

THE
SIXTH ANNUAL REPORT OF THE SANITARY BOARD,

THE THIRTY-EIGHTH ANNUAL REPORT OF THE
SANITARY COMMISSIONER,

AND THE
TWELFTH ANNUAL REPORT OF THE SANITARY ENGINEER

MADRAS.

1901.

* செப்பனிட வதற்காக எடுத்த
* கொள்ளப்பட்ட
* ஜூன் மாதம் 1901 வருடம்
* செப்பனிட முடிந்த
* 2^{ம்} மாதம் 1901 வருடம்
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* ஆராய்ச்சி உதவியாளர்
* கையொப்பம்

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SIXTH REPORT OF THE SANITARY BOARD.

SIXTH REPORT OF THE SANITARY BOARD

FOR THE YEAR 1901.

Constitution of the Board.—This remained unchanged. As regards the *personnel*, Mr. W. B. deWinton, the President, having availed himself of privilege leave for one month in March 1901, his place was filled temporarily by Colonel A. W. Smart, R.E. Colonel A. M. Branfoot, M.B., C.I.E., I.M.S., occupied the medical member's place in April 1901 during the absence on three months' privilege leave of Surgeon-General D. Sinclair, M.B., C.S.I., I.M.S., Surgeon-General with the Government of Madras. The Indian Civil Service member's place on the Board was held by Mr. M. Hammick, C.I.E., till March 1901, when Mr. C. J. Weir took office.

2. During the year, the Board scrutinized the plans and estimates of 85 sanitary works. Of these, 38 were for Municipalities, 43 for Local Fund Boards, 3 for the Collector of Madura and 1 for the Collector of Salem. The total estimated value of the projects amounted to Rs. 14,40,745.

3. The reports of the Sanitary Commissioner and the Sanitary Engineer contain details of sanitary work undertaken in this Presidency during the year. The report of the Sanitary Board will, therefore, as usual be confined to a brief notice of the more important of the projects with which it has, itself, dealt.

4. Of these, the following schemes were examined and laid before Government :—

	Estimated cost.
	RS.
(1) Reroofing the Municipal Hospital, Tellicherry	1,539
(2) Erode water-supply (the Cauvery scheme)	1,03,000
(3) Acquisition of land containing the spring heads of the water-supply of Coonoor Municipality	2,000
(4) Kumbakonam water-supply (the amended scheme)	4,05,120
(5) Economising the expenses on Kurnool water-works	...
(6) Ongole water-supply	1 20,000
(7) Sinking an artesian-well at Ellore, 8" bore	5,450
Do. do. 12" do.	16,450
(8) Piping water from the experimental trench at Oodukam valley to Dindigul	10,500
(9) Augmenting the water-supply of Adoni	16,100
(10) Drainage of Selayappa Mudali Street, Kumbakonam	7,650
(11) Experimental works in connection with the water-supply of Masulipatam	3,200

5. The undermentioned projects were, on the recommendation of the Board, sanctioned by Government :—

	Cost.
	RS.
(1) Constructing the Tiger Hill Reservoir in connection with Ootacamund water-supply	...
(2) Improvements to the Ootacamund public market	20,050
(3) Reroofing the Hospital building at Tellicherry	1,639
(4) Prohibition of cultivation of lands on the right bank of the river, within a radius of $\frac{1}{4}$ mile of the infiltration gallery of the Tirupati water-works	...
(5) Closing the wells at Calicut within 50 yards of the Kannanparamba burial-ground	...

6. Proposals for undertaking the following schemes were received and considered by the Board, but many of them had not sufficiently advanced to admit of estimates being prepared :—

(1) Kodaikanal water-supply.	(4) Improvements to Trichinopoly water-works.
(2) Water-supply of Guntur from the Yengalapalem springs.	(5) Improvements to the drinking water tank at Inavally.
(3) Construction of a new hospital at Anantapur.	

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THIRTY-EIGHTH ANNUAL REPORT

OF THE

SANITARY COMMISSIONER FOR MADRAS, 1901.

SECTION V.

GENERAL POPULATION.

RAINFALL.

1. The total average annual rainfall for the Presidency was 47·80 inches, or 3·5 per cent. more than the average for the ten years ending 1898. The north-east monsoon yielded 13·8 per cent. above this average, whilst the south-west monsoon was deficient by 10·3 per cent. In the districts of Kurnool, Bellary and Anantapur, there was a deficiency during both the south-west and north-east monsoons of 19·11 inches, or 23·7 per cent. of the decennial average. Cuddapah, although in poor case as to its south-west monsoon (—32·8 per cent.), was more fortunate during the north-east, when it received an excess of 7·6 per cent. In the Northern Circars, Gó dávari and Kistna received a total of 19·8 per cent. less during the two monsoons. The yield of the north-east monsoon was remarkably great in the Chingleput and Madras districts, where it exceeded the average by 47·6 and 45·0 per cent., respectively.

PRICES OF FOOD-GRAINS.

2. During the year 1901, quoted at (30 tola) seers per rupee, cholam was sold at 15·6, raggi at 15·7, cumbu at 15·1, against the decennial averages, 20·4, 22·5 and 20·0, respectively. These averages, however, afford but a poor guide, seeing that the period embraces years of exceptional high prices and scarcity in special parts of the Presidency, following failures of monsoons. A more trustworthy comparison is afforded by districts where the grain quoted is the staple, at a period not marked by previous wide fluctuation. Regarded thus, it is found that in 1888 in Tanjore 16·6 (80 tola) seers of rice per rupee were obtainable, but in 1901 only 10·7. In North Arcot, since 1891, the amount of staple grain per rupee obtainable, with the exception of two years (1895 and 1896), has been less than the Famine Code "warning rate." As another mode of comparison, it may be stated that, whilst in 1891, in North Arcot, 4 annas would purchase 7·9 seers of raggi, in 1901 it would secure only 3·5 seers. Such facts might lead to the conclusion that the people have been subjected to chronic starvation. There is, however, no necessity to regard matters in this extreme light. Undoubtedly, certain classes of the community and certain localities have been passing through "hard times," and this is testified to by the results of vital statistics, but the causation is not of that

food-grains, an increase of the death-rate may be expected to occur if the strain has been severe notwithstanding the less infantile rate. It is, however, obvious that whilst this factor was sufficiently powerful to depress the physiological functions, it has not been sufficient to sensibly increase the total mortality. The total deaths during the year were 796,140, or an increase of 25,281 when compared with the previous year. Reckoned upon the census population of 1901, the total death-rate was 21.3 per mille. Of the total deaths no less than 81,370 were due to cholera, whilst only 3,226 in excess of the number of the previous year were due to "diarrhoea and dysentery"—the diseases *par excellence* attending privation. Under all other heads of registration except plague (3,035 cases) there was a diminution of mortality. The total death-rate of infants below one year of age was 166.2 per mille of the registered births, against 164.9 per mille in the previous year. The death-rate of male infants was 174.6, against 157.5 per mille of females. In no district except the Nilgiris did the mortality of female infants exceed that of males. In the case of Malabar, the total registered infantile death-rate was 98.9 per mille of births. This is in complete contrast with results in other districts of the Presidency, and must be ascribed to failure to register deaths of infants, and to the long established custom in that area of burying infants within private premises. The necessity for care in the registration of births and deaths of infants was particularly urged by me upon all authorities responsible, in June 1899. Having regard to the scattered condition of houses in villages in Malabar, however, better results can be expected only as a consequence of steady insistence through a series of years.

BIRTHS IN MUNICIPALITIES.

7. The population under municipal administration amounts to 2,406,455, according to the Census of 1901. The total births (78,554) yield a birth-rate of 32.6 per mille, against 38.5 per mille in 1900. Reckoned upon the census population of 1891, the rate was 36.2. There was a decrease of 4,490 in total births registered in municipalities, when compared with the total of the previous year; this occurred in 44 towns of a total of 61. That the town population of the Presidency should have been less influenced than the rural as to fecundity by the high price of food-grains, seems to support the view that the pressure was chiefly upon the lowest classes of the agricultural population. The most marked decrease occurred in the following towns:—Vellore, Trichinopoly, Kurnool, Conjeevaram, Calicut, Masulipatam, Madras.

DEATHS IN MUNICIPALITIES.

8. The total deaths registered were 85,266, representing a death-rate of 35.4 per mille. The death-rate was considerably above normal in Bellary (48.1) chiefly due to cholera and plague; in Chingleput (38.4), where owing to the smallness of the population the deaths from fever have made an increase more apparent than real; in Berhampur (40.5), chiefly under "fevers" and "cholera." In Madras, the exceedingly heavy rate of 55.5 per mille occurred. This, however, represented but an increase of 14.6 upon the quinquennial average, and was due to death registration under "cholera" and "fevers."

The total average infantile mortality in municipalities was 237.3 per mille of births. This represents an increase of 14 per mille when compared with last year, and may possibly reflect the influence of the continued strain of prices already discussed, in addition to the usual factors of insanitary environment, and ignorance of hygienic care of infants characteristic of the uneducated Hindu mother. The rate may be contrasted with that obtained under the very unfavourable conditions of town life in England. There, the total average of 55 towns yields a rate of 182, and in London 166, per mille. In the following towns, the rate of infantile mortality was particularly heavy:—Berhampur (278.6), Bezwada (277.4), Madras

(328.4), Vaniyambadi (293.6), Palamcottah (240.4), and Tuticorin (304.4). Lest, however, an exaggerated idea of these undesirable rates be entertained, it may be stated that in at least three towns in England they are exceeded. As in the case of rates referred to in paragraph 6, which include data derived from rural areas, the mortality of male infants in municipal towns was greater than that of females—the rate being 227.6 for the latter, against 246.6 per mille for the former. That male infants should more readily succumb to unfavourable circumstances in the first year of life, accords with experience in all countries. Normally, births of boys are greater than of girls—for example, for the whole Presidency, during the year under review 100 girls were born for every 104.2 boys; but, by the end of the first year of life, the proportion becomes more equal, as the boys die at a greater rate in the earlier months than the girls. The native tendency is to regard the addition of a male infant to the family as of considerably more moment than of a female. Nevertheless, in this Presidency, this feeling is by no means so marked as to lead to neglect of female infants. The utmost that may occur in this direction is that, in times of marked scarcity, the female may occupy an inferior place in the table of precedence as to choice of supplies.

In former years, the mortality of infants from small-pox was regarded by the native population as inevitable. Under the influence of compulsory vaccination, however, the saving of infantile life is becoming yearly more evident. Up to 1894, in certain municipalities compulsory vaccination was optional; subsequent to that date, it has been adopted in all municipalities. Since 1900, it has been advanced, on the *festinante* principle, in rural areas. With the bulk of the rural population vaccination, however, is still optional. If the conditions of 1891 and 1901 be contrasted, it is found that, in 1891, the death-rate from small-pox of infants under one year of age in municipalities was 8 per mille of births, against 7.3 per mille of births in rural areas; whereas, in 1901, the deaths in municipal areas of infants under one year of age from this disease amounted to 2.7 per mille, against 8.6 per mille in rural areas. It is thus evident whilst in rural areas, in the years contrasted, the rate of mortality of infants from this cause had not decreased, in municipal areas, there was a marked improvement, as a result of better vaccination. It need not be said that were the infants liable to vaccination earlier than at six months of age, much more favourable results might be expected. In the hope of securing that guardians of infants born in a rural area under compulsory vaccination shall not evade the provisions of the law by proceeding to a municipality, or *vice versa*, I have advised Government to secure special legislation. By this means, a better grade of protection of infant life can be secured.

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simple nature which an appeal to figures alone will satisfy. A full discussion would be beyond the scope of this report. Stated briefly, the most evident condition is that the persons most likely to be affected are of the labouring agricultural classes. Of these, the permanent servants of the ryot are not likely to suffer, as they are still largely paid in grain. The full brunt of high prices is borne by ryots' coolies, who form a large part of the rural population, and, to a less extent, by their prototypes the "daily coolies" of towns. Both subsist by performing odd jobs. The ryots' "odd job men" used to be paid solely in grain, but the ryot of the present day, for obvious reasons, frequently prefers to pay in coin. The ryots and merchants have secured higher prices than formerly by exporting grain to parts of India, where failure of crops has been marked over a greater area than in this Presidency. This has been rendered possible by the extension of railways. The artificial condition of scarcity of food-grains thus produced has been accentuated, by the ryot throwing land out of cereal cultivation in favour of oil-producing nuts and tobacco, for both of which there is a brisk demand. On the other hand, artisans and certain classes of the labouring poor, more especially of the urban population, have found in railways, mills, mines and shipping increased facilities for work. The rate of wages is slowly increasing. The whole country is undergoing a much belated, yet sure, change in the search for other outlets for energy than secured by the plough. These changes are regrettably slow, but they, nevertheless, affect results to an extent that the price of food-grains *per se* will shortly no longer be of that importance as a guide to the condition of the labouring classes and of the Presidency, as a whole, which it has been in former years. The policy pursued by Government of carefully watching results upon populations in certain areas, and judging of their resources, and the possibility of their obtaining labour, is alone that which can secure the safety of the labouring classes, and a just appreciation of the influence of the incidence of high prices; that is to say, the Famine Code "warning rates" and "scarcity rates" are no longer mathematically correct criteria of the economic condition of the people—they must be read side by side with other data.

GENERAL POPULATION.

3. The population of the Presidency, according to the Census of 1901, was 38,623,066. The European and Eurasian population included in this total amounted to 40,231. The "natural increase" since last census amounted to 2,572,646, against 4,879,894 in the former intercensal period. The rate of increase for the Presidency excluding feudatory States was 6.99 per mille; but if the districts that have been specially subjected to famine and scarcity during the period be excluded, namely, Kurnool, Cuddapah, Bellary, Ganjam, Godavari, Kistna, Vizagapatam, Anantapur, Nellore, and North Arcot, the rate of increase has been 7.24 per mille. Cooly emigrants during the year exceeded immigrants by 4,849. The population under registration during the year was 37,315,611. In all Municipal areas, registration of births and deaths was compulsory, and also in 441 against 400 villages in the previous year, under Act III of 1899. Owing to the absence of the enforcement of the Village Proprietary Act, it is not possible to secure correct statistics from rural areas under zamindars. The method of inspection of registration records stated in former reports continues. At the suggestion of the Government of India, registration in rural areas under the heads "plague" and "respiratory disease" has been required. The forms employed in rural areas are under discussion. In reply to enquiries as to how many District Medical and Sanitary Officers have agreed to carry out my suggestion that Municipal Registrars should be trained in respect to medical terminology, the majority have reported that action has been taken. 87 prosecutions were undertaken by Municipal Councils for failure to comply with legal requirements as to compulsory registration.

BIRTHS IN DISTRICTS.

4. The total births reported during the year in the whole Presidency were 935,749, against 1,040,199 in the year 1900—a decrease of 113,450. The birth-rate per mille, therefore, reckoned upon the population according to the Census of 1901 was 25.1, or a decrease of 6.7 per mille when compared with the previous year. This indicates a very heavy fall in fecundity, even were allowance made for factors recognized as tending to the securing of imperfect statistics. One source of error is, however, at once apparent in this calculation. It has already been pointed out by me (and in this I have been supported by the Madras Government) that reckoning upon a census population year by year without allowing for the intercensal rate of increase, permits of an appearance of improvement in registration results that may not exist in fact. But, on the next census figures being available, a sudden drop in this improvement must occur—to be duly resumed in the succeeding years. This would at all times be avoided by use of "estimated populations." This having been forbidden, I at least may appeal to the fact that, if the 1901 births be reckoned upon the 1891 census, as was the case in 1900, the birth-rate results are by no means so appalling; the rate then becomes 28.3 per mille and shows, by comparison with 1900, a fall of 3.5 per mille. But a fall in the total birth-rate of the Presidency has not been unexpected in that, as shown by Mr. Stuart in the Census Report for 1891, the rate of increase in the intercensal period dealt with by him was abnormal, as a result of the age constitution of the people following the mortality of adults in the 1876-77 famine. This factor must show increasing power for some years to come; but the sudden fall during the year under review cannot be fully thus explained. It cannot be ascribed to laxity in registration at a period when compulsory registration has been advanced in many areas, and the endeavour to secure better registration has been evident throughout the Presidency. Moreover, such an argument would assume that unusual carelessness has been exhibited in 21 out of 22 districts. I can discover no religious, or other reason to believe that marriages were not carried out as usual during the year, or in that preceding it. Hence allowing the factor of changing age constitution of the population full weight, the result must, in great part, be ascribed to the well-known physiological influence of high prices of food upon fecundity. In accepting this interpretation, it must be remembered that the strain of high prices of food has acted upon certain classes of the population for successive years.

5. In scrutinizing the birth-rates of the various districts, to secure their just appreciation it would be necessary to compare results as I have done in considering the whole population of the Presidency, in the preceding paragraph; but as this would be inappropriate, it will, I hope, be remembered that the decrease of the birth-rate is not so great as the figures would convey, and that they are of utility only in making comparisons, seeing that the error is common to the whole. Further explanation is necessary as to the rates in the case of Ganjam and Madras. Both these districts include large zamindari tracts. It has not been possible to obtain from the Collectors' statistics for these, nor has it been possible, in communication with the Superintendent of the Census, to exclude the populations concerned; hence, the total births reported from tracts other than zamindari have been applied to the total population—a very weak method of calculation, but the only one feasible. If these two areas be excluded, it is found the more notable diminution of birth-rates, when compared with the preceding year, occurred in Chingleput (15.6), North Arcot (9.8), Madras (9.0), Kistna (8.6) and Kurnool (7.5).*

DEATHS IN DISTRICTS.

6. Were the decrease of birth-rate explainable on the grounds of mere cessation of marriages, as a result of precaution in view of high prices, the death-rate would show a diminution, by reason of less number of deaths of infants; but where the impress has been upon the fecundity of a population as a result of high prices of

* Unless otherwise stated throughout this report, figures enclosed in brackets refer to rates per mille.

SECTION VI.

GENERAL HISTORY OF CHIEF DISEASES.

CHOLERA.

9. There were 81,370 deaths from this disease during the year, or a total of 2.2 of the whole population. Anantapur (4.5), Giddapah (4.2), North Arcot (4.1) and Salem (5.1) were the districts which chiefly suffered. The municipal towns of Chingleput, Coimbatore, Erode, Karur, Berhampur, Nandyal, Palni, Calicut, Cochin, Gudiyattam, Salem, Vaniyambadi, Tirupattur and Mangalore gave rates above 5 per mille from this disease. As to prevention, it cannot be said that either Local Fund, Municipal or Revenue authorities are yet alive to the necessity for taking action during the advance of cholera. In spite of appeals from this office, they take advantage of the discretion allowed them in the rulings on the subject issued by Government, and do not think of appointing staffs until cholera is in their midst, and even then (in the interests of so-called economy), they allow these to be incomplete. So long as this condition continues, no real stand against cholera can be made.

10. Of the total of 6,322 deaths from this cause in 61 municipal towns, no less than 1,161 occurred in Madras town, or 2.4 per mille of its population. Notwithstanding the expenditure of several lakhs of rupees upon its public water-supply, the Madras Municipal Commission is content to allow the inhabitants to supplement it by the use of innumerable wells that are open to pollution, and are sunk in a foul subsoil. Under the circumstances, the town must be regarded as having escaped well out of evil conditions. The day that its long open water channel becomes contaminated with cholera or typhoid matter will, however, be one not so readily reckoned with. The towns of Coimbatore, Erode, Chingleput, Karur, Berhampur, Cochin, Gudiyattam, Vaniyambadi, Palamcottah and Tuticorin—all of which have water-supplies readily open to faecal pollution—chiefly suffered in mufassal areas.

SMALL-POX.

11. The total deaths from small-pox amounted to 26,202, against 27,692 of the previous year. The rate of incidence in municipal towns where compulsory vaccination is in force was 6 per mille, against 7 per mille in rural tracts, in a few unions only of which compulsion is exercised. If the town of Cochin be eliminated, where no fewer than 343 deaths occurred from this disease, the incidence on the total municipal population was 0.5 per mille. The large mortality in Cochin was doubtless due to the fact that it adjoins an area under independent native administration, where more care is requisite as to small-pox. Of 2,750 children personally inspected by District Medical and Sanitary Officers during their periodical sanitary inspection of taluqs, 449 or 16.3 per cent. were found unprotected by vaccination. But of these no less than 70.2 per cent. had undergone small-pox. Of the 2,301 children, below and above ten years of age, who had been vaccinated, the rate of attack by small-pox was 5 per cent.

PLAGUE.

12. During the year, there was, in the whole Presidency, a total of 3,960 attacks of plague, with a mortality of 76.6 per cent. There were 1,497 cases in municipalities, of which 702 and 769 occurred in Bellary and Vaniyambadi, respectively. The town of Bellary was infected by cases imported from the Bombay Presidency, and connected by house-holders. In all other parts, infection was derived directly or indirectly from the Mysore Territory, which continued to be a source of peril to the Presidency. Disregarding importation from that area by other routes, no less than 120 cases of plague were removed from the trains at the Inspection Station at Jalapet.

13. The "passport system" was extended for purposes of surveillance to "contacts." Brushes were used universally for the distribution of disinfecting solutions (which method seems to me erroneous except where smooth or greasy walls are concerned), whilst the "sheet anchor" of compulsory evacuation (when indigenous plague becomes uncontrollable) was not employed. The passport system gave satisfactory results, and granting there is no reason to doubt that the chances are always that a single neglected imported case may cause an epidemic, numerous localities have been saved from the incidence of plague by prompt discovery of such cases.

FEVERS.

14. 294,854 persons died from diseases which are registered under this head; these doubtless are chiefly malarial. Every effort has been made to induce local bodies to turn to advantage the modern dictum as to the rôle of the mosquito in the prevalence of malarial fevers. Some of them have treated the matter with extreme apathy, others have promised to make the desired efforts, whilst others have assigned as their reason their inability to discover that any action is requisite, as no malarious spot exists within their control, notwithstanding the "fevers" shown in their mortality statistics. The District Board of Kurnool has placed at my disposal the sum of Rs. 500 towards an experiment to exterminate malaria in a village. This sum is probably below requirements, but it at least exhibits on the part of the district board a wish to make advance, in the interests of the inhabitants of a notoriously malarious district. In the matter of distinguishing the various diseases now registered under "fevers," little advance can be made until a correct system of registration can be afforded by the country. A diagnosis of typhoid fever is common enough on the Nilgiris and at times in Malabar and South Canara, but is rare in the plains, although I have personally seen cases, from time to time, amongst pure natives in the Trichinopoly and Kurnool districts. Mr. Lafrenais, Acting District Medical and Sanitary Officer, Nellore, however has recently reported to me several cases of typhoid fever in Nellore. The chief supply of this town is a tank that (although I understand improvement has lately been evident) I have on more than one occasion represented to the municipal council was contaminated with faecal matter to an extraordinary extent. I will shortly investigate some of these cases by Widal's test. Lieut. Colonel Wilkins, District Medical and Sanitary Officer, Malabar, has sent me a list of 73 cases treated in the various hospitals in his charge during the last ten years. He has also supplied an interesting Note, which affords conclusive clinical evidence of the nature of the disease. After quoting similar evidence in his experience in Madras City, he states: "I have kept a careful watch to see whether it was really typhoid or true remittent fever prevailing in this district. For the past six years, I have seen several cases both in hospital and private practice, and I am convinced that the disease prevalent in this district among natives is typhoid. The disease is mostly prevalent about the end of July, the whole of August and September, and then gradually becomes less towards October and November. In other words, it begins with the rise of the subsoil water, is most prevalent at the time the water is almost on a level or within a few feet of the surrounding soil and gradually becomes less as the water subsides. In many cases, if the younger members have escaped

one year the next* or perhaps the second year another resident in the house is attacked and this one can easily understand when one knows that all the excreta from a typhoid patient are simply thrown away in most cases near the well, where the bed pan is washed or a plantain leaf, which is used in its stead, is disposed of. It is quite possible that the germs of the disease soak into the soil and as the sub-soil water rises, are carried into the wells from which the drinking water is obtained and then the infection passes to those who at the time are predisposed to the disease."

DYSENTERY AND DIARRHOEA.

15. In contrasting Municipal towns with rural areas, the difference in extent of mortality from dysentery and diarrhoea is marked. For the whole Presidency the rate is 1.1 per mille, whereas for the Municipal towns it amounts to 5.0. Such a result but illustrates the effect of the aggregation of human beings upon filthy and sewage sodden soils, plus water supplies open to contamination. In the following towns the rate was particularly heavy:—Chingleput (9.4), Madras (9.7), Periyakulam (8.0), Gudiyattam (9.2), Palamcottah (15.5) and Tuticorin (10.1).

INJURIES.

16. The total number of deaths due to injuries was 12,872, or at the rate of 0.3 per mille. There were 1,672 suicides, which yield a rate of 0.04 on the whole population. As usual in native life in this Presidency, the proportion of females who committed suicide was much greater than amongst males, namely, for every 100 females 80.0 males; whereas, in Great Britain, it is about 100 females to every 312.8 males. The total deaths from snake-bite and wild beasts amounted to 2,022.

ALL OTHER CAUSES.

17. Having regard to the existing system of registration, necessarily, a large number of cases cannot be classified. The result is that no less than 42.2 per cent. of the total mortality is placed under this head.

SECTION IX.

SANITARY WORKS—CIVIL.

MUNICIPALITIES.

18. In my Report for 1899, I called attention to the fact that, whilst on the basis of the statistics available, it would be out of the question to be dogmatic on the subject, there was reason to hold that with the introduction of public water supplies into towns—replacing, in great part, old supplies of shallow wells and tanks—there was evident a fall in the fever rate. I ascertained that, about the same period, Major Rogers, Professor of Pathology, Calcutta, had also pointed out, as a result of careful investigation throughout an extensive malarious area, that he had found where the inhabitants were supplied with filtered water the incidence was less than where unfiltered water was employed. To dare assert that the current literature rôle of the mosquito does not cover the whole question of epidemiology of malaria in the present day, is to proclaim oneself decidedly heterodox. To prevent this charge being hurled at me, I may, therefore, state I accept fully the truth that has been proved "up to the hilt" that malaria is conveyable by the mosquito. As I understand it, Major Rogers also entertains no heterodox views. There are, however, blanks in the history of the epidemiology of malaria that demand attention, and this cannot be secured if all matters—involving the mosquito or not—be not placed on record. Statistics, in this Presidency, show that the more perfectly water supply has been extended to a town the less is the fever rate notwithstanding that, in the absence of drainage systems, it is exceedingly likely that "anopheles pools" have been much increased. Where the inhabitants by choice use largely the old water supplies—such as in Madras City—and where the amount is so insufficient as to cause the people to still use them *volens volens* unsatisfactory results occur, as seen in Madura and Dindigul where no improvement of rate has been obtained. It may, at once, be objected that the improvement in the fever rate is probably not in regard to malarial fever but in respect to typhoid—a water-borne disease. This may be so; I am not in a position to say much against such a theory, beyond that whilst typhoid probably exists in South India much more than has hitherto been stated, its prevalence is not likely to be so great as to account for the difference. I am content to place the facts on record; they will form a basis for further enquiry. On this subject, statistics are exhibited in detail in the Appendix, page 20. To secure some (admittedly rough) method of ascertaining the value of these figures, I have excluded, for reasons stated, the three towns above mentioned and have compiled total averages for the six towns concerned, and for seventeen other towns of about the same average population that have not had water supplies introduced up to date—so as to ascertain whether errors in registration, or a "wave" of malaria prevalence, in certain years, have had anything to do with the matter.

19. It is found that in the six towns (aggregate population 280,979) the average fever death-rate for five years prior to introduction of water supplies was 8.9 per mille, but that, subsequent to introduction, it was reduced to 5.4 per mille; whilst the total death-rates, in the same periods, were 30.4 and 26.1 per mille, respectively—implying in a decade a saving of over 12,000 lives. In the group still unprovided with water supplies (aggregate population, 754,034), the quinquennial period ending 1896 gave a fever death-rate of 4.3 and the following quinquennium 6.0 per mille; whilst the total death-rates for the respective periods were 26.8 and 28.2 per mille. The increased total death-rates shown in the second group of towns is probably really due to improved registration and not to actual greater mortality—a factor which being common to both groups is of importance. It is

noteworthy that in Coonoor where a sewerage system has been completed, the fever rate has declined; whereas no influence is noticeable in Kumbakonam which possesses a system for relief of surface and, partly, of subsoil water.

20. It is unfortunately, not probable that much advance in large sanitary works, such as those for water-supply and sewerage, will be recorded in future Sanitary Reports of this Presidency, having regard to a recent ruling by the Government of India that grants-in-aid will not be given to local bodies. It goes without saying that the financial position of the majority of municipalities is such as to preclude the possibility of their successfully attempting to meet the full charges, without aid from Government. Indeed, although much experience has not been gathered on the point, it would seem that even were municipalities willing to attempt to secure loans in the market for the full cost of works, their chances of success would be extremely doubtful. As an instance, I may point to the case of Tanjore, where a sanitariously good and financially profitable scheme for utilizing sewage has been in abeyance for several years, because it cannot secure a loan of Rs. 33,000 in the open market.

21. During the year, no sanitary works of any importance were completed, except the extension of the water-supply of Trichinopoly to one of its suburbs—Worriur.

22. The progress in sewage farming, sewage filtration, and the employment of town rubbish and night-soil, and sewage filtrates for cultivation purposes, continues. The Government of Madras has sanctioned a series of experiments on the latter subject.

23. As regards administration, in municipalities so far as sanitary purposes are concerned, I am of opinion that the employment of Secretaries does not represent any gain in efficiency, and therefore is wasteful.

DISTRICT BOARDS.

24. District Medical and Sanitary Officers inspected 424 towns and villages, and forwarded copies of their reports to this office and to Local Bodies concerned. Extracts from these were sent to Presidents of District Boards and Municipal Chairmen, and special enquiries were made as to action taken in numerous instances. Where expenditure involved is of a trivial nature, action has usually been taken and, on the whole, much useful improvement has thereby resulted in regard to rural water supplies, conservancy, and the sanitation of schools. As, however, explained in former reports, so long as the small funds available are frittered away by petty allotments under Taluk Boards and Unions, no solid improvements under District Boards can be expected. Having regard to the fact that 50 per cent. of the total funds available under District Boards must be spent on roads, very little money falls to the share of sanitation—efforts as to which can always be conveniently postponed to that happy period “when funds are available.” It is time that a definite percentage of available funds be given for current sanitary expenditure.

25. The maintenance of Village Sanitary Inspection Books has been satisfactory during the year. It would be well that it be ruled these books be produced at Jamabundi, as very few officers make remarks in them.

MECCA PILGRIMAGE.

26. During the year under report, no pilgrims embarked from any of the ports in this Presidency for the Haj to Mecca.

SECTION X.

PERSONAL PROCEEDINGS AND GENERAL REMARKS.

27. I held charge up to the 18th March; subsequent to that period, Major A. E. Grant, I.M.S., took charge of the office until my return from furlough on the 18th December. His post as Deputy Sanitary Commissioner was filled by Captain Cornwall, I.M.S. The former officer as Deputy Sanitary Commissioner inspected the town of Nellore and the Hill Tracts of Jeypore, and the towns of Vaniyambadi and Tiruppattur (in connection with plague) and, as Sanitary Commissioner, made visits with reference to special objects to the towns of Madurai, Coimbatore, Ootacamund, Yercaud, Salem, Vizianagram, Anakapalle, Parlakimedi, Ranipettai, Cuddapah, Kurnool, Nandyal, Giddalore, Bezwada, Masulipatam, Bellary, Ambur, and Trichinopoly.

28. He also made formal inspections and forwarded written reports on the municipalities of Vellore, Kodaikanal, Tanjore, Vizagapatam and Nandyal.

29. Captain Cornwall, I.M.S., made formal inspections and forwarded written reports on the following towns:—Calicut, Tellicherry, Tiruppattur, Cannanore, Adoni, Bellary and Coonoor.

30. One hundred and twenty-three papers in reference to the sanitary points of engineering works in connection with the Sanitary Board were dealt with by this office.

31. In the month of December, the building of the Vaccine Institute for this Presidency was commenced, and, at the time of writing this Report, is nearly finished. A Bacteriological Laboratory for accommodation of a bacteriologist working on behalf of this presidency, will shortly be built. These additions should prove of great importance, in the near future, in aiding sanitary advance.

32. One hundred and nineteen Certificated Sanitary Inspectors were employed by Municipal Councils against 108 of the previous year. Forty-four were employed by District Boards. A scheme for securing improved status and tenure of appointment for Certificated Sanitary Inspectors has been submitted by me to Government.

33. Orders as to Office stores and Service Registers have been obeyed.

EGMORE,
6th May 1902.

(Signed) W. G. KING, Lt.-Col., I.M.S.,
Sanitary Commissioner for Madras.

APPENDIX.

VITAL STATISTICS OF THE GENERAL POPULATION.
No. I.—Showing the Births registered in the Districts of the Madras Presidency during the year 1901.

Sl. No.	Population (exclusive of Europeans and Eurasians) as per census of 1901.		Districts.	Population (exclusive of Europeans and Eurasians) for which returns were received.		Number of births registered (exclusive of Europeans and Eurasians and still-births).		Ratio of births per 1,000 of population.		Number of males born to every 100 females born.		Excess of births over deaths per 1,000 of population.	Excess of births over deaths per 1,000 of population.	Mean ratio of births per 1,000 during previous five years.	
	Males.	Females.		Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.			Males.	Females.
1	408,000	384,632	792,632	408,000	384,632	792,632	10,635	10,150	20,785	12.5	12.9	5.6	5.6	14.4	14.2
2	485,642	471,456	957,098	485,642	471,456	957,098	14,617	14,090	28,707	13.2	13.7	6.3	6.3	16.3	16.0
3	638,528	618,145	1,256,673	638,528	618,145	1,256,673	17,903	16,965	34,868	13.7	12.9	...	...	19.2	18.6
4	1,082,528	1,035,396	2,117,924	1,082,528	1,035,396	2,117,924	20,352	19,459	39,811	13.3	13.0	...	...	14.6	14.3
5	635,730	603,395	1,239,125	635,730	603,395	1,239,125	19,043	18,459	37,502	12.8	12.4	...	...	18.8	18.4
6	961,706	918,781	1,880,487	961,706	918,781	1,880,487	31,353	29,901	61,254	12.6	12.2	...	...	14.2	13.9
7	1,181,201	1,109,568	2,290,769	1,181,201	1,109,568	2,290,769	31,741	29,901	61,642	13.8	13.4	...	...	14.9	14.6
8	1,050,994	1,004,396	2,055,390	1,050,994	1,004,396	2,055,390	30,908	29,809	60,717	13.5	13.2	...	...	18.2	17.9
9	438,779	417,458	856,237	438,779	417,458	856,237	10,411	9,911	20,322	11.9	11.4	...	...	14.9	14.6
10	348,743	344,985	693,728	348,743	344,985	693,728	9,260	8,049	17,309	11.4	10.9	...	...	14.9	14.6
11	1,856,693	1,778,951	3,635,644	1,856,693	1,778,951	3,635,644	32,083	29,083	61,166	13.8	13.4	...	...	14.9	14.6
12	1,776,359	1,708,978	3,485,337	1,776,359	1,708,978	3,485,337	31,060	29,429	60,489	13.7	13.3	...	...	13.6	13.3
13	753,943	744,367	1,498,310	753,943	744,367	1,498,310	15,897	15,972	31,869	10.6	10.6	...	...	12.0	11.8
14	58,350	49,323	107,673	58,350	49,323	107,673	1,219	1,177	2,396	11.4	10.9	...	...	13.5	13.1
15	1,100,354	1,038,493	2,138,847	1,100,354	1,038,493	2,138,847	21,730	20,369	42,099	13.7	13.3	...	...	14.8	14.4
16	1,095,999	1,118,948	2,214,947	1,095,999	1,118,948	2,214,947	31,940	30,369	62,309	13.8	13.4	...	...	14.3	14.0
17	1,167,748	1,181,483	2,349,231	1,167,748	1,181,483	2,349,231	33,673	32,514	66,187	14.4	13.8	...	...	16.8	16.0
18	848,238	804,186	1,652,424	848,238	804,186	1,652,424	15,861	15,120	30,981	14.0	13.4	...	...	16.2	15.6
19	1,065,701	1,078,158	2,143,859	1,065,701	1,078,158	2,143,859	34,965	33,512	68,477	13.6	13.0	...	...	15.6	14.8
20	1,001,578	1,007,685	2,009,263	1,001,578	1,007,685	2,009,263	33,153	32,354	65,507	13.7	13.2	...	...	16.5	15.7
21	685,274	744,431	1,429,705	685,274	744,431	1,429,705	21,585	20,843	42,428	15.0	14.4	...	...	13.1	12.5
22	1,449,698	1,433,690	2,883,388	1,449,698	1,433,690	2,883,388	24,820	23,674	48,494	11.7	11.4	...	...	15.7	15.0
23	15,993,737	19,365,701	35,359,438	15,993,737	19,365,701	35,359,438	477,480	458,259	935,739	12.8	12.3	...	...	15.2	14.6
24	1,418,838	1,478,475	2,897,313	1,418,838	1,478,475	2,897,313	45,411	43,463	88,874	15.7	15.0	...	...	17.7	16.9
25	17,418,099	17,867,226	35,285,325	17,418,099	17,867,226	35,285,325	432,079	414,806	846,885	12.6	12.0	...	...	15.0	14.4

NOTE.—The population for which the returns were received from the districts of Ganjam and Madras according to the census of 1901, is not available. Hence the ratios have been calculated on the total population of those districts as per census of 1901.

simple nature which an appeal to figures alone will satisfy. A full discussion would be beyond the scope of this report. Stated briefly, the most evident condition is that the persons most likely to be affected are of the labouring agricultural classes. Of these, the permanent servants of the ryot are not likely to suffer, as they are still largely paid in grain. The full brunt of high prices is borne by ryots' coolies, who form a large part of the rural population, and, to a less extent, by their prototypes the "daily coolies" of towns. Both subsist by performing odd jobs. The ryots' "odd job men" used to be paid solely in grain, but the ryot of the present day, for obvious reasons, frequently prefers to pay in coin. The ryots and merchants have secured higher prices than formerly by exporting grain to parts of India, where failure of crops has been marked over a greater area than in this Presidency. This has been rendered possible by the extension of railways. The artificial condition of scarcity of food-grains thus produced has been accentuated, by the ryot throwing land out of cereal cultivation in favour of oil-producing nuts and tobacco, for both of which there is a brisk demand. On the other hand, artisans and certain classes of the labouring poor, more especially of the urban population, have found in railways, mills, mines and shipping increased facilities for work. The rate of wages is slowly increasing. The whole country is undergoing a much belated, yet sure, change in the search for other outlets for energy than secured by the plough. These changes are regrettably slow, but they, nevertheless, affect results to an extent that the price of food-grains *per se* will shortly no longer be of that importance as a guide to the condition of the labouring classes and of the Presidency, as a whole, which it has been in former years. The policy pursued by Government of carefully watching results upon populations in certain areas, and judging of their resources, and the possibility of their obtaining labour, is alone that which can secure the safety of the labouring classes, and a just appreciation of the influence of the incidence of high prices; that is to say, the Famine Code "warning rates" and "scarcity rates" are no longer mathematically correct criteria of the economic condition of the people—they must be read side by side with other data.

GENERAL POPULATION.

3. The population of the Presidency, according to the Census of 1901, was 38,623,066. The European and Eurasian population included in this total amounted to 40,231. The "natural increase" since last census amounted to 2,572,646, against 4,879,894 in the former intercensal period. The intercensal rate of increase for the Presidency excluding feudatory States was 6.99 per mille; but if the districts that have been specially subjected to famine and scarcity during the period be excluded, namely, Kurnool, Cuddapah, Bellary, Ganjam, Góddávari, Kistna, Vizagapatam, Anantapur, Nellore, and North Arcot, the rate of increase has been 7.24 per mille. Cooly emigrants during the year exceeded immigrants by 4,849. The population under registration during the year was 37,315,611. In all Municipal areas, registration of births and deaths was compulsory, and also in 441 against 400 villages in the previous year, under Act III of 1892. Owing to the absence of the enforcement of the Village Proprietary Act, it is still impossible to secure correct statistics from rural areas under zamindars. The method of inspection of registration records stated in former reports continues. At the suggestion of the Government of India, registration in rural areas under the heads "plague" and "respiratory disease" has been required. The forms employed in rural areas are under discussion. In reply to enquiries as to how many District Medical and Sanitary Officers have arranged to carry out my suggestion that Municipal Registrars should be trained in respect to medical terminology, the majority have reported that action has been taken. 87 prosecutions were undertaken by Municipal Councils for failure to comply with legal requirements as to compulsory registration.

BIRTHS IN DISTRICTS.

4. The total births reported during the year in the whole Presidency were 935,749, against 1,049,199 in the year 1900—a decrease of 113,450. The birth-rate per mille, therefore, reckoned upon the population according to the Census of 1901 was 25.1, or a decrease of 6.7 per mille when compared with the previous year. This indicates a very heavy fall in fecundity, even were allowance made for factors recognized as tending to the securing of imperfect statistics. One source of error is, however, at once apparent in this calculation. It has already been pointed out by me (and in this I have been supported by the Madras Government) that reckoning upon a census population year by year without allowing for the intercensal rate of increase, permits of an appearance of improvement in registration results that may not exist in fact. But, on the next census figures being available, a sudden drop in this improvement must occur—to be duly resumed in the succeeding years. This would at all times be avoided by use of "estimated populations." This having been forbidden, I at least may appeal to the fact that, if the 1901 births be reckoned upon the 1891 census, as was the case in 1900, the birth-rate results are by no means so appalling; the rate then becomes 28.3 per mille and shows, by comparison with 1900, a fall of 3.5 per mille. But a fall in the total birth-rate of the Presidency has not been unexpected in that, as shown by Mr. Stuart in the Census Report for 1891, the rate of increase in the intercensal period dealt with by him was abnormal, as a result of the age constitution of the people following the mortality of adults in the 1876-77 famine. This factor must show increasing power for some years to come; but the sudden fall during the year under review cannot be fully thus explained. It cannot be ascribed to laxity in registration at a period when compulsory registration has been advanced in many areas, and the endeavour to secure better registration has been evident throughout the Presidency. Moreover, such an argument would assume that unusual carelessness has been exhibited in 21 out of 22 districts. I can discover no religious, or other reason to believe that marriages were not carried out as usual during the year, or in that preceding it. Hence allowing the factor of changing age constitution of the population full weight, the result must, in great part, be ascribed to the well-known physiological influence of high prices of food upon fecundity. In accepting this interpretation, it must be remembered that the strain of high prices of food has acted upon certain classes of the population for successive years.

5. In scrutinizing the birth-rates of the various districts, to secure their just appreciation it would be necessary to compare results as I have done in considering the whole population of the Presidency, in the preceding paragraph; but as this would be inappropriate, it will, I hope, be remembered that the decrease of the birth-rate is not so great as the figures would convey, and that they are of utility only in making comparisons, seeing that the error is common to the whole. Further explanation is necessary as to the rates in the case of Ganjam and Madras. Both these districts include large zamindari tracts. It has not been possible to obtain from the Collectors statistics for these, nor has it been possible, in communication with the Superintendent of the Census, to exclude the populations concerned; hence, the total births reported from tracts other than zamindari have been applied to the total population—a very weak method of calculation, but the only one feasible. If these two areas be excluded, it is found the more notable diminution of birth-rates, when compared with the preceding year, occurred in Chingleput (18.6), North Arcot (9.8), Madras (9.0), Kistna (8.6) and Kurnool (7.6).*

DEATHS IN DISTRICTS.

6. Were the decrease of birth-rate explainable on the grounds of mere cessation of marriages, as a result of precaution in view of high prices, the death-rate would show a diminution, by reason of less number of deaths of infants; but where the impress has been upon the fecundity of a population as a result of high prices of

* Unless otherwise stated throughout this report, figures enclosed in brackets refer to rates per mille.

food-grains, an increase of the death-rate may be expected to occur if the strain has been severe notwithstanding the less infantile rate. It is, however, obvious that whilst this factor was sufficiently powerful to depress the physiological functions, it has not been sufficient to sensibly increase the total mortality. The total deaths during the year were 796,140, or an increase of 25,281 when compared with the previous year. Reckoned upon the census population of 1901, the total death-rate was 21·3 per mille. Of the total deaths no less than 81,370 were due to cholera, whilst only 3,226 in excess of the number of the previous year were due to "diarrhoea and dysentery"—the diseases *par excellence* attending privation. Under all other heads of registration except plague (3,035 cases) there was a diminution of mortality. The total death-rate of infants below one year of age was 166·2 per mille of the registered births, against 164·9 per mille in the previous year. The death-rate of male infants was 174·6, against 157·5 per mille of females. In no district except the Nilgiris did the mortality of female infants exceed that of males. In the case of Malabar, the total registered infantile death-rate was 98·9 per mille of births. This is in complete contrast with results in other districts of the Presidency, and must be ascribed to failure to register deaths of infants, and to the long established custom in that area of burying infants within private premises. The necessity for care in the registration of births and deaths of infants was particularly urged by me upon all authorities responsible, in June 1899. Having regard to the scattered condition of houses in villages in Malabar, however, better results can be expected only as a consequence of steady insistence through a series of years.

BIRTHS IN MUNICIPALITIES.

7. The population under municipal administration amounts to 2,406,455, according to the Census of 1901. The total births (78,554) yield a birth-rate of 32·6 per mille, against 38·5 per mille in 1900. Reckoned upon the census population of 1891, the rate was 36·2. There was a decrease of 4,490 in total births registered in municipalities, when compared with the total of the previous year; this occurred in 44 towns of a total of 61. That the town population of the Presidency should have been less influenced than the rural as to fecundity by the high price of food-grains, seems to support the view that the pressure was chiefly upon the lowest classes of the agricultural population. The most marked decrease occurred in the following towns:—Vellore, Trichinopoly, Kurnool, Conjeeveram, Calicut, Masulipatan, Madras.

DEATHS IN MUNICIPALITIES.

8. The total deaths registered were 85,266, representing a death-rate of 35·4 per mille. The death-rate was considerably above normal in Bellary (48·1) chiefly due to cholera and plague; in Chingleput (38·4), where owing to the smallness of the population the deaths from fever have made an increase more apparent than real; in Berhampur (40·5), chiefly under "fevers" and "cholera." In Madras, the exceedingly heavy rate of 55·5 per mille occurred. This, however, represented but an increase of 14·6 upon the quinquennial average, and was due to death registration under "cholera" and "fevers."

The total average infantile mortality in municipalities was 237·3 per mille of births. This represents an increase of 14 per mille when compared with last year, and may possibly reflect the influence of the continued strain of prices already discussed, in addition to the usual factors of insanitary environment, and ignorance of hygienic care of infants characteristic of the uneducated Hindu mother. The rate may be contrasted with that obtained under the very unfavourable conditions of town life in England. There, the total average of 55 towns yields a rate of 182, and in London 166, per mille. In the following towns, the rate of infantile mortality was particularly heavy:—Berhampur (278·6), Bezwada (277·4), Madras

(328·4), Vaniyambadi (293·6), Palamcottah (240·4), and Tuticorin (304·4). Lest, however, an exaggerated idea of these undesirable rates be entertained, it may be stated that in at least three towns in England they are exceeded. As in the case of rates referred to in paragraph 6, which include data derived from rural areas, the mortality of male infants in municipal towns was greater than that of females—the rate being 227·6 for the latter, against 246·6 per mille for the former. That male infants should more readily succumb to unfavourable circumstances in the first year of life, accords with experience in all countries. Normally, births of boys are greater than of girls—for example, for the whole Presidency, during the year under review 100 girls were born for every 104·2 boys; but, by the end of the first year of life, the proportion becomes more equal, as the boys die at a greater rate in the earlier months than the girls. The native tendency is to regard the addition of a male infant to the family as of considerably more moment than of a female. Nevertheless, in this Presidency, this feeling is by no means so marked as to lead to neglect of female infants. The utmost that may occur in this direction is that, in times of marked scarcity, the female may occupy an inferior place in the table of precedence as to choice of supplies.

In former years, the mortality of infants from small-pox was regarded by the native population as inevitable. Under the influence of compulsory vaccination, however, the saving of infantile life is becoming yearly more evident. Up to 1894, in certain municipalities compulsory vaccination was optional; subsequent to that date, it has been adopted in all municipalities. Since 1900, it has been advanced, on the *festina lente* principle, in rural areas. With the bulk of the rural population vaccination, however, is still optional. If the conditions of 1891 and 1901 be contrasted, it is found that, in 1891, the death-rate from small-pox of infants under one year of age in municipalities was 8 per mille of births, against 7·3 per mille of births in rural areas; whereas, in 1901, the deaths in municipal areas of infants under one year of age from this disease amounted to 2·7 per mille, against 8·6 per mille in rural areas. It is thus evident whilst in rural areas, in the years contrasted, the rate of mortality of infants from this cause had not decreased, in municipal areas, there was a marked improvement, as a result of better vaccination. It need not be said that were the infants liable to vaccination earlier than at six months of age, much more favourable results might be expected. In the hope of securing that guardians of infants born in a rural area under compulsory vaccination shall not evade the provisions of the law by proceeding to a municipality, or *vice versa*, I have advised Government to secure special legislation. By this means, a better grade of protection of infant life can be secured.

SECTION VI.

GENERAL HISTORY OF CHIEF DISEASES.

CHOLERA.

9. There were 81,370 deaths from this disease during the year, or a total of 2.2 of the whole population. Anantapur (4.5), Cuddapah (4.2), North Arcot (4.1) and Salem (5.1) were the districts which chiefly suffered. The municipal towns of Chingleput, Coimbatore, Erode, Karur, Berhampur, Nandyal, Palni, Calicut, Cochin, Gudiyattam, Salem, Vaniyambadi, Tirupattur and Mangalore gave rates above 5 per mille from this disease. As to prevention, it cannot be said that either Local Fund, Municipal or Revenue authorities are yet alive to the necessity for taking action during the advance of cholera. In spite of appeals from this office, they take advantage of the discretion allowed them in the rulings on the subject issued by Government, and do not think of appointing staffs until cholera is in their midst, and even then (in the interests of so-called economy), they allow these to be incomplete. So long as this condition continues, no real stand against cholera can be made.

10. Of the total of 6,322 deaths from this cause in 61 municipal towns, no less than 1,161 occurred in Madras town, or 2.4 per mille of its population. Notwithstanding the expenditure of several lakhs of rupees upon its public water-supply, the Madras Municipal Commission is content to allow the inhabitants to supplement it by the use of innumerable wells that are open to pollution, and are sunk in a foul subsoil. Under the circumstances, the town must be regarded as having escaped well out of evil conditions. The day that its long open water channel becomes contaminated with cholera or typhoid matter will, however, be one not so readily reckoned with. The towns of Coimbatore, Erode, Chingleput, Karur, Berhampur, Cochin, Gudiyattam, Vaniyambadi, Palamcottah and Tuticorin—all of which have water-supplies readily open to faecal pollution—chiefly suffered in mufassal areas.

SMALL-POX.

11. The total deaths from small-pox amounted to 26,202, against 27,692 of the previous year. The rate of incidence in municipal towns where compulsory vaccination is in force was 6 per mille, against 7 per mille in rural tracts, in a few unions only of which compulsion is exercised. If the town of Cochin be eliminated, where no fewer than 343 deaths occurred from this disease, the incidence on the total municipal population was 0.5 per mille. The large mortality in Cochin was doubtless due to the fact that it adjoins an area under independent native administration, where more care is requisite as to small-pox. Of 2,750 children personally inspected by District Medical and Sanitary Officers during their periodical sanitary inspection of schools, 449 or 16.3 per cent. were found unprotected by vaccination. But of these no less than 70.2 per cent. had undergone small-pox. Of the 2,301 children, below and above ten years of age, who had been vaccinated, the rate of attack by small-pox was 5 per cent.

PLAGUE.

12. During the year, there was, in the whole Presidency, a total of 3,960 attacks of plague, with a mortality of 76.6 per cent. There were 1,497 cases in municipalities, of which 702 and 769 occurred in Bellary and Vaniyambadi, respectively. The town of Bellary was infected by cases imported from the Bombay Presidency, and concealed by house-holders. In all other parts, infection was derived directly or indirectly from the Mysore Territory, which continued to be a source of peril to this Presidency. Disregarding importation from that area by other routes, no less than 120 cases of plague were removed from the trains at the Inspection Station of Jalarpet.

13. The "passport system" was extended for purposes of surveillance to "contacts." Brushes were used universally for the distribution of disinfecting solutions (which method seems to me erroneous except where smooth or greasy walls are concerned), whilst the "sheet anchor" of compulsory evacuation (when indigenous plague becomes uncontrollable) was not employed. The passport system gave satisfactory results, and granting there is no reason to doubt that the chances are always that a single neglected imported case may cause an epidemic, numerous localities have been saved from the incidence of plague by prompt discovery of such cases.

FEVERS.

14. 294,854 persons died from diseases which are registered under this head; these doubtless are chiefly malarial. Every effort has been made to induce local bodies to turn to advantage the modern dictum as to the rôle of the mosquito in the prevalence of malarial fevers. Some of them have treated the matter with extreme apathy, others have promised to make the desired efforts, whilst others have assigned as their reason their inability to discover that any action is requisite, as no malarious spot exists within their control, notwithstanding the "fevers" shown in their mortality statistics. The District Board of Kurnool has placed at my disposal the sum of Rs. 500 towards an experiment to exterminate malaria in a village. This sum is probably below requirements, but it at least exhibits on the part of the district board a wish to make advance, in the interests of the inhabitants of a notoriously malarious district. In the matter of distinguishing the various diseases now registered under "fevers," little advance can be made until a correct system of registration can be afforded by the country. A diagnosis of typhoid fever is common enough on the Nilgiris and at times in Malabar and South Canara, but is rare in the plains, although I have personally seen cases, from time to time, amongst pure natives in the Trichinopoly and Kurnool districts. Mr. Lafrenais, Acting District Medical and Sanitary Officer, Nellore, however has recently reported to me several cases of typhoid fever in Nellore. The chief supply of this town is a tank that (although I understand improvement has lately been evident) I have on more than one occasion represented to the municipal council was contaminated with faecal matter to an extraordinary extent. I will shortly investigate some of these cases by Widal's test. Lieut.-Colonel Wilkins, District Medical and Sanitary Officer, Malabar, has sent me a list of 73 cases treated in the various hospitals in his charge during the last ten years. He has also supplied an interesting Note, which affords conclusive clinical evidence of the nature of the disease. After quoting similar evidence in his experience in Madras City, he states: "I have kept a careful watch to see whether it was really typhoid or true remittent fever prevailing in this district. For the past six years, I have seen several cases both in hospital and private practice, and I am convinced that the disease prevalent in this district among natives, is typhoid. The disease is mostly prevalent about the end of July, the whole of August and September, and then gradually becomes less towards October and November. In other words, it begins with the rise of the subsoil water, is most prevalent at the time the water is almost on a level or within a few feet of the surrounding soil and gradually becomes less as the water subsides. In many cases, if the younger members have escaped

one year the next or perhaps the second year another resident in the house is attacked and this one can easily understand when one knows that all the excreta from a typhoid patient are simply thrown away in most cases near the well, where the bed pan is washed or a plantain leaf, which is used in its stead, is disposed of. It is quite possible that the germs of the disease soak into the soil and as the sub-soil water rises, are carried into the wells from which the drinking water is obtained and then the infection passes to those who at the time are predisposed to the disease."

DYSENTERY AND DIARRHOEA.

15. In contrasting Municipal towns with rural areas, the difference in extent of mortality from dysentery and diarrhoea is marked. For the whole Presidency the rate is 1.1 per mille; whereas for the Municipal towns it amounts to 5.0. Such a result but illustrates the effect of the aggregation of human beings upon filthy and sewage sodden soils, plus water supplies open to contamination. In the following towns the rate was particularly heavy:—Chingleput (9.4), Madras (9.7), Periyakulam (8.0), Gudiyattam (9.2), Palamcottah (15.5) and Tuticorin (10.1).

INJURIES.

16. The total number of deaths due to injuries was 12,872, or at the rate of 0.3 per mille. There were 1,672 suicides, which yield a rate of 0.04 on the whole population. As usual in native life in this Presidency, the proportion of females who committed suicide was much greater than amongst males, namely, for every 100 females 80.0 males; whereas, in Great Britain, it is about 100 females to every 312.8 males. The total deaths from snake-bite and wild beasts amounted to 2,022.

ALL OTHER CAUSES.

17. Having regard to the existing system of registration, necessarily, a large number of cases cannot be classified. The result is that no less than 42.2 per cent. of the total mortality is placed under this head.

SECTION IX.

SANITARY WORKS—CIVIL.

MUNICIPALITIES.

13. In my Report for 1899, I called attention to the fact that, whilst on the basis of the statistics available, it would be out of the question to be dogmatic on the subject, there was reason to hold that with the introduction of public water supplies into towns—replacing, in great part, old supplies of shallow wells and tanks—there was evident a fall in the fever rate. I ascertained that, about the same period, Major Rogers, Professor of Pathology, Calcutta, had also pointed out, as a result of careful investigation throughout an extensive malarious area, that he had found where the inhabitants were supplied with filtered water the incidence was less than where unfiltered water was employed. To dare assert that the current literature rôle of the mosquito does not cover the whole question of epidemiology of malaria in the present day, is to proclaim oneself decidedly heterodox. To prevent this charge being hurled at me, I may, therefore, state I accept fully the truth that has been proved "up to the hilt" that malaria is conveyable by the mosquito. As I understand it, Major Rogers also entertains no heterodox views. There are, however, blanks in the history of the epidemiology of malaria that demand attention, and this cannot be secured if all matters—involving the mosquito or not—be not placed on record. Statistics, in this Presidency, show that the more perfectly water-supply has been extended to a town the less is the fever rate notwithstanding that, in the absence of drainage systems, it is exceedingly likely that "anopheles pools" have been much increased. Where the inhabitants by choice use largely the old water-supplies—such as in Madras City—and where the amount is so insufficient as to cause the people to still use them *volens nolens* unsatisfactory results occur, as seen in Madura and Dindigul where no improvement of rate has been obtained. It may, at once, be objected that the improvement in the fever rate is probably not in regard to malarial fever but in respect to typhoid—a water-borne disease. This may be so; I am not in a position to say much against such a theory, beyond that whilst typhoid probably exists in South India much more than has hitherto been stated, its prevalence is not likely to be so great as to account for the difference. I am content to place the facts on record; they will form a basis for further enquiry. On this subject, statistics are exhibited in detail in the Appendix, page 20. To secure some (admittedly rough) method of ascertaining the value of these figures, I have excluded, for reasons stated, the three towns above mentioned and have compiled total averages for the six towns concerned, and for seventeen other towns of about the same average population that have not had water-supplies introduced up to date—so as to ascertain whether errors in registration, or a "wave" of malaria prevalence, in certain years, have had anything to do with the matter.

—19. It is found that in the six towns (aggregate population 280,979) the average fever death-rate for five years prior to introduction of water-supplies was 8.9 per mille, but that, subsequent to introduction, it was reduced to 5.4 per mille; whilst the total death-rates, in the same periods, were 30.4 and 26.1 per mille, respectively—implying in a decade a saving of over 12,000 lives. In the group still unprovided with water-supplies (aggregate population, 754,034), the quinquennial period ending 1896 gave a fever death-rate of 6.3 and the following quinquennium 6.0 per mille; whilst the total death-rates for the respective periods were 26.8 and 28.2 per mille. The increased total death-rates shown in the second group of towns is probably really due to improved registration and not to actual greater mortality—a factor which being common to both groups is of importance. It is

noteworthy that in Coonoor where a sewerage system has been completed, the fever rate has declined; whereas no influence is noticeable in Kumbakonam which possesses a system for relief of surface and, partly, of subsoil water.

20. It is unfortunately, not probable that much advance in large sanitary works, such as those for water-supply and sewerage, will be recorded in future Sanitary Reports of this Presidency, having regard to a recent ruling by the Government of India that grants-in-aid will not be given to local bodies. It goes without saying that the financial position of the majority of municipalities is such as to preclude the possibility of their successfully attempting to meet the full charges, without aid from Government. Indeed, although much experience has not been gathered on the point, it would seem that even were municipalities willing to attempt to secure loans in the market for the full cost of works, their chances of success would be extremely doubtful. As an instance, I may point to the case of Tanjore, where a sanitariously good and financially profitable scheme for utilizing sewage has been in abeyance for several years, because it cannot secure a loan of Rs. 33,000 in the open market.

21. During the year, no sanitary works of any importance were completed, except the extension of the water-supply of Trichinopoly to one of its suburbs—Worriur.

22. The progress in sewage farming, sewage filtration, and the employment of town rubbish and night-soil, and sewage filtrates for cultivation purposes, continues. The Government of Madras has sanctioned a series of experiments on the latter subject.

23. As regards administration, in municipalities so far as sanitary purposes are concerned, I am of opinion that the employment of Secretaries does not represent any gain in efficiency, and therefore is wasteful.

DISTRICT BOARDS.

24. District Medical and Sanitary Officers inspected 424 towns and villages, and forwarded copies of their reports to this office and to Local Bodies concerned. Extracts from these were sent to Presidents of District Boards and Municipal Chairmen, and special enquiries were made as to action taken in numerous instances. Where expenditure involved is of a trivial nature, action has usually been taken and, on the whole, much useful improvement has thereby resulted in regard to rural water supplies, conservancy, and the sanitation of schools. As, however, explained in former reports, so long as the small funds available are frittered away by petty allotments under Taluk Boards and Unions, no solid improvements under District Boards can be expected. Having regard to the fact that 50 per cent. of the total funds available under District Boards must be spent on roads, very little money falls to the share of sanitation—efforts as to which can always be conveniently postponed to that happy period “when funds are available.” It is time that a definite percentage of available funds be given for current sanitary expenditure.

25. The maintenance of Village Sanitary Inspection Books has been satisfactory during the year. It would be well that it be ruled these books be produced at Jamabundi, as very few officers make remarks in them.

MECCA PILGRIMAGE.

26. During the year under report, no pilgrims embarked from any of the ports in this Presidency for the Haj to Mecca.

SECTION X.

PERSONAL PROCEEDINGS AND GENERAL REMARKS.

27. I held charge up to the 18th March; subsequent to that period, Major A. E. Grant, I.M.S., took charge of the office until my return from furlough on the 18th December. His post as Deputy Sanitary Commissioner was filled by Captain Cornwall, I.M.S. The former officer as Deputy Sanitary Commissioner inspected the town of Nellore and the Hill Tracts of Jeypore, and the towns of Vaniyambadi and Tirupattur (in connection with plague) and, as Sanitary Commissioner, made visits with reference to special objects to the towns of Madura, Coimbatore, Ootacamund, Yercaud, Salem, Vizianagram, Anakapalle, Parlakimedi, Ranipettai, Cuddapah, Kurnool, Nandyal, Giddalore, Bezwada, Masulipatam, Bellary, Ambur, and Trichinopoly.

28. He also made formal inspections and forwarded written reports on the municipalities of Vellore, Kodaikanal, Tanjore, Vizagapatam and Nandyal.

29. Captain Cornwall, I.M.S., made formal inspections and forwarded written reports on the following towns:—Calicut, Tellicherry, Tirupattur, Cannanore, Adoni, Bellary and Coonoor.

30. One hundred and twenty-three papers in reference to the sanitary points of engineering works in connection with the Sanitary Board were dealt with by this office.

31. In the month of December, the building of the Vaccine Institute for this Presidency was commenced, and, at the time of writing this Report, is nearly finished. A Bacteriological Laboratory for accommodation of a bacteriologist working on behalf of this presidency, will shortly be built. These additions should prove of great importance, in the near future, in aiding sanitary advance.

32. One hundred and nineteen Certificated Sanitary Inspectors were employed by Municipal Councils against 108 of the previous year. Forty-four were employed by District Boards. A scheme for securing improved status and tenure of appointment for Certificated Sanitary Inspectors has been submitted by me to Government.

33. Orders as to Office stores and Service Registers have been obeyed.

EGMORE,
6th May 1902.

(Signed) W. G. KING, Lt.-Col., I.M.S.,
Sanitary Commissioner for Madras.

APPENDIX.

VITAL STATISTICS OF THE GENERAL POPULATION.

No. I.—Showing the Births registered in the districts of the Madras Presidency during the year 1901.

Summary of Births and Deaths in the Districts of the Madras Presidency during the year 1901.													
1	2		3	4		5		6		7	8	9	10
	Population (exclusive of Europeans and Eurasians) as per census of 1901.			Population (exclusive of Europeans and Eurasians) for which returns were received.		Number of births received (exclusive of Europeans and Eurasians and still-births).		Ratio of births per 1,000 of population.					
Number.	Population (exclusive of Europeans and Eurasians) as per census of 1901.		Districts.	Population (exclusive of Europeans and Eurasians) for which returns were received.		Number of births received (exclusive of Europeans and Eurasians and still-births).		Ratio of births per 1,000 of population.		Excess of births over deaths per 1,000 of population.	Mean ratio of births per 1,000 during previous five years.		
	Males.	Females.		Total.	Males.	Females.	Total.	Males.	Females.				
1	408,000	384,662	792,662	403,000	384,662	787,662	10,035	10,150	20,185	104.8	14.4	14.2	
2	485,432	471,425	956,857	485,842	471,425	957,267	14,917	14,040	28,957	104.8	16.3	16.0	
3	639,902	649,458	1,289,360	659,02	649,458	1,308,478	17,904	16,965	34,869	104.8	18.3	18.0	
4	1,082,524	1,118,145	2,200,669	1,082,238	1,118,145	2,200,383	20,532	28,555	49,087	104.8	14.6	14.3	
5	685,730	635,395	1,321,125	655,730	635,395	1,291,125	21,943	13,469	35,412	104.8	18.8	18.4	
6	981,708	1,025,243	2,006,951	961,708	1,025,243	1,986,951	21,334	15,761	37,095	104.8	14.2	13.9	
7	1,181,123	1,169,569	2,350,692	1,181,123	1,169,569	2,350,692	31,741	29,901	61,642	104.8	14.9	14.6	
8	1,083,994	1,064,236	2,148,230	1,083,994	1,064,236	2,148,230	28,508	28,508	57,016	104.8	18.2	17.7	
9	456,779	447,428	904,207	456,779	447,428	904,207	10,411	9,911	20,322	104.8	14.9	14.6	
10	248,742	244,938	493,680	248,742	244,938	493,680	9,260	9,049	18,309	104.8	13.6	12.9	
11	1,356,693	1,473,951	2,830,644	1,356,693	1,473,951	2,830,644	23,083	23,359	46,442	104.8	12.0	11.8	
12	1,375,320	1,408,978	2,784,298	1,375,320	1,408,978	2,784,298	31,063	28,423	59,486	104.8	13.5	13.1	
13	752,243	744,367	1,496,610	752,243	744,367	1,496,610	15,867	15,872	31,739	104.8	14.8	14.1	
14	58,360	49,323	107,683	58,360	49,323	107,683	1,219	1,177	2,396	104.8	13.5	12.9	
15	1,106,351	1,106,459	2,212,810	1,106,351	1,106,459	2,212,810	21,736	21,462	43,198	104.8	14.3	13.7	
16	1,085,980	1,118,948	2,204,928	1,085,980	1,118,948	2,204,928	31,840	30,250	62,090	104.8	13.6	12.9	
17	1,181,420	1,181,420	2,362,840	1,181,420	1,181,420	2,362,840	34,673	32,114	66,787	104.8	13.4	12.9	
18	548,345	586,041	1,134,386	548,345	586,041	1,134,386	15,961	15,120	31,081	104.8	13.4	12.9	
19	1,065,731	1,178,158	2,243,889	1,065,731	1,178,158	2,243,889	34,995	33,512	68,507	104.8	13.6	13.1	
20	1,001,578	1,057,825	2,059,403	1,001,578	1,057,825	2,059,403	33,158	32,354	65,512	104.8	13.5	12.9	
21	690,274	744,421	1,434,695	690,274	744,421	1,434,695	21,583	20,849	42,432	104.8	13.1	12.9	
22	1,445,568	1,482,590	2,928,158	1,445,568	1,482,590	2,928,158	24,920	24,920	49,840	104.8	13.1	12.9	
23	18,836,737	10,335,701	29,172,438	18,836,737	10,335,701	29,172,438	477,460	456,259	933,719	104.8	15.2	14.6	
24	1,418,638	1,476,475	2,895,113	1,418,638	1,476,475	2,895,113	45,411	43,453	88,864	104.8	17.7	16.9	
180	17,418,068	17,887,226	35,305,295	16,963,989	17,451,509	34,415,498	432,079	414,806	846,885	104.2	15.0	14.4	

NOTE.—The population for which the returns were received from the districts of Gaujium and Madura according to the census of 1901, is not available. Hence the ratios have been calculated on the actual population of those districts as per census of 1901.

* Including the Hill Tracts.

No. II.—Statement of births and deaths registered in the districts of the Madras Presidency during the year 1901.

1	2	3	4	5	6	7	8	9	10							
Serial number.	Districts.	Area in square miles.	Average population per square mile.	Population (exclusive of Europeans and Eurasians) for which returns were received.		Births.	Number of deaths registered (exclusive of Europeans and Eurasians and born dead).		Ratio of deaths per 1,000 of population from all causes.							
				Males.	Females.		Total.	Birth-rate per 1,000 of popu- lation.		Males.	Females.	Total.				
1	Anantapur ...	5,357	141.8	408,090	381,602	789,738	20,785	26.4	8,533	7,846	16,379	108.8	106.8	210	211	211
2	Bellary ...	5,475	162.9	435,842	471,425	907,667	28,697	30.0	11,819	10,915	22,734	108.3	107.6	210	219	252
3	Chingleput ...	3,979	435.8	639,992	646,468	1,306,370	34,868	27.6	20,468	18,970	39,378	107.6	81	07	0002	24.8
4	Coimbatore ...	7,400	280.0	1,082,528	1,118,115	2,200,673	37,907	26.3	22,356	22,984	45,640	104.8	81	05	0002	19.6
5	Cuddapah ...	8,723	148.0	685,730	683,355	1,369,125	27,408	21.2	15,432	14,236	29,688	108.5	4.2	08	0001	21.3
6	Ganjam ...	7,772	240.1	961,706	1,048,243	2,009,949	41,119	20.5	16,613	14,178	30,691	109.4	0.3	02	00005	24.9
7	Godavari ...	8,472	288.6	1,131,231	1,139,560	2,300,800	61,042	26.8	26,149	24,027	50,776	106.2	1.0	2.4	...	20.8
8	Kistna ...	8,498	253.5	1,082,934	1,064,296	2,147,230	58,017	27.2	23,043	22,087	45,730	107.0	1.0	0.6	...	21.8
9	Kurnool ...	7,378	115.1	440,553	431,895	871,948	20,322	23.3	9,624	9,000	18,624	106.9	1.6	0.4	...	21.8
10	Madrass ...	27	16,284.4	2,457,742	2,441,395	4,899,136	15,369	37.1	12,680	13,734	26,414	99.6	2.4	0.6	...	40.9
11	Madras ...	8,701	325.3	1,356,893	1,473,351	2,830,244	45,472	16.1	15,955	16,005	30,980	106.3	1.0	0.2	...	19.6
12	Malabar ...	5,793	480.8	1,376,329	1,406,975	2,783,307	60,480	21.7	30,632	27,732	58,364	110.5	2.4	0.8	...	19.6
13	Nellore ...	9,761	170.8	752,243	744,267	1,496,510	31,749	22.3	15,417	14,103	29,620	106.3	1.3	0.8	...	19.0
14	Nilgiris ...	597	112.5	68,850	49,423	107,673	2,894	22.6	1,246	984	2,230	108.3	0.08	0.1	...	27.7
15	North Arcot ...	7,886	296.8	1,106,454	1,106,463	2,206,817	42,305	18.1	26,839	24,649	50,806	107.6	4.1	1.1	...	19.8
16	Salem ...	7,530	202.7	1,085,079	1,118,943	2,204,023	62,240	28.2	26,364	25,649	52,013	102.8	5.1	0.9	...	22.5
17	South Arcot ...	4,017	450.3	1,167,715	1,181,429	2,349,177	66,187	28.2	26,260	23,668	51,663	102.1	1.7	0.9	...	24.6
18	South Canara ...	2,710	604.8	646,586	584,136	1,130,781	30,981	27.4	15,217	14,165	29,832	107.4	3.7	0.2	...	26.6
19	Tanjore ...	3,869	382.1	1,065,751	1,178,158	2,243,949	68,407	30.5	27,026	28,560	55,526	94.8	1.5	0.9	...	23.3
20	Tinnevely ...	4,682	337.5	1,001,578	1,057,325	2,058,903	65,510	31.8	32,627	23,167	48,754	102.0	1.7	0.4	...	22.3
21	Trichinopoly ...	4,600	452.4	690,274	744,421	1,434,695	42,435	29.4	16,001	16,223	32,224	98.6	2.2	0.2	...	21.6
22	Vizagapatnam ...	129,239	288.7	1,016,471	1,064,737	2,081,238	47,694	23.1	15,774	14,628	30,402	107.8	0.1	0.1	...	22.1
Grand total for the Presidency.				15,385,637	18,926,954	37,316,611	936,749	25.1	407,675	368,165	796,140	1,061	2.2	0.7	...	22.1
Total of Town circles in the Presidency.				1,418,638	1,478,475	2,897,113	88,864	30.7	47,685	47,025	94,710	101.4	2.7	0.6	...	30.6
Total of Rural circles in the Presidency.				16,966,999	17,448,479	34,415,488	846,885	21.6	360,290	321,140	701,430	106.6	2.1	0.7	...	21.4

No. V.—Deaths registered according to Classes in the districts of the Madras Presidency during the year 1901.

Number.	Districts.	Population for which returns were received.					Number of deaths registered.					Ratio of deaths per 1,000 of population.				
		Native Christians.	Muslims.	Hindus.	Other classes.	Total.	Native Christians.	Muslims.	Hindus.	Other classes.	Total.	Native Christians.	Muslims.	Hindus.	Other classes.	Total.
1	Anantapur	2,173	58,917	718,381	8,301	787,792	40	1,068	15,328	5	16,379	15.4	17.1	21.3	0.6	20.8
2	Bellary	3,756	97,474	854,056	1,781	957,067	81	2,448	20,173	38	22,734	21.6	25.1	23.6	21.3	28.7
3	Chingleput	22,714	80,010	1,268,267	389	1,369,370	481	699	38,173	25	39,378	20.3	23.8	30.4	64.3	30.1
4	Coimbatore	17,808	60,745	2,126,063	6,052	2,209,678	378	1,215	44,016	31	45,640	21.4	23.6	20.7	5.1	20.7
5	Cuddapah	18,781	129,537	1,142,454	363	1,291,135	304	2,736	28,524	124	29,688	16.3	21.1	23.2	361.3	28.0
6	Ganjam	3,042	5,049	1,723,591	277,377	2,008,949	65	151	20,422	63	20,691	21.4	22.4	17.1	0.2	14.8
7	Godavari	15,536	43,481	2,236,363	3,200	2,300,500	298	843	49,696	29	50,776	19.2	19.4	22.9	5.6	22.1
8	Kistna	100,841	132,053	1,912,014	6,422	2,151,330	1,391	2,631	41,808	...	44,430	13.8	18.9	21.9	...	21.2
9	Kurnool	33,936	107,026	728,782	1,604	871,348	429	2,307	15,783	95	18,594	12.6	21.4	21.7	50.2	21.4
10	Madras	25,292	67,331	410,648	409	493,680	1,076	3,006	23,272	1	27,414	42.5	53.5	56.7	3.4	55.5
11	Madura	111,201	108,616	2,550,793	42	2,770,652	856	1,048	25,461	...	26,509	7.7	9.7	11.2	...	10.9
12	Malabar	48,519	832,970	1,504,474	1,344	2,387,307	1,002	18,298	88,710	354	107,464	21.5	22.0	20.5	263.4	21.0
13	Nellore	53,471	82,386	1,356,246	8,907	1,446,510	413	1,341	27,768	...	29,109	7.7	16.2	20.0	...	10.7
14	Nilgiris	11,081	6,967	85,088	4,067	103,143	185	154	1,712	179	2,048	16.7	26.2	19.8	44.1	20.7
15	North Arcot	22,009	103,038	2,069,856	13,324	2,208,217	206	2,421	17,974	205	20,598	9.4	23.5	23.2	15.4	23.0
16	Salem	18,701	68,407	2,116,798	67	2,204,173	894	2,446	49,002	...	51,448	10.5	26.6	23.1	...	23.6
17	South Arcot	65,748	84,976	2,212,548	3,905	2,349,177	994	1,120	49,480	319	51,863	14.7	17.2	22.4	54.0	22.1
18	South Canara	83,779	123,261	914,147	9,594	1,130,781	1,754	3,499	23,306	260	27,554	20.9	28.1	26.1	27.1	26.0
19	Tanjore	85,909	123,033	2,034,369	508	2,244,819	1,653	3,202	50,324	47	53,576	22.7	20.0	24.7	78.0	24.7
20	Tinnevely	159,809	101,875	1,798,519	...	2,060,203	3,832	2,826	40,736	...	44,562	20.4	27.7	22.6	...	22.2
21	Trichinopoly	75,585	43,819	1,324,768	23	1,443,895	1,340	831	20,007	...	21,838	18.3	19.2	22.7	...	22.3
22	Visagapatnam	2,757	22,476	2,005,926	50,089	2,181,228	27	223	50,145	7	50,402	9.8	9.6	15.0	0.1	14.6
Total, Madras Presidency		980,738	2,153,950	23,482,030	298,813	27,923,531	16,638	55,270	722,400	1,772	796,140	17.0	22.5	21.1	4.4	21.3

No. VI.—Births and Deaths registered from different causes in the districts and towns of the Madras Presidency during the year 1901.

1	2	3	4		5	6	7	8	9	10			11	12	13										
			Births.	Rate per 1,000 of population.						Suicides.	Wounds and accidents.	Snake-bite and killed by wild beasts.			Ratio of deaths per 1,000 of population.						From all causes.				
															Cholera.	Small-pox.	Plague.	Fever.	Dysentery and diarrhoea.	Injuries.	All other causes.	For this year.	Mean of previous years.		
Number.	Districts and towns.	Population for which returns were received.	Total number.		Cholera.	Small-pox.	Plague.	Fever.	Dysentery and diarrhoea.	Males.	Females.	Total.	All other causes.	Total deaths from all causes.	Cholera.	Small-pox.	Plague.	Fever.	Dysentery and diarrhoea.	Injuries.	All other causes.	For this year.	Mean of previous years.		
A.—Districts.*																									
1	Anantapur	769,358	20,246	26.3	3,463	239	7	2,718	279	13	22	195	17	246	8,087	15,969	4.6	0.3	0.01	8.6	0.4	4.3	11.7	20.5	31.1
2	Bellary	829,651	23,018	30.2	2,564	629	205	5,402	683	20	20	200	47	286	8,818	18,597	3.1	0.6	0.0	5.6	0.8	0.8	19.8	22.4	34.7
3	Chingleput	1,297,094	32,904	26.7	3,525	823	2	6,898	4,488	38	55	421	94	688	21,567	37,087	2.8	0.7	0.04	6.2	0.6	0.8	17.2	30.0	24.4
4	Coimbatore	2,119,296	55,071	26.0	6,800	1,090	44	16,488	1,033	32	48	519	124	723	17,207	42,963	8.0	0.8	0.02	7.3	0.9	0.4	6.1	30.5	19.1
5	Cuddapah	1,274,693	27,038	21.2	5,366	964	1	18,116	308	22	56	537	67	681	3,687	39,208	4.2	0.3	0.001	14.3	0.3	0.3	1.9	22.9	21.3
6	Ganjam	1,048,888	30,191	28.7	1,641	472	1	21,006	1,435	16	38	240	68	359	2,860	27,761	6.8	0.2	0.001	16.2	0.2	0.2	1.3	14.2	24.7
7	Godavari	2,189,627	56,867	26.0	2,136	5,312	...	21,006	884	41	88	349	100	578	16,146	40,625	1.0	1.4	...	10.2	0.4	0.2	7.6	21.0	20.6
8	Kistna	2,043,402	53,068	27.0	1,890	1,534	...	23,720	706	40	47	419	96	601	14,011	42,292	0.9	0.7	...	11.3	0.3	0.3	0.3	20.7	23.4
9	Kurnool	831,435	19,179	23.1	1,212	324	8	12,534	191	8	26	156	34	225	2,059	17,147	1.4	0.4	0.001	18.1	0.4	0.3	8.2	30.5	21.3
10	Madras	3,897,047	38,709	10.0	2,104	637	...	10,043	439	30	17	373	92	502	12,373	26,097	0.8	0.7	...	3.9	0.2	0.1	4.3	19.1	19.0
11	Malabar	2,589,181	64,232	24.9	5,447	1,688	2	21,412	3,729	83	38	302	106	679	16,695	51,632	2.1	0.6	0.001	3.3	0.2	0.3	6.4	19.9	18.3
12	Nellore	1,461,806	30,431	21.0	1,361	1,231	2	13,901	622	21	34	423	64	637	10,136	28,410	1.4	0.3	0.001	9.6	0.4	0.4	7.0	19.6	18.7
13	Nilgiris	80,562	1,642	19.1	1	8	...	1,375	76	3	2	4	3	12	182	1,654	0.01	0.1	...	17.1	1.0	0.1	1.9	30.2	18.4
14	North Arcot	2,077,784	38,890	18.7	6,399	2,830	110	15,010	2,566	51	57	961	125	1,144	17,070	48,540	4.0	1.1	0.06	7.3	1.3	0.8	8.2	23.4	26.6
15	Salem	2,077,022	56,007	28.0	10,840	1,960	777	18,445	2,136	65	67	601	133	806	17,804	47,564	5.0	1.0	0.4	6.5	1.0	0.4	6.5	22.8	20.5
16	South Arcot	2,246,271	62,871	28.0	3,013	2,171	2	13,026	1,134	37	47	631	185	896	23,036	49,339	1.7	1.9	0.001	10.7	2.6	0.5	12.5	21.9	22.3
17	South Canara	1,036,673	29,817	27.4	3,827	269	1	11,639	2,775	40	33	399	89	561	8,979	28,071	5.3	0.3	0.001	10.7	2.6	0.5	8.2	23.8	24.5
18	Tanjore	2,069,053	61,631	29.6	2,965	1,970	...	7,132	1,132	23	20	633	154	849	24,061	48,765	1.8	1.0	...	3.6	0.6	0.4	17.2	24.3	26.1
19	Tinnevely	1,787,829	37,514	21.2	3,224	742	...	8,168	1,079	37	39	417	74	606	23,177	39,074	1.8	0.4	...	4.6	0.4	0.4	14.9	22.8	22.8
20	Trichinopoly	1,315,358	38,608	29.5	2,806	813	...	6,079	470	32	38	323	101	404	18,801	28,063	2.1	0.2	...	4.6	0.4	0.4	14.9	22.8	22.8
21	Visagapatnam	1,315,453	45,676	34.8	177	107	...	24,157	489	34	46	315	122	516	1,779	27,225	0.1	0.1	...	12.6	0.2	0.3	4.9	14.3	21.4
Total, Rural districts		36,418,498	846,885	23.3	23,443	24,129	1,106,272	158,731	884	554	8,471	1,843	11,360	238,263	701,430	2.1	0.7	0.03	7.9	0.9	0.4	8.3	23.4	21.4	

* Exclusive of B.—Towns.

No. VI.—Births and Deaths registered from different causes in the districts and towns of the Madras Presidency during the year 1901—cont.

No. VI.—Births and Deaths registered from different towns in the districts and towns of the Madras Presidency.																					
Number.	Districts and towns.	Population for which returns were received.	Births.		Cholera.	Small-pox.	Plague.	Dysentery and diarrhoea.	Injuries.				Total.	All other causes.	Total deaths from all causes.	Ratio of deaths per 1,000 of population.					
			Local number.	Birth-rate per 1,000 of population.					Males.	Females.	Wounds and accidents.	Struck by wild horses.				Cholera.	Small-pox.	Plague.	Dysentery and diarrhoea.	Injuries.	All other causes.
B.—Towns.																					
1	M.T.C. Anantapur	76,935	2,014	26.3	2	2	2	15	...	...	...	...	2	82	148	1.9	0.6	0.6	10.8	18.6	28.1
2	M.T.C. Bellary	1,297,094	32,904	25.3	120	2	160	130	15	3	...	...	20	1,543	2,582	2.1	0.3	0.3	10.8	18.6	28.1
3	M.T.C. Chingleput	2,119,296	55,071	26.0	27	1	98	130	14	1	...	...	3	4,922	8,104	3.8	0.1	0.1	10.8	18.6	28.1
4	M.T.C. Coimbatore	1,274,693	27,038	21.2	31	11	68	130	14	1	...	...	3	4,922	8,104	3.8	0.1	0.1	10.8	18.6	28.1
5	M.T.C. Cuddapah	1,048,889	30,191	28.7	11	9	1	133	14	1	...	...	3	4,922	8,104	3.8	0.1	0.1	10.8	18.6	28.1
6	M.T.C. Ganjam	2,189,627	56,867	26.0	46	17	2	178	200	10	...	...	16	1,004	1,632	1.0	0.4	0.4	10.8	18.6	28.1
7	M.T.C. Godavari	2,043,402	53,068	24.8	34	13	58	130	14	3	...	...	7	1,580	2,484	1.1	0.1	0.1	10.8	18.6	28.1
8	M.T.C. Kistna	831,435	19,179	23.1	1	...	...	115	13	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
9	M.T.C. Kurnool	2,589,181	64,232	24.8	14	23	218	130	14	3	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
10	M.T.C. Madras	3,897,047	38,709	10.0	15	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
11	M.T.C. Malabar	1,461,806	30,431	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
12	M.T.C. North Arcot	2,077,784	38,890	18.7	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
13	M.T.C. Salem	2,077,022	56,007	26.9	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
14	M.T.C. Tanjore	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
15	M.T.C. Tinnevely	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
16	M.T.C. Tirunelveli	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
17	M.T.C. Travancore	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
18	M.T.C. Vizagapatnam	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
19	M.T.C. Warangal	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
20	M.T.C. Hyderabad	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
21	M.T.C. Bangalore	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
22	M.T.C. Mysore	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
23	M.T.C. Srirangapatna	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
24	M.T.C. Channarayana	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
25	M.T.C. Dindurthy	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
26	M.T.C. Guntur	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
27	M.T.C. Kakinada	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
28	M.T.C. Rajahmundry	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
29	M.T.C. Srisailam	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
30	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
31	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
32	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
33	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
34	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
35	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
36	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
37	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
38	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
39	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
40	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
41	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
42	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
43	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
44	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
45	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
46	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
47	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
48	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
49	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
50	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
51	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
52	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
53	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
54	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
55	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
56	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
57	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
58	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
59	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
60	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
61	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
62	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
63	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
64	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
65	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
66	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
67	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
68	M.T.C. Tirumala	1,787,829	37,514	21.0	...	...	...	13	...	...	...	...	18	1,102	1,700	2.1	0.3	0.3	10.8	18.6	28.1
69	M.T.C. Tirumala	1,787,829																			

VI.—Births and Deaths registered from different causes in the districts and towns of the Madras Presidency during the year 1901—cont.

[illegible]

No. VI.—Births and Deaths registered from different causes in the districts and towns of the Madras Presidency during the year 1901.—cont.

[illegible]

NOTE.—(1) Population for the Town circles except Madras, exclusive of Europeans and Eurasians, is not available according to the census of 1901. Hence the ratios have been calculated according to the census of 1901. Population of these Town circles inclusive of Europeans and Eurasians, though the statistics are exclusive of Europeans and Eurasians.

(2) Column (4) has been added to the form prescribed by the Government of India in this statement, as this important information so conveyed regarding births and their ratios in the Town circles and Urban districts is omitted in the body of the report.

No. VII.—Deaths registered from Cholera in the districts of the Madras Presidency during each month of the year 1901.

Number	Districts.	3		4		5												6			7			8	
		Circles of registration.		Villages.														Total.	Ratio of deaths per 1,000 of population.						
		Number in each district.	Number from which deaths from cholera were reported.	Number in each district.	Number from which deaths from cholera were reported.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.	Males.	Females.	Total.		Mean ratio per 1,000 for previous 5 years.
1	Anantapur	10	10	865	187	4	3	204	180	729	708	364	246	610	73	226	181	1,842	1,588	3,430	4.9	4.1	4.5	2.9	
2	Bellary	14	14	914	204	62	23	220	663	828	461	220	67	44	96	27	2	1,480	1,237	2,717	3.1	2.6	2.8	2.5	
3	Chingleput	9	9	2,179	559	867	233	106	59	11	31	127	658	921	438	103	85	1,922	1,712	3,634	2.9	2.6	2.8	1.2	
4	Coimbatore	13	13	1,558	329	594	565	550	438	697	607	223	62	14	293	981	1,327	5,796	3,072	8,868	5.6	2.7	3.1	3.3	
5	Cuddapah	13	12	1,538	715	534	540	455	346	216	148	302	211	162	58	1,196	893	2,824	2,500	5,414	4.1	2.7	3.4	1.9	
6	Ganjam	8	6	4,348	265	204	57	62	36	29	84	15	163	646	625	406	204	1,167	1,138	2,305	10.0	0.7	0.8	0.4	
7	Godavari	18	16	2,603	204	57	62	36	29	84	15	163	646	625	406	204	4	1,167	1,138	2,305	10.0	1.0	1.0	1.6	
8	Kistna	16	16	1,851	258	255	240	376	199	215	9	64	306	215	128	90	1,129	979	2,108	1.0	1.0	1.0	1.2		
9	Kurnool	10	9	758	105	43	41	27	35	54	175	419	267	104	43	154	729	683	1,366	1.7	1.5	1.6	1.5		
10	Madras	1	1	1	1	1	49	33	5	9	11	4	30	308	311	239	93	22	575	688	1,161	2.3	2.4	2.4	0.7
11	Madura	17	15	1,088	342	487	313	134	123	...	...	...	...	...	...	...	...	1,187	2,727	1.1	0.9	1.0	3.0		
12	Malabar	15	13	440	288	192	201	76	616	243	996	1,671	1,066	576	383	873	620	3,281	3,445	6,726	2.4	2.4	2.4	3.3	
13	Nellore	12	11	1,852	217	800	367	180	68	73	2	...	...	...	...	...	...	1,106	807	2,016	1.5	1.2	1.3	1.9	
14	Nilgiris	4	4	3,428	434	2,150	916	627	535	190	580	640	1,348	843	508	256	450	4,938	4,709	9,647	4.5	3.8	4.1	1.8	
15	North Arcot	17	12	3,428	808	784	817	659	272	234	380	507	392	994	1,951	2,320	1,466	5,830	3,982	9,812	4.5	4.8	5.1	1.7	
16	Salern	14	14	3,742	808	784	817	659	272	234	380	507	392	994	1,951	2,320	1,466	5,830	3,982	9,812	4.5	4.8	5.1	1.7	
17	South Arcot	12	12	2,683	623	675	598	277	129	54	165	233	558	259	116	185	834	3,006	1,046	4,052	1.8	1.7	1.7	3.2	
18	South Canara	6	6	1,288	400	106	153	104	5	146	93	347	307	284	744	740	985	2,102	2,062	4,164	3.8	3.0	3.7	0.4	
19	Tanjore	15	15	3,572	618	1,062	814	69	39	44	61	88	125	147	74	150	1,111	1,027	2,138	1.6	1.4	1.6	4.6		
20	Tinnevely	21	20	1,610	436	1,225	748	253	31	32	33	39	55	...	...	...	...	1,876	1,632	3,508	1.9	1.5	1.7	2.4	
21	Trichinopoly	8	8	380	658	224	260	158	25	67	169	252	...	...	...	...	...	1,060	1,464	2,524	2.4	2.0	2.2	2.8	
22	Vizagapatnam	22	11	2,008	31	13	5	...	...	...	...	...	...	...	...	...	...	106	...	204	0.1	0.1	0.1	0.8	
Total, Madras Presidency		274	250	30,904	7,703	10,473	6,167	4,382	3,081	3,095	4,710	5,945	8,017	6,923	6,604	8,032	11,622	42,506	38,404	81,370	5.2	3.0	5.2	2.1	

No. IX.—Deaths registered from Fevers in the Districts of the Madras Presidency during each month of the year 1901.

1	2	3	4	5	6	7	8																	
Number.	Districts.	Circles of registration.		Villages.		Total.												Ratio of deaths per 1,000 of population.		Mean ratio per 1,000 for previous 5 years.				
		Number in each district.	Number from which deaths from fevers were reported.	Number in each district.	Number from which deaths from fevers were reported.													Males.	Females.					
						January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.							
1	Anantapur	10	10	965	418	217	195	283	248	394	217	235	173	196	277	283	353	1,425	1,388	2,813	3.5	3.6	3.6	3.8
2	Bellary	14	14	914	551	436	439	658	714	251	362	548	568	454	607	375	365	2,224	3,006	5,230	5.8	5.4	5.1	4.6
3	Chingleput	9	9	2,179	1,231	384	473	441	394	413	359	428	487	718	899	900	843	3,313	6,732	10,045	4.6	4.5	4.1	4.1
4	Coimbatore	13	13	1,538	329	594	565	550	438	697	607	223	62	14	293	981	1,327	5,796	3,072	8,868	5.6	5.4	5.2	5.2
5	Cuddapah	12	12	1,538	715	534	540	455	346	216	148	302	211	162	58	1,196	893	2,824	2,500	5,414	4.3	4.2	4.1	4.1
6	Ganjam	8	8	4,348	265	204	57	62	36	29	84	15	163	646	625	406	204	1,167	1,138	2,305	10.0	9.8	9.6	9.6
7	Godavari	18	18	1,851	258	240	376	199	215	9	64	306	215	128	90	1,129	979	2,108	170	170	1.2	1.2	1.2	1.2
8	Kurnool	10	9	758	105	43	41	27	35	54	175	419	267	104	43	154	729	683	1,366	17.5	17.4	17.3	17.3	
9	Madras	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	588	1,101	2.3	2.4	2.4	2.4	
10	Madura	17	15	1,088	342	487	313	134	123	...	...	...	...	...	...	...	...	1,187	2,727	11.0	3.0	3.0	3.1	
11	Malabar	15	13	446	288	192	201	76	618	245	948	1,571	1,066	376	383	873	620	3,281	3,445	6,726	2.4	2.4	2.4	2.4
12	Nellore	12	11	1,852	217	800	367	180	68	73	2	...	...	...	...	...	...	1,106	807	2,018	1.8	1.8	1.8	1.8
13	Nilgiris	4	4	3,428	434	2,150	916	627	535	190	580	640	1,348	843	508	256	450	4,938	4,709	9,647	4.5	4.5	4.5	4.5
14	North Arcot	14	14	3,742	808	784	817	659	272	234	380	507	392	994	1,951	2,320	1,466	5,830	4,982	10,812	4.8	4.8	4.8	4.8
15	South Arcot	12	12	2,683	623	675	598	277	129	54	165	233	558	259	116	185	834	3,006	1,046	4,052	1.7	1.7	1.7	1.7
16	South Canara	6	6	1,288	400	106	153	104	5	146	93	347	307	284	744	740	985	2,102	2,062	4,164	3.0	3.0	3.0	3.0
17	Tanjore	15	15	3,572	618	1,062	814	69	39	44	61	88	125	147	74	150	1,111	1,027	2,138	1.4	1.4	1.4	1.4	
18	Tinnevely	21	20	1,610	436	1,225	748	253	31	32	33	39	55	...	...	...	...	1,876	1,632	3,508	1.9	1.9	1.9	1.9
19	Trichinopoly	8	8	380	658	224	260	158	25	67	169	252	...	...	...	...	...	1,060	1,464	2,524	2.2	2.2	2.2	2.2
20	Vizagapatnam	22	11	2,008	31	13	5	...	...	...	...	...	...	...	...	...	...	106	...	204	0.1	0.1	0.1	0.1
	Total, Madras Presidency.	274	250	30,904	7,703	10,473	6,167	4,382	3,081	3,095	4,710	5,945	8,017	6,923	6,604	8,032	11,622	42,506	38,404	81,370	5.2	5.0	4.8	4.7

No. VIII.—Deaths registered from small-pox in the districts of the Madras Presidency during each month of the year 1901.

Number.	Districts.	3		4		5												6		7		8		9		
		Circles of Registration.	Deaths from small-pox were reported.	Villages.	Deaths from small-pox were reported.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.		Number of deaths among children.	Ratio of deaths per 1,000 of population.					
																		Males.	Females.		Males.	Females.				
1	Anantapur	10	9	965	107	13	16	25	22	19	23	30	3	13	15	36	28	127	114	241	107	80	0.8	0.8	0.8	
2	Bellary	14	13	914	141	61	32	53	33	61	73	59	80	45	44	58	85	961	810	1,671	277	254	0.7	0.7	0.7	
3	Chingleput	9	9	2,179	551	102	62	71	61	69	81	68	77	87	54	70	95	940	408	1,348	306	268	0.7	0.7	0.7	
4	Coimbatore	13	13	1,538	329	594	565	550	438	697	607	223	62	14	293	981	1,327	5,796	3,072	8,868	548	485	0.5	0.5	0.5	
5	Cuddapah	12	12	1,538	715	534	540	455	346	216	148	302	211	162	58	1,196	893	2,824	2,500	5,414	278	273	0.5	0.5	0.5	
6	Ganjam	8	4	4,348	265	204	57	62	36	29	84	15	163	646	625	406	204	1,167	1,138	2,305	478	327	0.5	0.5	0.5	
7	Godavari	18	18	2,803	927	865	894	713	638	525	454	324	298	194	224	176	100	2,826	2,874	5,699	989	986	0.5	0.5	0.5	
8	Karnool	16	15	1,851	406	76	72	140	169	123	115	140	127	156	88	65	88	983	683	1,666	327	281	0.5	0.5	0.5	
9	Katna	10	9	758	23	17	7	48	48	30	29	22	22	24	25	37	93	128	139	269	113	93	0.2	0.2	0.2	
10	Kurnool	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	143	143	286	72	64	0.4	0.4	0.4
11	Madras	17	17	1,004	107	66	85	35	54	87	40	69	45	41	37	47	63	548	301	849	866	180	0.3	0.3	0.3	
12	Malabar	15	15	446	236	205	260	374	301	209	165	155	129	101	103	116	167	1,171	1,043	2,214	86	202	0.9	0.7	0.8	
13	Nellore	12	12	1,852	262	98	119	100	101	100	65	89	87	107	140	102	185	648	640	1,288	451	401	0.9	0.8	0.9	
14	Nilgiris	4	2	3,428	5	1	1	1	1	1	1	1	1	1	1	1	1	588	1,101	1,689	581	504	0.1	0.1	0.1	
15	North Arcot	17	16	3,628	808	103	185	154	162	250	180	215	178	290	208	247	343	1,506	1,308	2,814	837	711	1.1	1.1	1.1	
16	Salem	14	13	3,702	541	100	96	146	157	116	123	188	173	194	254	247	259	1,019	1,024	2,043	677	686	0.9	0.9	0.9	
17	South Arcot	12	11	2,683	623	675	598	483	63	134	162	220	218	198	286	282	1,04	1,063	2,186	1,081	1,081	0.9	0.9	0.9		
18	South Canara	9	6	1,282	128	17	25	60	26	30	20	19	13	17	28	156	123	278	22	13	22	13	0.3	0.2	0.2	
19	Tanjore	16	15	3,538	686	246	294	192	192	103	148	122	115	164	163	147	199	1,017	2,015	782	546	438	0.9	0.9	0.9	
20	Tinnevely	21	18	1,619	232	49	56	57	77	48	86	62	61	78	62	111	111	458	469	808	308	245	0.5	0.4	0.4	
21	Tiruchinopoly	8	8	839	162	28	46	37	30	56	40	14	20	3	21	16	129	183	179	353	92	181	0.2	0.2	0.2	
22	Vizagapatam.	22	8	918	21	28	6	6	13	10	10	12	2	3	2	5	3	57	61	108	16	48	0.1	0.08	0.1	
Total, Madras Presidency.		274	233	30,904	5,480	2,635	2,670	2,668	2,639	2,844	1,829	2,040	1,823	1,884	1,788	1,905	2,278	13,425	12,777	26,203	8,029	7,131	0.7	0.7	0.7	

APPENDIX.

(Comparative Table showing percentage of mortality to total mortality from year to year under each head of death causation.)

1	2	3	4				5	6													
Name of municipality.	Date of completion of works of	Average annual death-rate since the introduction of drainage system or water-supply.	Percentage of deaths to total mortality under each head of death causation.				Average annual death-rate for the five-year period preceding the introduction of drainage system or water-supply.	Percentage of deaths to total mortality under each head of death causation.													
			Cholera.	Small-pox.	Fever.	Dysentery and Diarrhoea.		Injuries.	All other causes.	Cholera.	Small-pox.	Fever.	Dysentery and Diarrhoea.	Injuries.	All other causes.						
Adoni ...	...	September 1895.	1895	23.6	...	0.2	...	38.1	0.8	0.8	0.5	1894	19.2	...	...	...	2.1	40.3			
			1896	25.4	1.0	1.0	...	31.2	0.9	0.6	0.5	1894	38.1	...	...	...	0.5	26.2			
			1897	27.0	9.3	...	...	31.7	3.9	0.7	0.4	1892	31.7	...	...	...	1.0	44.8			
			1898	26.5	...	...	...	29.7	5.3	2.7	0.2	1893	22.2	...	...	...	1.4	40.6			
			1899	24.1	0.1	0.1	...	22.1	2.4	1.3	7.1	1894	24.3	...	...	...	1.4	61.3			
Conjeeravaram ...	...	July 1897.	1900	24.4	...	0.3	...	31.9	5.3	0.5	69.3	...	...	...	...	...	...	...			
			1901	20.1	...	0.3	...	30.0	2.9	0.7	66.1	...	...	...	...	...	...	...			
			1897	28.3	...	0.6	...	21.3	10.7	1.3	59.7	1892	32.5	...	...	...	...	...	...		
			1898	29.4	1.1	1.1	...	13.5	13.0	1.4	70.4	1893	33.0	...	...	...	...	...	...		
			1899	29.8	1.9	1.9	...	2.1	15.5	1.7	77.1	1894	30.6	...	...	...	...	...	...		
Coonoor ...	...	Jan. 1893 ...	1900	31.2	...	2.0	...	4.5	14.2	1.1	70.5	1895	33.6	...	...	...	...	...	...		
			1901	35.5	...	2.8	...	10.8	17.7	1.0	65.7	1896	33.3	...	...	...	...	...	...		
			1893	31.0	...	1.6	...	30.5	17.6	0.5	49.7	1888	28.4	...	...	...	...	...	...		
			1894	31.9	...	2.6	...	28.0	19.7	0.5	49.2	1890	26.9	...	...	...	...	...	...		
			1895	27.9	...	...	...	21.9	13.6	1.2	63.3	1890	22.7	...	...	...	...	...	...		
Cuddapah ...	...	July 1893.	1896	41.3	...	2.8	...	0.4	...	22.4	17.6	1.2	55.6	1891	29.4	...	...	...	...	...	...
			1897	43.8	...	5.6	...	20.8	15.5	1.9	55.8	1892	37.0	...	...	...	...	...	...		
			1898	31.6	...	...	...	14.8	17.2	2.9	66.1	...	...	...	...	...	...	...	...		
			1899	28.6	...	...	...	9.4	22.9	1.8	65.9	...	...	...	...	...	...	...	...		
			1900	36.5	...	...	...	20.4	19.1	1.8	57.0	...	...	...	...	...	...	...	...		
...	...	...	1901	24.4	...	1.0	...	20.2	14.9	0.9	53.9	...	...	...	...	...	...	...			
			1893	46.9	...	...	...	68.0	2.0	0.9	27.6	1888	31.7	...	...	...	...	...	...		
			1894	33.9	...	...	...	49.9	4.4	2.9	40.9	1889	39.2	...	...	...	...	...	...		
			1895	32.9	...	...	...	54.9	5.2	1.9	37.7	1890	43.0	...	...	...	...	...	...		
			1896	21.7	...	0.5	...	46.6	3.7	2.4	41.2	1891	29.3	...	...	...	...	...	...		
...	...	...	1897	28.5	...	4.3	...	42.0	2.6	2.2	45.7	1892	58.3	...	...	...	...	...	...		
			...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		

Dindigul ...	...	...	Aug. 1896.	1898	20.7	...	0.2	...	...	40.4	0.8	0.8	0.5	0.5
				1899	29.0	...	...	...	...	47.2	0.9	0.9	0.5	0.5
				1900	31.7	...	4.0	...	...	31.2	7.0	1.4	0.5	0.5
				1896	28.5	...	5.8	...	...	32.0	2.5	1.2	0.5	0.5
				1897	23.1	...	0.0	...	...	25.4	1.3	0.2	0.5	0.5
Kumbakonam ...	...	Oct. 1894 ...	...	1898	25.6	...	15.7	...	...	22.3	7.0	1.3	0.5	0.5
				1899	18.9	...	...	...	...	22.0	1.5	2.1	0.5	0.5
				1900	25.6	...	25.2	...	...	15.0	16.0	0.8	0.5	0.5
				1894	37.5	...	17.3	...	...	20.3	18.4	1.7	0.5	0.5
				1895	31.2	...	3.2	...	...	21.0	10.0	0.5	0.5	0.5
Kurnool ...	...	October 1897.	...	1896	34.2	...	9.3	...	...	20.0	11.6	0.6	0.5	0.5
				1897	39.9	...	26.2	...	...	13.2	11.5	0.4	0.5	0.5
				1898	30.0	...	11.8	...	...	15.1	10.8	0.7	0.5	0.5
				1899	36.4	...	13.0	...	...	14.7	9.3	1.1	0.5	0.5
				1900	30.3	...	3.4	...	...	14.5	6.5	0.8	0.5	0.5
Madras ...	...	April 1872.	...	1897	33.2	...	10.2	...	...	15.9	7.4	1.2	0.5	0.5
				1898	37.4	...	3.2	...	...	40.8	12.7	0.2	0.5	0.5
				1899	27.0	...	...	...	...	50.8	6.0	1.0	0.5	0.5
				1900	29.8	...	...	...	...	48.2	15.7	2.3	0.5	0.5
				1896	33.6	...	0.8	...	...	45.6	16.8	2.8	0.5	0.5

No. XI.—Statement prescribed by the Government of India in Letter No. 10—326, dated 8th December 1894, Home Department (Sanitary), communicated with G. O., No. 2654 L., M., dated 20th December 1894—cont.

(Comparative Table showing percentage of mortality to total mortality from year to year under each head of death causation.)

1.	2		3		4					5		6							
	Date of completion of works of	Drainage.	Water supply.	Average annual death-rate since the introduction of drainage system or water supply.		Percentage of deaths to total mortality under each head of death causation.					Average annual death-rate for the five-year period preceding the introduction of drainage system or water supply.		Percentage of deaths to total mortality under each head of death causation.						
				Years.	Death-rate.	Cholera.	Small-pox.	Fever.	Dysentery and Diarrhoea.	Injuries.	All other causes.	Years.	Death-rate.	Cholera.	Small-pox.	Fever.	Dysentery and Diarrhoea.	Injuries.	All other causes.
Madure	...	...	...	1894	32.6	18.5	0.9	15.8	11.7	1.0	67.1	1899	31.2	9.0	3.0	15.1	10.4	1.8	51.7
	April 1894.	...	...	1895	28.1	1.2	0.6	17.6	9.3	1.3	70.0	1890	32.7	3.0	4.9	18.0	14.2	1.6	51.3
		1896	23.2	0.4	0.6	22.3	10.6	1.6	64.6	1891	31.4	16.8	7.3	12.8	13.0	1.9	48.2		
		1897	25.6	11.3	0.7	18.7	12.5	1.2	55.6	1892	29.3	0.8	9.9	16.0	9.9	1.5	61.9		
		1898	25.1	4.5	0.5	18.7	15.4	1.6	64.3	1893	29.9	9.8	7.6	14.6	7.3	1.6	59.1		
		1899	24.5	3.0	3.4	18.8	10.9	0.9	65.0	...	...	...	...	...	...	...	...	...	
Tanjore	...	...	...	1900	31.9	30.3	1.2	14.3	9.8	1.0	43.4	...	...	...	...	...	...	...	
	Oct. 1895.	...	...	1901	22.7	5.4	0.2	18.7	10.4	0.5	64.8	...	...	...	...	...	...	...	
		1895	25.5	5.8	0.8	22.1	21.2	0.8	49.3	1890	28.2	11.1	6.3	22.6	20.0	0.9	39.1		
		1896	27.0	3.7	2.0	23.5	25.4	0.3	44.5	1891	29.4	8.8	4.4	21.2	23.3	0.6	46.7		
		1897	26.2	12.3	0.6	20.4	22.4	0.7	43.6	1892	29.2	12.7	0.9	19.1	28.4	0.8	38.1		
		1898	25.5	15.3	0.3	13.1	18.2	0.1	52.0	1893	35.7	28.8	2.2	17.6	22.0	0.3	29.1		
Trichinopoly	...	...	...	1899	26.0	6.2	3.1	19.2	16.4	1.1	54.0	1894	26.9	15.2	0.9	16.5	26.3	1.2	39.9
	December last water supply was introduced from the new tank.	...	...	1900	27.0	4.8	2.6	22.2	19.8	0.2	50.5	...	...	...	...	...	...	...	
		1901	26.0	5.2	0.1	18.2	25.7	0.8	50.0	...	...	...	...	...	...	...	...	...	
		1896	30.4	19.2	0.8	22.4	11.9	1.1	44.6	1891	29.5	17.1	2.8	19.9	11.4	0.6	47.2		
		1897	23.1	10.6	1.4	19.6	9.2	1.0	49.2	1892	25.6	13.0	5.9	26.6	13.7	1.3	39.5		
		1898	20.4	24.1	1.4	14.1	6.7	0.9	52.8	1893	36.6	36.8	3.9	20.3	4.9	0.8	27.8		

PART II.

SANITARY ENGINEERING.

THE TWELFTH ANNUAL REPORT

OF THE

SANITARY ENGINEER TO THE GOVERNMENT OF MADRAS,

1901.

This department dealt with questions of drainage or water-supply relating to the following towns during the year :—

I (a).—WORKS ON THE PROGRAMME FOR 1901.

(1) *Negapatam water-supply.*—The Chief Engineer, Public Works Department, having considered the points raised in two preliminary reports in reference to the investigation of this scheme, the heavy rainfall at Negapatam, the porous nature of the ground and the fact of the rainfall being supplemented by irrigation water for eight months of the year, thought that the tentative source of supply proposed by Mr. Malet, viz., a trench in the Papanacheri area would give the town a much better and purer supply than it has now, and directed the preparation of an estimate for a scheme on this basis; this was submitted with plans, the capital cost amounting to Rs. 2,32,000, exclusive of the cost of land with an annual charge of Rs. 18,620. The proposals differed from Mr. Malet's scheme in the following respects :—

- (i) The trench 200 feet long is replaced by one 500 feet in length.
- (ii) In place of a temporary engine shed and hired pumping plant, new pumping plant and a permanent engine house.
- (iii) Instead of an elevated tank to hold 125,000 gallons, a tank to hold 87,500 gallons only.
- (iv) Instead of only one line of piping along the east of the town, two lines of piping east and west.

Doubting the possibility of obtaining the full supply and in view to avoid a large expenditure which might be uselessly incurred, it was suggested that sanction for the trench and for temporary pumping throughout a hot season should be given before any other work was put in hand. The cost of this for six months, including the hire of machinery, etc., was estimated at Rs. 6,000, plus cost of trench Rs. 18,000 = Rs. 24,000.

(2) *Calicut water-supply.*—Boring operations suspended in 1900 on the advent of the monsoon were resumed on the 14th February 1901 and completed at the end of March. Levels were also taken over the entire town area. As the results of the investigation were disappointing, and the state of the finances unfavourable to the construction of any scheme in the near future, no scheme was prepared. A note on the results of the investigation made, with a sketch plan of Calicut and sections on borings, was however forwarded to the Chief Engineer, in view to being recorded and available whenever required for the preparation of a scheme.

(3) *Tinnevely and Palamcottah water-supply.*—The question of providing a water-supply scheme for these towns was beset with many engineering and financial difficulties; a careful investigation showed that it would be impossible to formulate any complete scheme which would be within the reach of the two towns; the whole question was fully discussed in a report submitted with approximate estimates for all possible schemes, viz. :—

- (i) *Irrigation channel scheme.*—With the Kodagan channel as source of supply for Tinnevely, estimated to cost Rs. 4,01,000 with an annual charge of Rs. 23,950, and with the Palayam channel as source of supply for Palamcottah, roughly costing Rs. 4,10,000 with an annual cost of Rs. 26,218.

(ii) *Tambraparni scheme*.—Approximately costing Rs. 2,63,000 for Tinnevely with an annual cost of Rs. 20,508, and Rs. 2,76,000 for Palamcottah with an annual charge of Rs. 21,990.

(4) *Madura drainage*.—The scheme for the drainage of that portion of Madura lying within the four Masai streets was incomplete at the end of the year under review, but will shortly be so.

(5) *Guntur water-supply*.—The Municipal Council had, for various reasons, failed to continue their experiments to gauge the amount of the supply likely to be obtained from the springs or to continue the search for the fissures said by the Geological Department to be supplying the springs. They, however, formulated a scheme for the town from the springs which was briefly to pump water from the springs into an open earthen channel constructed between the springs and the receiving tank (the Mallappa gunta), which is a mile from Guntur, and to supply the town from this tank by pumping. Government, in G.O., No. 1270 M., Mis., dated 3rd September 1901, called for a report and proposals as to the best method of utilizing the water from the springs. The Yengalayapalem springs were inspected and borings were taken over the water bearing area and additional surveys made between the springs and Guntur. A report was submitted to the effect that the open channel proposed by the Council did not commend itself and should be abandoned for any permanent scheme, as the arrangement would be a most expensive one to work and heavy pumping would be required both at the springs and at the receiving tank which is considerably lower in level than the greater portion of the town.

The scheme put forward is to convey the water to Guntur by means of an 18-inch brick culvert and deliver it into a service reservoir there at such an elevation as will command the whole town. As regards distribution, it is proposed to lay at first only a few mains which may be added to gradually as the town can afford the expenditure. A material reduction in the cost was effected by these proposals which amounted to Rs. 2,17,800 as against Rs. 5,13,400 for the scheme originally proposed.

The success of the scheme will, of course, depend on the supply from the springs being sufficient and continuous. Experiments must therefore be made to thoroughly test the yield before the works are begun and the Municipal Council have been urged to do so.

I (b).—ADDITIONAL WORKS.

(1) *Tiruvannamalai water-supply scheme*.—In January 1901 three schemes were submitted; the Chief Engineer, Public Works Department, approved No. 3 and returned the papers for completion. Plans and estimates were submitted to the Sanitary Board on 18th November 1901. The scheme is designed for an ultimate supply of 300,000 gallons per day or 15 gallons per head per day for a population of 20,000. The scheme contemplates the cutting of a trench 500 feet long with 8 feet bottom width and 16 feet top width in the Samudram Valley, pumping the water through an 8-inch cast iron main 10,400 feet long into a service reservoir and distributing the supply thence by gravitation through pipes and fountains in the usual manner. The distribution system is limited to a single line of piping along the main road with only one compartment of the service reservoir capable of holding 150,000 gallons. The works as above are estimated to cost Rs. 1,04,000 and the cost of maintenance will be Rs. 4,000 per annum.

(2) *Adoni—Improving the water-supply*.—The water in the Nallacheruvu supply tank having failed in 1900–1901, wells had to be sunk and baling resorted to with the result that the charges under water-supply exceeded the budget provision by Rs. 5,800. The Sanitary Commissioner suggested that an infiltration gallery might be constructed in the higher portion of the tank whence the water might flow to the lower by gravitation or if lifting were inevitable that improved mechanical and less expensive means should be employed. These suggestions were referred for report, but were found impracticable. The works recommended are the construction of an infiltration trench in the bed of the Nallacheruvu tank with well and pumps, the water therefrom to flow into a cistern at the leg of the syphon by which it

will be drawn and delivered on to the filters similarly to the tank supply. The capital cost of this scheme was estimated at Rs. 16,100 and the working expenses at Rs. 130 per mensem. This scheme was approved and the plans and estimates were forwarded with G.O., No. 1646 M., Mis., dated 8th November 1901, to the Municipal Council for remarks and report as to how they proposed to finance the scheme.

(3) *Erode—Scheme for water-supply*.—The Assistant Sanitary Engineer inspected the town in connection with its water-supply scheme and made a report which was forwarded to the Sanitary Board. Two schemes were described (i) the Cauvery scheme and (ii) the Calingaroyen canal scheme. The first scheme was estimated to cost Rs. 1,03,000 with an annual working charges of Rs. 11,000 on the assumption that Government would contribute a moiety of the cost, and the second scheme Rs. 84,000 with an annual working charges of Rs. 7,500.

Both the Sanitary Commissioner and the Sanitary Board recommended the Cauvery scheme. The papers were forwarded to the Municipal Council who expressed their inability to take up either scheme without aid from Government.

(4) *Kumbakonam—Amended scheme for water-supply*.—On the suggestion of the Sanitary Board an amended scheme, including a service tank, was framed. In it provision is made for an elevated tank capable of meeting the requirements of 60,000 people at 10 gallons per head per day; the tank can be enlarged at any time when 15 gallons per head are required. The estimate as revised amounted to Rs. 4,05,120 with an annual working charges of Rs. 26,843. The scheme was approved of by the Sanitary Board and the plans and estimates forwarded to the Municipal Council in G.O., No. 1392 M., Mis., dated 23rd December 1901, for remarks and report as to how they intend financing the scheme.

(5) *Kumbakonam—Revised scheme for improving Solayappa Mudali Street Drainage including bacterial filters*.—The Executive Engineer of the Division suggested the adoption of bacterial filters in this scheme; revised plans and estimates amounting to Rs. 7,650 were submitted. These estimates were approved and communicated to the Municipal Council and the Public Works Department ordered to make necessary arrangements to carry out the work which consisted of surface drains, sewers, sewage well, tank, cistern and filters.

(6) *Kurnool—Additional storage tank*.—On a reference from Government regarding the suggestion of the Collector to reduce the pumping charges by substituting direct pumping on to the filters instead of the present method of pumping water into the settling tank whence it flows to the filter beds and the service reservoir, it was pointed out that it was inadvisable to pump water on to the filter beds direct and that whereas filtration must be a regular process pumping is intermittent. Plans and estimates were, however, prepared for a small settling tank at a lower level than the large settling tank now in use. From this small settling tank the water could be passed on to the filter beds. The cost of such a tank was estimated at Rs. 9,480, its storage capacity being one day's supply, viz., 216,666 gallons. The saving, in working expenses by this means, was estimated at Rs. 955 annually. It was, however, pointed out that, before embarking on further capital expenditure, it would be better for the municipality to work the engines at full speed, keep the machinery in proper order, and obtain a sufficient stock of good dry wood or coal instead of the green wood in use and that this would materially reduce the working charges. As the estimated saving due to the construction of the new storage tank was a doubtful one, the proposal did not commend itself to Government and the municipality was ordered to endeavour to reduce the working charges as above suggested.

(7) *Trichinopoly—Water Works Extension and Protective Works*.—Considerable progress was made with these during the year. The repairs and examination of the steel pipes in the bed of the river and the restoration of the pumping station building were completed. The distribution system in Woraiyur and Puthur and the erection of the fourth engine and boiler were nearing completion at the end of the year. The protective works, which had to be discontinued last May owing to rise of the Cauvery, will be continued as soon as the river level falls.

The estimate for the above works was revised in the beginning of the year under report and amounted to Rs. 2,42,000. Towards the end of the year, however, the pipe across the river was broken at one of the joints by a very heavy flood and accompanying scour of the river bed and must again be relaid. The estimated cost of this work is Rs. 3,850. A proposal was also made for a stone groin projecting from the revetment, in order to divert the current from the face of the latter. The estimate for this was Rs. 2,650. Considerable savings had accrued on many items of the estimate and including these extra works, a further revised estimate was forwarded for sanction. This amounted to only Rs. 2,36,710.

(8) *Trichinopoly—Service reservoir at the sub-pumping station.*—Plans and an estimate amounting to Rs. 7,400 for this work prepared and submitted during the year were sanctioned in G.O., No. 2417 W., dated 12th September 1901, for execution on funds being made available by the Municipal Council; these funds have not been allotted.

(9) *Trichinopoly—High level service reservoir in the Fort Rock and additional infiltration galleries.*—The water works of this town will not be complete until these works are undertaken. Plans and estimates for them were prepared and submitted on 1st August 1901. The rock reservoir was estimated to cost Rs. 63,300; additional gallery for No. 1 well Rs. 17,000 and that for No. 3 well Rs. 26,200. The three estimates in the aggregate amount to Rs. 1,06,500. The reservoir as designed will contain 602,112 gallons or one-third of a day's supply. The additional galleries are expected to give an additional supply of 600 gallons per minute or 864,000 gallons per day. Some addition to the supply is necessary owing to the extra demand which will occur by the extension of the pipe system to Woraiyur and Puthur.

(10) *Coonoor—Revised water-supply scheme.*—The investigation for a joint water-supply for Wellington Cantonment and Coonoor, which commenced in November 1900 and was referred to in last year's report, was completed during the year under review.

The investigations proved that no dam of any kind, whether of earth or masonry, could be founded across the Coonoor stream (the original proposed source of supply), as the soil was porous and soluble in water. As already stated in last year's report, it was thought that the yield from Coonoor stream would not, in some years, be sufficient. A scheme with the Brickfield, Wellington, or Kundamanji channel and the Coonoor streams, as the sources of supply was therefore prepared. This scheme comprised the construction of low dams at the Brickfield and Coonoor streams and the diversion of the Wellington channel into the Coonoor stream. Pipes from the Coonoor and Brickfield streams will lead the water to a common reservoir located at the spur between the two streams. From the reservoir one main will go to Coonoor and the other to Wellington. The cost to Coonoor allowing for the portions payable by Wellington Cantonment is estimated at Rs. 1,20,633 and for Wellington Rs. 31,217. The Military authorities had not, at the end of the year, stated whether they were prepared to agree to the proposal. Wellington Cantonment can, in any case, well afford to surrender the Brickfield stream, as there is sufficient supply brought down by the Kundamanji channel.

(11) *Ootacamund—Tiger Hill reservoir scheme.*—The design of the tower and machinery, in connection with the scheme which is being executed by the Public Works Department, was revised and certain suggestions were made in respect to the pipes, etc. New indents were framed with schedules and specification for the materials required from the India Stores Department.

(12) *Dindigul—Improving the water-supply.*—The Oodukam valley scheme for augmenting the water-supply of Dindigul described in the report for 1899, being a tentative one, the Sanitary Board advised, as stated in last year's report, the construction of an experimental trench 400 feet long in the above valley which was selected as the additional source of supply. That length was excavated by the Public Works Department, and was inspected and a report submitted. The trench yielded 66,000 gallons per day or 4 gallons per head. The proposed original length of trench, viz., 750 feet would yield, therefore, only 7.5 gallons a head instead of 10 gallons expected. The trench will, therefore, have to be considerably increased in

length and will probably have to be 1,000 feet long. It was, however, suggested that borings should be put down to determine the exact line, the trench should follow so as to intercept the largest volume of water. This is now being done.

(13) *Madura—Extension of water works.*—In last year's report two sources of supply, viz.,—(1) Old river course west of jail and (2) the Vaigai river above Kochadi were proposed to supplement the existing water-supply.

As regards No. (1) the Chief Engineer, Public Works Department, looking to the deterioration of the jail water and the amount of cultivation round the old river course rejected it. No. (2) was considered to be the best scheme, but expensive to construct. A third scheme was suggested by the Chief Engineer, viz., the construction of an infiltration gallery down stream below the existing filter bed and dam. This was, however, eventually considered unsuitable both in respect to quantity and quality.

Under the circumstances No. 2 was indisputedly the best scheme. Plans and estimates were, therefore, prepared for an infiltration pipe in the bed of the river 10,040 feet long which would tap the large quantity of water in the bed above Kochadi. The plans and estimates had not been submitted at the close of 1901.

(14) *Masulipatam water-supply.*—After a reference to the Sanitary Commissioner, the undersigned reported that of the two sources of supply indicated in last year's report, viz., the Masulipatam canal and the Gúdúr Sand Ridge, the latter was considered preferable as likely to be less expensive, but that, before its adoption as a source, it should be fully investigated by sinking observation wells and testing the yield both as to quality and quantity during the non-irrigation season; this experiment was estimated to cost Rs. 3,200. It had not been sanctioned at the close of the year.

(15) *Kodalkanal water-supply scheme.*—The Municipal Council having allotted funds for the investigation of this scheme during the year, the necessary surveys and levels were taken and the preparation of plans and estimates have well advanced towards completion and will be presented early in 1902.

(16) *Saidapet water-supply scheme.*—As the Military authorities did not arrive at any conclusion regarding their participation in a joint scheme for this town and the Mount Cantonment, it was resolved to make a search for a source of supply nearer Saidapet than that selected for both the places at Mudalivakkam, a village three miles west of Saidapet. Careful reconnaissance of the country around it indicated the existence of a fairly ample supply of potable water in the village of Ikkattuthangal on the right bank of the Adyar within a distance of one and-a-half miles from Saidapet. An additional sum of Rs. 250 was allotted by the District Board and the investigation of this source of supply was completed in November 1901; plans and estimates are under preparation. The scheme may or may not include a supply for the new vaccine institute at Guindy; this question yet remains unsettled. The scheme is almost ready for submission.

(17) *Giddalur water-supply.*—At the request of the Sanitary Board, several schemes were suggested for a supply of water to this village. No orders had been passed at the end of the year.

(18) *Ongole water-supply.*—The necessity for a proper water-supply for this town was again raised by the Chief Engineer, Public Works Department.

It was reported that of the two schemes submitted by this department in 1892, the municipality could carry out scheme called A which was considered to be the best. It provided for drawing the required supply from a tunnel in the laterite strata to the west of the town, but it was suggested that some test borings should be made, which would cost about Rs. 500, before a revised estimate was submitted. The cost of the scheme is capable of reduction as the East Coast Railway has been opened to Ongole since scheme A was framed. Both the Sanitary Commissioner and the Sanitary Board approved of the proposal and the Government, in G.O., No. 1375 M., Mis., dated 21st September 1901, ordered the Municipal Council to provide the necessary funds. The Council, however, owing to the straitened condition of its finances requested Government to undertake the work at its cost, which question remained undecided at the close of the year.

(19) *Salem water-supply*.—The Public Works Department reported in the beginning of the year the results of gauging the water-supply from certain wells which the Executive Engineer of Salem had sunk near a hill near Salem which bears what is known as the Namum mark. The supply was extremely meagre and Mr. Bruce Foote, Geological Survey Department (retired), who was good enough to inspect the wells, reported that the geological features of the locality were not such as to warrant any hopes of an increased supply.

It was supposed that this site was one which had been recommended by Mr. Ellis, Acting Sanitary Engineer; but it is not the site recommended in his official letters; this latter site has been again indicated to the Public Works Department, but nothing further has been heard of the matter.

II.—INSPECTION OF WORKS UNDER EXECUTION BY THE PUBLIC WORKS DEPARTMENT.

- (1) Cocanada water works.
- (2) Vizagapatam water works.

Both these works were inspected during the year, the progress has been slow as the works were sanctioned in 1897.

(1) *Cocanada water works*.—An alteration of the design of the engine-house seemed desirable as well as a change in the location of the two sets of engines required for pumping the canal and filtered water, respectively, and it was finally advised that the pump well should be sunk outside and some 25 feet away from the engine-house. It is understood that this suggestion has been adopted.

It has also been arranged that the engines shall be erected under the superintendence of the Inspector of Steam-boilers and Prime Movers.

Sub-soil water had penetrated the floor of the service reservoir and as the works are located not far from an inhabited area, it was deemed advisable that this should be entirely excluded; clay puddling, 3 feet thick, was recommended around the whole reservoir. The floor had not been executed according to the original design and it was advised that the floor should be increased in thickness by 9 inches and a layer of cement or asphalt rendering $\frac{1}{2}$ inch thick placed between the two floors.

It is understood that the pipes for distribution are now being received at Cocanada, and it is hoped that the works will be in operation within the next few months.

(2) *Vizagapatam water works*.—In respect to these it was found that they were nearing completion with the exception of the bund and outlet tower in the tank. The distribution system had been nearly completed.

Attention was called to the necessity for the removal of all the villages within the water spread area. This was a portion of the original scheme, but there seemed to be an impression that the villages not actually in the water spread did not require removal. That is, however, a mistaken impression and their removal is undoubtedly called for.

An alteration in the position of the sand-washing box was recommended.

The question of the best methods of giving the jail and lunatic asylum supplies from the new works was also discussed with the Executive Engineer.

III.—MAINTENANCE OF EXISTING WATER WORKS.

The works in operation at Madura, Dindigul, Trichinopoly, Tanjore, Cuddapah, Conjeevaram and Kurnool were inspected during the year. The suggestions made will be found embodied in the various reports which have since been before Government and which therefore it is unnecessary to refer to.

The Boiler Inspector made his usual half-yearly inspections of the machinery and plant at each pumping station and his reports are also communicated to Government from time to time.

During the year it seemed desirable to keep the Chairman of each Council informed in respect to variation in the fuel expenditure. This is done weekly and a comparison made week by week with previous weeks of the fuel consumption per

horse-power and per 1,000,000 gallons pumped 1 foot high. The result has been satisfactory so far as the drivers are inclined to be more careful having to explain any increase in consumption.

The report on the state of the plant and working of the various stations will be found as usual in the Boiler Inspector's annual report.

IV.—BIOLOGICAL TREATMENT OF SEWAGE.

It was proposed to erect filters at the Robinson Park for experiments in regard to the above. Rs. 7,000 were budgeted for this purpose. It was found that there would be difficulty in obtaining the services of any properly-qualified officer for the examination of the samples and as the Sanitary Board considered that the experiments of Mr. James of Bombay seemed to have been ample and to afford sufficient information, Government ordered the project to be dropped. The proposal was, however, revived in a modified form at the end of the year, but nothing was done during 1901.

The proposed bacterial experimental filters at Madura were also abandoned.

V.—MINOR SANITARY WORKS AND TYPE DESIGNS.

Advice was given to the Sanitary Board with reference to 76 minor sanitary works, of which 2 were minor drainage works, 22 minor water works, 21 hospital buildings, 21 markets, 5 slaughter-houses, 4 latrines and 1 village-site.

Six type designs were prepared as follows:—

- (1) A mortuary and *post-mortem* room for a rural hospital.
- (2) Compound walls in different materials.
- (3) Quarters for a Civil Apothecary.
- (4) A semi-permanent ward for caste patients suitable for rural hospitals (without verandah in rear).
- (5) A lying-in ward for a rural hospital.
- (6) A single latrine with six seats.

Of these the first four were issued by the Sanitary Board as type designs Nos. 88, 89, 90 and 91, respectively, and the rest will be issued shortly. No. 6 design was the outcome of the construction of several model latrine seats built for inspection by the Sanitary Board and it embodies the best features of all with the least possible expense.

Plans and estimates for three classes of dwellings suitable for Ootacamund and other hill stations generally were designed and submitted to the Sanitary Board; but these have not yet been issued as types.

VI.—CONCLUDING REMARKS.

Inventories of valuable stock have been maintained in this office.

The service registers have been duly maintained and kept up to date.

The staff has worked satisfactorily throughout the year.

J. A. JONES, M.I.C.E.,
Sanitary Engineer to Government.

OFFICE OF SANITARY ENGINEER TO GOVERNMENT,
POONAMALLEE ROAD (PARK TOWN),
MADRAS, February 1902.

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

READ—the following papers:—

Proceedings of the Sanitary Board, No. 194-S., dated 14th May 1902.

Read—the following papers:—

Report of the Sanitary Engineer to Government for the year 1901.

” ” Commissioner for Madras for the year 1901.

” ” Board for the year 1901.

Resolution—No. 194-S., dated 14th May 1902.

Submitted to Government with reference to rule 20 of the rules for conducting the business of the Sanitary Board issued with G.O., No. 1698 L., dated 18th September 1896.

2. The reports of the Sanitary Engineer and the Sanitary Board have been reduced to the limits prescribed in G.O., No. 2170 L., dated 17th December 1901. That of the Sanitary Commissioner has been still further reduced.

(True Extract.)

R. PARSONS,
Secretary.

To the Secretary to Government, Local and Municipal
Department, with 3 enclosures and 8 spare copies
of the Sanitary Board's Administration report.

From the Sanitary Commissioner for Madras, No. 42-T.
S., dated 17th June 1902.

ABSTRACT.—Submitting brief remarks on infantile mortality during 1901.

ORDER—No. 628 L., dated 4th July 1902.

The climatic conditions of the year 1901 were on the whole unfavourable to the public health. The south-west monsoon gave a rainfall below the average and though the later rains were more favourable in most districts this was not the case in all. Moreover the season in other parts of India was unsatisfactory and this reacted on prices in Madras which throughout the year were much above the average.

2. Partly on this account, but mainly in consequence of the unfavourable character of the previous year, there was a decline of over 100,000 in the number of births registered, which almost certainly denotes a still greater decrease in the actual number. The nominal birth-rate was 25.1 per mille, calculated on the population as ascertained by the census of 1901, and this figure shows how imperfect is the registration, since the actual birth-rate is certainly not less than 40 per mille and probably is higher than that figure.

3. The number of deaths was larger by 25,000 than in the previous year. The death-rate was 21.3 per mille and this is nearly as inaccurate as the birth-rate. Some slight progress has been made in the extension of the area in which the registration of births and deaths is compulsory and orders have been issued directing Collectors to pay more attention to this important subject. The returns from municipal towns, in which the birth-rate was 32.6 per mille and the death-rate 35.4 per mille, show that compulsion has a good effect; but it is clear that even there the registration of births is still seriously defective.

4. There can be little doubt that the chief cause of the imperfection of the statistics is the failure to register the births and deaths of infants who die in the first few months of life. The infantile death-rate is only 166.2 per mille while the calculated rate for the city of Madras is 295 per mille and this does not err on the side of excess. In the Nilgiris the mortality of female infants was higher than that of the males, and it is noteworthy that the Badaga and Toda tribes of this district show an excess of males. The obvious defect in the registration in Malabar, where the infantile death-rate is only 98.9 per mille, demands the close attention of the Collector, who should report what action he has taken to secure greater accuracy. Useful information regarding the causes of defective registration and the amount of the defect might be obtained by inquiries in selected villages, provided the inquiries are continuous and not sporadic. The most suitable villages for such an investigation are those in which important Government servants reside and those which are frequently visited by competent officers. The Governor in Council desires that effect may be given to this suggestion without delay, the result being noted in future reports.

5. There was an increase of 20,000 in the number of deaths from cholera, and the city of Madras suffered considerably from this disease. The Sanitary Commissioner ascribes the increased mortality in part to the neglect of the local authorities, who in his opinion do not exercise properly the discretion given to them in the matter of appointing the special observation and sanitary establishments which are required when a town is threatened with an invasion of cholera. The Government appreciate Colonel King's laudable enthusiasm, but they are unable to acquiesce in these general criticisms, which would be justified only if funds were sufficient to allow of the employment of a special staff on a somewhat remote probability of cholera attacking a town. In future reports the relation between the prevalence of cholera and the existence of a protected water-supply should be noticed in more detail. From the statistics given in statements VI and XI it is ascertained that, while the cholera mortality in all towns was 2.7 per mille, the rates in those towns which had a protected water-supply was 1.97 per mille. Among these towns those with the highest cholera mortality were Trichinopoly (2.9), Madras (2.4) and Dindigul (2.0).

6. The number of plague cases rose from 895 to 3,960 and the mortality was 77 per cent. The chief source of infection was the Mysore State and it was found impossible to protect the villages in the neighbourhood of its frontier, though the measures taken were successful in preventing the epidemic from spreading to other parts of the Presidency. The remarks of the Sanitary Commissioner on the subject of fevers have been read with interest, and the Governor in Council trusts that further investigations may be made regarding the nature and causes of this, the most prevalent of all Indian maladies. The number of deaths registered under the indefinite head of "all other causes" continues high, being 42 per cent. of the total. The statistics for a few towns and rural areas should be examined in detail in order that it may be ascertained whether greater precision is not possible. Information regarding deaths from respiratory diseases should be given in forms II and VI as required by the resolution of the Government of India, Nos. 1530-43, dated 13th August 1901, which was communicated with G.O., No. 1424 L., dated 30th August 1901.

7. The mortality from small-pox was 26,202 or .7 per mille of the population against 27,692 or .8 per mille in the previous year, the largest number of deaths having occurred in Gódvári (2.4 per mille) and North Arcot (1.1 per mille). The district boards concerned are requested to consider the desirability of enforcing the

compulsory provisions of the Local Boards Act in regard to vaccination in the more advanced tracts of these districts as has been done in six* other districts of the Presidency. Among municipalities Cochin headed the list with 343 deaths, this large mortality being attributed to the fact that the town adjoins an area under native administration where sufficient attention is not paid to the prevention and spread of small-pox.

8. One of the most unsatisfactory features disclosed by the report is the further increase in the already high death-rate of the city of Madras, where the mortality was no less than 55.5 per mille, the mean of the previous five years being 40.9. Colonel King has referred to the imperfections of the existing water-supply of the city and the attention of the Municipal Commissioners will be drawn to his criticisms. The present drainage, too, is defective and inadequate; but work has already been commenced on a new system which is estimated to cost Rs. 31,81,000. The Governor in Council fears, however, that even the improvement of the drainage and the water-supply will not be sufficient to place the health of the city in a satisfactory condition unless the congested areas in Black Town and Triplicane are thoroughly opened up by means of wide streets which will allow the prevailing winds to penetrate into quarters where there is now no proper ventilation or access of fresh air. The importance of an improvement scheme of this nature has long been recognized, but it would be impossible for the municipality to carry it out without a large measure of financial assistance from Provincial or Imperial revenues or both.

9. With regard to the suggestion made in paragraph 24 of his report that a definite percentage of available funds should be set apart by local boards for expenditure on sanitation, the attention of the Sanitary Commissioner will be drawn to paragraph 2 of G.O., No. 1337 L., dated 3rd August 1900, in which the Government vetoed a similar proposal made by the President of the Gódvári District Board. Colonel King's suggestion in paragraph 25 that orders should be issued for the production of village sanitary inspection books at jamabandi will be considered in the Revenue department.

10. The construction of the Trichinopoly water-works extension and protective works, which had been commenced under the supervision of the Sanitary Engineer in 1900, was still in progress. The Vizagapatam and Cocanada water-works the execution of which had been similarly commenced in 1900 by the Public Works department, were also in course of construction. The former work was nearly completed, but much progress was not made as regards the latter. A scheme for the water-supply of Ootacamund from the Tiger Hill reservoir was under execution by the Public Works department. Surveys and levels were completed by the Sanitary Engineer for two water-supply projects, and plans and estimates were prepared and submitted for one drainage and seven water projects. The Sanitary Engineer also inspected and reported upon certain improvements which were found necessary in connection with five of the existing water-works.

11. The Sanitary Board examined the schemes relating to eleven works of a sanitary nature and submitted them to Government. The Board also issued type designs for four works and scrutinized the plans and estimates relating to 85 sanitary works of the total estimated value of Rs. 14,40,745.

(True Extract.)

H. A. STUART,
Ag. Secretary to Government.

