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M.R.O. 1-32,000-16-11-29

MADRAS RECORD OFFICE.

Government of Madras.

Public DEPARTMENT.

G.O. No.	1574	Press
		~~Mis.~~
Dated	18-11-1936	

Not to be folded or roughly handled

Proceedings of the Madras Government, Public Department,
18th November 1869.

No. 111. Read the following letter from Surgeon J. L. RANKING, Sanitary Commissioner for Madras, to the Chief Secretary to Government, Fort Saint George, dated Madras, 22nd October 1869, No. 3125.

I have the honour to submit a Report by Captain Tulloch, R.E., upon the Sewage Farm, based upon an inspection made during the period he officiated as Sanitary Commissioner.

One Report on Sewage Farm, by Captain Tulloch.
One Plan of Farm.

2. He was unable to transmit the Report during his incumbency from want of a plan of the ground, which has only recently been completed, and from want also of some information which the Municipality required him to furnish.

3. Captain Tulloch, at the close of his Report, refers to my intention to have submitted a report in due course; but adds that, at the time of his temporarily relieving me of the duties of the office, the operations were not sufficiently advanced to enable me to do so with any advantage. I may mention that, keeping in mind the Order of Government, No. 658, of the 19th May 1869, I twice visited the farm to watch the progress made, in the very important experiment of utilization of sewage, in view to future report.

4. Captain Tulloch's Report enters very fully into the economic bearings of the experiment, and, viewed in this light, there can be little doubt that it will prove a great financial success.

5. The opinion expressed regarding the sanitary aspect of the question I fully endorse; for, although the extent of land brought under sewage irrigation is as yet small, and the amount of sewage itself thus disposed of very limited, yet, viewed by the results that have been recorded in England and at Bombay, there are no grounds upon which risk to the public health can be reasonably advanced. On the contrary, the experiment, so far as it has been worked out, promises well for the solution of the question that has so long agitated the public mind and engaged the attention of Government; the disposal of the sewage of the city otherwise than by the present objectionable one of its discharge into the Cooum, or upon waste land where it forms stagnant pools of seething filth, or the prospective one of its removal by the costly system of drainage proposed by Captain Tulloch in his Report upon "The Drainage of Madras." In fact, it opens up the question of the possibility of draining the city by sections, and of utilizing the sewage of each section upon adjoining waste lands.

6. This question I shall submit to the Committee directed in G. O., No. 1170, of the 19th August, to report upon the reclamation of the Cooum river.

7. There is one proposition in Captain Tulloch's Report which is, I think, open to question; that is, the utilization of poudrette and town filth in a solid form at the farm, as well as the sewage. If the filth, as it is brought to the spot, is deposited in furrows, and immediately covered over, no harm can accrue; but, practically, I apprehend this would not be done. The poudrette and solid filth would be at first stored in heaps, then be spread over the ground, and finally ploughed in. I would not advise the experiment, but would limit the fertilizing matter to that derivable from the liquid sewage.

8. Could the solid excreta of the community be mixed with the liquid matters and be distributed in solution and suspension with them, I would offer no objection.

Indeed, I think it very desirable that they should be thus admitted—a measure which would effect a great saving to the Municipality in the cost of their removal under the present system.

9. I look forward, in fact, to the time when the sewage of the city may be carried out upon the Home system; when water-carriage may be substituted for dry conservancy. But this must await the completion of the water scheme.

10. The solid excreta bear so small a proportion (1 to 195 parts* only by calculation) to the liquid refuse discharged from dwellings, that their admission into the sewers adds but little to the noxious characters of the sewage, while it adds materially to its fertilizing properties.

11. The dry system of sewage is, doubtless, admirably suited to barracks, hospitals, and public institutions; but cannot be efficiently carried out in large towns and cities, and must give place sooner or later to sewage by water-carriage. Till the system can be applied to this city as a whole, or to sections of it, I would deprecate the utilization of solid filth at the farm.

12. I may touch upon one or two more questions involved in the experiments now being carried out.

13. I think it very desirable that it be ascertained how far the results now being obtained are due to *sewage* or to *simple* irrigation. To this end similar crops might be planted upon similar areas of ground, the one simply irrigated by water, the other by sewage, and the yield of the crops compared.

14. I think it also desirable that the sewage should be analysed at the storing reservoir, and as it flows upon the land. At present it flows along open channels, and much of its fertilizing properties are, I apprehend, lost by the escape of ammonia and sulphide of ammonium into the atmosphere. This might be remedied by conveying the sewage to the fields in closed glazed earthenware pipes, as is proposed to be done in the case of the districts of Shoolay and Frangoonum. Analysis would determine the extent to which loss of fertilizing properties (the result of escape of the gaseous products of decomposition) taken place during the flow of the sewage from one reservoir to another, and from the last reservoir to the fields; and this analysis I recommend should be made.

REPORT ON THE MADRAS SEWAGE FARM.

The Sewage Farm is situated between Pursewalkum and the Government Powder Mills, and consists of about thirty-seven acres of land, of which nearly two are at present under cultivation. The site is an old swamp where, after every heavy shower of rain, water used to collect and stand in pools for weeks and sometimes months together. The ground is very little elevated above the sea; on an average not more than four feet.

2. The soil is as bad as it well can be. It consists of a stiff clay mixed with much salt and a little sand. After being dug out and exposed to the sun, the lumps of clay split and break up, and a shower of rain causes a deposit of sand to appear on the surface. If it were not for the sand it would be difficult to conceive a soil less suited to the purposes of agriculture.

3. From the site being so very low it is evident that no cultivation could be successfully carried on unless the land were artificially raised. The plan adopted has been that which proved

so successful in the People's Park. Tanks have been dug in convenient positions, and the earth excavated from them has been employed to raise the other portions. In order, moreover, to keep out the rain which falls on the adjacent high grounds from running on to the land, a small earthen embankment has been run right round the entire enclosure. The Government will understand how low the ground lies when I mention that, but for this embankment, the farm would be liable to be flooded even from Cochrane's canal. As it is now, the farm may be considered as well-drained as could reasonably be expected. No water is liable to flood it from outside, and the rain that falls on the farm itself runs off into the tanks, which thus answer the further purpose of storing a supply for the crops.

4. The land came into the possession of the Municipal Commissioners on the 7th June 1869, and operations were commenced on the 29th June. It speaks volumes for Colonel Denison that he should have been able to effect so much in so short a time.

5. At present the only sewage made use of is that which flows from the Perambore barracks and a small portion of the adjacent village. The total quantity available does not amount at the most to more than 5000 gallons in the twenty-four hours, and this is run off at three different times of the day—in the early morning, at noon, and in the evening. At each time the flow does not continue for more than half an hour or so. In that short period the quantity of sewage which has previously collected becomes exhausted. It is evident from this that no very extensive area can be brought under the influence of the fertilizing stream.

6. The point at which the sewage is taken is so low that it is necessary to raise it before it can be delivered on the farm. This is effected by piccottahs in two lifts, each of eleven feet. The first piccottah has been erected near the corner of the Perambore barracks, and the second midway between that point and the Sewage Farm. The sewage runs along in a six-inch semi-circular earthenware unglazed tube, which is laid on the top of an embankment with a slope of one in two hundred. The stream is not rapid, but neither on the other hand is it sluggish. The sewage just flows easily along.

7. The consistency of the liquid varies a good deal at present. Sometimes it is nearly as thick as pea-soup, at others it is much thinner. This is probably due to the showers which we have had at occasional times ever since the farm was established. If there is considerable variation in the viscosity of the sewage, I can venture to assert there is none whatever in its odour, which is as strong as can well be imagined. But this smell is only overpowering near the channel itself. As soon as the sewage flows on to the farm and over the beds laid out to receive it, it loses its offensiveness very soon.

8. The plan of cultivation, which has been adopted at present, is to prepare a bed two or three yards wide by from six to eight long, and to let the sewage flow on to it for two or three consecutive days. Another two days are then allowed to elapse before seed is put down. After the plants have come up they are watered with sewage every three or four days. If any of the crops show signs of "bleaching," it is assumed that the sewage is too strong for them, and the supply is stopped, or the sewage is well diluted with water from the neighbouring nullah.

9. Experience has shown that no two crops can be treated in precisely the same manner, and that it is very necessary to watch the effects of the sewage on each as a guide to the mode of treatment. This is of course what would be expected from the very nature of the case. Certain crops, such as the grasses, are found to take greedily any quantity of sewage with which they may be inundated; whilst others, such as certain kinds of Indian beans, require very little.

10. The best crop, I am glad to say, is of the same class as those which have succeeded so well in Europe. Indeed if we continue to get as fine crops of Guinea-grass as the one just cut, the yearly produce of the land will be enormous. This grass was planted from roots on the 11th July. A cutting which was not weighed, three-and-a-half feet high, was taken from it on the 27th August. Another cutting was taken from it on the 21st September; this was weighed and found to be 248 lbs. The bed was only twenty-three feet long by eighteen feet wide. On these data the produce on an acre would be (say) eleven tons per crop, and supposing that eight crops were

31. Subsequent experience will probably show that, after about two years, the land will become so rich, that grass will not grow on it. In England after every three years it becomes necessary to re-plough the ground and to take a wheat, or oats, or other exhausting crop off it. Some of the Indian grains would probably answer the same purpose in Madras. Immediately after the grain crop, the land may be put down again with grass which will continue to flourish for another two or three years.

32. The hot sun in India will undoubtedly make the grass grow much more rapidly than in England, and we may fairly, therefore, expect a greater number of crops during the year. From four to six is the number of times Italian rye-grass is usually cut in England in the twelve months; but I should not be surprised to find in Madras that as many as ten or twelve crops were produced in the same time. If this proves correct the profits from sewage utilization ought to be very large indeed.

33. During the monsoon some inconvenience will no doubt be felt in the farm from the excessive quantities of water that there will be in addition to the sewage; but I should not anticipate any great nuisance. The power of water to absorb gases is so great that most of the smell from the sewage will probably be carried away by the rain into the soil. Should the rain be so heavy as to drown the entire enclosure, means must be adopted by the Municipality to let the floods escape into the neighbouring sewers immediately after the storm abates.

34. Regarding the question as to whether any evil consequences may arise to the inhabitants from the establishment of this farm, I believe on the contrary that the undertaking will produce the most beneficial results. If it be remembered what the state of things about the Perambore barracks and the immediate neighbourhood was before the farm was opened, and if we compare this with the state of things now existing, it will be impossible to deny that Colonel Denison has done a public good to the community. The Government should be particularly thankful that one great source of sickness and disease, in the form of stagnant sewage, has been removed from the precincts of the native regiment quartered at Perambore.

35. Good as the effects are at present, they will be more visible in the course of the next few months. Colonel Denison has nearly completed the works for utilizing the sewage of two other districts, viz., Shoolay and Erangoonum. The main drains from these localities, which are among the filthiest in the whole of Madras, run close to the farm. All the sewage which they bring down will be carried by a small earthenware tube into a well situated within the grounds, and will be raised by picottahs in a single lift, and distributed at once over the beds. This will give the Municipality the command of a much greater quantity of water than they have at present, and will enable them to continue their experiment on a larger and more satisfactory scale.

36. I cannot conclude this report without expressing the hope that the Government will give all the encouragement in their power to the efforts that Colonel Denison is making to solve one of the sanitary questions of the day. If it can be satisfactorily shown to the inhabitants that the sewage of Madras can really be profitably applied to the soil and without any bad influence on the health of the community at large, we may reasonably hope that those prejudices, which exist in the minds of so many people regarding the necessity of some proper system of drainage, will be removed, and that the present disgraceful state of things, resulting from the sewage being discharged into the Cooum and the canal, will give place to the more enlightened practice of utilizing it—a practice which, we may now assume, has been fairly established in England, and will shortly be adopted in every country of Europe.

37. I should mention that it was Doctor Ranking's intention to make a report on the Madras Sewage Farm, but that the crops were not sufficiently advanced when I took charge of the office in the early part of August to enable him to do so.

MADRAS,
21st September 1869.

(Signed) H. TULLOCH, R.E.,
Actg. Sanitary Commissioner.

No. 112.

ORDER THEREON, 18th November 1869, No. 1577.

His Excellency the Governor in Council has read, with great interest and satisfaction, Captain Tulloch's Report on the Madras Sewage Farm, which is submitted with his own remarks by the Sanitary Commissioner, Doctor Ranking. The Madras Municipal Commissioners have, in the opinion of Government, rendered an important public service by carrying out so energetically and successfully the experiment of utilizing the town sewage by its application to agriculture.

2. His Excellency desires to offer to the President of the Commission, Colonel Denison, under whose personal direction the Sewage Farm has been established and directed, his cordial congratulations on the successful results of his labours. It is gratifying to find that, as in England, grasses grow most luxuriantly on land irrigated with sewage, that the earth deodorizes the sewage as soon as it touches it, and that there are no complaints of nuisance from the irrigated land, nor of injury to health. The Government concur in the opinion expressed by Captain Tulloch that "the conversion of sewage into fodder should, in the present state of the science of utilizing sewage, be the process to which the greatest attention should be paid."

3. It is observed that the Sanitary Commissioner and Captain Tulloch differ in opinion as to whether poudrette and other town filth in a solid form should be utilized on the farm. Doctor Ranking allows that if the filth as it is brought to the spot, is deposited in furrows and immediately covered over, no harm can accrue, but practically he apprehends this would not be done. The poudrette and solid filth would be at first stored in heaps, then be spread over the ground, and finally be ploughed in. Captain Tulloch, on the other hand, recommends the experiment of utilizing solid filth on the farm as well as the liquid sewage; but he specially provides that this manure should be immediately applied to the land upon which a constant succession of crops should be kept up.

4. In this recommendation Captain Tulloch is supported by the experience of those persons in England whose opinions on the application of sewage to land are authoritative, and who lay down a principle that "excreta in a fresh state or mixed

vide Memorandum by the Army Sanitary Commission on a "Report and Order of the Madras Government, upon the Dry-Earth System of Sewage in the Madras Presidency."

with earth should never be disposed of by burial. They should be ploughed or dug into the ground simply as manure, and the manured ground should be cropped."

"In England application of saturated earth to agriculture is part of the dry-earth system."

5. His Excellency in Council considers that it is very desirable that the application of excreta and solid filth to agriculture should, on a small scale and under careful observation, be tried at the Municipal Sewage Farm, and he requests Colonel Denison and Doctor Ranking to conduct this experiment and report the result.

6. Doctor Ranking, in paragraphs 13 and 14 of his letter, recommends that experiments should be made to ascertain how far the results now obtained on the farm are due to sewage or to simple irrigation, and that the sewage should be analysed at the storing reservoir, and as it flows upon the land, so as to determine the loss of fertilizing properties caused by the conveyance of the sewage in open channels. This recommendation appears deserving of consideration by the Municipal Commissioners.

taken off the land in the year, the total quantity of Guinea-grass would be eighty-eight tons, or, if converted into hay, twenty-nine tons. Taking the average price that would probably be obtained for this fodder in the Madras market at only twenty rupees per ton, the yearly returns, without considering working expenses, from an acre of land would be 580 rupees. If the yield from the farm comes to be even one quarter of this, it will be a most successful undertaking.

11. The second best crop is a bed of bandikai which, although planted too close, the native gardeners declare to be admirable. They certainly look in very fine condition. The seeds were put down on the 3rd of July, and the plants are expected to yield early in October. Sewage seems to agree remarkably well with this vegetable, and it has never shown any signs of failure.

12. The native bean, called kottavarakai, thrives well. Seeds were planted on the 26th July, and the first crop of beans was picked on the 17th September. The plants look very healthy, but those seem the best which stand nearest the sewage channel. Oddly enough this end of the bed is made of earth composed of the stiffest clay, while the rest of the bed is part of an old native burial-ground.

13. Another good crop is the ragi which stands about three-and-a-half feet high. It was unfortunately planted too close and was not cut when it was young as it ought to have been, (according to the regular native custom). The consequence is that it has run too much to straw. The seeds were put down on the 29th July, and the crop is expected to be cut about the end of October.

14. Country radishes are doing well, but they require sewage in a very dilute state, otherwise they bleach.

15. Carolina paddy has come up, but is not in a healthy state. More experiments are required before we shall succeed with this crop.

16. The native vegetables "peerkenkai" and "pavakay" thrive pretty well, but not so well as the native vegetable marrows which look in a more healthy state.

17. Some of the best crops on the farm are the native greens called "arrakeera." The plants grow most luxuriantly and take a large quantity of sewage, but still not so much as the grasses.

18. Sweet potatoes and ground-nuts promised very well, but some pigs from the neighbouring village got into the beds and rooted up nearly the entire crop.

19. There are a few plants of Egyptian cotton, and these are in blossom, but the experiment is on too small a scale to draw any conclusions from.

20. The tomatoes are young at present, but seem to be coming up very well. One or two vegetables do not like the sewage. These are karamance, onions, chillies, country beans, &c.

21. The lucerne crop has not turned out nearly so well as was expected, but this is certainly not due to the sewage, for a small part of the bed has come up very well, although the rest is in a most unsatisfactory state. I am inclined to think that the soil is not so well suited to this crop as could be wished, but longer experience will no doubt suggest a better mode of treating the plant with sewage. This is one of the crops to which great attention should be paid, as its growth is rapid, and it can absorb an enormous quantity of liquid matter.

22. The hurriala grass grows well, but has been planted only recently.

23. There are many vegetables besides those mentioned above which are grown on the farm, but they call for no particular remark.

24. The trees which have been planted are of the following kinds, and are all doing well: cocoanuts, jacks, and tamarind. These have not been treated with sewage.

25. I think the present experiment is as successful as the advocates of sewage utilization could possibly hope for. It must not, however, be forgotten that the results are not altogether

due to the sewage. The quantity of this fertilizing liquid is so small that each crop gets but very little indeed. When the sewage fails, water is used, and much of the good effect already produced is no doubt due to this cause. In fact the farm has been too recently established, and at present is on too small a scale to draw any permanent conclusions from except of a general nature.

26. Of certain facts there appears to be no doubt at all; these are that both the Guinea-grass and the common hurriala-grass flourish most luxuriantly under the sewage, and are able to absorb large quantities of it. The Guinea-grass has been found to grow in one day as much as two inches, and two crops have been taken in little more than nine weeks from the date of first planting. Mr. Lee, the Engineer to the Municipality, informs me that, whenever there is any excess of sewage, i. e., any sewage over after all the vegetables have been fully watered, it is turned on to the grasses, and allowed to run until it is exhausted, and he says that at present he has not been able to find any limit to the quantity which these crops may be irrigated with. I look upon these facts as the most important of all, inasmuch as they go to confirm the general experience of England. It is the grasses we must chiefly cultivate, and especially at first until we know more of the manner in which each kind of vegetable should be treated, if we wish to deprive our town filth rapidly of all power to do harm. In other words the conversion of sewage into fodder should, in the present state of the science of utilizing sewage, be that process in every farm to which the greatest attention should be paid. If the Municipality attend to this, I have no doubt they will ultimately recoup themselves for all the expenses to which they may be put.

27. With regard to the best mode of applying the sewage to grasses, none can be more simple than, and none has proved so successful as, the general one adopted in England. It is found that all expensive expedients, such for instance as cultivation by the ridge and furrow system, by underground pipes, by hose and jet, &c., &c., are invariably failures, and that the only plan is to let the sewage run over the fields itself after having previously levelled the surface so that there should be no inequalities of ground. Practically there is no limit to the length or breadth of the field. It may be fifty yards wide, or it may be three hundred. If the sewage is able to run easily along over the entire surface, and to keep the ground well-flooded, the effect in either case will be equally good. The sewage will rapidly be deprived of all the foul matters, and the grasses will grow luxuriantly.

28. The beds in the Madras farm are far too small to enable us to judge of the wonderful assimilating power of the grasses. Colonel Denison is fully aware of this, and is having beds prepared on a much larger scale. When these are finished, and there is more sewage at his disposal, it will be very interesting to mark the sewage as it comes on to the field and as it leaves it. The manner in which it is filtered as it passes quietly along through the grasses can hardly be realized unless it is seen.

29. As the Municipality are daily removing large quantities of poudrette and of other town filth in a solid form beyond the limits of Madras, I do think that a portion of this should be utilized on the farm. The soil at present is so bad that a top dressing of manure of almost any kind would be most invaluable to it. No nuisance will result if the land is not allowed to lie fallow. The great point to attend to is to keep up a constant succession of crops. So long as the field is green, so long may we conclude that the foul matters in the soil are being removed by the plants, and being rendered innocuous.

30. The earth from the latrines, or whatever the solid filth to be used may be, need not be buried in pits first, but should be laid on the land and ploughed well in. After this the sewage should be run in a concentrated state over the field for two or three days until it is found to be sufficiently manured when, after another two or three days, it may be planted with grass. If there were abundance of sewage it would be preferable to keep the field under water for a week or two or even longer; but the present supply is so small that if this were done now there would not be enough sewage left for other purposes.

Proceedings of the Madras Government, Public Department,
18th November 1869.

7. His Excellency the Governor in Council will await, with much interest, a further report on the Sewage Farm at Pursewalkum, and on those which are about to be established in Shoolay and Erangoonum.

(True Extract.)

Chief Secretary.

To the President of the Municipal Commission for the Town of Madras.
„ Sanitary Commissioner, with the plan.
To Captain H. Tulloch.

No. 3

Madras, 22nd October 1869

From

The Sanitary Commissioner for Madras,

To

The Chief Secretary to Government,
Public Department,
Fort Saint George.

Sir,

I have the honor to submit a report by Captain Tulloch R.E. upon the Sewage Farm, based upon an inspection made during the period he officiated as Sanitary Commissioner.

Enclosures.

- 1 Report on Sewage Farm by Captain Tulloch.
- 1 Plan of the

He was unable to transmit the report during his absence from want of a plan of the ground, which has only recently been completed, and from want also of some information which the Municipality requested him to furnish.

3. Captain Tulloch, at the close of his Report, refers to my intention to have submitted a report in due course; but adds that, at the time of his temporarily relinquishing one of the duties of the office, the operations were not sufficiently advanced to enable me to do so with any advantage. I may mention that, keeping in mind the Order of Government bearing of the 19th May 1869, I twice visited the farm to watch the progress made, in the very important experiment of utilization of sewage, in view to future reports.

Cont. of 1869 Madras.

PUBLIC.

To

THE PRESIDENT OF THE
MUNICIPAL COMMISSION
for the Town of Madras.
&c., &c., &c.

Dated November, 1869.

Recd.

Encl.

G. O., 18th November 1869, No. 1577.

NOVEMBER.
Nos. 111-112.Reviewing Captain Tulloch's Report on the
Madras Sewage Farm.

4. Captain Sullock's report will be very fully into the economic bearings of the experiment, and, viewed in this light, there can be little doubt that it will prove a great financial success.

5. The opinion expressed regarding the sanitary aspect of the question I fully endorse; for, although the extent of land brought under sewerage irrigation is as yet small, and the amount of sewage itself thus disposed of very limited, yet, viewed by the results that have been recorded in England and at Bombay, there are no grounds upon which risk to the public health can be reasonably ascribed. On the contrary, the experiment, so far as it has been worked out promises well for the solution of the question that has so long agitated the public mind and engaged the attention of Government, the disposal of the sewage of the city otherwise than by the present objectionable out of its discharges into the Coom, or upon waste land where it forms stagnant pools of stinking filth, or the prospect of one of its removal by the costly system of the one proposed by Captain Sullock in his report upon "the drainage of Madras". In fact, it brings up the question of the possibility of turning the city into a factory and of utilizing the sewage of each section upon its own waste lands.

6. The question I shall submit to the Committee selected on 20th Dec 1872 of the 17th August, to report upon the advisability of the Coom River.

7. There is one proposition in Captain Sullock's

Sullock's report which is, I think, open to question - that is, the utilization of pondrette and town filth in a solid form at the farm, as well as the sewage. If the filth, as it is brought to the spot, is deposited in furrows and immediately covered over, no harm can accrue; but, practically, I apprehend this would not be done. The pondrette and solid filth would be at first stored in heaps, then be spread over the ground and finally ploughed in. I would not advise this experiment, but would limit the fertilizing matter to that derivable from the liquid sewage.

8. Could the solid excreta of the community be mixed with the liquid matters and be distributed in solution and suspension with them, I would offer no objection. Indeed, I think it very desirable that they should be thus admitted - a measure which would effect a great saving to the Municipality in the cost of their removal under the present system.

9. I look forward in fact to the time when the sewerage of this city may be carried out upon the Home system, where water carriage may be substituted for dry conservancy. But this must await the completion of the water scheme.

Exhibited by the Army 10.

Sanitary Commission

"Report on the Sanitary Condition of the Madras Presidency" para. 5. The solid excreta bear so small a proportion (1 to 195 parts only by calculation) to the liquid refuse discharged from dwellings, that the Dry Earth System of sewage is the more advisable than admission into the sewers and its but little to the nuisance of the sewage, while it adds

Sincerely

materially, to its fertilizing properties.

11. The dry system of sewage is doubtless admirably suited to barracks, hospitals and public institutions; but cannot be efficiently carried out in large towns and cities, and must give place sooner or later to sewage by water-carriage. Till the system can be applied to this city as a whole, to sections of it, I would deprecate the utilization of solid filth at the farm.

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14. I think it also desirable that the sewage should be analysed at the storing reservoir, and as it flows upon the land. At present it flows along open channels and much of its fertilizing properties are, I apprehend, lost by the escape of ammonia and sulphide of ammonium into the atmosphere. This might be prevented by conveying the sewage to the fields in closed glazed earthenware pipes, as is proposed to be done in the case of the districts of Choolay and Traingoonum. Analysis would determine the extent to which loss of fertilizing properties [the result of escape of

15/3
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I have the honor to be
Sir

Your most Obedient Servant

J. Sanitary
Sanitary Commissioner
for Madras

Public Department

PROCEEDINGS of the MADRAS GOVERNMENT.

Read the following letter

Sanitary Commissioner for Madras.

(This letter is dated 10th Dec 1869)

Order thereon 15th 17th 18th Nov. 1869.

This meeting the Governor in Council has read with great interest and satisfaction Captain Tullock's Report on the Madras Sewage Farm, which is submitted with his own remarks, by the Sanitary Commissioner D. Ranking. The Madras Municipal Commissioners have, in the opinion of Government, rendered an important public service by carrying out so energetically and

successfully

I have visited the place. The experiment appears to have succeeded - a small scale work offer - a good example hereafter to be effected in a greater. I believe the terms of the order will be found satisfactory.

I trust this will prove of great interest to you. I know nothing further.

I am, Sir, very respectfully,
Yours,
W. D. N.

Publ: 1869. Date

From: Sanitary Commissioner

for Madras.

To: The Chief Secy: to Govt

Public Works
and
Sanitary Department

Dated 22nd Nov 1869

Selection

No 3125

No 277
No 2735

Submits a report

drawn up by Capt. Tullock
R. G. of the sewage farm
at Madras.

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this manure should be im-
mediately applied to the
land upon which a con-
stant succession of crops
should be kept up.

4. In this recommenda-
tion Captain Tulloch is
supported by the experience
of those persons in England
whose opinions on the
application of sewage to
land are authoritative, and
who lay down a principle
that "excreta in a fresh
state or mixed with
earth should never be
disposed of by burial."
They

Secretary Commission on a Report
and order of the Madras Govt.
upon the dry earth system
of sewage in the Madras Pre-
sidency.

They should be ploughed or
 dug into the ground and
as manure, and the manure
ground should be propped.
In the
natural earth to which
ture is part of the dry earth
system.

5. His Excellency in
Council considers that it is
very desirable that the ap-
plication of excreta and
solid filth to agriculture
should on a small scale
and under careful observation,
be tried at the Municipal
Sewage Farm, and he requests
Colonel Beinson and Dr.
Ranking to conduct this
experiment and report the
result.

6. Dr. Ranking, in paras
13 and 14 of his letter recom-
mends that experiments
should be made to ascertain
how

how far the results now
obtained on the Farm are
due to sewage or to simple
irrigation, and that the

at the storing reservoir
and as it flows upon the
land, so as to determine
the loss of fertilizing pro-
perties caused by the convey-
ance of the sewage in open
channels. This recommenda-
tion appears deserving of
consideration by the Muni-
cipal Commissioners.

7. His Excellency the Governor
in Council will await with
much interest a further
report on the Sewage Farm
at Puzoswakkum and on
those which are about to
be established in Shoolay
and Erangoonum.

M

To the
Municipal Comm^y Madras 6
Sanitary Comm^y 6

Out. of 1869 Quarters.

Cattle

To

The President of the
Chambers County
Agricultural Society.
yes.

Dated Nov 28th }
Recd. 1869, No. 1577

Nos. 111, 112.

Receiving Captain
Buttont's Report on
the various things
of the
Farm —