

Gobt. of (1883) Madras.
REVENUE.

No 908 Wd/20 Madras

*Communicated
to the officers of the
Public Works Dept
in Continuation of
G.O. 463 to a/10 17 Feb/83*

Issued

Recd.

Encl.

G.O., 16th February 1883,
Nos. 224, 224A.

No 908 Wd/20-3-83

FEBRUARY.

14.5-0

Artesian Wells.

Orders passed on G.O., Political Department,
regarding — in Pondicherry.

With order

Filed in Receipt Book

Sy

*Att
12/3/83*

*S. G. S. ✓
C. P. to Govt ✓
Secy. to Govt ✓
C. & for Rep. ✓
C. & for V. S. ✓
2/3*

In comparing the cost per metre of these several Artesian wells, the high prices of cost of the wells Nos. 6, 8 and 13, executed by contract and including consequently the cost of superintendence, interest on the Capital sunk on materials, and the profits of the contractors must be taken into consideration. These charges do not appear in the cost of the other wells; they can be valued approximately to a-tenth for the wells executed by Government.

The spot of each of the fourteen Artesian wells is shown on a chart of the territory of Pondicherry annexed to the present notice as well as the tracings reproducing on the same scale as the tracings of the 14th August 1880 the geological place of the seven last wells. The indications given for the Artesian wells, the information on which is insufficient, will be easily found out by their spots on the chart. In ending this brief *exposé* of the Artesian wells of the territory of Pondicherry, we think it necessary to state that it will be advisable not to defer any longer the placing of a column of ascension in copper to perpetuate the very advantageous results often obtained and sometimes after much labor.

PONDICHERY,
13th January 1883.

(Signed) E. JUMEAN,
Colonial Engineer,
Head of the Service of Roads and Bridges.

(True Translation)

R. G. DELA VILLETTE,
French Translator to Government.

Order—dated 8th February 1883, Mis. No. 107.

Communicated to the Revenue Department in continuation of G.O. (Political), dated 15th January 1883, No. 36.

(True Extract.)

(Signed) E. S. LAFFAN,
Acting Under Secretary.

To the Revenue Department, with papers.

ORDER—dated 16th February 1883, No. 224, Revenue.

Miscellaneous.

The thanks of this Government will be conveyed, in the Political Department, to His Excellency the Governor of the French Settlements in India for the interesting report recorded above, a translation of which will be published, with this Order, as a Supplement to the *Fort St. George Gazette*. Spare copies will also be struck off for general distribution.

2. A copy of these Proceedings will be forwarded to the Government of India, who will be informed that, on the recommendation of the Sanitary Commissioner, this Government have lately sanctioned * an experimental boring for an Artesian well in some convenient locality in Madras, and that inquiries are being made in view to similar experiments elsewhere.

* G.O., 26th January 1883, No. 170, F. D.
Copy forwarded for information.

(True Extract.)

Ag. Secretary to Government.

To the Political Department.
" Sanitary Commissioner.
" Board of Revenue.
" Director of Revenue Settlement and Agriculture.
" Public Works Department.
" Superintendent of the Government Press.
" Editors' Table.

No. 224A.

Copy to the Government of India, Revenue and Agricultural Department, with reference to their letters and reminders noted in the margin, and with a request that the geological chart and sketch of Pondicherry may be returned when no longer required.

Letter dated 23rd August 1881, No. 112.
Letter dated 28th Jan. 1882, No. 73A and H.
Letter dated 28th April 1882, No. 373, A. H.

(Signed) P. P. HUTCHINS,
Ag. Secretary to Government.

Exd. W. H. French.

200 Copies.

with 20 copies.

Information on the Artesian Wells of Territory of Pondicherry—(Continued).

Numbers of the Wells of the Notice.	Designation of the Borings.	Depth in the Soil.	Cost Price per current Metre.	Total Cost Price.	Diameter of the Orifice of Discharge.	Discharge in Litres per Minute.	Water—how used.	Remarks.
12	Fourth boring in the Savana Cotton Mills.	M. 45.00	F. C. 25 50	F. C. 1,303 25	M. 0.18	60	Feeds the boiler of a machine of 16 horse-power and supplies for its condensation.	Copper tubed with hydraulic mortar.
13	To the east and near to the road to Cuddalore and the left bank of the Chennambar.	21.00	75 43	1,584 00	0.18	400	Feeds 6½ cawies of rice-fields and the surplus fills up a large pool of water.	....
14	In the top of Illipes close to the west side of the Bahour pagoda.	115.17	53 34	6,804 43	0.26 & 0.21	300	Used as a feeder and for all domestic purposes of the population of Bahour and the surrounding country. The surplus water feeds two reservoirs used for washing purposes and used by the cattle.	Two columns of guarantee of 0.26 and 0.21 of diameter have been placed in this boring.

Information on the Artesian Wells of Territory of Pondicherry.

Numbers of the Wells of the Notice.	Designation of the Borings.	Depth in the Soil.	Cost Price per current Metre.	Total Cost Price.	Diameter of the Orifice of Discharge.	Discharge in Litres per Minute.	Water—how used.	Remarks.
1	First boring of the Cotton Mills, Savana.	M. 53.00	F. C. 113 21	F. C. 6,000 00	M. 0.14	215	Feeds the two boilers of a machine of 90 horse-power and supplies for condensation by the means of a new refrigerator.	Tube in copper hydraulic mortar; works regularly.
2	In the yard of the Cotton Mills of Oupalem.	35.70	100 84	3,600 00	0.18	450	Feeds the boilers of the Cotton Mills, irrigates the garden and the trees of the establishment and is given for an hour morning and evening to the inhabitants of the neighborhood.	Tube in copper hydraulic mortar. From its base and the hydraulic mortar of the column of ascension the Artesian well of Oupalem gives 700 litres per minute. Worked regularly.
3	In the centre of the Great Basin of the garden of.	79.52	63 75	5,050 12	0.26	600	Feeds a fountain with four cocks and irrigates the 16 cawies of land of the garden.	Has been abandoned.
4	In the yard of the house of Mr. G. Cornet situated near the south-west angle of the Government House Gardens.	62.00	38 71	2,400 00	0.09	..	....	Must be continued with a column of a small diameter when the necessary funds will be provided.
5	West side of the cross-way to the north-west of the College Calce.	171.98	47 73	8,200 34	0.21	..	....	Often requires cleaning in consequence of the foot of the column being blocked up by sand.
6	In the centre of the property of Jaganmuni Ouar in the village Modharpett.	24.00	89 00	2,136 00	0.18	70	Feeds the garden of this property which has an extent of four and a half cawies.	Requires to be cleaned twice a year.
7	On the west side of the road to Cuddalore to the north and near the Arincoupon Church.	58.50	49 53	2,879 99	0.26	400	Used for all domestic purposes and the use of the population of the village. Feeds during thirty six hours every week two tanks used for bathing and cattle and having each a piodée for irrigation purpose. The remainder is let on an average of 100 rupees a year.	The inferior part of the column of guarantee in iron sheeting being deteriorated, this well will very shortly be tubed in copper.
8	In the field of Mr. Channemongumodellar at Mourenapacom.	29.00	111 72	3,240 00	0.16	200	Irrigates five cawies of rice fields.	....
9	Second boring in the Cotton Mills, Savana.	20.20	41 54	1,088 40	0.18	200	Feeds the boilers of a machine of 700 horse-power, supplies for the condensing of a machine of 90 horse-power, the boilers of which are fed by means of refrigerators.	....
10	At Calapett in the centre of the French Possessions at ten kilometres to the north of Pondicherry.	40.94	46 23	1,892 86	0.16	..	....	Has been abandoned.
11	Third boring in the Savana Cotton Mills.	72.60	43 00	2,213 60	0.18	125	The water of this well is used to supplement the feeding of the machine of 90 horse-power which recovers for condensation the water of the 9th well.	....

Information on the Artesian Wells of Territory of Pondicherry—(Continued).

Numbers of the Wells of the Notice.	Designation of the Boring.	Depth in the Soil.	Cost Price per current Metre.	Total Cost Price.	Diameter of the Orifice of Discharge.	Discharge in Litres per Minute.	Water—how used.	Remarks.
12	Fourth boring in the Savana Cotton Mills.	M. 45.00	P. C. 28 96	P. C. 1,303 25	M. 0.18	60	Feeds the boiler of a machine of 16 horse-power and supplies for its condensation.	Copper tubed with hydraulic mortar.
13	To the east and near to the road to Cuddalore and the left bank of the Choumnam.	21.00	75 43	1,584 00	0.18	400	Feeds of canmies of rice-fields and the surplus fills up a large pool of water.	....
14	In the town of Illapet close to the west side of the Babour pagoda.	118.17	58 34	6,894 43	0.26 & 0.21	300	Used as a feeder and for all domestic purposes of the Pondicherry country. The surplus water feeds two reservoirs used for washing purposes and used by the cattle.	Two columns of granite of 0.26 and 0.21 of diameter have been placed in this boring.

Height of the soil above the mean level of the sea	about.	4.50 metres.
Depth of the well in the soil	...	118.17 "
Diameter of the orifice of discharge	...	0.21 "
Discharge per minute at M. 0.20 above the natural level.	...	300 litres.
Temperature of the water at the orifice of discharge	...	32 centigrades.
Hydrometrical degree of the water	...	6°
Hydrostatic level of the spouting sheet of water above the natural soil	...	1.67 metres.
Hydrostatic level above the mean level of the sea	...	6.17 "

In the execution of this work the sounding lead met with the following series of layers :—

Numbers of Layers.	Composition of the Ground traversed.	Thickness of Layers.	Depth of Layers.	Remarks.
		M.	M.	
0	Natural ground	1.980	1.980	
1	Brown sandy clay	2.258	4.238	M. 2.36 level of the waters of the neighboring ordinary wells.
2	Gray sandy clay	3.618	7.856	
3	Pale yellow clay sandy, large grained sand with pebbles.	3.416	11.272	
4	Pale yellow clay sandy thin grains.	2.125	13.397	
5	Thick pale yellow clay	5.319	18.716	
6	Blackish clay very hard	1.900	20.616	
7	Gray clay little sandy very hard	1.670	22.286	
8	Gray thin clay sand	2.384	24.670	
9	Gray sand with pebbles and gravels.	2.416	27.086	
10	Gray sandy clay with small pebbles.	0.600	27.686	
11	Clay veined yellow and gray	2.110	29.796	
12	Yellow clay	0.140	29.936	
13	Very hard gray clay	1.650	31.586	
14	Clay veined yellow and gray	0.580	32.166	
15	Very hard gray clay	0.450	32.616	
16	White sandy clay	1.030	33.646	
17	Clay sand with pebbles and gravels.	2.942	36.588	
18	Large white sand and pebbles	1.080	37.668	
19	Sand with pieces of clay, pebbles, and pudding stone.	1.490	39.158	Bank of pudding stones of M. 0.08 of thickness.
20	Gray sand and pebbles	4.760	43.918	
21	Large yellow sand with pebbles	2.104	46.022	
22	Large gray sand, pebbles and calcareous pieces.	0.770	46.792	
23	Clay bigarree	4.460	51.252	
24	Very hard gray clay	4.788	56.040	
25	Very hard white calcareous clay	10.031	66.071	
26	White and sandy clay	1.470	67.541	
27	Very hard gray clay	2.960	70.501	
28	Gray and sandy hard clay	0.420	70.921	
29	Blackish clay very hard	0.480	71.401	
30	Large black sand	0.340	71.741	
31	Blackish sand with pieces of clay	0.530	72.271	
32	Brown lignite	0.47	72.741	
33	Large blackish sand	0.64	73.381	
34	Very black lignite with pyrite of iron.	10.646	84.027	
35	Gray clay very hard	0.340	84.367	
36	Gray sandy clay	1.500	85.867	
37	Very hard gray clay with pyrites of iron and thin sand.	7.383	93.250	At M. 89.044 begins the ascending sheet of water.

Numbers of Layers.	Composition of the Ground traversed.	Thick-ness of Layers.	Depth of Layers.	Remarks.
		M.	M.	
38	Very black lignite	0.140	93.420	
39	Gray clay, thin sand and pyrite of iron.	2.158	95.578	
40	Gray sand	5.942	101.520	
41	Clods of gray clay	0.650	101.570	
42	Gray sand	2.250	103.820	At M. 10.322 banks of pyrite of iron of M. 0.04 deep.
43	Very hard black clay	7.550	111.370	
44	Clay mixed with large sand	0.650	112.020	
45	Very hard blackish clay	0.900	112.920	At M. 112.92 spouting sheet of water the level of which stopped at 1.67 above the natural ground.
46	Blackish gray thin sand	2.730	115.650	
47	Large gray sand	2.200	117.850	
48	Large gray sand mixed with pieces of fluid clay	1.220	118.670	Boring, tubed as far as M. 118.17 of depth.

A powerful layer of lignite of good quality of M. 10.646 of thickness was met with between M. 73.381 and M. 84.027 of depth.

The first ascending sheet of water did not show itself in the boring only after reaching M. 89.044. It rose to M. 1.50 in downward direction to the soil. This ascending sheet of water reached its maximum of height M. 1.16 above the soil at M. 93.524 of depth.

From M. 79.498 where the first column of M. 0.26 of diameter suddenly stopped, it could only be shoved in to M. 0.080 under the pressure of considerable efforts to about thirty thousand grammes. The boring works continue in the clay without the column of guarantee until M. 95.578 of depth and are stopped on the 1st June 1882. A column of 0.21 of diameter is then made which is finished on the 24th July, and the placing of which at the interior of the column is completed on the 1st August following.

At M. 103.22 on the 5th August, this second column meets with a small bank of pyrites of iron of M. 0.04 of thickness. This bank was bored through and enlarged, notwithstanding which the column refuses to go beyond. Considerable efforts made in an inverse sense do not succeed however to raise it up. Divers means and divers tools are successively employed to attain this end which is arrived at only on the 23rd September after great difficulties. When a new combination is tried without success whilst another was being prepared, the boring being continued without using the tube in the layer of clay and even of clay and sand in which the sides of the hole of the sounding lead perfectly maintain themselves. At M. 109.941 the ascending sheet of water rises to M. 1.10 in a downward direction of the soil; it continues its ascension progressively until M. 112.92 where it reaches the level of the soil. From this point the same sheet of water becomes spouting and its hydrostatic level increases until M. 118.17 where it reaches M. 1.67 above the natural ground. It lowers afterwards and is no more than M. 1.20 at 118.67 of depth. The column is then easily raised up to M. 0.50 and the first hydrostatic level M. 1.67 is found back.

The last tube is afterwards cut at M. 0.20 above the soil, then the basis of the boring having been cleared of the falling down sands, a discharge of 300 litres per minute was obtained. This quantity of an excellent drinkable water is more than sufficient to the consumption and all domestic requirements of the inhabitants of Bahour, the hygienic condition of whom are considerably ameliorated.

Divers other Artesian Wells on which we have no sufficient information have been undertaken in the Territory of Pondicherry principally at—

Chingarcovil.—At $\frac{1}{4}$ mile north-west of Archivack. This boring has about 60 metres of depth. The column of guarantee having been imprisoned in compact layers of clay of divers colours nearly similar to those of the Bahour well, the proprietor did not wish to go to the

expense of a second column, and make use of the ascending waters of this boring which almost reach the level of the soil to irrigate the fields by the means of a picotee.

Mouroungapacom.—At 130 metres south-west of the well, Colonel Shermann caused an Artesian well to be constructed in his property. The spouting sheet of water was met with at M. 22.00 of depth and discharges nearly 150 litres per minute. The layers met with are evidently the same as those of well No. 8.

Ariancoupom.—At 150 metres south of the Ariancoupom bridge on the western coast of the road to Cuddalore, Mr. P. Tardivel caused a boring to be made by an Indian contractor. The tools employed were not sufficient to go beyond the layers of clay to reach the column of guarantee, notwithstanding which a spouting sheet of water was met with at M. 31.00 of depth and its discharge is about 50 litres per minute. This boring is not tubed in its inferior part. The several layers met with are sensibly similar to those of the well No. 7.

Ariancoupom.—At about 200 metres south of the Ariancoupom Church on the east of the road to Cuddalore in the lands belonging to the Chouldry of Tambonnaicker, Mr. Balakichenai-kaier has constructed an Artesian well in which he met with a sheet of spouting water at M. 35.50 of depth. The discharge of the water is of 100 litres per minute at M. 2.10 above the soil. The layers met in this boring are of the same nature as those of the well No. 7.

Papanchavadi.—Between Mouroungapacom and Commapacom at one mile to the west of the well No. 8, Mr. Tambansavararetti caused to be constructed an Artesian well in his property cultivated with rice. A spouting sheet of water was met with at 51 metres of depth and its discharge is of 300 litres per minute. The layers met with are of the same nature as those of the well No. 7.

Tavalacoupom.—On the east coast of the road to Cuddalore at about 150 metres south-east to the road leading from the road of Cuddalore to Archivack, Mr. Marins LePrince has caused an Artesian well to be bored in his property. A spouting sheet of water was met with at M. 60 of depth and its discharge was of 100 litres per minute. But the owner having found this quantity insufficient is continuing this boring.

Settlement of Karikal.

Government undertook a boring in 1881 on the Government premises at Karikal. The works not having given good results at first were stopped several times and resumed at the end of 1882.

The first column of 0.21 being engaged in the layers of clay and many banks of rocks formed of sediments of a thickness varying from M. 0.11 to M. 0.60, the works were continued with a new column of M. 0.16 of diameter which was introduced in the first column. Some metres lower at M. 87.80 appeared a sheet of water which rose to M. 0.80 in a downward direction of the natural soil. This ascending sheet of water, the first that was met in this boring, gives hope amongst our sounders. The workmen go on with greater zeal when at M. 105.51 deep a new sheet of water, the level of which at the natural level of the soil, showed itself. All haste is used in order to disentangle this sheet of water which proceeds from a layer of thin sand of M. 0.20 of thickness, situated between two banks of agglomerated rocks. The level of this sheet of water remaining the same, the second bank which is only a sheet of M. 0.10 of thickness is soon perforated and gives passage to a spouting sheet of water proceeding from a layer of thin pure sand at M. 105.81 of depth. The hydrostatic level of this sheet of water is M. 2.00, the hydrometrical degree of the water is 5°, and its temperature of 34 centigrades. The discharge of this sheet of water being only of 66 litres per minute at M. 0.60 above the soil, this boring will perhaps be continued till a more abundant sheet of water is met with.

The preceding work comprising like the notice of 1880, to which it forms the sequel, the scientific and technical parts only of the borings on the territory of Pondicherry, we have grouped in the table below concerning the fourteen Artesian wells, the geological tracings of which we are aware of as well as all the supplementary information asked for by the Government of the Presidency of Madras to the Government of Pondicherry.

Information on the Artesian Wells of Territory of Pondicherry.

Numbers of the Wells of the Notice.	Designation of the Borings.	Depth in the Soil.	Cost Price per current Meure.	Total Cost Price.	Diameter of the Orifice of Discharge.	Discharge in Litres per Minute.	Water—how used.	Remarks.
1	First boring of the Cotton Mills, Savana.	M. 53-00	F. C. 113 21	F. C. 6,000 00	M. 0-14	215	Feeds the two boilers of a machine of 90 horse-power and supplies for condensation by the means of a new refrigerator.	Tube in copper hydraulic mortar; works regularly.
2	In the yard of the Cotton Mills of Ompalem.	55-70	100 84	5,600 00	0-18	450	Feeds the boilers of the Cotton Mills, irrigates the garden and the trees of the establishment, and is given for an hour morning and evening to the inhabitants of the neighborhood.	Tube in copper hydraulic mortar. From its base and the hydraulic mortar of the column of ascension the Artesian well of Ompalem gives 700 litres per minute. Worked regularly.
3	In the centre of the Great Basin of the garden of.	79-52	63 75	5,050 12	0-26	600	Feeds a fountain with four cocks and irrigates the 16 cavities of land of the garden.	Has been abandoned.
4	In the yard of the house of Mr. G. Cornet situated near the south-west angle of the Government House Gardens.	62-00	38 71	2,400 00	0-09	..	.....	Must be continued with a column of a small diameter when the necessary funds will be provided.
5	West side of the cross-way to the north-west of the College Calce.	171-98	47 73	8,209 34	0-21	..	.....	Often requires cleaning in consequence of the foot of the column being blocked up by sand.
6	In the centre of the property Cojades-samy Odgar in the village Modelpatt.	24-00	89 00	2,136 00	0-18	70	Feeds the garden of this property which has an extent of four and a half cavities.	Requires to be cleaned twice a year.
7	On the west side of the road to Cuddalore to the north and near the Ariancoupen Church.	58-50	49 53	2,879 99	0-26	400	Used for all domestic purposes and the use of the population of the village. Feeds during thirty six hours every week two tanks used for bathing of cattle and having also a pond for irrigation purpose. The remainder is let on an average of 100 rupees a year.	The interior part of the column of guarantee in iron sheeting being deteriorated, this well will very shortly be tubed in copper.
8	In the field of Mr. Channemongamodellar at Mureungasam.	29-00	111 72	3,240 00	0-16	200	Irrigates five cavities of rice fields.	.....
9	Second boring in the Cotton Mills, Savana.	26-20	41 54	1,088 40	0-18	200	Feeds the boilers of a machine of 700 horse-power, supplies for the condensing of a machine of 60 horse-power, the boilers of which are fed by means of refrigerators.	.....
10	At Calapeti in the centre of the French Possessions at ten kilometres to the north of Pondicherry.	40-94	46 23	1,892 80	0-16	..	.....	Has been abandoned.
11	Third boring in the Savana Cotton Mills.	72-60	43 00	2,613 60	0-18	125	The water of this well is used to supplement the feeding of the machine of 90 horse-power which receives for condensation the water of the 9th well.	.....