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MADRAS RECORD OFFICE.

Government of Madras.

MUNICIPAL DEPARTMENT.

G.O. No. 1087	Press / Mis.
Dated 28-10-1886.	

Not to be folded or roughly handled

2/1087 Rd 28/10/86

India Office,
London, 2nd September 1886.

Statistics and Commerce,
No. 97.

To His Excellency The Right Honourable The Governor General of India in Council.

My Lord,

I forward, for your information, 30* copies of a Memorandum by the Army Sanitary Commission on the Report of the Bombay Municipality for 1884-85.

I have the honour to be,
My Lord,
Your Lordship's most obedient humble Servant,
(Signed) Cross.

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* 12 by mail; 18 by parcels post.

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ENCLOSURE.

11

MEMORANDUM of the Army Sanitary Commission on the Administration Report of the Municipal Commissioner of Bombay for 1884–85.

1. In our Memorandum on the Report of 1883 we dealt chiefly with certain facts stated in the Report which had an important bearing on the susceptibility of the population of Bombay to epidemic outbursts of cholera and small-pox, and the general principles which in our view ought to be adopted in dealing with them. We have found nothing in the present Report to call for modification of what we then said on the subject, but in place of resuming the discussion it will, perhaps, be more advantageous to follow our usual course and to take up the sanitary history where we left it, and to see precisely what is the present state of the public health as shown by the statistics and by the various departmental reports included in the present volume.

2. The population element made use of in calculating locality ratios is that of the 1881 Census, which was 773,196. But we think there can be little doubt that the population of a great commercial and manufacturing city such as Bombay now is must have undergone considerable increase since the Census year, and hence that all the local ratios will be found too high for any purposes of comparison. This difficulty, which exists in all populations whose rate of increase year by year has not been determined, is one of the main difficulties in the way of estimating the sanitary condition of Bombay, and there is also reason to believe that the registration itself is incomplete. Our estimate will hence be based not only on the ratios but on the actual numbers on the register, so far as these can be depended on.

3. *Births.*—The population of 1881 included,—

Males - - - - -	464,
Females - - - - -	308,4
Total - -	773,196

In the review of the Annual Report by the Town Council th a- tion is estimated at a total of 825,839, and the births, in ing still- born, at 16,148 7·72 per 1,000 on this number. Wer his ratio correct it hat only about half the births were registered. Tak 1881 the birth rate would be about 20·9 per 1 and the conclusion is tha the birth ose of comparison, and no more

following

The death-rate estimate on the assumed increase of population was 27·29 per 1,000; but on the Census population the death-rate would be a little over 29 per 1,000; nearer, but below the real death-rate if all the deaths were registered.

5. The deaths registered annually for the last eight years have stood as follows:—

Years.	Registered Deaths.
1877	33,511
1878	26,999
1879	22,527
1880	21,146
1881	21,856
1882	20,468
1883	23,530
1884	22,542

On the assumption that the registration errors have been tolerably constant during these eight years, we learn from the figures that subsequent to the famine year 1877 there had been a steady decline in the deaths, with an increase in 1883 not yet passed away.

6. The chief death causes during 1884 were as follows:—

Diseases.	Deaths.	Ratio per 1,000 of estimated Population.
Fevers	6,830	8·27
Respiratory diseases	3,744	4·53
Phthisis	3,061	3·74
Nervous system diseases	2,479	2·93
Diarrhœa	1,081	1·31
Dysentery	653	·77
Cholera	576	·70
Measles	456	·55
Small-pox	112	·13
All other causes	3,585	4·36
All causes	22,542	27·29

[illegible] mortality, 30·30 per cent. was due to fevers. Another [illegible] was due to diseases of the chest, including consumption; [illegible] altogether the diseases usually denominated as epidemic and [illegible] showed that [illegible] per cent. of the year's deaths was yielded by [illegible] the purely epidemic diseases, such as cholera and [illegible] of which caused 1,027 deaths in 1883, and the [illegible] represented in 1884 by 576 deaths from cholera and [illegible] small-pox. This decline [illegible] proof that the [illegible] activity [illegible] this [illegible]

Localities.		Population, 1881.	Death-rates per 1,000 of Population (1884).				
			Small-pox.	Cholera.	Fevers.	Phthisis, highest Ratios.	All Causes.
Colaba	Upper	9,867	—	—	2·44	—	33·13
	Middle and Lower	14,265	·07	·63	7·01	—	20·18
Fort	South	3,515	—	—	3·69	—	9·10
	North	33,828	·05	·38	7·80	—	24·32
Esplanade		13,080	·07	1·91	5·65	—	18·42
Market		49,130	·12	·56	7·46	—	24·62
Mandul		42,351	·28	·35	11·21	—	32·06
Chuckla		37,048	·10	·32	11·14	9·04	40·02
Ummarkhari		54,656	·10	·53	9·62	5·47	33·33
Dongri		33,290	·12	·48	8·47	—	26·79
Dhobi Talao		39,409	·15	1·67	9·56	—	33·39
Fanaswadi		23,218	·21	1·11	6·20	—	22·09
Bhuleshwar		38,106	·05	·44	8·24	6·21	30·20
Nal Bazar (Khara Talao)		28,691	·13	·52	10·63	7·31	37·88
Kumbharwada		34,990	·05	·68	8·00	4·40	27·77
Khetwadi		29,436	·03	·91	7·94	—	26·87
Girgam		25,319	·27	1·97	9·55	—	32·86
Chaupati		10,975	·09	2·09	5·46	4·93	22·14
Walkeshwar		11,303	—	·35	3·36	—	14·50
Mahalakshmi		6,232	—	·96	11·87	—	32·25
Mazagon		27,904	·10	·64	6·88	—	24·90
Tarwadi		14,542	·13	·48	6·05	—	33·21
2nd Nagpada		15,922	·06	·37	11·43	8·47	39·81
Kamathipura		28,455	·35	·49	12·86	5·69	42·17
Tardeo		20,281	·29	·54	9·51	—	23·81
Byculla		26,842	·14	·44	8·90	—	27·38
1st Nagpada		9,372	—	·32	12·80	—	43·74
Parel		18,560	·10	·43	14·70	—	35·77
Sewri		5,555	—	·72	16·20	—	30·78
Son		17,237	—	·17	8·58	—	21·69
Mahin		17,309	—	1·79	8·95	—	29·23
Worli		14,621	·40	1·09	10·46	—	26·94

9. These data are only for a single year, 1884, and would be liable to the usual annual variations if they were assumed as constants; but they nevertheless present facts that can scarcely be accepted as strictly accurate. It would appear as if further inquiry were necessary to introduce required corrections. Take, for example, the [illegible] representing the death ratio from phthisis. If the data were [illegible] should have to rank consumption among the epidemics o[illegible] The year's ratios are apparently not accidental, because simila[illegible] are given in the Report for three successive [illegible]s. It seems [illegible] likely that careful testing of cases would show th[illegible] other chest [illegible] besides pulmonary consumption were included [illegible] the designation of "phthisis," just as other diseases are included [illegible] the general head of "[illegible]ers." But if the ratios as they s[illegible] represent roughly th[illegible] from phthisis in the most severely affected distric[illegible] be accepted as representing the existence of [illegible] more unhealth[illegible] construction, and wors[illegible] other city.

"wholesome dens, into which the light of day never penetrates, and "which of necessity must breed disease and pestilence. This is only "one instance of the many unwholesome description of buildings being "erected in Bombay."

He fully admits that the setting back of houses to widen streets is an "unmixed good" so far as the street is concerned, but in the absence of necessary Building Acts "by a large expenditure of money on the "one hand certain sanitary advantages are procured, which are in a "measure counterbalanced by defective legislation on the other."

10. He describes the proceedings as follows:—"A man intends to "rebuild his house, in the rear of which ten or twelve feet of open "space had been left for ventilation. On submitting plans he is "perhaps called upon by the municipality to set back his house ten feet. "What is the consequence? He does not diminish the size of the "house and still leave an open breathing space in the rear, of ten feet; "he literally sets back his house ten feet, and builds on the open space "which had originally been left for ventilation, thus shutting out light "and air from the rear portion of the dwelling, and rendering the back "rooms dark unwholesome dens, into which light and pure air never "enter." And he concludes, that "it is not only useless but detrimental "to enlarge the breathing space of the streets at the expense of the "ventilation of the houses." But on this view the Municipal Commissioner remarks that "there is no reason in Bombay, more than "elsewhere, that one improvement should be made at the expense of "another."

It will be seen that the complaint of the Officer of Health is that nevertheless this is done. We may recall, in passing, that one of the [illegible]ost effectual measures for arresting epidemic diseases in Bombay used to be unroofing affected dwellings, a fact which proves the truth of the Officer of Health's view in another way.

11. The question raised by the preceding table is, whether the haphazard method of massing houses together described by the Officer of Health has been a possible factor in causing the enormous losses from phthisis which have taken place in the city; and the reply must be that just in proportion as original construction or subsequent rebuilding of dwellings has left the all-important requirement in a warm climate of free moving air not only around but inside dwellings unprovided for, will th[illegible]ally crowded population of unhealthy localities suffer from [illegible] also from endemic diseases generally.

[illegible]e practical result of this discussion is that the widening of [illegible] such a city as Bombay is of very decided public advantage, [illegible] it would be less costly and more effective at the same time to [illegible]uct the removed houses on strictly sanitary principles. Because, if this [illegible] done at the time, it will, in all probability, have to be done afterw[illegible] at the public expense, while in the meantime the advantages to health which have been expected from wideni[illegible]ets will have been only very partially realized, if realized [illegible]

[illegible] A further, exa[illegible] of th[illegible] all the distri[illegible]

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or insanitary condition, and as showing where outlay for works is required, and the probable nature and extent of them in each locality. In the present case the facts appear to show that there are circumscribed districts in Bombay where general sanitary improvements are greatly needed, and that these are probably subsoil drainage and opening up of close neighbourhoods.

Mortality from cholera, although influenced by the same local conditions, is more closely connected with filth in air, earth, or water, and thus the table supports the conclusion that the healthiest town will always be that one where sanitary work in all its departments is most fully carried out.

So far as regards phthisis, we concur in the view expressed by the sanitary officer, who says: "Unless we are enabled to deal with house "sanitation in a more effectual manner than at present, I fear there is "little hope of reducing the death-rate from phthisis."

15. The Report contains no detailed account of the localities where epidemics prevailed in 1884, but in former reports much useful information has been given about them.

16. As regards cholera, the Officer of Health has continued the details of the relation of this disease to the water-supply, which it may be well to give here simply as facts corrective of opinions still prevalent in certain parts of India that this disease is specially related to cholera-poisoned water.

The 576 cholera deaths which were registered in Bombay in 1884 were related to the quality of water used by the people as follows:—

	Attacked.	Died.
Vehar and Tulsi water drinkers	569	444
Well-water drinkers	89	71
Not known	76	61
Total	734	576

It thus appears that the population using the comparatively pure water conducted in pipes from the country reservoirs yielded 60 per cent. of the cholera attacks, and 77 per cent. of the death[illegible]ile the population still using the bad well water containing foul sub[illegible] yielded about 12 per cent. of the attacks and 12·3 per cen[illegible] of the deaths. Although we have no means in either case of giving [illegible]ios to the population using each class of waters, th[illegible] facts are co[illegible] as against the specific action of well waters in cholera. They [illegible] prove that bad water has no effect on cholera morta[illegible] but ra[illegible] reverse. One result is obvious enough, and this is, tha[illegible] Veh[illegible] water drinkers were affected by localizing causes of cho[illegible] qui[illegible] apart from [illegible]pply. This point is one of considerable i[illegible]portan[illegible] [illegible]cause the facts clearly show that wh[illegible] the[illegible] [illegible]pplied by the Vehar and Tulsi [illegible] [illegible] will st[illegible] suffer from ch[illegible] [illegible]ss the [illegible]al localiz[illegible] caus[illegible]

“In these cases the difficulty consists, not in detecting the blot, for that is patent, but in providing a remedy which shall at once be effective and inflict the least possible hardship. We have to deal with insanitary habits of very ancient standing, which the great body of the population regard as perfectly innocent. In the carrying out of many of the most important sanitary reforms we have to encounter opposition not merely from the ignorant, but from a large population of the educated classes, and hasty or ill advised action would stimulate that opposition to an extent which would render all action impossible.” We must not forget, however, that similar language might have been used not long ago regarding the opposition to sanitary reforms in many English towns. It follows that the spread of information on the subject is of essential importance. This, to a large extent, ought to be effected by the ordinary municipal discussions and the press. But then it must never be forgotten that the most entire acquiescence of public opinion, say on the necessity of cleanliness, could not in a large city lead to any satisfactory result unless facilities for cleanliness were brought to the houses, and this is not domestic but municipal work.

18. The simple inspection of a cholera locality such as those described by Drs. Klein and Gibbes in their report to the India Office, and then raising the question who is to blame for this, the municipality or the people, ought to lead at once to a practical answer.

19. In such localities the measures required are mainly those which the people cannot apply, such as water-supply, drainage, and cleansing, and which are clearly municipal work. So far as relates to the sanitary state of the houses it would be in vain to look for improvement in this requisite of health so long as the external conditions remain such as have been described in the report referred to.

20. In his own Report the Municipal Commissioner states that house-drainage connections with the sewers are under trial in Kamathipura, and we have referred to this circumstance for the purpose of suggesting, if necessary, that all such trial works require continuous skilled inspection to avoid failure in some small and easily remediable matter which may involve the fate of the entire scheme.

We have introduced these remarks because they refer to matters of san[illegible] principle, but we are desirous that they should not be under[illegible]lying that good work has not been done for improving the pu[illegible] health.

[illegible]ater-supply. On the contrary, a glance at the tables in the [illegible] shows tha[illegible] drainage and water-supply especially, large [illegible] have ta[illegible] place in the course of the year. In times past [illegible] been some miscalculation in the amount of water [illegible] beginning with the Vehar reservoir, which was soon [illegible] [illegible]voir at Tulsi [illegible] to be [illegible]sufficient for its object [illegible] the Tansa [illegible] will [illegible] been constructed, and now it has [illegible] the others and it is to be [illegible] be place[illegible] a satisfa[illegible] [illegible] B[illegible] [illegible]arwa[illegible]

22. We feel disposed to ask whether so large a number of bursts in water mains and consequent loss as shown in the following list are inevitable :—

Size of the Mains.	Number of Bursts.
48 inches	1
24 „	4
9 „	1
7 „	2
6 „	4
5 „	6
4 „	30
3 „	77
Total	125

23. In former Memoranda we gave the rainfall over the gathering area for Vehar, and the following table will show what has been the rainfall for both the areas at present yielding water :—

Years.	Rainfall, Inches.	
	Vehar.	Tulsi.
1880	72·42	93·76
1881	59·10	86·11
1882—83	54·63	74·22
1883—84	99·54	109·46

For the year 1884 itself the Vehar rainfall was 87·65 inches, and that over Tulsi was 94·84 inches. The facts show how unsafe it would be to depend on a single year's record for the amount of water available.

24. As regards distribution, the house connections have been as follows :—

1880	12,494
1881	12,817
1882–83	13,244
1883–84	13,545
1884–85	13,909

The public water distribution is effected by,—

46 dipping wells.
56 drinking fountains.
24 stand pipes.
14 large ornam[illegible]
17 cattle tro[illegible]

[illegible] the dipping wells, drinki[illegible] "scarcely any duty. Only in a few cases of new buildings, and of "some old connections (with the old drains), which are irreparably bad, "connections have been made with the new pipe sewers at the expense "of the house owners."

26. Besides the general advance of the sewerage scheme, much good work for improving the surface drainage and regulating the overflow of storm water, and surface levelling, was done in the course of the year. But notwithstanding all that has been done we are still met by the fact that, while the current mortality from cholera has been greatly reduced, the people are still liable to outbursts of epidemics such as the one described in our Memorandum on last year's Report. Many conditions no doubt act together in leading to this result, but the one which all past experience shows to be the most fatal is defective cleanliness, and the evidence in our possession shows that this disease cause is present in all epidemic localities in the city. We have, in fact, to deal with a case, not of a village, but of a great city of some 800,000 inhabitants, the entire sewage of which has to be collected by hand labour and carried away, while this work must reach effectually not only the streets and better class of houses, but those closely packed, densely peopled localities where most of the people find house room.

27. *Cleansing.*—During the year 1884 there were employed in this work a daily average of 3,603 men and women, including those employed on surface work, and 540 carts, besides 127 used for collecting the night-soil. The staff collected and removed as an every day's average 389 tons of garbage and 295 tons of night-soil.

The total cost of this department of public health work was 83,855*l.*, of which 48,808*l.* was paid for by the Municipality, and the remainder was recouped to the Health Department apparently for work done. Any way, the larger sum shows the cost of this method of dealing with the question to the city. The amount included the cost of clearing out 197 miles of covered drains, which is a customary item in Bombay municipal work. Under any system efficient surface cleansing of all streets, lanes, compounds of houses, and other close localities is of course necessary, but it is not from ordinary street refuse that the danger comes. It is from the solid and liquid sewage of houses, and the filthy state of surroundings which this leads to, that the great losses of life from recurring epidemics arise.

[illegible] been a long settled conclusion of sanitary science and
that, in large cities at least, no attainable perfection in house
can meet the every day dangers to which the people are
rom disease emanations proceeding from their own excretions.
has also be [illegible] established result of sanitary engineering
e danger [illegible] avoided by applying natural laws
ectually done by house drainag
In a question such as this,
ave to b [illegible] aside,

29. In conclusion, the Report under review shows that, in the important requirements of drainage and water-supply, advances have taken place in the course of the year, but there is ample evidence to show what a great amount of work in both directions requires to be done before the public health is out of danger, and of this fact perhaps the best evidence is that of the Municipal Commissioner himself, who "expresses a hope that the combination of a copious water-supply with "efficient drainage will lay the foundation of a permanent improve-"ment in the public health of these insanitary portions of the city; "that in six years the Tansa scheme will have given the water-supply, "and that in less than that period the drainage will have been com-"pleted;" and he adds this important caution, which we have frequently given in past years,—"the admission of more water necessitates the con-"struction of more channels to remove it, in other words progress in "drainage operations." The two works in sanitary practice are inseparable. They are indeed one work, and their final object is to supply every person with water for domestic use, and to ensure continuous house cleansing and removal of sewage by gravitation to a distance. Any way this is the position of the works after about a quarter of a century of discussion and consideration of plans, and there are six years still to wait for their completion. In the meantime, all that can be done is to insist on the effective supervision of house construction and on great improvements in the arrangements for cleansing and keeping clean. The state of things revealed by Drs. Klein and Gibbes, and by the Officer of Health, ought no longer to be tolerated, and has not the Sanitary Commissioner for Bombay, who was for many years Officer of Health for the city, told us lately that Bombay is still an "Augean stable?"

25th June 1886.

No. 142

y forwarded to the Government of Madras for information
ith a request that with the permission of His Excellency the
rnor in Council the Memorandum of the Army Sanitary
mission may be communicated to the Municipal author.
of Madras.

By order,

J. P. Hewett.

Offg. Under Secy: to the Govt.
of India

e Dept
unicipalities
imla
14th October 1886

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SECY. GOVT. MADRAS
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REV. DEPT.

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[9]

Financial Department
CURRENT No. 1765 M

78

H.M. Kasturi P.S./

Order of 28th Octr./86. No. 1087 M

Communicated to the President, Mnl Commission, Madras, and the Sanitary Commissioner.

From

The Offg. Under Secretary to the Govt. of India Home Dept.

No. 142

Dated 14th } October 1886.
Received 21st
Enclosures 26.

SUBJECT.

Forwarding the Memorandum by the Army Sanitary Co[illegible]ssion on the Repor[illegible] the [illegible]ipality Bomba[illegible] for [illegible]

9

28th October 1886, No. 1087 M., Financial.

GOVERNMENT OF MADRAS.

FINANCIAL DEPARTMENT.

Read—the following paper:—

Despatch from the Right Honorable Lord CROSS, Her Majesty's Secretary of State for India, to His Excellency the Right Honorable the Governor-General of India in Council, dated India Office, London, 2nd September 1886, No. 97 (Statistics and Commerce).

I forward, for your information, 30* copies of a Memorandum by the Army Sanitary Commission on the Report of the Bombay Municipality for 1884-85.

* 12 by mail; 18 by parcels post.

Enclosure.

Memorandum of the Army Sanitary Commission on the Administration Report of t Commissioner of Bombay for 1884-85.

1. In our memorandum on the report of 1883, we dealt [illegible] with cer the report which had an important bearing on the susceptib epidemic outbursts of cholera and small-pox, and th ought to be adopted in dealing with them. We have for modification of what we then said on the subject, will, perhaps, be more advantageous to follow our usua where we left it, and to see precisely what is the prese the statistics and by the various departmental reports

2. The population element made use of in cal census, which was 773,196. But we think there c great com[illegible]l and manufacturing city such as Bom able increase since the census year, and hence that for any purposes of comparison. This difficulty, whi increase year by year has not been determined, is one mating the sanitary condition of Bombay, and there is itself is incomplete. Our estimate will hence be base numbers on the register, so far as these can be depende

Births.—The population of 1881 included—

Males . . . . .

Females . . . . .

4. *Death.*—Exclusive of still-born there were registered the following deaths :—

Males	11,757=25·29 per 1,000.
Females	10,785=34·96 "
Total ..	22,542

The death-rate estimate on the assumed increase of population was 27·29 per 1,000; but on the census population the death-rate would be a little over 29 per 1,000; nearer, but below the real death-rate if all the deaths were registered.

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Cholera	576	·70
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[illegible]o[illegible]	112	·13
	3,595	4·36
All causes	22,542	27·29

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ox. This decline affords no proof that the local causes
than in the former year. The reduction was most
in 1884, and annual variation is, indeed, one of the

lded an increase of 927 deaths over the fever death-

elements for Bombay, but it is not sufficient to state
al purposes they must be localized, in order to be able
's is shown in the next abstract.

Localities.		Population, 1881.	Death-rates per 1,000 of population (1884).				
			Small-pox.	Cholera.	Fevers.	Phthisis, highest ratios.	All Caus
Colaba ..	Upper	9,867	..	..	2·44	..	33·13
	Middle and Lower ..	14,265	·07	·63	7·01	..	20·18
Fort ..	South	3,515	..	..	3·69	..	9·10
	North	33,828	·05	·38	7·80	..	24·32
Esplanade		13,080	·07	1·91	5·65	..	18·42
Market		49,130	·12	·56	7·46	..	24·62
Mandul		42,351	·28	·35	11·21	..	32·06
Chuckla		37,048	·10	·32	11·14	9·04	40·02
Ummarkhari		54,656	·10	·53	9·62	5·47	33·33
Dongri		33,290	·12	·48	8·47	..	26·79
Dhobi Talao		30,409	·15	1·67	9·56	..	33·39
Fanaswadi		23,218	·21	1·11	6·20	..	22·09
Bhuleshwar		38,106	·05	·44	8·24	6·21	30 20
Nal Bazar (Khara Talao)		28,691	·13	·52	10·63	7·31	37·88
Kumbharwada		34[illegible]	·05	·68	8·00	4·40	27·77
Khetwadi		2[illegible]	·03	·91	7·94	..	26·87
Girgam		2[illegible],319	·27	1·97	9·55	..	32·86
Chaupati		10,975	·09	2·09	5·16	4·93	22·14
Walkeshwar		11,303	..	·35	3·36	..	14·50
Mahalakshmi		6,232	..	·96	11·87	..	32·25
Mazagon		27,904	·10	·64	6·88	..	24·90
Tarwadi		14,542	·13	·48	6·05	..	33·21
2nd Nagpada		15,922	·06	·37	11·43	8·47	39·81
Kamathipura		28,455	·35	·49	12·86	5·69	42·17
Tardeo		20,281	·29	·54	9·51	..	23·81
Byculla		26,842	·14	·44	8·90	..	27·38
1st Nagpada		9,372	..	·32	12·80	..	43·74
Parel		18,560	·10	·43	14·70	..	35·77
Sewri		5,555	..	·72	16·20	..	30·78
Son		17,237	..	·17	8·58	..	21·69
Mahin		17,309	..	1·79	8·95	..	29·23
Worli		14,621	·40	1·09	10·46	..	26·94

9. These data are only for a single year, 1884, and would be liable to the usual annual
variations if they were assumed as constants; but they nevertheless present facts that [illegible]ely
be accepted as strictly accurate. It would appear as if further inquiry were necess[illegible]
duce required corrections. Take, for example, the column representing the death r[illegible]
phthisis. If the data were correct, we should have to rank cons[illegible]nption among the [illegible]
Bombay. The year's ratios are apparently not accidental, [illegible] similar r[illegible]
the report for three successive years. It seems not unlike[illegible] testin[illegible]
show that other chest diseases besides pulmonary consum[illegible] aded u[illegible]
designation of "phthisis," just as other diseases are incl[illegible] eral hea[illegible]
But if the ratios as they stand represent roughly the [illegible] n phthisis
severely affected districts, they would have to be accept[illegible] e existe[illegible]
more crowded, of more unhealthy construction, and [illegible] coul[illegible]
found in any other city. This subject has for years
Health, and the necessity of town improvements for op[illegible]
has been fully admitted, and to some extent acted on.
improvemen[illegible] and the Acting Officer of Health raises
his special report :—"Plans for almost every descripti[illegible]
A not unfrequent plan is that of a chawl, three or four
three or four feet wide on each side. The centre rooms
munication with the external air. They are dark unwh[illegible]
never penetrates, and which of necessity must breed di[illegible]
instance of the many unwholesome description of buildin[illegible]

fully admits that the setting back of houses to
treet is concerned, but in the absence of nec[illegible]
oney on the one hand certain sanitary advan[illegible]
nced by defective legislation on the other."

te describes the proceedings as follows :—"A
which ten or twelve feet of open space had been
perhaps called upon by the municipality to set
[illegible] He does not dimi[illegible] the size of the ho[illegible]
[illegible] back his house
[illegible] ten feet; he liter[illegible] ation thus shu[illegible]
[illegible] ack rooms da[illegible]
that "i[illegible]

e the breathing space of the streets at the expense of the ventilation of the houses." But
is view the Municipal Commissioner remarks that "there is no reason in Bombay, more
n elsewhere, that one improvement should be made at the expense of another."

It will be seen that the complaint of the Officer of Health is that nevertheless this is done. We may recall, in passing, that one of the most effectual measures for arresting epidemic diseases in Bombay used to be unroofing affected dwellings, a fact which proves the truth of the Officer of Health's view in another way.

11. The question raised by the preceding table is, whether the hap-hazard method of massing houses together described by the Officer of Health has been a possible factor in causing the enormous losses from phthisis which have taken place in the city; and the reply must be that just in proportion as original construction or subsequent rebuilding of dwellings has left the all-important requirement in a warm climate of free moving air not only around but inside dwellings unprovided for, will the usually crowded population of unhealthy localities suffer from phthisis and also from endemic diseases generally.

12. The practical result of this discussion is that the widening of streets in such a city as Bombay is of very decided public advantage, but that it would be less costly and more effective at the same time to reconstruct the removed houses on s tly sanitary principles. Because, if this be not done at the time, it will, in all probability, hav to be done afterwards at the public expense, while in the mean time the advantages to health, which have been expected from widening the streets, will have been only very partially realized, if realized at all.

13. A further examination of the preceding table shows that in nearly all the districts where phthisis is most fatal there are high death-rates from fever, which is a true endemic disease in Bombay. A probable cause common to both diseases is very probably subsoil damp from defective drainage, for this is a well-known cause, where it exists, both of fever and consumption, and it may be safely stated that stagnant, damp, impure air supplies a not unimportant factor in the etiology of both diseases in this city.

14. It will be learned from the table also that all the death-rates vary largely in the different localities. A similar distribution of ratios takes place in all large cities, and is adopted as an index of relative sanitary or insanitary condition, and as showing where outlay for works is required, and the probable nature and extent of them in each locality. In the present case the facts appear to show that there are circumscribed districts in Bombay where general sanitary improvements are greatly needed, and that these are probably subsoil drainage and opening up
of [illegible]hbourhoods.
ty from cholera, although influenced by the same local conditions, is more closely
with filth in air, earth, or water, and thus the table supports the conclusion that the
owr will always be that one where sanitary work in all its departments is most fully

cur in the view expressed by the Sanitary officer, who says:
s gards use-sanitation in a more effectual manner than at present,
enabled death-rate from phthisis."
little hop
report co account of the localities where epidemics prevailed in
former re nformation has been given about them.
of Health has continued the details of the relation of
may be well to give here simply as facts corrective of
India that this disease is specially related to cholera-

gistered in Bombay in 1884, were related to the quality

	Attacked.	Died.
.. ..	569	444
.. ..	89	71
.. ..	76	61
Total ..	734	576

using the comparatively pure water conducte
r cent. of the cholera attacks and 77 per ce
the bad well water containing foul subsoil
and 12·3 per cent. of the deaths. Although we
ratios to the population using each class of water
action of well w in cholera. They do not
ortality, but ra everse. One re lt is
r drinker we
s point i one
that w the

Vehar and Tulsi water mains, which they will be before long, they will still suffer from c
and their case will be hopeless unless the real localizing causes are dealt with, and what these
is quite well known.

17. We have so frequently discussed the disease history of Bombay that it is unnecessa to enter further on this subject at present, and it will perhaps be better to inquire generally into the present state of the sanitary works, beginning with the following remark in the Municipal Commissioner's report. After stating that the more impo disease causes are, it is hoped, about to be met by legislative remedies, he says: "In these the difficulty consists, not in detecting the blot, for that is patent, but in providing a rem which shall at once be effective and inflict the least possible hardship. We have to deal with insanitary habits of very ancient standing, which the great body of the population regard as perfectly innocent. In the carrying out of many of the most important sanitary reforms, we have to encounter opposition, not merely from the ignorant, but from a large population of the educated classes, and hasty or ill-advised action would stimulate that opposition to n extent which would render all action impossible." We must not forget, however, that simi nguage might have been used not long ago regarding the opposition to sanitary reforms many English towns. It follows that the spread of information on the subject is of es ial importance. This, to a large extent, ought to be effected by the ordinary municipal d ssions and the press. But then it must never be forgotten that the most entire acquiescence of public opinion, say, on the necessity of cleanliness, could not in a large city lead to any satisfactory result unless facilities for cleanliness were brought to the houses, and this is not domestic but municipal work.

18. The simple inspection of a cholera locality such as those described by Drs. Klein and Gibbes in their report to the India Office, and then raising the question who is to blame for this, the municipality or the people, ought to lead at once to a practical answer.

19. In such localities the measures required are mainly those which the people cannot apply, such as water-supply, drainage, and cleansing, and which are clearly municipal work. So far as relates to the sanitary state of the houses, it would be in vain to look for improvement in this requisite of health so long as the external conditions remain such as have been described in the report referred to.

20. In his own report the Municipal Commissioner states that house-drainage connections
with the sewers are under trial in Kamathipura, and we have referred to this circumstance for
the purpose of suggesting, if necessary, that all such trial works require conti d
inspection to avoid failure in some small and easily remediable matter which m
fate of the entire scheme.

We have introduced these remarks because they refer to ma
are desirous that they should not be understood as implying
for improving the public health.

21. *Water-supply.*—On the contrary, a glance at
drainage and water-supply especially, large advances ha
In times past there has no doubt been some miscalcul
that beginning with the Vehar reservoir, which was s
another large reservoir at Tulsi has been constructed
Tansa scheme to the others, and it is to be hoped that th
a satisfactory footing, including filtration of the sup
purifying and regulating the distribution of water ha
be advantageous in regulating the supply and rende
that 12 millions of gallons per diem will be required
districts, an amount in excess of what may be available.
250,000 gallons of waste per diem had been discovere
The tank and filter works on Malabar hill appear also to

22. We feel disposed to ask whether so large a num
quent loss as shown in the following list are inevitable :-

3. In former memoranda we gave the rainfall over the gathering area for Vehar, and the wing table will show what has been the rainfall for both the areas at present yielding ater :—

Years.	Rainfall, Inches.	
	Vehar.	Tulsi.
1880	72·42	93·76
1881	59·10	86·11
1882-83	54·63	74·22
1883-84	99·54	109·46

For the year 1884 itself, the Vehar rainfall was 87·65 inches, and that over Tulsi was 94·84 inches. The facts show how unsafe it would be to depend on a single year's record for the amount of water available.

24. As regards distribution, the house connection have been as follows :—

1880	12,494
1881	12,817
1882-83	13,244
1883-84	13,545
1884-85	13,909

The public water distribution s effected by—

Forty-si pping wells.
Fifty-six drinking fountains.
Twenty-four stand pipes.
Fourteen large ornamental fountains.
Seventeen cattle troughs.

"A a dipping wells, drinking fountains, &c., were cleaned at short intervals." Better that there e no dipping wells to clean.

There were 715 private water meters and 102 Government meters in use.

25. *Drainage and sewerage.*—Perhaps the most important statement under this head is as follows :—"The discharge of the night-soil, that used to be pumped into the harbour at Carnac Bundar, into the new main sewer at the same place, is one of the chief features of the year's administration.

The total quantity of sewage lifted during the year at the Love Grove pumping station was 415 8 cubic feet.

a sewers of the first sanctioned portion of the drainage scheme have been completed,
r states that "for want of connections to conduct the sewage into the pipe sewers,
ty. Only in a few cases of new buildings, and of some old
which are irreparably bad, connections have been made with
f the house-owners."

of the sewerage scheme, much good work for improving
overflow of storm water, and surface levelling, was done
tanding all that has been done, we are still met by the
n cholera has been greatly reduced, the people are still
the one described in our memorandum on last year's
together in leading to this result, but the one which all
is defective cleanliness, and the evidence in our posses-
ent in all epidemic localities in the city. We have, in
but of a great city of some 800,000 inhabitants, the
d by hand labor and carried away, while this work must
better class of houses, but those closely-packed, densely-
ple find house room.

384 there were employed in this work a daily average of
employed on surface work, and 540 carts, besides 127 u d
collected and removed as an every day's average 389 tons

public health work was 83,8 *l.*, of w
ainder was recouped to the health depa
um shows the cost of this ethod of
led the cost of clearing miles o
municipal work. U
f houses, and otn r
hat the danger n
urround gs

lusion of it
in house-clea
ase ema ti

But it has also been a long-established result of sanitar
entirely avoided by applying natural laws in solving the p
house-drainage and water-supply, but in no other way. I
established, unhealthy, popular habits have to be set aside, th
not whether the people prefer their bad habits to freedom f
from epidemics is or is not a public advantage. If it is, th
in administrative matters of this kind, while the great lead
and their application in view, much wisdom is everywh
It has happened in this country that loud objections ag
executed have been at once destroyed by proposing to
removed, and things restored to their former state. Even in ndi
have been conceded by their owners as a favor to the authority,
adopted as soon as their great advantages had been experienced.

29. In conclusion, the report under review shows that, in the n
drainage and water-supply, advance taken place in the cou
ample evidence to show what a gr ount of work in both
before the public health is out of dan and of this fact perhaps
Municipal Commissioner himself, "expresses a hope tha
water-supply with efficient drainage will lay the foundation of a
public health of these insanitary portions of the city; that i r
have given the water-supply, and that in less than that the d
completed;" and he adds this important caution, which we have frequ
—"the admission of more water necessitates the construction of more hann
other words progress in drainage operations." The two works in sanitary pr
able. They are indeed one work, and their final object is to supply every person
domestic use, and to ensure continuous house-cleansing and removal of sewage by
a distance. Any way this is the position of the works after about a quarter of a cen
sion and consideration of plans, and there are six years still to wait for their com
meantime, all that can be done is to insist on the effective supervision of house-
on great improvements in the arrangements for cleansing and keeping clean
things revealed by Drs. Klein and Gibbes, and by the Officer of Health. o
tolerated, and has not the Sanitary Commissioner for Bombay, who v
of Health for the city, told us lately that Bombay is still an "Aug

25th June 1886.

No. 142.

Copy forwarded to the Government of Madras f
that, with the permission of His Excellency the Gov
of the Army Sanitary Commission may be commu
of Madras.

(By order.)

(Signed)
Offg.

Home Dept. (Municipalities),
Simla, 14*th October* 1886.

Order—dated 28th October 1886, No. 1087 M., I
unicated to the President, Municipal Co
r.

(True Extract.

n, Madras.
s.

Govt. of {1886} Madras.

FINANCIAL.

8th October 1886, No. 1087 M.

OCTOBER.

[1]

PRESS.

Finl. DEPARTMENT.

G.O. DATED 28th Octr./86

No. 1087.M.

First [illegible] to Press.

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Sanitation Comn. to the Pres t Munl. Comn. & the Sanitary Commr. Madras, Endorsement of the Govt. of India forwarding memorandum by Sanitary repor me