A5
B5
A4
B5
B4
A4
A3

Archives I—10,006—16-8 77.

(1) Number of pages 22

19 (2) Date of repair 25.5.87

(3) Initials of the Referencer bang

# TAMIL NADU ARCHIVES

## GOVERNMENT OF TAMIL NADU

Jail DEPARTMENT

G.O. No. 2262 Press.
B.P. No. Mis.

Dated 18. 11. 1881. 19 .

S & M

*Not to be folded or roughly handled*

11

2262
1

GOVERNMENT OF MADRAS.

FINANCIAL DEPARTMENT.

---

18th November 1881, No. 2262.

**Municipal Reports.**

Read the following paper:—

*Despatch from the Most Honorable the Secretary of State for India.*

India Office, London,
13th October 1881.

Statistics and Commerce,
No. 22 [Current No. 3040].

Sir,—I forward, for your information, 70* copies of a Memorandum by the Army Sanitary Commission on the Report of the Madras Municipality for 1879.

* 12 by mail; 58 through Store Department.

2. You will observe that, in their remarks in paragraph 9 on the drainage of Madras, the Commission refer to Captain Galton's Report on the drainage of Memphis, United States. This is now being printed, and copies will be forwarded when ready.

I have, &c.,
(Signed) HARTINGTON.

His Excellency the Honorable the
Governor in Council, Fort St. George.

---

Enclosure No. 1.

Memorandum of the Army Sanitary Commission on the Report of the Madras Municipality for 1879.

This report is chiefly devoted to ordinary administrative details. It contains very little sanitary information, and, taken as a whole, it cannot be said to be very hopeful for future progress. There are, however, a few sanitary points in it which may be noticed.

2. The population of Madras is given in the report at 397,552, of which 194,676 were males and 202,876 were females. The numbers according to race were—

| | |
|---|---|
| Europeans .. .. .. .. .. .. | 3,613 |
| East Indians .. .. .. .. .. .. | 12,013 |
| Native Christians .. .. .. .. .. .. | 21,441 |
| Hindus .. .. .. .. .. .. | 309,521 |
| Mahomedans .. .. .. .. .. .. | 50,964 |

Among this population there were 16,629 births, equal to a birth-rate of 41·8 per 1,000.

3. The deaths of the year numbered 13,803, rather fewer than the annual average. The deaths according to sex were of males 6,929 and of females 6,874, the mortality being nearly the same in both sexes. The ratio of mortality was for both sexes 34·7 per 1,000. This rate is largely in excess of what is attainable even in a city such as Madras, but its reduction over the preceding averages (excluding the famine years altogether) was no doubt partly due to the clearing off by famine and its diseases of the more susceptible part of the population during that calamity.

The death-rates according to classes were—

| | |
|---|---|
| Europeans .. .. .. .. .. | 24·3 per 1,000. |
| East Indians .. .. .. .. .. | 25·0 „ |
| Native Christians .. .. .. .. .. | 28·6 „ |
| Hindus .. .. .. .. .. | 35·9 „ |
| Mahomedans .. .. .. .. .. | 32·9 „ |

As a general proposition it may be stated, as showing the superior healthiness of European quarters in Calcutta, that the Madras rate is very much higher for Europeans than the Calcutta rate, which averaged 16·4 per 1,000 in 1878 and 17·9 per 1,000 in 1879.

These data will be sufficient to show the death-rates without further analysis until the new census of Madras is adopted in the reports.

The death-rates in different municipal divisions did not show the same excesses as in previous years, as will be seen by the following figures:—

| Divisions. | Death-rates per 1,000. | Divisions. | Death-rates per 1,000. |
|---|---|---|---|
| 1 .. | 36·5 | 5 .. | 28·2 |
| 2 .. | 37·2 | 6 .. | 13·1 |
| 3 .. | 32·9 | 7 .. | 34·6 |
| 4 .. | 29·6 | 8 .. | 33·0 |

Each division contains a number of villages, and it is among these that the most marked diversities in death-rates are to be found. The lowest rates of the year were 1·5 per 1,000 among 641 inhabitants at the Gunpowder Mills, and 1·8 per 1,000 among 1,584 people in Fort St. George; at the other extremity of the scale we have 6,487 people in Poodoopakkam, yielding a death-rate of 53·5 per 1,000, Ilayapuram with 11,089 inhabitants and a death-rate of 59·8 per 1,000, and Royapettah showing a rate of 70·7 per 1,000 from among 5,255 people.

The same law appears to show itself in the separate groups of population as in the city generally, that the most susceptible persons had been cleared out by the mortality causes of preceding years.

4. The following were the deaths registered in 1879; it will be seen that Madras participated in comparative exemption from cholera which existed over the South of India:—

| | Registered Deaths. |
|---|---|
| Cholera .. .. .. .. .. | 35 |
| Small-pox .. .. .. .. .. | 910 |
| Measles .. .. .. .. .. | 10 |
| Fevers .. .. .. .. .. | 3,465 |
| Bowel Complaints .. .. .. .. | 1,757 |
| Total epidemic deaths .. .. | 6,177 |
| All other deaths .. .. .. | 7,326 |
| Total of the year .. .. .. | 13,503 |

There was a great reduction of the epidemic death-rate over the corresponding rate of 1878, which showed 10,057 epidemic deaths out of a total mortality of 18,912.

The chief death cause of 1879 was fever, a disease which appears to have been distinctly localized in certain villages, for, out of 36 villages in the tables, 10 villages yielded 2,740 fever deaths out of 3,465. As with fever, so with cholera, the 31 deaths from which were registered (excluding four in the hospitals) in seven villages; one of them yielded 19 deaths.

Bowel-complaint deaths, which, in the year 1878, after the stress of the famine had passed over, numbered 4,522, fell to 1,757, a lower number than was recorded in any year since 1870. It will be seen that, for the reasons stated above, the year 1879 was a less unhealthy year than several recent years, but it is not by this circumstance that the real sanitary standard of Madras, or indeed of any group of population, is to be judged.

5. *Sanitary Works.*—The following improvements have occupied attention in the "Public Works and Conservancy Departments" during 1879:—

Improvement of drainage.
Improvement of water-supply.
Improvement of public and private markets.
Collection of nightsoil from private houses, &c.
Improvement of parcherries.
Extension of sewage farms.

We propose to introduce a few remarks on each of these heads.

6. *Drainage.*—Mr. Clarke's scheme for draining Madras has been finally abandoned as too costly and as unsuitable; but one reason stated for following this course is that "the Commissioners have not, I believe, hesitated about draining the city, but have so regarding the adoption of any one scheme, and it was necessary that full investigation should be made, as the city could not bear the result of a failure. The unsatisfactory state of Calcutta after the completion of its drainage was one of the causes which militated against the adoption of the late Mr. Clarke's scheme."



Caution in such matters is always necessary, and every means should be adopted to ensure the successful application of engineering details as well as of economy in great drainage works, but it is not correct to state, as a reason for rejecting Mr. Clarke's Madras scheme, that his Calcutta scheme had been "unsatisfactory" in its results. It is no part of our duty to adjudicate on questions of this kind, but year after year the Calcutta reports have shown the great improvements which the drainage has led to there, and they have also shown how "unsatisfactory" has been the surface condition of the city, not from defects in the drainage, but from the great extent of foul tank surfaces, which no drainage works could remove. It is quite well known that the high disease and death-rates in several districts of Calcutta are due to foul domestic water being taken from these tanks and to the deadly malaria proceeding from them, and it is also quite well known that the real remedy required is filling up the tanks with earth. The Vice-President of the Madras Departments complains that considerable opposition is experienced in improving the city, but we may suggest that is not likely to be lessened by objections against the Calcutta drainage, which might equally well be urged against the Calcutta water-supply.

7. The Vice-President, Mr. Jones, proposes as an alternative to carry out the drainage of Madras on the following principles:—

"To provide open sewers along the streets for surface water, house drainage, &c.

"To provide sewers in valleys and other necessary places to carry off the sewage alone, any storm waters being divided from it and carried to other outlets.

"To improve the present sewers, to make them more efficient for the carrying off the storm and subsoil waters.

"To pump the sewage collected and place it on land at some distance to the north of the town.

"In addition to this, the house-to-house collection of nightsoil and other conservancy arrangements hereafter detailed should make a marked improvement in the health of the town."

It will be seen that there is nothing effectual proposed to be done for the foul subsoil and its results, as described by the late Mr. Gover in his report for 1871-72, which may be described as by far the best sanitary report ever drawn up for Madras town. Mr. Gover's statement, if correct, would show that the proposed surface drainage scheme would not remove the evil, and we have frequently insisted on this. Mr. Jones quotes our last statement of the case and meets it by the following reply:—"The subsoil of the city is not in the state described by the late Mr. Gover; no doubt Mr. Gover believed that he had reasons for making the remarks he did, but these were really without any foundation whatever, and what he took for 'subsoil,' saturated with sewage, is, what can be found all over Madras, nothing less than black sand mixed with a little clay, the sand being so fine as to have the character of tin sand. The subsoil is remarkably little polluted."

8. It may be conceded that in a city spread over so large an area as Madras the subsoil condition may vary, and Mr. Jones admits some degree of pollution as general, although it would have been better to have met Mr. Gover's statement by a set of soil analyses at different points. The questions at issue all relate to *unhealthy districts* of Madras, and, after having stated what Mr. Jones says, we may be permitted to quote the following passage from Mr. Gover's report:—"Exhalations from sewage poison the air, downward percolation of sewage poisons the water. It will be almost incredible to those at a distance, yet the fact remains that large and populous portions of Madras have absolutely no drainage at all. There are nearly 70,000 persons dwelling in the parcherries of Madras, and I believe I am correct in saying that there was not a drain in any one of them. The excavations for the waterworks reveal very strikingly the evils of downward percolation of the sewage both where there are no drains and where there are. Mr. Woolley, the contractor for the works, has drawn my special attention to the fact that, in the more densely peopled and old localities, he frequently suffers great inconvenience through the soil being saturated with filth. That the workmen exhibit great disinclination to continue their labor; in some places the soil has been found as black as ink to a depth of 8 or 10 feet—as black, to use Mr. Woolley's expression, as tin sand. I have seen excavations made for other purposes in Chintadrepetta, where the same blackness was observed for several feet down. Now it is very evident that the earth does not retain this sewage as a well-corked bottle might retain wine. The sewage with which the ground is thus saturated is constantly undergoing physical changes. Poisonous gases from it perpetually rise through the upper stratum of earth; poisonous washings continually descend into the lower stratum of water defiling every well. Discoloration of the soil in this way is palpable evidence that there is real danger to those who live above the polluted ground—a danger which shows itself in perennial fevers, frequent epidemic outbreaks, and a general debility of intellect and physique among the people. It seems absurd to say more on a subject that so publicly and loudly calls for attention."

9. Where there is such diversity of view and of sanitary estimate between two officers of the same Municipality, it is not for us to decide who is right or who is wrong. What we have to do is with the facts. If the subsoil of Madras is not polluted by filth, it must be a very happy exception to the general experience of mankind, and all outlay for drainage of any kind must be waste so far as health is concerned. Unless it is shown that the blackness, as of "tin sand," is not due to sewage, but to the nature of the sand, the fact, as stated both by the late Mr. Gover and by Mr. Jones, must be accepted as proof of a dangerous condition of the subsoil. That there are odours from it no one can deny. That there are violent epidemics among the poor people living over it is shown year by year in the death returns, and last year's Madras Report (1878) shows, by the infallible well water test, that Mr. Gover's statements were correct. The analysis is here reproduced—one out of several. It is in Old Jail Street at the barracks.

| | Grains per Gallon |
|---|---|
| Total solids | 1470 |
| Volatile | 7·00 |
| Chloride of sodium | 4·69 |
| Free ammonia | ·01120 |
| Albumenoid ammonia | ·03360 |
| Nitric acid | ·06300 |

It is simply sand water highly charged with sewage. We must here leave the case with one remark, that, useful as a good system of impervious surface drainage may be, Mr. Jones has by no means shown that it is the only kind of drainage required for improving the health of Madras, and, to aid in the further discussion and understanding of the questions at issue, we would beg to refer to Captain Galton's report on the drainage of Memphis, United States, sent to the India Office for information in India, as indicating the methods considered to be necessary for improving a city subject, in time past, to great epidemics by authorities on the spot amply able to deal with the question.

10. It is satisfactory to be informed that the municipal authorities of Madras still hope to drain the city, and we have said sufficient to show that the surface drainage scheme need not stand in the way of proceeding with the complete drainage of every house. An obvious requirement of both schemes is more water. Without it underground drains would not work, and surface sewage drains would become offensive. But, whenever water is laid on, it must be kept out of the subsoil, and, if the surface drains are not kept sound and in good working condition, the last end may be worse than the beginning.

11. In the present state of the drainage question it is unnecessary to discuss the remaining principles, but it may be suggested that whatever outlay may be incurred in giving effect to them should be so applied that when Madras is effectually drained it may be found that the works can all be included in the completed scheme.

We may, however, call attention to the general principles of Indian drainage long ago laid down by us, and which we are glad to see have been practically carried out at Memphis, viz., that all the rainfall should be led to outlets by well-formed impervious surface drains and not by underground sewers; that underground sewers and drains should be perfectly tight and restricted solely to the conveyance of house sewage; and that drainage of the subsoil should be separately provided for.

The proposed plan for Madras would provide for the first requirement, but not for the others; and it is intended apparently to leave the subsoil as it is, and to remove the solid house sewage by hand labor, and to provide for this work by a more effective organization than at present exists.

12. The subject is fully dealt with by the Municipal Committee in a report (included in the appendix to the Municipal report), in which occurs the following important statement bearing directly on the nature and extent of all sanitary works for the city. They say: "We would remark in passing that it has been a constant error and source of expense to treat Madras as if it were a large city. This is far from the case, and it might better be described as a few densely populated villages at some distance from each other, and that therefore in all sanitary regulations the suburban and sparsely-populated should be treated apart from populous parts." No doubt this principle is a correct one up to a certain point; it applies, not to the things to be done, but to the manner of doing them. Every city, however large and however densely populated, and every village, however small, require cleanliness, dry and clean subsoil, and pure water. In villages all these requirements can be obtained, except under very special circumstances, without permanent works or expensive establishments. It is otherwise in densely peopled towns or in large cities where all the measures require to be enforced with unceasing care for the protection of public health, and in these cases it has been long known that drainage, water-supply, cleansing, and general sanitary organization are much more economically carried out by adopting one general system of procedure. In such a case as Madras it may be possible to divide the work between the different population groups in such a way that, while the large population centres are drained and supplied with water by permanent works, the smaller groups may be dealt with



2262/81
3

separately. In our suggestions for improving Indian villages we have stated the general principles which might be found applicable in these suburban villages, and the Memphis report shows how the larger and denser groups might possibly be dealt with.

As the case stands, supposing that Mr. Jones' scheme of surface drainage were applied to one of the larger groups of population, then the Municipality must provide against increasing subsoil, air, and water pollution by so arranging the nightsoil collection and removal as to keep the soil from touching the ground, and to remove it before the commencement of decomposition, which, when it begins, indicates the evolution of disease.

13. *Water-supply.*—The quantity of water drawn from the mains in 1879 was 144,779,000 cubic feet. The water is used by 200,000 people, or about half the population, and for this number the supply was 12½ gallons per head per diem. The total house services amount to 457, in 41 of which repairs were made during the year. The rainfall of 1879 was 40·84 inches, 27·64 inches of which took place in October and November. The tank level was lowest in August. As in many preceding years the water supplied from this country tank and gathering ground was far from being good in 1879. It contained "five or six times as much albumenoid ammonia" as the London waters, and "almost as much as the River Thames at London Bridge." The cause of this condition of the water appears to be found in a superabundance of the lower forms of organic life, either in the tank itself and its surroundings or in the open channel by which the water is conducted to Madras. It appears to be an open cutting, and the report mentions a slip of about 50 feet in length in its side "caused by rats and snakes boring holes, and by water oozing through the channel at places where it has been badly constructed, &c. The channel is a continual source of trouble to us and an obstacle to a continuous supply, produces a very considerable deterioration of the water, at the same time causes our pipes to be filled with fish, snails, &c., which we are unable to prevent with the best strainers, as when they enter the pipes they are in almost a microscopic state."

To remedy this state of matters it is proposed to replace the open culvert by a pipe main 36 inches in diameter, to extend the supply and provide filters at the tank, and also additional reservoirs. The state of the gathering ground would require careful watching to prevent pollution, and this, with the proposed works, ought to remedy the evils complained of. But to accomplish them an annual water-tax of 38,356*l.* would be required to pay off the loan and meet the establishment charges. It is proposed to lessen the amount by trusting to local wells in the outlying villages.

The whole subject, together with the future drainage, will no doubt be fully considered. There is every disposition apparently to proceed, but the former set-off, viz., poverty, is urged as a cause of inaction. All that we can say is that the existing Red Hills water-supply as described in this report is scarcely fit for any domestic purpose.

The following practical points in the domestic water services may be here introduced. The best and cheapest house service pipes are of plain iron, not galvanized, screw jointed, known as "gas tubing." For house service the largest need not exceed one inch, the smallest half an inch, with three-eighth screw-down taps. The tubes from the main to the house should be laid in a small case of wood, large enough to allow the pipe to be embedded in asphalte or Portland cement concrete. The cost of similar protection for gas pipes in London is 3*d.* per lineal yard, where also an inch pipe laid complete costs 2*s.* 9*d.* per lineal yard, and one half-inch pipe 2*s.*

An inch pipe will deliver, under a low pressure, about 480 gallons per hour, a half-inch pipe about 120 gallons per hour. A pipe two inches in diameter, laid complete and costing 5*s.* per lineal yard, will deliver 1,900 gallons per hour.

Pipes from two inches to one inch may be used as "rider mains" and have half-inch branches taken from them to the houses. As all pipes, T pieces, screw-down taps, &c., are screwed to a standard pitch and thread, any ordinary workman would soon learn to fit and repair them.

14. *Conservancy.*—The following account of this important work is given by the Acting President:—"The daily removal of rubbish and filth, and the cleansing of surface drains, &c., was carried out by a force of 944 coolies and 349 carts. The carts make two trips to the day. 369,779 cartloads, of which 37,666 were nightsoil, were removed during the year. The main sewers of Black Town and Triplicane were cleaned out at a cost of Rs. 381—456 cubic yards of silt were removed. The cost of surface cleansing, the most important part of the conservancy and sanitation of the town, was Rs. 1,53,653. The receipts from sale of rubbish and nightsoil were Rs. 4,982." We could only assent to this estimate of the importance of surface cleansing to health if it included the effective cleansing of all compounds, courts, lanes, &c., because Indian experience has long shown that it is not by dirty roads, so much as by dirty houses and their surroundings, that the public health suffers.

15. The outflow from the three largest Madras sewers is used for irrigation on five separate areas of ground. Three of these are sewage farms, from which the receipts for hay and grass were Rs. 8,308. But, as the maintenance cost Rs. 6,468 and the rents Rs. 3,182, there was a loss of Rs. 1,342, which was the sum paid for getting rid of sewage.

16. *Vaccination.*—The total successful vaccinations during the year were 17,009. As has been already stated, the deaths from small-pox were 910, or one death for about every 18½ vaccinations.

17. Besides the points noticed in the preceding remarks, the Madras Report for 1879 shows that a large amount of detail work connected with the public health has been done in course of the year. On this we have no remark to make. Our object, as will have been seen, has been to assist as far as we can in the discussion which has been proceeding on the drainage of the city. In the present state of the question we have no recommendation to make, except that the city be drained concurrently with the water-supply extension, and that, until both works are completed, the most scrupulous attention should be given to the cleanliness of houses, compounds, lanes, and public roads and streets as the chief means of protection against epidemics. And another measure, the removal of unwholesome huts, of which we are glad to learn 204 had been removed from one hot-bed of disease, should be carried out. The owners will be compensated, the ground will be levelled and drained, and better huts erected on the site. But, like a change of camp, this measure at best is but a change of ground, and, if the future huts are to be fit for healthy occupation, suitable works for this object will have to be provided.

23*rd July* 1881.

---

ORDER THEREON, 18th November 1881, No. 2262.

A copy of this despatch and the enclosure thereto will be forwarded to the Municipal Commissioners of Madras for their consideration.

2. Copy of Captain Galton's report on the drainage of Memphis, United States, will also be forwarded when received from the Secretary of State.

(True Extract.)

*Chief Secretary.*

To the President of the Municipal Commission, Madras.
" Sanitary Commissioner.

Copy to the Public Works Department.
" " Surgeon-General with the Government of Madras.

Exd. J. W. Fischer

India Office,
London, 18th October 1881.

Statistics and Commerce,
No.

## To His Excellency The Honourable The Governor in Council, Fort St. George.

Sir,

Para. 1. I forward, for your information, 70* copies of a Memorandum by the Army Sanitary Commission on the Report of the Madras Municipality for 1879.

2. You will observe that, in their remarks in para. 9 on the drainage of Madras, the Commission refer to Captain Galton's Report on the drainage of Memphis, United States. This is now being printed, and copies will be forwarded when ready.

I have the honour to be,
Sir,
Your most obedient humble Servant,

* 12 by mail; 58 through Store Department.

23692
6

ENCLOSURE.

MEMORANDUM of the Army Sanitary Commission on the Report of the Madras Municipality for 1879.

1. This Report is chiefly devoted to ordinary administrative details. It contains very little sanitary information, and, taken as a whole it cannot be said to be very hopeful for future progress. There are, however, a few sanitary points in it which may be noticed.

2. The population of Madras is given in the Report at 397,552, of which 194,676 were males and 202,876 were females. The numbers according to race were—

| | |
|---|---|
| Europeans | 3,613 |
| East Indians | 12,013 |
| Native Christians | 21,141 |
| Hindus | 309,521 |
| Mahomedans | 50,964 |

Among this population there were 16,629 births, equal to a birth-rate of 41·8 per 1,000.

3. The deaths of the year numbered 13,803, rather fewer than the annual average. The deaths according to sex were, of males 6,929, and of females 6,874, the mortality being nearly the same in both sexes. The ratio of mortality was for both sexes 34·7 per 1,000. The rate is largely in excess of what is attainable even in a city such as Madras, but its reduction over the preceding averages (excluding the famine years altogether) was no doubt partly due to the clearing off by famine and its diseases of the more susceptible part of the population during that calamity.

The death-rates according to classes were—

| | |
|---|---|
| Europeans | 24·3 per 1000. |
| East Indians | 25·0 ,, |
| Native Christians | 28·6 ,, |
| Hindus | 35·9 ,, |
| Mahomedans | 32·9 ,, |

As a general proposition, it may be stated, as showing the superior healthiness of European quarters in Calcutta, that the Madras rate is very much higher for Europeans than the Calcutta rate, which averaged 16·1 per 1,000 in 1878 and 17·9 per 1,000 in 1879.

These data will be sufficient to show the death-rates without further analysis until the new census of Madras is adopted in the reports.

The death-rates in different municipal divisions did not show the same excesses as in previous years, as will be seen by the following figures:

| Divisions. | Death-rates per 1,000. | Divisions. | Death-rates per 1,000. |
|---|---|---|---|
| 1 | 36·5 | 5 | 28·2 |
| 2 | 35·2 | 6 | 13·1 |
| 3 | 32·9 | 7 | 34·6 |
| 4 | 29·6 | 8 | 33·0 |

Each division contains a number of villages, and it is among these that the most marked diversities in death-rates are to be found. The

lowest rates of the year were 1·5 per 1,000 among 641 inhabitants at the gunpowder mills, and 1·8 per 1,000 among 1,583 people in Fort George; at the other extremity of the scale we have 6,087 people in Pooloo-penkum yielding a death-rate of 53·5 p r 1,000, Royapuram with 11,089 inhabitants and a death-rate of 60·8 per 1,000, and Royapettah showing a rate of 70·7 per 1,000 from among 5,255 people.

The same law appears to show itself in the separate groups of population as in the city generally, that the most susceptible persons had been cleared out by the mortality causes of preceding years.

4. The following were the deaths registered in 1879; it will be seen that Madras participated in comparative exemption from cholera which existed over the South of India:—

| | Registered Deaths. |
|---|---|
| Cholera | 35 |
| Small-pox | 910 |
| Measles | 10 |
| Fevers | 3,465 |
| Bowel complaints | 1,757 |
| Total epidemic deaths | 6,177 |
| All other deaths | 7,626 |
| Total of the year | 13,803 |

There was a great reduction of the epidemic death-rate over the corresponding rate of 1878, which showed 10,057 epidemic deaths out of a total mortality of 18,912.

The chief death cause of 1879 was fever, a disease which appears to have been distinctly localized in certain villages, for, out of 30 villages in the tables, ten villages yielded 2,740 fever deaths out of 3,465. As with fever, so with cholera, the 31 deaths from which were registered (excluding four in the hospitals) in seven villages; one of them yielded 19 deaths.

Bowel complaint deaths, which, in the year 1878, after the stress of the famine had passed over, numbered 1,522, fell to 1,757, a lower number than was recorded in any year since 1870. It will be seen that, for the reasons stated above, the year 1879 was a less unhealthy year than several recent years, but it is not by this circumstance that the real sanitary standard of Madras or indeed of any group of population is to be judged.

5. *Sanitary works.*—The following improvements have occupied attention in the "Public Works and Conservancy Departments" during 1879:—

Improvement of drainage.
Improvement of water-supply.
Improvement of public and private markets.
Collection of night-soil from private houses, &c.
Improvement of parcherries.
Extension of sewage farms.

We propose to introduce a few remarks on each of these heads.

6. *Drainage.*—Mr. Clarke's scheme for draining Madras has been finally abandoned, as too costly and as unsuitable; but one reason stated for following this course is that "the Commissioners have not, I believe, "hesitated about draining the city, but have so regarding the adoption "of any one scheme, and it was necessary that full investigation should "be made, as the city could not bear the result of a failure. The "unsatisfactory state of Calcutta after the completion of its drainage "was one of the causes which militated against the adoption of the late "Mr. Clarke's scheme."

Caution in such matters is always necessary, and every means should be adopted to ensure the successful application of engineering details as well as of economy in great drainage works, but it is not correct to state, as a reason for rejecting Mr. Clarke's Madras scheme, that his Calcutta scheme had been "unsatisfactory" in its results. It is no part of our duty to adjudicate on questions of this kind, but year after year the Calcutta reports have shown the great improvements which the drainage has led to there, and they have also shown how "unsatisfactory" has been the surface condition of the city, not from defects in the drainage, but from the great extent of foul tank surface, which no drainage works could remove. It is quite well known that the high disease and death rates in several districts of Calcutta are due to foul domestic water being taken from these tanks, and to the deadly malaria proceeding from them, and it is also quite well known that the real remedy required is filling up the tanks with earth. The Vice President of the Madras Departments complains that considerable opposition is experienced in improving the city, but we may suggest that this is not likely to be lessened by objections against the Calcutta drainage which might equally well be urged against the Calcutta water-supply.

7. The Vice President, Mr. Jones, proposes as an alternative to carry out the drainage of Madras on the following principles:—

"To provide open sewers along the streets for surface water, house "drainage, &c.

"To provide sewers in valleys and other necessary places to carry off "the sewage alone, any storm waters being divided from it and carried "to other outlets.

"To improve the present sewers, to make them more efficient for the "carrying off the storm and subsoil waters.

"To pump the sewage collected, and place it on land at some distance "to the north of the town.

"In addition to this, the house to house collection of night-soil, and "other conservancy arrangements hereafter detailed, should make a "marked improvement in the health of the town."

It will be seen that there is nothing effectual proposed to be done for the foul subsoil and its results, as described by the late Mr. Gover in his report for 1871–72, which may be described as by far the best sanitary report ever drawn up for Madras town. Mr. Gover's statement, if correct, would show that the proposed surface drainage scheme would not remove the evil, and we have frequently insisted on this. Mr. Jones quotes our last statement of the case, and meets it by the following reply:—"The subsoil of the city is not in the state described by the late "Mr. Gover; no doubt Mr. Gover believed that he had reasons for "making the remarks he did, but these were really without any foun-"dation whatever, and what he took for 'subsoil,' saturated with sewage, "is, what can be found all over Madras, nothing less than black sand "mixed with a little clay, the sand being so fine as to have the character "of tin sand. The subsoil is remarkably little polluted."

8. It may be conceded that in a city spread over so large an area as Madras the subsoil condition may vary, and Mr. Jones admits some degree of pollution as general, although it would have been better to have met Mr. Gover's statement by a set of soil analyses at different points. The questions at issue all relate to *unhealthy districts* of Madras, and, after having stated what Mr. Jones says, we may be permitted to quote the following passage from Mr. Gover's report:—"Exhalations "from sewage poison the air, downward percolation of sewage "poisons the water. It will be almost incredible to those at a

"distance, yet the fact remains that large and populous portions of "Madras have absolutely no drainage at all. There are nearly 70,000 "persons dwelling in the parcheeries of Madras, and I believe I am "correct in saying that there was not a drain in any one of them. "The excavations for the waterworks reveal very strikingly the evils "of downward percolation of the sewage, both where there are no drains "and where there are. Mr. Woolley, the contractor for the works, has "drawn my special attention to the fact that, in the more densely "peopled and old localities, he frequently suffers great inconvenience "through the soil being saturated with filth. That the workmen "exhibit great disinclination to continue their labour; in some places "the soil has been found as black as ink to a depth of 8 or 10 feet,— "as black (Mr. Woolley's expression,—as tin sand. I have "seen excavations made for other purposes in Chintadrepetta, where "the same blackness was observed for several feet down. Now it is "very evident that the earth does not retain this sewage as a well "corked bottle might retain wine. The sewage with which the ground "is thus saturated is constantly undergoing physical changes. Poisonous "gases from it perpetually rise through the upper stratum of earth; "poisonous washings continually descend into the lower stratum of "water defiling every well. Discolouration of the soil in this way is "palpable evidence that there is real danger to those who live above "the polluted ground—a danger which shows itself in perennial fevers, "frequent epidemic outbreaks, and a general debility of intellect and "physique among the people. It seems absurd to say more on a subject "that so publicly and loudly calls for attention."

9. Where there is such diversity of view and of sanitary estimate between two officers of the same municipality, it is not for us to decide who is right or who is wrong. What we have to *do* is with the facts. If the subsoil of Madras is not polluted by filth it must be a very happy exception to the general experience of mankind, and all outlay for drainage of any kind must be waste, so far as health is concerned. Unless it is shown that the blackness, as of "tin sand," is not due to sewage but to the nature of the sand, the fact, as stated both by the late Mr. Grover and by Mr. Jones, must be accepted as proof of a dangerous condition of the subsoil. That there are odours from it no one can deny. That there are violent epidemics among the poor people living over it is shown year by year in the death returns, and last year's Madras Report (1873) shows, by the infallible well water test, that Mr. Grover's statements were correct. The analysis is here reproduced—one out of several. It is in Old Jail Street at the barracks.

| | Grains per Gallon. |
|---|---|
| Total solids | 14·70 |
| Volatile | 7·00 |
| Chloride of sodium | 4·60 |
| Free ammonia | ·01120 |
| Albuminoid ammonia | ·03360 |
| Nitric acid | ·06300 |

It is simply sand water highly charged with sewage. We must here leave the case with one remark, that, useful as a good system of impervious surface drainage may be, Mr. Jones has by no means shown that it is the only kind of drainage required for improving the health of Madras, and, to aid in the further discussion and understanding of the questions at issue, we would beg to refer to Captain Galton's report on the drainage of Memphis, United States, sent to the India Office for information in India, as indicating the methods considered to be necessary for improving a city subject, in time past, to great epidemics by authorities on the spot amply able to deal with the question.



10. It is satisfactory to be informed that the municipal authorities of Madras still hope to drain the city, and we have said sufficient to show that the surface drainage scheme need not stand in the way of proceeding with the complete drainage of every house. An obvious requirement of both schemes is more water. Without it underground drains would not work, and surface sewage drains would become offensive. But, whenever water is laid on, it must be kept out of the subsoil, and if the surface drains are not kept sound, and in good working condition, the last end may be worse than the beginning.

11. In the present state of the drainage question it is unnecessary to discuss the remaining principles, but it may be suggested that whatever outlay may be incurred in giving effect to them should be so applied that when Madras is effectually drained it may be found that the works can all be included in the completed scheme.

We may, however, call attention to the general principles of Indian drainage long ago laid down by us, and which we are glad to see have been practically carried out at Memphis, viz., that all the rainfall should be led to outlets by well formed impervious surface drains and not by underground sewers; that underground sewers and drains should be perfectly tight and restricted solely to the conveyance of house sewage, and that drainage of the subsoil should be separately provided for.

The proposed plan for Madras would provide for the first requirement, but not for the others: and it is intended apparently to leave the subsoil as it is, and to remove the solid house sewage by hand labour, and to provide for this work by a more effective organization than at present exists.

12. The subject is fully dealt with by the municipal committee in a report (included in the appendix to the municipal report), in which occurs the following important statement bearing directly on the nature and extent of all sanitary works for the city. They say: "We would "remark in passing that it has been a constant error and source of "expense to treat Madras as if it were a large city. This is far from "the case, and it might better be described as a few densely populated "villages at some distance from each other, and that therefore in all "sanitary regulations the suburban and sparsely populated should be "treated apart from populous parts." No doubt this principle is a correct one up to a certain point; it applies not to the things to be done but to the manner of doing them. Every city, however large and however densely populated, and every village, however small, require cleanliness, dry and clean subsoil, and pure water. In villages all these requirements can be obtained, except under very special circumstances, without permanent works or expensive establishments. It is otherwise in densely peopled towns as in large cities where all the measures require to be enforced with unceasing care for the protection of public health, and in these cases it has been long known that drainage, water-supply, cleansing, and general sanitary organization are much more economically carried out by adopting one general system of procedure. In such a case as Madras it may be possible to divide the work between the different population groups, in such a way that while the large population centres are drained and supplied with water by permanent works, the smaller groups may be dealt with separately. In our suggestions for improving Indian villages we have stated the general principles which might be found applicable to these suburban villages, and the Memphis report shows how the larger and denser groups might possibly be dealt with.

As the case stands, supposing that Mr. Jones's scheme of surface drainage were applied to one of the larger genus of population, then the municipality must provide against increasing subsoil, air, and water pollution by so arranging the night-soil collection and removal as to keep the soil from touching the ground, and to remove it before the

commencement of decomposition, which, when it begins, indicates the evolution of disease.

13. *Water-supply.*—The quantity of water drawn from the mains in 1879 was 144,779,000 cubic feet. The water is used by 200,000 people, or about half the population, and for this number the supply was 12½ gallons per head per diem. The total house services amount to 457, in 41 of which repairs were made during the year. The rainfall of 1879 was 40·84 inches, 27·61 inches of which took place in October and November. The tank level was lowest in August. As in many preceding years the water supplied from this country tank and gathering ground was far from being good in 1879. It contained "five or six "times as much albuminoid ammonia," as the London waters, and "almost as much as the River Thames at London Bridge." The cause of this condition of the water appears to be found in a superabundance of the lower forms of organic life, either in the tank itself and its surroundings or in the open channel by which the water is conducted to Madras. It appears to be an open cutting, and the Report mentions a slip of about 50 feet in length in its side "caused by rats and snakes "boring holes, and by water oozing through the channel at places "where it has been badly constructed, &c. The channel is a continual "source of trouble to us and *an obstacle* to a continuous supply, pro- "duces a very considerable deterioration of the water, at the same time "causes our pipes to be filled with fish, snails, &c., which we are *unable* "to prevent with the best strainers, as when they enter the pipes they "are in almost a microscopic state."

To remedy this state of matters it is proposed to replace the open culvert by a pipe main 36 inches in diameter, to extend the supply and provide filters at the tank, and also additional reservoirs. The state of the gathering ground would require careful watching to prevent pollution, and this, with the proposed works, ought to remedy the evils complained of. But to accomplish them an annual water tax of 38,956*l.* would be required to pay off the loan and meet the establishment charges. It is proposed to lessen the amount by trusting to local wells in the outlying villages.

The whole subject, together with the future drainage, will no doubt be fully considered. There is every disposition apparently to proceed, but the former set off, namely, poverty, is urged as a cause of inaction. All that we can say is that the existing Red Hill water-supply as described in this Report it scarcely fit for any domestic purpose.

The following practical points in the domestic water services may be here introduced. The best and cheapest house service pipes are of plain iron, not galvanized, screw jointed, known as "gas tubing." For house services the largest need not exceed one inch, the smallest half an inch, with ¼ screw-down taps. The tubes from the main to the house should be laid in a small case of wood, large enough to allow the pipe to be embedded in asphalte or Portland cement concrete. The cost of similar protection for gas pipes in London is 3*d.* per lineal yard, where also an inch pipe laid complete costs 2*s.* 9*d.* per lineal yard, and one half-inch pipe 2*s.*

An inch pipe will deliver, under a low pressure, about 180 gallons per hour, a half-inch pipe about 120 gallons per hour. A pipe two inches in diameter, laid complete and costing 5*s.* per lineal yard, will deliver 1,900 gallons per hour.

Pipes from two inches to one inch may be used as "rider mains" and have half-inch branches taken from them to the houses. As all pipes, T-pieces, screw-down taps, &c., are screwed to a standard pitch and thread, any ordinary workman would soon learn to fit and repair them.

14. *Conservancy.*—The following account of this important work is given by the Acting President:—"The daily removal of rubbish and filth,



"and the cleansing of surface drains, &c., was carried out by a force of "941 coolies and 349 carts. The carts make two trips to the day. "369,779 cartloads, of which 87,663 were night-soil, were removed "during the year. The main sewers of Black Town and Triplicane were "cleaned out at a cost of Rs. 381—136 cubic yards of silt were removed. "The cost of surface cleansing, the most important part of the con- "servancy and sanitation of the town was Rs. 153,653. The receipts "from sale of rubbish and night-soil were Rs. 1,982." We could only assent to this estimate of the importance of surface cleansing to health if it included the effective cleansing of all compounds, courts, lanes, &c., because Indian experience has long shown that it is not by dirty roads, so much as by dirty houses and their surroundings, that the public health suffers.

15. The outflow from the three largest *Madras* sewers is used for irrigation on five separate areas of ground. Three of these are sewage farms, from which the receipts for hay and grass were Rs. 8,308. But as the maintenance cost Rs. 6,468 and the rents Rs. 3,182, there was a loss of Rs. 1,342, which was the sum paid for getting rid of sewage.

16. *Vaccination.*—The total successful vaccinations during the year were 17,009. As has been already stated, the deaths from small-pox were 910, or one death for about every 18½ vaccinations.

17. Besides the points noticed in the preceding remarks, the Madras Report for 1879 shows that a large amount of detail work connected with the public health has been done in course of the year. On this we have no remark to make. Our object, as will have been seen, has been to assist as far as we can in the discussion which has been proceeding on the drainage of the city. In the present state of the question we have no recommendation to make, except that the city be drained concurrently with the water-supply extension, and that until both works are completed the most scrupulous attention should be given to the cleanliness of houses, compounds, lanes, and public roads and streets, as the chief means of protection against epidemics. And another measure, the removal of unwholesome huts, of which we are glad to learn 264 had been removed from one hotbed of disease, should be carried out. The owners will be compensated, the ground will be levelled and drained, and better huts erected on the site. But like a change of camp, this measure at best is but a change of ground, and if the future huts are to be fit for healthy occupation suitable works for this object will have to be provided.

23rd July 1881.

SL
2968

No 11

Statistics Commerce

13 October 1881

The Lords of Committee

of Council

Recd 2 Nov/81

Nov 10th 1881 No 2262

Account of Coin distributed and the balance thereof in the hands of the Municipal Commissioners of Aberdeen for Coin Distribution.

Copy of Capt. Galton's Report on the drawing of Aberdeen, No. 11 which has been forwarded, which received from the Secretary of State.

Education

Nov 19/81

Read 19 Nov 81

Read 2 Nov/81

Copy of Report by Capt. Galton on the Drawing of Aberdeen No. 11 which has been forwarded to the Education Department by the Secretary of State.

Education

Nov 19/81

Read 19 Nov 81

2262
No 11

Comté de Nice
Fonds
Archives départementales
des Alpes-Maritimes
81 6 DIV 226

(167)