

1. Number
2. Date of repair. 16-7-3
3. Initials of Releaser

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M.B.O. 1-82,400-22-11-80.

MADRAS RECORD OFFICE.

Government of Madras.

Public DEPARTMENT.

G.O. No.	1030	Press ~~Mis.~~
Dated	22-7-	1869

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Department,
22nd July 1869.*

No. 170. Read the following letter from Surgeon-Major J. L. RANKING, Sanitary Commissioner for Madras, to the Chief Secretary to Government, Fort Saint George; dated Madras, 3rd July 1869, No. 2524.

Adverting to the official correspondence published in the Supplement to the *Fort Saint George Gazette* of the 29th ultimo, regarding rules for determining the presence of organic matter in potable waters, I feel it my duty, in justice to myself and the Chemical Examiner, to trouble the Government with a few remarks.

2. It will be within your recollection that, in conformity with the Order of Government, No. 1831, of the 6th May 1868, I drew up a simple scheme of analysis of potable waters; and that, in regard to the determination of organic matters, I adopted the process of evaporation and incineration of the residue, directing that the amount of blackening during incineration (as an indicator of the presence of organic matter) and of scintillation and evolution of red fumes (as evidencing the existence of nitrates) should be carefully noted, prior to the actual weighing of the ignited residue, to determine the loss by volatile and organic matters. To determine further the quantity of oxydizable matter, I advised the use of the permanganate of potash, in the way suggested by Dr. Angus Smith in his pamphlet entitled "Estimation of organic matter in water," a process allied to that followed at Netley by Medical Officers undergoing the course of instruction at that Military School.

3. These processes obtained the approval of the Chemical Examiner with this Government.

4. The correspondence regarding the matter, together with an indent for chemicals and apparatus, to be procured from England, was transmitted to the Government of India, under date the 29th of September 1868, and the rules were referred to Dr. Macnamara, the Chemical Examiner with the Government of India, for his opinion; who, in a letter to the Secretary to the Inspector General of Hospitals, Lower Provinces, took exception to the process I laid down. He remarked that he agreed with Dr. Frankland and Messrs. Wanklyn and Chapman, and eminent chemists, that the process by combustion of the residue left on evaporation is not to be depended on. He also took exception to the use of permanganate of potash; considering it useful only in indicating the degree of putrefying organic matter in any specimen of water. He then proceeded to recommend, as the process that could most confidently be employed, that described by Messrs. Wanklyn and Chapman.

5. This opinion was in due course communicated to this Government, and referred to the Inspector General of the Medical Department, who forwarded it to me for comment.

6. I replied that, although aware of the objections that had been raised by some chemists, to the determination of organic matter by combustion and the permanganate of potash, that such objections were not shared by all chemists; and that the processes were still taught at Netley to candidates for the British and Indian Medical Services, to whose hands my scheme contemplated that the analysis of waters should be entrusted.

7. I admitted that I was not practically acquainted with Messrs. Wanklyn and Chapman's process, and suggested that, if a better process could be followed than that I had laid down, rules should be drawn up by Dr. Macnamara in com-

munication with the Chemical Examiners of Madras and Bombay, to be made applicable to the three presidencies, and in this Dr. Mackenzie concurred.

8. I am not, therefore, a little surprised to find that the rules Dr. Macnamara does lay down, do not materially differ from those I advised. They are in fact less precise than those I suggested. The same processes, the use of permanganate of potash and combustion of the residue left on evaporation are followed; but with the intent only of determining the *presence* without any reference to the *quantity* of organic matter. It is true that Dr. Macnamara gives the process by the chloride of gold; but this affords only a rough indication of the presence of organic matter; is a *qualitative*, and not a *quantitative* test; and is rarely used except as a corroborative one.

9. I am at a loss, therefore, to understand why Dr. Macnamara should have taken exception to the process I advised, when he adopts the very same (except as regards the addition of the test by the chloride of gold) restricting all his tests to the determination of the *presence* of organic matter, without any attempt to ascertain the quantity.

10. There is also a contradiction in the tenor of Dr. Macnamara's letters. In the first he shows that there is a difference of opinion amongst chemists; but in the last he writes that "the means used for determining the presence of organic matter are very definite and simple; and so well-known that an Assistant Surgeon fresh from Netley is as competent to lay them down as the most experienced chemist." Why then, in his letter of the 16th November 1868, does he take exception to the processes I laid down, in communication with the Chemical Examiner with this Government, which are conformable to those followed at Netley?

11. That the Government may be in possession of the present aspect of the question of determination of organic matters in water, I quote from the Statistical Sanitary and Medical Reports of the Army Medical Department for 1865, Dr. Parkes' (Professor of Hygiene at Netley) conclusions upon the subject, after a careful review of, and doubtless practical acquaintance with, all the methods recently advanced, including those of Drs. Frankland and Smith, and Messrs. Wanklyn and Chapman, whose processes he gives in detail. Dr. Parkes writes: "At present I believe that careful incineration, and the use of the permanganate of potassium, are still the most available means we have for forming an approximate idea of the amount of organic matter."

12. I should add that, although Dr. Macnamara in his first letter recommends Messrs. Wanklyn and Chapman's process, it finds no place in the rules that accompany his second communication, though he provides for the apparatus necessary to the process, in the list he appends to his first letter.

13. I respectfully submit, therefore, for the consideration of Government, that the rules I have laid down for the determination of the presence and approximate amount of organic matters in water, are in accordance with the processes still followed at Netley; that they contain all that Dr. Macnamara has advanced as relates to the simple *detection* of organic matters; but that they go further, inasmuch as that they aim at arriving at some conclusions as to the *amount* of such matters.

14. Since the receipt of Dr. Macnamara's first communication, I have obtained a copy of Messrs. Wanklyn and Chapman's work, and am in a position to add

to the rules I drew up, the process followed by those gentlemen; but at the same time, respectfully advance for the information of Government, and in so doing quote again from Professor Parkes, that "unfortunately none of these processes are very well-adapted for hygienic purposes; nor indeed could they be used by any but professed chemists who have plenty of time. It may be questioned whether the result is worth the labour, and whether elements of inaccuracy are not introduced."

15. In conclusion, I have the honour to solicit definite instructions as to whether the rules I have laid down for the determination of the *presence* and approximation of the *quantity* of organic matters are to be retained; or whether those drawn up by Dr. Macnamara, with the addition of Messrs. Wanklyn and Chapman's process, are to be substituted.

16. I am still of opinion, however, that in a question upon which so much difference of opinion exists, it is advisable that the procedure to be followed, be the same in each presidency, in view to uniform results; and that the Chemical advisers of each Government should be consulted.

17. I have submitted this letter for the information of Dr. Mackenzie, who has authorized me to say that it meets his entire approval.

No. 171. To the Secretary to the Government of India, Home Department, dated Fort Saint George, 22nd July 1869, No. 1030.

I am directed by the Governor in Council to transmit copy of a letter from the Sanitary Commissioner, Madras, regarding the rules for determining the presence of organic matter in water, annexed to Dr. Macnamara's letter to the Inspector General of Hospitals, Bengal Medical Department, published in the Supplement to the *Gazette of India* of the 12th June 1869; and to inquire whether the adoption of these rules is obligatory.

2. I am also instructed to mark that the scheme proposed by Dr. Ranking, which has already been laid before the Government of India,* appears, though the processes employed are substantially the same as those now recommended by Dr.

Macnamara, to be preferable, inasmuch as provision is made for the quantitative as well as qualitative determination of the organic matter. His Excellency the Governor in Council considers that it is, for obvious reasons, desirable that a uniform system should be adopted throughout India; and that it is not advisable to introduce the process of Messrs. Wanklyn and Chapman, though believed by Dr. Macnamara to be the more reliable yet devised, as this process is not taught at Netley.

(Signed) R. A. DALYELL,
Actg. Secy. to Govt.

MILITARY DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read the following papers :—

From the Dy. Insp. Genl. Indian Medl. Dept. Here enter 15th September 1868, No. 312.
Report from the Contr. of Military Accts. 22nd C.

From the Deputy Inspector General Indian Medical Department, Fort Saint George, 15th September 1868, No. 312; to the Secretary to Government, Military Department.

In obedience to the Order of Government, No. 3383 of date 31st August 1868, I have the honor to forward, for submission to Government, and eventual transmission to the Right Honorable the Secretary of State for India, the extra indent No. 33, in quadruplicate, for apparatus, &c., for the examination and analysis of water in Military Cantonments.

From the Controller of Military Accounts, Fort Saint George, 22nd September 1868, C; to the Secretary to Government, Military Department.

I have the honor to forward a letter from the Inspector General Indian Medical Department, dated 15th September 1868, No. 312, enclosing, for transmission to the Home Authorities, an extra indent (in quadruplicate) for apparatus, &c., for the examination and analysis of water in Military Cantonments.

2. The indent has been checked and the articles found to correspond in designation, number and quantities with those in the list published in Proceedings of Government, No. 3383 of 31st August 1868.

3. Opposite "Clark's neutral test paper book" no quantity is shown in the list. dozens 4 have been entered in the indent.

4. The articles not having been indented for before, their value cannot be shown.

ORDER, No. 3813, 29th September 1868.

Forwarded to the Secretary of State for India, together with the correspondence noted in the margin.
Pro. of Govt., 6th May 1868, No. 1831.
" 31st Augt. " " 3383.

Docket to the Offg. Secy. to the Govt. of India, M. D. | Here enter 29th Sept. 1868, No. 3814.

(True Extract.)

(Signed) C. S. ELLIOT, Lieut.-Colonel,
Offg. Deputy Secretary to Government.

DOCKET, No. 3814.

Copy of the above, and of the indent and previous correspondence connected therewith, transmitted to the Officiating Military Secretary to the Government of India, for the information of that Government.

FORT SAINT GEORGE, }
29th September 1868. }

Ed. J. E. Cashart.

Lieut.-Colonel,

Offg. Deputy Secretary to Government.

Home 1869 Dept

From Government of

Fort St. George.

Dated 22nd July 1869. No.

Enclosures

Spare copies

D. No.

Progs.

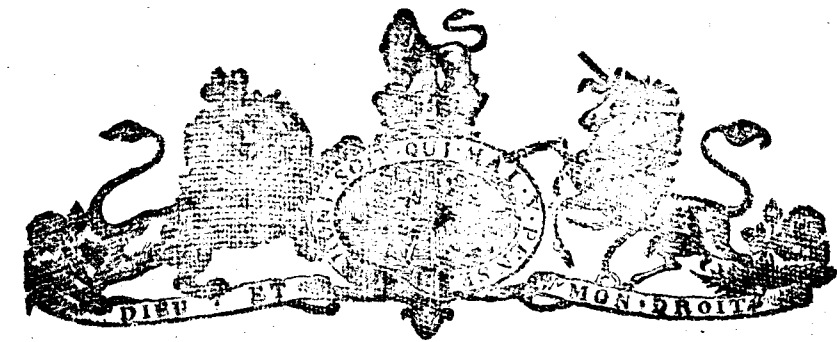
D. No.

No. 1030.

JULY.

Nos. 170-171.

Transmitting, with remarks, copy of a letter from the Sanitary Commissioner, Madras, regarding the rules for determining the presence of organic matter in water, annexed to Dr. Macdonald's letter to the Inspector General of Hospitals, Bengal Medical Department.



OFFICIAL PAPERS.

GOVERNMENT OF INDIA. MILITARY DEPARTMENT

RULES FOR DETERMINING THE PRESENCE OF ORGANIC MATTER IN POTABLE WATERS.

From J. MURRAY, Esq., M.D., Inspector General of Hospitals, Bengal Medical Department, to the Secretary to the Government of India, Military Department,—No. 86, dated the 4th May 1869.

In reply to your letter No. 454, of the 21st ultimo, I have the honor to forward, for submission to His Excellency the Viceroy and Governor General in Council, an original letter dated 1st current, from the Chemical Examiner to Government, together with a set of Rules drawn up by him for determining the presence of organic matter in potable waters.

From F. N. MACNAMARA, Esq., M.D., Chemical Examiner to Government, to the Secretary to the Inspector General of Hospitals,—dated Calcutta, the 1st May 1869.

With reference to your memorandum dated the 24th ultimo, I have the honor to enclose the Rules which I think applicable to the determination of the presence of organic matter in water.

With reference to the direction to place myself in communication with the Chemical Examiners at Madras and Bombay, I beg very respectfully to state, for the information of Government, that the means to be used for determining the presence of organic matter in water are very definite, and simple, and so well known that an Assistant Surgeon, fresh from the course of Practical Chemistry at Netley, is as competent to lay them down as the most experienced chemist. Regarding the methods to be used for determining the presence of organic matter in water, there is not, so far as I know, any controversy amongst chemists.

In laying down Rules for the use of persons not acquainted with chemical manipulations, it is therefore only necessary to separate the Rules from the extraneous matter with which they are found mixed in text books on the subject; to put them into such a shape that they may be comprehended by any non-professional person who may wish to employ them; and to describe the method for the preparation of the solutions which are needed for use in the processes. All this I have done in the enclosed set of rules.

If after this explanation which I have ventured to make, the Government still consider I should communicate with the Chemical Examiners at Madras and Bombay, I shall at once do so.

Rules for determining the presence of organic matter in water.

In examining water with a view to determining the presence of organic matter, both the physical and chemical properties of the water must be attended to.

I. If the water has a putrid taste or smell, the presence of decomposing organic matter is at once determined.

II. Fill a tall soda-water glass with the water, and, having placed the glass and its contents upon a white surface, look down through it. Should the water display a greenish or greenish brown tinge, it contains organic matter.

III. Examine the water for animal or vegetable growths, the presence of which of course demonstrates organic matter in the water.

If a microscope is available, allow some of the water to stand for 12 hours in a covered conical glass, and examine any sediment microscopically with a view to the detection in it of animal or vegetable life. It must be borne in mind that water may contain organic matter, though its physical properties are apparently unexceptionable.

IV. Dissolve 10 grains of gold in half a drachm of strong nitric acid, and a drachm and a half of strong hydrochloric acid—a gentle heat should be used, and the acid fluid should be evaporated down on a sand bath to one-third its original bulk. The residue which contains the perchloride of gold is then mixed with distilled water till its bulk is made up to an ounce. The solution must be kept in a glass-stoppered bottle. Boil in a clean porcelain or glass vessel six ounces of the water, and add 5 minims of the solution of perchloride of gold; should the yellow colour of the perchloride of gold immediately disappear, another addition of 5 minims of the solution may be made. The gold will be reduced in proportion to the amount of organic matter present in the water, and will form a violet, or almost black powder which will shortly deposit upon the bottom and side of the vessel.

V. Dissolve 2 grains of permanganate of potash in a pint of distilled water. Keep the solution in a glass-stoppered bottle.

Take a pint of the water for examination, place it in a clean glass vessel standing on a piece of white paper. Add 30 minims of strong

sulphuric acid, and then add, at the same time gently stirring with a glass rod, 5 minims of the solution of permanganate of potash.

Allow the water to come to rest, and wait for five minutes; if the rose-coloured tint of the permanganate solution disappear, the water contains readily oxidisable (decomposing) organic matter. Again add 5 minims of the permanganate solution, and after waiting 5 minutes, if the colour disappears, continue successive additions of 5 minims of the solution till the rose tint of the permanganate persists during 5 minutes. The amount of decomposing organic matter may be roughly estimated from the number of minims of the permanganate solution needed to give a rose colour to the water persistent during 5 minutes.

The tests thus given may be very readily and very speedily employed, and they do not necessitate the possession of any special apparatus. By their conjoint use the presence of organic matter may, with certainty, be determined.

VI. There is another method which may be used for the same purpose, but it is tedious and unnecessary unless in the case of the tests already

described failing to give satisfactory evidence. The test I allude to is the one by the combustion of the residue obtained from the evaporation to dryness of a portion of the water.

Place a pint of the water in a porcelain basin, concentrate by evaporation over the naked flame of a spirit lamp, and eventually, when the quantity of water has been much reduced, evaporate to dryness on a sand bath. By means of a spatula, transfer the dry residue to a piece of platinum foil, or to a piece of white porcelain, and heat in the flame of a spirit lamp. If the residue blackens, the presence of organic matter is determined. If in the act of charring the residue evolves a smell like that of burning feathers, the organic matter is wholly or in part nitrogenous.

F. N. MACNAMARA.

Calcutta, the 1st May 1869.

Re-published by order of His Excellency the Governor in Council.

R. S. ELLIS, Chief Secretary.

N^o 2524

From

Office of Sanitary Commissioner

Madras 3rd July 1868

Surgeon Major J. L. Ranting
Sanitary Commissioner
for Madras

To

The Honorable R. S. Ellis C.B.

Chief Secretary to Government
Public Department
Fort Saint George.

Sir,

Adverting to the official correspondence published in the Supplement to the Fort Saint George Gazette of the 29th ultimo, regarding rules for determining the presence of organic matter in potable waters, I feel it my duty, in justice to myself and the Chemical Examiner, to trouble the Government with a few remarks.

2. It will be within your recollection that in conformity with the order of Government No. 1831 of the 8th May 1868, I drew up a simple ~~in~~ ~~series~~ of analysis of potable waters; and that in regard to the determination of organic matters, I adopted the process of evaporation and incineration of the residue, directing that the amount of blackening during incineration (as an indicator of the presence of organic matter) and of re-ignition and evolution of red fumes (as indicating the existence of nitrates)

of nitrates) should be carefully noted, prior to the actual weighing, of the ignited residue, to determine the loss by volatile and organic matters.

To determine further the quantity of oxidizable matter, I advised the use of the Permanganate of Potash, in the way suggested by Dr. Angus Smith in his pamphlet entitled "Estimation of organic matter in water", a process allied to that followed at Netley by medical officers undergoing the course of instruction at that Military school.

3. These processes obtained the approval of the Chemical Examiner with the Government.

4. The correspondence regarding the matter, together with an indent for chemicals and apparatus, to be procured from England, was transmitted to the Government of India under date the 29th of September 1868, and the papers were referred to Dr. Macnamara, the Chemical Examiner with the Government of India, for his opinion; who, in a letter to the Secretary to the Inspector General of Hospitals, Lower Provinces, took exception to the process I had done. We remarked that he agreed with Dr. Frankland and Messrs. Wanklyn and Chapman, and miners chemists, that the process by combustion of the residue left on evaporation is not to be depended

~~on. He also took exception to the use of~~

Permanganate of Potash; considering it useful only in indicating the degree of putrefying organic matter in any specimen of water. He then proceeded to recommend, as the process that could be most confidently be employed, that described by Messrs. Wanklyn and Chapman.

5. This opinion was in due course communicated to the Government and referred to the Inspector General of the Medical Department, who forwarded it to me for comment.

6. I replied that, although aware of the objections that had been raised by some chemists, to the determination of organic matter by combustion and the Permanganate of Potash, that such objections were not shared by all chemists; and that the processes were still taught at Netley to candidates for the British and Indian Medical Services; to whose hands my scheme contemplated that the analysis of waters should be entrusted.

7. I admitted that I was not practically acquainted with Messrs. Wanklyn and Chapman's process, and suggested that, if a better process could be followed than that I had laid down, papers should be drawn up by Dr. Macnamara in communication with the Chemical Examiners of Madras and Bombay; to be made applicable to the three Presidencies, and in this Dr. Macnamara concurred.

8. I am not therefore a little surprised to find that the rules Dr Macnamara does lay down, do not materially differ from those I advised. They are in fact less precise than those I suggested. The same processes, the use of Permannanganate of Potash and combustion of the residue left on evaporation, are followed; but with the intent only of determining the presence without any reference to the quantity of organic matter. It is true that Dr Macnamara gives the process by the chloride of gold; but this affords only a rough indication of the presence of organic matter; is a qualitative and not a quantitative test; and is rarely used except as a corroborative

I am at a loss therefore to understand why Dr Macnamara should have taken exception to the process I advised, when he adopts the very same (except as regards the addition of the test by the Chloride of Gold) restricting all his tests to the determination of the presence of organic matter, without any attempt to ascertain the quantity.

10. There is also a contradiction in the tenor of Dr Macnamara's letters. In the first he shows that there is a difference of opinion amongst chemists; but in the last he writes that "the means used for determining the presence of

and so well known that an Assistant Surgeon fresh from Netley is as competent to lay them down as the most experienced chemist". Why then, in his letter of the 16th November 1868, does he take exception to the processes I laid down, in communication with the Chemical Examiner with this Government, which are conformable to those followed at Netley?

11. That the Government may be in possession of the present aspect of the question of determination of organic matters in water, I quote from the Statistical Sanitary and Medical Reports of the Army Medical Department for 1868, Dr Parkes (Professor of Hygiene at Netley) conclusions upon the subject, after a careful review of, and doubtless practical acquaintance with, all the methods recently advanced, including those of Dr Frankland and Smith and Messrs Wanklyn and Chapman, whose processes he gives in detail.

Dr Parkes writes "at present I believe that careful evaporation, and the use of the permanganate of potassium, are still the most available means we have for forming an approximate idea of the amount of organic matter".

12. I should add that although Dr Macnamara in his first letter recommends Messrs Wanklyn and Chapman's process, it finds no place in the rules that accompany his second communication, though he provides for the apparatus

apparatus necessary to the process, in the list he appends to his first letter.

13. I respectfully submit therefore, for the consideration of Government that the rules I have laid down for the determination of the presence and approximate amount of organic matters in water, are in accordance with the processes still followed at Nitbay; that they contain all that Dr. Macnamara has advanced as relating to the simple detection of organic matters; but that they go further, inasmuch as that they aim at arriving at some conclusions as to the amount of such matters.

14. Since the receipt of Dr. Macnamara's ~~in communication~~, I have obtained a copy of Messrs. Wanklyn and Chapman's work, and am in a position to add to the rules drawn up, the process followed by these gentlemen; but at the same time respectfully advance for the information of Government, and in so doing quote again from Professor Richards, that "unfortunately none of these processes are very well adapted for hygienic purposes; nor indeed could they be used by any but professional chemists, who have plenty of time. It may be questioned whether the result is worth the labor and whether elements of inaccuracy are not introduced."

15. In conclusion I have the honor

15 to the rules I have laid down for the determination of the presence and approximation of the quantity of organic matters are to be retained; or whether those drawn up by Dr. Macnamara, in the addition of Messrs. Wanklyn and Chapman's process, are to be substituted.

16. I am still of opinion, however, that in a question upon which so much difference of opinion exists, it is advisable that the process to be followed, be the same in each Presidency, in view to uniform results; and that Chemical advisers of each Government should be consulted.

17. I have submitted this letter for the information of Dr. MacKinger, who has authorized me to say that it meets his entire approval.

I have the honor to be
Sir

Yours most obedient servant
J. Murray
Sanitary Commissioner
for Madras.

Public Department X
17

No. 1034.

The Secretary to the Government
of India.

Home Department

Sir,

I am directed by
the Governor in Council
to transmit copy of a
letter from the Sanitary
Commissioners Madras, re-
-garding the rules for de-
-termining the presence
of organic matter in
water, annexed to Dr.
Macnamara's letter to
the Inspector General
of Hospitals, Bengal
Medical Department,
published in the suppl.
-ment to the Gazette of
India of the 12th June
1889; and to enquire whether
the adoption of these

rules

WOL
S.A.

Sept 27/11

To

Memorandum to the Secretary
Gazette 29 June 1881
Sanitary Commission Madras 347-34
11 June 306-30
29 Sept 188-3873-3874
6 May 1881-333
31 March 1881-333

Sanitary Commission
Madras 347-34
11 June 306-30
29 Sept 188-3873-3874
6 May 1881-333
31 March 1881-333

1608 1881-333
Sanitary Commission

Sanitary Commission
Madras 347-34
11 June 306-30
29 Sept 188-3873-3874
6 May 1881-333
31 March 1881-333

213/4
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rules is obligatory.

2. I am also instructed to remark that the scheme proposed by Dr. Ranking which has already been laid before the Government of India, appears, though the ~~proposed~~ employees are substantially the same as those now re-

commended by Dr. Macnamara to be preferable inasmuch as provision is made for the quantitative as well as qualitative determination

& the organic matter.

His Excellency the Governor in Council considers that it is, for obvious reasons, desirable that a uniform system

Letter from this Govt. to Mr. Dr.
29 Sep. 1868 N. 3814.

should be adopted through-
out India; and that it is not advisable to introduce the process of Messrs. Wanklyn & Chapman, though believed by Dr. Macnamara to be the most reliable yet devised, as this process is not taught at Netley.

Fort St. George
22 July 1869.

Copy to Sanitary Comtee Sept 28/

186 • *Department.*

No.

To
The Secretary to the
Government of
Department

Dated 186 •

*of No. 2422.
" 14 of 1870.*

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June 1880

For the Government of

Dated July 22. 1880

D. No. 1030.

170-171.

7th 2422
114 of 1870

Transmitting, with remarks,
Copy of a letter from the San-
itary Commr., Madras, re-
-garding the Rules for de termin-
-ing the presence of organic
matter in water, annexed
to Dr Macnamara's letter
to the Sanit. Comr. of Hospital.
Bengal Med. Dept.