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MADRAS RECORD OFFICE.

Government of Madras.

Public Works **DEPARTMENT.**

G.O. No. <u>1049</u>	Press
<u>43-44</u>	~~Mis.~~
Dated <u>5-4-</u>	18 <u>66.</u>

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
5th April 1866.*

No. 43. Read the following Proceedings of the Madras Government in the
Military Department:—

Passing orders on a Report by the Sanitary Com-
mission on the impure state of the water sup- } (Here enter 26th March 1866, No. 1,132.)
ply at Saint Thomas' Mount.

No. 44. ORDER THEREON, 5th April 1866, No. 1,049.

MILITARY WORKS, No. 4.

Communicated to the Superintend-
ing Engineer of the 4th Division, whose
attention is requested to the orders con-
tained in paragraph 1.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,

Secretary to Government.

To the Superintending Engineer, 4th Division.

Exd. S. T. Augustin.

MILITARY DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read the following papers:—

From the Officiating President Sanitary Commission, Madras, 9th March 1866, No. 831; to the Secretary to Government, Military Department, Fort Saint George.

I have the honor to bring to the notice of Government the very impure state of the water supply at Saint Thomas' Mount, as shewn by the appended analysis of that derived from ten wells which

Enclosure 1.
One statement of analysis.

has already been briefly noticed in the report by this Commission on the sanitary condition of Saint Thomas' Mount.

2. From this it appears that in ten samples, the solid ingredients in an Imperial gallon vary from 19.7 grains to 90 grains, and that the amount of organic matter contained in seven wells out of the ten is from 10.6 grains to 35.3 grains per gallon, while in the remaining three it ranges from 3.7 to 5.8 grains per gallon.

3. The excessive impurity of the former wells has prevented their being used for drinking purposes for some time past, and even the wells that are used contain a larger amount of organic matter than
* Vide report of the Royal Commissioners. is considered by competent authority* sufficient to render its use free from the danger of inducing or producing disease.

4. The attention of this Commission was drawn to the alarming impurity of water of those wells situated in the immediate neighbourhood of a crowded bazaar and more especially to that in the Hospital compound; and, in order to discover if possible any obvious causes other than those which may be attributed to the bad surface conservancy, a Sub-Committee was formed by this Commission who proceeded to the Mount on the 19th ultimo for this purpose, and their report has already been recorded at page 15 of the Proceedings of this Commission for January 1866.

5. In conformity with the resolution then passed, a fresh supply of water from the well in the Hospital compound was collected with great care, and the following is the result of the analysis with the Chemical Examiner's remarks.

Sensible properties.

Appearance.....	In a long tube compared with distilled water slightly greenish brown in colour.
Taste.....	Not refreshing.
Odour.....	Nothing remarkable.

Chemical properties.

To test paper reaction	Vary faintly alkaline.
Solid matter in one Imperial gallon. { Organic and other volatile matters.....	27.45
{ Inorganic, salts, &c,.....	61.05
Total...	88.5
Oxidizable matter by Permanganate solution.	
Relation of oxygen to organic matter 1 to 8. }	1.008 grains in the gallon.
Hardness to Soap test... Temporary.	5. 5.
1° = .727 grains of Carbonate of lime. }	
.989 grains of Sulphate of lime. } Permanent.	33.
Total...	38.5.
Chlorides determined volumetrically as Chloride of Sodium in one gallon. }	32.737.
Carbonate of Lime	Average proportion.
do. of Magnesia	In large proportion.
Iron	Traces.

In solution after boiling.

Lime.....	In large proportion.	Magnesia.....	Average proportion.
Chlorides....	Determined above.	Sulphates.....	Large proportion.
Nitrates....	Large proportion.	Ammonia.....	None detected.

"These results though differing somewhat in quantity as regards the volatile matters from the previous analysis, still shew the same results as before, viz., that the water contains a very large quantity of nitrates and Chlorides and is therefore unfit for drinking or domestic use."

"The quantity of Nitrates was so large that upon igniting the dried residue, copious fumes of nitrous acid were evolved."

6. As a careful examination of all these wells has failed to discover any cause which directly vitiates their supply, this Commission cannot help thinking that this excessive impurity is derived from the filtering of the water through a soil loaded with animal and other matters, and that it results from the extremely defective conservancy of the neighbouring crowded bazaars—two of the wells which afford the purest supply being furthest removed from any contaminating source of this description.

7. To determine this point satisfactorily, this Commission suggest that the seven wells referred to be carefully cleaned out, and a fresh analysis then be made of their contents. Should the water supply still continue as impure as it is now, we can only add that it will show the greater urgency for improving the conservancy arrangements.

This subject has been fully referred to in the Sanitary Report by this Commission attached to their Proceedings for December 1865.

TABULAR STATEMENT of the results of analysis of the following drinking waters from Saint Thomas' Mount and Palaveram.

TABULAR STATEMENT of the results of analysis of the following drinking waters from Saint Thomas' Mount and Palaveram.																						
Number.	Locality.	Sensible properties.			Re-action to test paper.	Solid ingredients in one Imperial gallon.			Hardness to soap test.			Chemical properties.										Remarks.
		Appearance.	Odour.	Taste.		Organic and Nitrates.	Inorganic.	Total.	Temporary.	Permanent.	Total.	Chlorides determined as Chloride of Sodium in one Imperial gallon.	Bases in solution by carbonic acid.			In solution after boiling.						
													Iron.	Lime.	Magnesia.	Lime.	Magnesia.	Chlorides.	Sulphates.	Nitrates.		
1	From a well near the South Barracks sent with Dr. Mackay's letter, No. 111, dated 3rd March 1864.	Clear...	Void of ...	Earthy ...	Faintly acid.	Grains. 14	Grains. 74	Grains. 88	2°	38°	40°	Grains. 24.5	Faint traces	Fair proportions.	Average quantity.	Small quantity.	Average quantity.	Large quantity.	Above average quantity.	None detailed.	An impure hard water not well fitted for drinking or domestic use.	
2	From a well inside South Barrack square.....	Do.....	Do.....	Free from...	Neutral ...	18	45	63	1°	26°	27°	14.03	Traces....	Very small.	Very small.	Average quantity.	Very small quantity.	Do.....	Small quantity.	Present ...	None of these can be considered fit for drinking waters; the presence of nitrates suggests defective sanitation and makes the organic impurity, i. e., that "that can be burnt off" appear larger than it is in reality.	
3	Do. outside South Barrack square	Do.....	Do.....	Do.....	Do.....	11.6	30	41.6	4°	45°	49°	28.64	Do.....	Quantity ...	Quantity ...	Rather above average.	Average ...	Generally large.	Average ...	Do.....		
4	Do. in Family quarters, Barracks South	Do.....	Do.....	Do.....	Do.....	18.7	34.4	53.1	2°	23°	25°	15.78	Do.....	Very small.	Very small.	Average ...	Small...	Large...	Small...	Do.....		
5	Do. in Barrack square.....	Contains suspended particles.	Free from...	None...	Do.....	10.6	30.9	41.5	10°	18°	28°	9.35	More than traces.	Fair quantity.	Small...	Above average.	Above average.	Average ...	Average ...	Do.....	An impure water—part of what set down as organic is due to nitrates.	
6	Do. in Horse Lines	Clear...	Do.....	Void of ...	Do.....	4.7	23	27.7	10°	12°	22°	7.6	Do.....	Fair.....	Do.....	Average ...	Average ...	Moderate...	Do.....	None...	These if filtered and kept clean would probably make good drinking waters.	
7	Do. near Palaveram Plain	Contains suspended particles.	Slightly offensive.	Somewhat unpleasant.	Do.....	3.7	15	18.7	5°	14°	19°	4.67	Do.....	Average ...	Do.....	Below average.	Do.....	Small...	Small...	Do.....		
8	Do. in Parcherry.....	Do.....	Earthy ...	None...	Do.....	22.3	36.3	58.6	12°	25°	37°	21.6	Faint traces	Large...	Do.....	Above average.	Above average.	Large...	Average ...	Large...	Very impure water, unfit for use, nitrates probably from defective sanitation.	
9	Do. in Barrack square, No. 6 Battery.	Clear...	Free from...	Void of.....	Do.....	5.8	13.9	19.7	3°	11°	14°	7.01	Do.....	Small...	Do.....	Average ...	Average ...	Small...	Small...	None ..	Fair sample of well water.	
10	From the well in the Hospital compound Saint Thomas' Mount.	Faint greenish colour.	Free from...	Not refreshing.	Faintly alkaline.	35.05	54.85	89.9	10°	28°	38°	31.568	Traces....	Average quantity.	Large quantity.	Large quantity.	Large quantity.		Above the average.	In large proportions.	A large quantity of nitrates and chlorides present, sufficient to condemn the water for drinking use.	

Extract from a letter from the Chemical Examiner, No. 77, dated Madras, 20th December 1865.

"The tabulated results forwarded to you were compiled from a qualitative analysis of the water made with the object of enabling me to pronounce an opinion as to whether they were well adapted for drinking are no."

"In the margin of the tabulated results, you will observe it stated, as regards Nos. 2, 3 and 4, "the presence of nitrates suggests defective sanitation and makes the organic impurity, i. e., that, that can be burnt off appear larger than it is in reality."

"The qualitative detection of nitrates and chlorides together in considerable quantity is quite sufficient to condemn a water for drinking use. Yet it would be well perhaps before entirely rejecting such a water with a view to its purification to ascertain by careful comparative examination of other wells in the vicinity whether or no, this impurity is derived from the filtering through the soil of animal matters from latrines or urinals, as I think would probably be found to be the case in this instance; for, unless alkaline nitrates exist in the soil itself their presence in water is almost invariably due to the decay of animal matter containing nitrogen the organic matter so derived filtering through the soil and draining into the springs supplying wells in the neighbourhood."

(Signed) S. J. WYNDOWE, M. D.,
Chemical Examiner.

ORDER, No. 1132, 26th March 1866.

Communicated to the Department of Public Works, in view to assistance being afforded to carry out the suggestion in paragraph 7 of the foregoing letter, the experiment being, however, restricted to two of the worst wells of those situated near the bazaar and that in the Hospital compound as recommended by the Sub-Committee in their memorandum recorded in page 15 of the Proceedings of the Sanitary Commission for the month of January 1866.

2. The Governor in Council observes that the Sub-Committee do not attribute the impurity of the water in the Hospital well, or in those of the Barrack square, to any deficiency in the surface drainage.

3. In connection with this subject, Government wish to be informed whether the periodical cleansing of wells in Cantonments is provided for, and if so, whether it is generally attended to.

(True Extract.)

Alcock

Deputy Secretary to Government.

To the President Sanitary Commission

„ Public Works Department. *W. H. C. P. W.*
„ Quarter Master General.
„ Adjutant General.
„ Principal Inspector General Medical Department, } for information.
„ Controller of Military Accounts, ...

Exd. A. W. Cooke.

20th 1866 Dept
Pro. of Govt for April
No 1303

For the Madras Govt
in the Military Dept

Of 28 March } 1866
No 4044 }

A/132

Pursuing orders on
a report by the Sanitary
Commission on the
unpure state of the
water supply at St.
Thomas Mount.

No 1049 - 5th April 1866

With encl. No

Sub

Comm. to the S. of the S. D. in whose
attention is requested to the enclosed contained in the

No 1049

Comm. to the S. of the S. D. in whose

25th 1866

25th 1866

Spent 8th 1866 }
5th 1866 }

25th

A/132 - 11th