. Arbuthnot's cotton gins, who was extremely handy in the use of the tools supplied with the wells. In the case of the screw which broke in Mr. Arundel's experiment, I find on examination that 14 out of 19 threads had been screwed in, so that no charge of negligence can be made to explain the breakage. But as the thread is necessarily a deep one, leaving little thickness of metal to stand a strain brought to bear on it, unless the screws will fit with precision, it is extremely likely for such an accident to occur. Of course, any number of screws cut to the same thread ought to fit exactly, but the failure in this case may perhaps be explained by the fact that the pipes have been knocking about between London and Madras, and are not so accurate as when they first left the factory. Any how, this defect in the screws is a very serious one, and must always imperil the use of the wells.

13. Another minor defect exists in the pumps, the valves of which are not perfectly air-tight, while the strike of the handle is so short that pumping is unnecessarily laborious; indeed, both in my trials and in Mr. Arundel's, it took six men to work the pump handle persistently; a bamboo contrivance being affixed to the handle to let them all work together.

14. As for the facility of driving the tubes into the ground which is claimed in the explanat on or rather the "puff" of the invention sent with the wells, I must say that it is greatly exaggerated. It is all very well to draw a picture of two men in graceful and easy attitudes working the monkey alone, but as the natives of this country are not Daniel Lamberts; and the bitter truth is that at least three men are required at each rope, six hands who ought to be every now and then relieved, it is absured to deny that the labour of driving in the tubes is most severe. I worked at the rope myself, and know what it is. In fact, the whole account of the invention

*Proceedings of the Madras Government, Revenue Department,*
19*th October* 1870.

resembles the boast of the Yankee Skipper that all he wanted to sail his yacht was a heavy fall of dew.

15. As to the extreme advantages that ordinary mortals may expect to derive from these tube wells, I confess they may, in my opinion, be greatly over-estimated. No doubt an army on the march, who must find water quickly, and in large quantities, will use these wells in suitable soils with great advantage, but the only real uses that can be generally served by them to stationary drinkers are two, first, the provision of a supply of water where physical difficulties render the supply deficient; and, secondly, the provision of a supply of water drawn from a great depth, and saved from the contamination that the atmosphere and external impurities cause to water stored in open reservoirs and wells.

16. This report has been long delayed in order to admit of full trial being made of the wells in the Town of Cuddapah. Under the superintendence of the Acting Zillah Surgeon, the wells have been put down in six or seven places all over the town near the Jail, in the Dispensary premises, on the site of the market place, and elsewhere, but in no single instance could the tubes be driven to a sufficient depth owing to the invariable occurrence of compact rock formations at about 12 feet below the surface.

17. I believe we have now given these tube wells every opportunity of proving their usefulness. The result can scarcely be considered to crown the invention with glory. The only place where water has been brought by them to the surface was the sandy bed of a river, where any body could find water at any season of the year by scraping with his hands to a slight depth. In other places the wells have been baffled by the occurrence of rock which prevented their being driven to a sufficient depth; or by the presence of clay which choked the perforated tubes, and stopped the ascent of water.

18. I have no bill of charges to send in, for I paid the coolies myself from time to time, and have kept no accounts from which to frame a bill.

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This report will be submitted for the information of Government.

2. It only proves what was well known before, viz., that the wells are only valuable in particular soils; but the advantages described by the Board in their Proceedings of the 22nd February 1869, No. 1,206, paragraphs 16 and 17, are undeniable.

Government Order, No. 963, of 8th April 1869.

3. The General Superintendent of Government Workshops and Stores will be requested to favour the Board with his opinion as to the general character of the workmanship of these wells. It will be observed that Mr. Boyle describes it as being decidedly bad in those he tried.

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No. 193. Order thereon, 19th October 1870, No. 1,594.

Miscellaneous.

The Government will await reports from the other districts mentioned in Board's Proceedings, dated 3rd May 1870, No. 2,931.

(True Extract.)

(Signed) R. A. DALYELL,
*Acting Secretary to Government.*

To the Board of Revenue.

Exd. F. R. Bantleman.

Revenue Department

By-1594.

Proceedings of the Madras Government

Under date the 19th October 1870.

Read the following

Proceedings of the Board

of Revenue.

Letter forwarding report from Capt. Boyle Collr. Mgt. Boyle of Cuddapah district on working of Norton's tube wells.

G.O. 26th September 1870 No. 5862

The Government

will await reports from

the other districts mentioned

hereon in Board's Proceedings

dated 3rd May 1870

No. 2931.

Govt. of {1870} Madras.

REVENUE.

To

THE BOARD OF REVENUE.

Dated October, 19th.

Read. Encl.

G. O., 19th October 1870, No. 1,591.

OCTOBER.
Nos. 192-193.

Mr. Boyle's report on Norton's Tube Wells.—Reports from the other districts called for by the Board of Revenue, awaited.