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MADRAS RECORD OFFICE.

Government of Madras.

Public DEPARTMENT.

G.O. No.	608	Press ~~Mis.~~
Dated	4-6-	1867

Not to be folded or roughly handled

20-10-36

1

Proceedings of the Madras Government, Public Department,
4th June 1867.

No. 8. Read the following letter from the Honorable R. S. ELLIS, c. B., Sanitary Commissioner, Madras, to the Chief Secretary to Government, Fort Saint George; dated Madras, 17th May 1867, No. 111.

Enclosures four.
4 Mortuary Reports.

I have the honor to forward, for submission to Government, the accompanying Mortuary Report of the Town of Madras for the 1st quarter in 1867.

Report on the Deaths in Madras for the 1st Quarter, 1867.

The health of Madras during the first quarter has not been altogether satisfactory.

The total number of deaths registered amounts to 3715, which, contrasted with the mean for ten years of similar quarters from 1857 to 1866 inclusive, gives an increase of 730 deaths to the period under review.

Taking the first quarters of six previous years, as shown in the margin, we observe that there

1861.....	2,809
1862.....	3,912
1863.....	3,783
1864.....	3,125
1865.....	2,594
1866.....	2,960
Total ..	19,183
Mean...	3197.1

is still a heavy increase in the mortality of the present year of 518 deaths. The years 1862 and 1863 are the only two years in the above period which show a larger number of deaths.

Contrasting the quarter under review with that which has past, and which was also a sickly one, it is satisfactory to find a decrease in the number of deaths, amounting to 112.

The death-rate for the past quarter has been at the annual rate of 33.02 per mille, which must be considered high.

There have been 39 deaths amongst Europeans, of which 11 have been females. This number is 1.6 less than that of the average for the first quarters of ten previous years. Nearly half these deaths has been from miasmatic disease, of which fever contributes 2, dysentery 5, diarrhœa 3, and cholera 6.

The deaths among East Indians amount to 98, of which the larger proportion is females (54). The deaths amongst this class of the population have increased on the ten year period by 21.8 deaths. More than half these deaths is from miasmatic diseases, amongst which cholera contributes 23.

Hindoos, from composing the great bulk of the population, make up the greater number of deaths. This amounts to 2,912, the male being 248 in excess of female mortality. The increase of deaths in this class over the ten years' average amounts to 510 1 deaths.

Mahomedans also show a great increase in the number of deaths, which amounts to 200.4 beyond the average.

The total number registered from this section of the population during the past quarter amounts to 666, of which number 356 are females, or 46 more than the opposite sex.

Taking the last Municipal census* (which it is necessary to say must be received with caution) as the basis of our calculation, we find that the annual death-rate amongst the above different classes of the population has been as follows:—

	Per Mille.
Europeans and East Indians.....	28.52
Hindoos.....	33.2
Mahomedans	41.6

Putting aside the results given by these figures, there is no room for doubt that the proportion of mortality in the Mahomedan section of the community has been greatly in excess of other classes, which may be accounted for by the unfavorable sanitary conditions of the parts of the

* The population taken by the Municipal Commissioners is said to be 417,771 but as this must be below the real number, 450,000 has generally been taken as a nearer estimate in calculating the death-rate in these Returns. In this instance we adhere to the Municipal census.

town in which the Mahomedans live, and from the abject poverty of the classes who are dependent on the stipendiaries, and upon trades connected with the late Palace.

Looking to the causes of this increased number of deaths over the average for ten previous years, we find that of the 3715 total deaths registered, 2183, or nearly three-fifths, are from miasmatic diseases.

The latter order of disease shows an increase of 508.6, and other diseases 222.1 deaths on the ten year average.

MIASMATIC DISEASES.

1861.....	1,387
1862.....	2,747
1863.....	2,449
1864.....	1,701
1865.....	1,244
1866.....	1,521

Total... 11,049

Average... 1641.5

Taking the mean of miasmatic diseases for the first quarters of six previous years, as shown in the margin, we observe that there has been an increase of 541 deaths in this order of diseases. A more minute examination of the principal diseases which have made up this order shows us this increase has been chiefly due to fevers and dysentery.

A glance at the Mortality Chart at once brings these facts to the mind, as well as other points connected with those diseases which are the chief contributors to the mortality of our crowded Native cities.

The number of deaths registered under the head of fevers has amounted to 697, which is 172.2 in excess of the mean for six previous years.

FEVERS.

1861.....	508
1862.....	521
1863.....	524
1864.....	611
1865.....	444
1866.....	541

Total... 3,149

Mean... 524.8

The greatest number of deaths registered in any one week has been 59, namely, for that ending February 22nd, and the least number (45) in the week ending March 8th.

A glance at the Chart shows how steadily the wave line of death keeps above the average in the sixth and tenth weeks. The deaths are in

for the whole quarter, only approaching it once in the sixth and tenth weeks. The deaths are in excess of those registered last quarter by 35.

DIARRHOEA.

1861.....	165
1862.....	232
1863.....	265
1864.....	216
1865.....	246
1866.....	267

Total... 1,391

Average... 231.8

The deaths registered from diarrhoea amount to 277, or 45.2 above the average. The greatest number of deaths (29) registered in any week from this cause was that ending February 8th, and the minimum number (15) on the 1st March.

It will be observed that the wave line of deaths from this cause only falls below the average on two occasions, namely, in the 3rd and 9th weeks. These deaths show a decrease on last quarter of 6.

The total deaths registered from dysentery amount to 484, or 169.5 deaths above the average. A probable cause for the increased mortality from this and the former disease is to be found in the fact that a large quantity of new rice was introduced into the market during the past quarter, and being cheaper, was doubtless purchased and partaken freely of by the poorer classes of the population.

This kind of rice, it is well known, is very indigestible, and if eaten largely of, is certain to produce derangement of the bowels. Such an article coming into the market immediately after a season of great scarcity, was doubly dangerous to those who were reduced in health and strength by previous privation.

The greatest number of deaths (47) occurred in the week ending January 4th, the minimum (24) in that ending March 29th.

It will be observed how strikingly the wave line of deaths from dysentery continues to run high above the average, it being only towards the end of the quarter that it commences to fall.

The deaths from this disease are 75 more than last quarter.

There are meteorological causes which may have tended towards the increased mortality from this disease, which are noticed at the end of this report.

The number of deaths registered from small-pox amount to 98, or 56 less than the average.

SMALL-POX.

1861.....	201
1862.....	545
1863.....	33
1864.....	103
1865.....	6
1866.....	28

Total... 924

Average... 154

Although this is to a certain extent satisfactory, it is not altogether so great a decrease as we might expect from the increased extension of the prophylactic operation of vaccination. Amongst the first quarters of six previous years, we observe that there are three years, namely, 1863, 1865, and 1866, where the deaths were very few, compared with the past period,

and an examination of the Chart shows a sudden rise in the last week of the quarter in the deaths from this disease above the average wave line, which leads us to fear that the month in which we are writing will show an increase of deaths on the average of no small amount. It must, however, be remembered that April is the month of the year in which small-pox attains its maximum with unerring certainty.

A sudden rise in the mortality from this disease occurred in the 10th week ending March 8th, when the deaths rose from 3 to 14, and attained a maximum of 21 in the 13th week ending March 29th.

No death occurred during the first week.

The deaths from this disease are in excess of those of last quarter by 86.

An examination of the tables shows that the deaths from this disease occurred amongst the different classes of the community, as follows:—

Ratio per MILE of Population.

Europeans...	0}	...	...	31
East Indians.	5}	...	...	
Hindoos.....	82	...	...	23
Mahomedans.	11	...	...	17

The total admissions from cholera have been 600, showing the very slight increase of 16 deaths on the average mortality from this disease, for six similar quarters, as shown in the margin. Taking, however, four out of the six years, we observe that the mortality is considerably in excess of what it usually is during the first quarter.

1861...	164
1862...	1,139
1863...	1,279
1864...	349
1865...	217
1866...	321

Total... 3,469

Average... 583.1

The excessive mortality was chiefly confined to the first six weeks of the quarter, in which

period 477 out of the 600 deaths occurred; during the remaining period the deaths only amounted to 123. These facts are clearly brought to notice by the Chart.

In the 4th week ending January 25th, the deaths amounted to the maximum of 104. They fall to a minimum (2) in the last week of the period under review.

There is a decrease of 88 deaths from cholera on that of last quarter.

From Appendix C, it will be observed that the deaths have been registered throughout the quarter as follows:—

January...	364
February...	178
March.....	58

The greatest mortality (118) has occurred in Division IV; 59 of the deaths being at Saint Thomé, and 31 at Royapettah.

The Mahomedan quarter, Triplicane, has also 55 deaths recorded against it.

It is worthy of record that Chintadrepettah has suffered but slightly from this epidemic outbreak.

In order to obtain an insight into the meteorological condition of Madras for the quarter, an inspection should be made of the diagram attached.

This element has been slightly greater during the quarter than shown by the average of 20 years, namely, 29.975 against 29.956. No very remarkable variations have taken place, except a fall in the barometer, which usually takes place about the 5th week on the change of the wind from north-east to a south-easterly quarter. A reference to the 1st Quarterly Chart for 1866 shows a similar, although a more marked change at this period.

The barometer stands above the average during the greater part of the first and latter half of the quarter.

The wave line of maximum temperature has been above the average the whole quarter, while that of the maximum crosses and re-crosses the latter five different times.

TEMPERATURE.

These two elements have been 83.7 and 69.9 against a mean of 83.2 and 70.2 respectively.

The mean temperature has been 76.5 against the 20 years' mean of 76.9 showing, on the whole, a slight decrease in the heat of the atmosphere.

An examination of the Chart shows those points of the quarter where there was a rise or fall in the thermometer.

These changes occur in the 2nd, 4th, 6th, 8th, and 11th weeks, after which there is a sudden rise in the temperature, to the end of the quarter. These are appoints with which it is interesting to compare the increment and decrement of the mortality.

With the exception of the 10th and 11th weeks, the wave line of humidity is above the average during the whole quarter. At the above periods, the line makes a sudden dip corresponding to a fall in the temperature.

HUMIDITY.

The average percentage of humidity has been 76.4, being 9° above the average. Some variations in the wave line of humidity occur at the commencement of the quarter in the 2nd and 4th weeks, when it attains a maximum of 82 and 83 per cent. respectively.

The wind has blown, as usual, at the time of the year under review, from a north-east quarter during the first five weeks, when it changed to a south-easterly one for the remainder of the quarter.

PREVAILING WIND.

These turning points in the prevailing winds are interesting, when examined in connection with the Chart of mortality.

The mean velocity of the wind has been 142.7 miles daily, being an increase of 3 miles on the average for past years.

Sudden variations are noticed in the course of the wave line of this element in the 1st, 4th, and 12th weeks. In the first of these periods, the velocity falls from 250 to 171 miles, and in the 4th week from 167 to 99; in the last period mentioned, it rises from 151 to 206, and as suddenly falls to 149 miles.

The only rain which has fallen during the first quarter was registered during the first three weeks, amounting to .17 inches. The twenty years' average rain-fall for this quarter is 1.7.

RAIN-FALL.

It has been before noticed there is a general tendency of the wave line, showing the deaths registered under the head of fever, to follow the wave line of temperature, showing therefore that an increase of temperature seems to affect unfavorably the mortality from this class of diseases.

The wave line of diarrhoea shows an opposite course to that of fever, and attains its maximum and minimum points at different periods. A marked fall in this disease occurs in the 9th week, which is characterized by a rise in the temperature.

Both deaths from dysentery and diarrhoea rise in the 10th week, ending March the 15th, in a very marked manner, corresponding to a fall in the temperature, with a decrease in the percentage of humidity.

The changes in the velocity of the wind is a meteorological element of great interest in the comparison of climate and disease, as upon its action depends the thorough ventilation of over-populated towns and crowded dwelling houses.

It has been noticed by more than one observer that the deaths from diseases increase numerically during those parts of the year which are characterized by close sultry nights, and periods when the air may be said to stagnate over localities thickly populated.

In examining the wave line of cholera and contrasting it with meteorological elements, we might naturally expect to find the deaths increasing with decreased ventilation, that is to say, with a stagnating atmosphere; but any such theory must be at once rejected when practical illustration of the real state of things is placed before us.

Going back to the diagrams which have accompanied these Reports, during the year 1865, it is observed that there is no connection whatever between the wave line of deaths from this, and the daily motion of the atmosphere, as an examination of these elements shews that from the 1st of January 1865 to the 31st March 1866, the two wave lines have taken the same direction in 32, and a different one in 29 instances, which seem to lead to the conclusion at present this element has nothing whatever to do with the prevalence of this mysterious disease in Madras.

It is worthy of record in connection with this and other meteorological elements to record the very wide-spread epidemic of influenza which took place amongst horses at the Presidency, but which reached its height about the 12th week of the quarter ending March 22nd, corresponding to an increase observable in fever and dysentery in the population of Madras.

In a communication from the Government Astronomer on the subject, we are informed that during March the solar heat* was far above the average, while the shade temperature was about the usual average; but the gross minimum (that is, a thermometer placed on the ground outside) was extraordinarily low. Long shore winds blew throughout this period, and a stagnation of the air generally took place from midnight to sunrise, being succeeded by a sudden rise in the wind about 8 A. M., just two hours after the most chilly part of the night ground cold.

The following tabular statement, which has been kindly furnished by Mr. Pogson, shews the excesses and defects of the mean half-monthly sun and grass thermometers, and the state of the wind.

1867.	Radiation Thermometer.		Anenometer.	
	Sun above average.	Ground below average.	Midnight to 8 A. M.	8 A. M. to 6 P. M.
March 1st to 15th.....	6° 8	5.1	2 miles from S.S.E.	9½ from S.E.
March 16th to 21st.....	8° 1	0.2	3 miles from S.E.	11 from S.E.

These effects, as Mr. Pogson states, are all marked enough about the period of the above epidemic (March 22nd), and effects of these meteorological elements upon horses might be as follows:—

The animals exposed to and worked in sunshine would get over-heated during the day. The stagnation of the air at night, from midnight to sunrise, would keep up their over-heated state, and the sudden rise of the wind about 8 A. M., would be quite sufficient to the wide-spread epidemic, and would be more severely felt in those stables which are freely exposed to the wind.

These facts must be taken into consideration with the increased mortality which has been observed in fever and dysentery, when we remember the exposure suffered by the poorer classes to the sun's heat during the day, and their position on the cold ground at night.

OFFICE OF SANITARY COMMISSIONER,

(Signed) W. ARNOLD SMITH, M. D.,

MADRAS, 30th April 1867.

Officiating Secretary, Sanitary Commissioner.

* "Owing to scarcity of solar spots?"

*Proceedings of the Madras Government, Public Department,
4th June 1867.*

APPENDIX A.

Deaths in Madras for 1st Quarter, 1867.

	Euro- peans.		East In- dians.		Hindoos.		Mahomedans.		Total.		Gene- ral Total.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Small-pox.....	...	...	3	2	38	44	5	6	46	52	8
Fevers.....	1	1	7	7	311	301	29	40	348	349	67
Dysentery.....	4	1	1	4	205	189	34	46	244	240	484
Diarrhoea.....	2	1	3	2	114	103	20	32	139	138	277
Cholera.....	4	2	11	12	215	207	62	87	292	308	600
Other Miasmatic dis- eases.....	...	...	...	1	9	5	9	3	18	9	27
Total Miasmatic dis- eases.....	11	5	25	28	892	849	159	214	1,087	1,096	2,183
Total of all other dis- eases.....	17	6	19	26	688	483	151	142	875	657	1,532
Total...	28	11	44	54	1,580	1,332	310	356	1,962	1,753	3,715
Mean mortality of ten first quarters from 1857 to 1866.	39		98		2,912		666		3,715		
Miasmatic diseases....	13.2	4.2	17.4	17.8	716.8	646.9	122.0	136.1	869.4	805.0	1674.4
Other diseases.....	17.4	5.8	18.7	22.3	555.1	483.1	105.7	101.8	696.9	613.0	1309.9
Total...	30.6	10.0	36.1	40.1	1271.9	1130.0	227.7	237.9	1566.3	1418.0	2984.9
Increase.....	40.6	...	76.2	...	2401.9	...	465.6	...	2984.3	...	730.7
Decrease.....	1.6	...	21.8	...	510.1	...	200.4	...	...	...	...

APPENDIX B.

Table showing the mortality from Miasmatic diseases in the last 13 weeks.

	Jan. 4.	Jan. 11.	Jan. 18.	Jan. 25.	Feb. 1.	Feb. 8.	Feb. 15.	Feb. 22.	Mar. 1.	Mar. 8.	Mar. 15.	Mar. 22.	Mar. 29.	Total.
Fevers.....	53	55	56	57	50	47	55	59	58	45	54	55	58	702
Diarrhoea.....	28	23	17	20	21	29	23	25	15	26	22	23	19	291
Dysentery.....	47	44	45	41	39	37	37	40	32	40	36	34	24	496
Small-pox.....	0	3	6	4	3	2	4	4	3	14	11	13	21	88
Cholera.....	81	70	82	104	70	70	45	35	35	18	18	9	2	639
Other Miasmatic dis- eases.....	2	0	1	0	3	1	1	4	5	2	0	3	3	25
Total...	211	195	207	226	186	186	165	167	148	145	141	137	127	2,241

*Proceedings of the Madras Government, Public Department,
4th June 1867.*

Average of the corresponding weeks for 5 previous years.

Fevers.....	41.2	43.4	4.6	38.4	41.0	44.8	41.4	37.6	42.4	40.0	38.4	41.6	41.8	533.6
Diarrhoea.....	20.0	21.0	20.0	19.2	21.4	23.4	18.2	16.8	19.2	17.8	16.6	19.8	17.2	250.6
Dysentery.....	25.8	23.2	24.4	25.4	27.4	25.6	20.2	23.4	24.2	25.4	22.6	24.4	21.4	313.4
Small-pox.....	5.2	6.0	8.0	6.2	6.8	12.8	14.0	14.0	11.6	13.0	17.6	18.6	13.2	147.2
Cholera.....	30.0	43.2	66.6	67.4	58.2	58.0	59.8	59.6	54.6	53.2	32.8	34.6	39.6	665.6
Other Miasmatic Diseases.....	2.8	2.6	1.6	2.2	1.8	3.2	3.4	3.6	4.2	4.4	3.0	3.0	4.2	40.0
Total...	132.0	139.4	163.4	158.8	156.6	167.8	157.0	155.0	156.2	153.8	131.0	142.0	137.4	1950.4

Mean Meteorological Observations for the past 13 weeks.

Barometer reduc- ed to 32° F.....	30.004	30.016	30.021	30.031	29.999	29.951	29.939	29.969	29.993	29.939	29.982	29.899	29.930	29.975
Mean Maximum Temperature	79.5	81.8	81.3	80.8	80.6	82.7	84.8	83.6	84.9	84.3	86.4	88.0	87.5	83.7
Do. Minimum do.	69.6	71.0	69.3	66.7	67.9	70.5	70.4	66.9	68.7	67.5	71.0	74.0	75.4	69.9
Do. Temperature.....	74.5	76.0	74.4	73.0	74.5	76.8	76.8	74.8	76.4	76.8	78.7	80.6	81.4	76.5
Do. Humidity.....	76	83	76	82	74	80	80	77	78	68	74	75	71	76.4
Prevailing Wind....	N. E.	E.	E. N. E.	E.	E. by N.	S. E.	S. E.	S. E.	S. E.	S. E.	S. E.	S. S. E.	E. by S.	S. E. by S.
Mean velocity in Miles.....	17.1	141	167	99	149	146	114	116	114	123	151	206	149	142.7
Rain-fall.....	0.05	0.03	0.09	...	...	...	...	...	...	...	...	...	...	0.17

*Table shewing the Mean Half-Monthly Meteorological condition of Madras for 20 years
past.*

	Half month ending 15th January.	Half month ending 31st January.	Half month ending 14th February.	Half month ending 28th February.	Half month ending 15th March.	Half month ending 31st March.	Average.
Barometer reduced to 32° F.....	30.004	29.991	29.982	29.958	29.920	29.886	29.956
Mean Maximum Tem- perature.....	80.0	80.6	81.8	83.8	85.5	87.5	83.2
Do. Minimum do.	69.1	68.2	69.0	69.7	71.7	74.2	70.3
Do. Temperature.....	74.6	74.5	75.6	76.9	78.9	80.9	76.9
Do. Humidity.....	76	75	75	75	75	76	75.3
Prevailing Wind.....	N. E.	N. E. by E.	E.	E. S. E.	S. E.	S. S. E.	N. E.
Mean velocity in Miles.	158	126	134	129	137	150	139.0
Rain-fall.....	0.61	0.37	0.27	0.05	0.05	0.32	1.7

*Proceedings of the Madras Government, Public Department,
4th June 1867.*

APPENDIX C.
Deaths from Cholera in each District.

		January.	February.	March.	Total.
I. Division.	Fort Saint George...	...	1	...	1
	Black Town or Mootealpettah ...	19	26	6	51
II. Division.		19	27	6	52
	Pedoo Naick's Pettah...	20	17	9	46
	Uttapolliam...	1	1	1	3
	Big Parcherry...	4	3	2	9
	John Pereira's Gardens ...	1	1	...	2
III. Division.		26	22	12	60
	Triplicane...	55	25	6	86
	Poodoopaukum ...	11	1	...	12
	Fisherman's Pettah ...	...	...	...	...
IV. Division.		66	26	6	98
	St. Thomé...	59	14	3	76
	Alwarpettah...	...	1	...	1
	Royapettah...	31	12	...	43
	Meer Saib's Pettah ...	19	3	...	22
	Kistnampettah...	7	1	...	8
	Tanampettah...	2	1	...	3
		118	32	3	153
V. Division.	Chintadrepettah...	7	6	6	19
	Narasingapooram...	7	1	...	8
	Comeleeswarapuram ...	1	1	...	2
	Poodoopettah...	3	...	...	3
	Egmore...	1	...	...	1
	Chetput...	5	...	...	5
	Codumbaukum...	...	...	...	...
	Nungumbaukum...	22	1	...	24
	Mackay's Gardens...	8	4	...	12
	Nagatha Covil...	3	...	1	4
		57	13	8	78
	Pereamettoo...	2	1	...	3
VI. Division.	New Town...	2	1	...	3
	Vepery...	4	1	...	6
	Choolay...	9	...	2	11
	Gunpowder Mills...	...	...	...	...
	Pursewaukum...	6	5	3	14
	Kilpaukum...	...	...	...	...
	Perambore ...	6	3	1	10
	Viasarapaudy...	...	...	...	...
VII. Division.		29	11	7	47
	Tondiarpettah...	1	2	2	5
	Washerman's Pettah...	21	30	11	62
	Monegar Choultry...	5	3	1	9
	Royapooram...	16	11	...	27
	Cashemode...	6	1	2	9
General Total...		49	47	16	112
		364	178	58	600

*Proceedings of the Madras Government, Public Department,
4th June 1867.*

No. 9.

ORDER THEREON, 4th June 1867, No. 608.

To be recorded.

A. J. ARBUTHNOT,
Chief Secretary.

Exd. J. Tulloch.

11

REPORT

On the Deaths in Madras,

FOR THE FIRST QUARTER, 1867.

THE health of Madras during the first quarter has not been altogether satisfactory. The total number of deaths registered amounts to 3,715, which, contrasted with the mean for ten years of similar quarters from 1857 to 1866 inclusive, gives an increase of 730 deaths to the period under review.

Taking the first quarters of six previous years, as shewn in the margin, we observe			that there is still a heavy increase in the mortality of the present year of 518 deaths. The years 1862 and 1863 are the only two years in the above period which show a larger number of deaths.
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Hindoos, from composing the great bulk of the population, make up the greater number of deaths. This amounts to 2,912, the male being 248 in excess of female mortality. The increase of deaths in this class over the ten years' average, amounts to 510.1 deaths.

Mahomedans also show a great increase in the number of deaths, which amounts to 200.4 beyond the average.

The total number registered from this section of the population during the past quarter amounts to 666, of which number 356 are females, or 46 more than the opposite sex.

Taking the last Municipal census* (which it is necessary to say must be received with caution) as the basis of our calculation, we find that the annual death-rate amongst the above different classes of the population has been, as follows :—

	Per Mille.
Europeans and East Indians.....	28.52
Hindoos.....	33. 2
Mahomedans.....	41. 6

* The population taken by the Municipal Commissioners is said to be 427,771, but as this must be below the real number, 450,000 has generally been taken as a nearer estimate in calculating the death-rate in these Returns. In this instance we adhere to the Municipal census.

Putting aside the results given by these figures, there is no room for doubt that the proportion of mortality in the Mahomedan section of the community has been greatly in excess of other classes, which may be accounted for by the unfavourable sanitary conditions of the parts of the town in which the Mahomedans live, and from the abject poverty of the classes who are dependent on the stipendiaries, and upon trades connected with the late Palace.

Looking to the causes of this increased number of deaths over the average for ten previous years, we find that of the 3,715 total deaths registered; 2,183, or nearly three-fifths are from miasmatic diseases.

The latter order of disease shews an increase of 508.6, and other diseases 222.1 deaths on the ten year average.

Miasmatic Diseases.

1861...	1,387
1862...	2,747
1863...	2,449
1864...	1,701
1865...	1,244
1866...	1,521

Total...11,049

Average...1641.5

Taking the mean of miasmatic diseases for the first quarters of six previous years, as shewn in the margin, we observe that there has been an increase of 541 deaths in this order of diseases. A more minute examination of the principal diseases which have made up this order shows us this increase has been chiefly due to fevers and dysentery.

A glance at the Mortality Chart at once brings these facts to the mind as well as other points connected with those diseases which are the chief contributors to the mortality of our crowded native cities.

The number of deaths registered under the head of fevers has amounted to 697, which is 172.2 in excess of the mean for six previous years.

1861...	503
1862...	521
1863...	524
1864...	611
1865...	444
1866...	541

Total... 3,149

Mean...524.8

The greatest number of deaths registered in any one week has been 59, namely, for that ending February 22nd; and the least number (45) in the week ending March 8th.

A glance at the chart shows how steadily the wave line of death keeps above the average for the whole quarter, only approaching it once in the sixth and tenth weeks. The deaths are in excess of those registered last quarter by 35.

The deaths registered from diarrhoea amount to 277, or 45.2 above the average. The greatest number of deaths (29) registered in any week from this cause was that ending February 8th, and the minimum number (15) on the 1st March.

1861...	165
1862...	232
1863...	265
1864...	216
1865...	246
1866...	267

Total...1,391

Average...231.8

It will be observed that the wave line of deaths from this cause only falls below the average on two occasions, namely, in the third and ninth weeks. These deaths show a decrease on last quarter of 6.

The total deaths registered from dysentery amount to 484 or 169.5 deaths above the average. A probable cause for the increased mortality from this and the former disease is to be found in the fact that a large quantity of new rice was introduced into the market during the past quarter, and being cheaper, was doubtless purchased and partaken freely of by the poorer classes of the population.

1861...	318
1862...	272
1863...	338
1864...	350
1865...	272
1866...	337

Total...1,887

Mean...314.5

This kind of rice, it is well known, is very indigestible, and if eaten largely of, is certain to produce derangement of the bowels.

Such an article coming into the market immediately after a season of great scarcity, was doubly dangerous to those who were reduced in health and strength by previous privation.

The greatest number of deaths (47) occurred in the week ending January 4th; the minimum (24) in that ending March 29th.

It will be observed how strikingly the wave line of deaths from dysentery continues to run high above the average, it being only towards the end of the quarter that it commences to fall.

The deaths from this disease are 75 more than last quarter.

There are meteorological causes which may have tended towards the increased mortality from this disease, which are noticed at the end of this report.

The number of deaths registered from small-pox amount to 98, or 56 less than the average.

Small-pox.	204
1861...	545
1862...	33
1863...	198
1864...	6
1865...	28
1866...	
Total...	924
Average...	154

Although this is to a certain extent satisfactory, it is not altogether so great a decrease as we might expect from the increased extension of the prophylactic operation of vaccination. Amongst the first quarters of six previous years, we observe that there are three years, namely, 1863, 1865 and 1866, where the deaths were very few, compared with the past period, and an examination of the chart shows a sudden rise in the last week of the quarter in the deaths from this disease above the average wave line, which leads us to fear that the month in which we are writing will show an increase of deaths on the average of no small amount. It must, however, be remembered that April is the month of the year in which small-pox attains its maximum with unerring certainty.

A sudden rise in the mortality from this disease occurred in the tenth week ending March 8th, when the deaths rose from 3 to 14, and attained a maximum of 21, in the 13th week ending March 29th.

No death occurred during the first week.

The deaths from this disease are in excess of those of last quarter by 86.

An examination of the Tables shows that the deaths from this disease occurred amongst the different classes of the community, as follows:—

Ratio per Mille of Population.

Europeans...	31
East Indians...	23
Hindoos...	17
Mahomedans...	

The total admissions from Cholera have been 600, showing the very slight increase of 16 deaths on the average mortality from this disease, for six similar quarters, as shewn in the margin. Taking, however, four out of the six years, we observe that the mortality is considerably in excess of what it usually is during the first quarter.

Cholera.	164
1861...	1,139
1862...	1,279
1863...	349
1864...	247
1865...	321
1866...	
Total...	3,499
Average...	583.1

The excessive mortality was chiefly confined to the first six weeks of the quarter, in which period 477 out of the 600 deaths occurred; during the remaining period the deaths only amounted to 123. These facts are clearly brought to notice by the chart.

In the 4th week ending January 25th, the deaths amounted to the maximum of 101. They fall to a minimum (2) in the last week of the period under review.

There is a decrease of 88 deaths from cholera on that of last quarter.

From Appendix C, it will be observed that the deaths have been registered throughout the quarter, as follows:—

January...	364
February...	173
March...	58

The greatest mortality (118) has occurred in Division IV; 59 of the deaths being at Saint Thomé, and 31 at Royapettah.

The Mahomedan quarter, Triplicane, has also 55 deaths recorded against it.

It is worthy of record that Chintadrepetta has suffered but slightly from this epidemic outbreak.

In order to obtain an insight into the meteorological condition of Madras for the quarter, an inspection should be made of the diagram attached.

This element has been slightly greater during the quarter than shewn by the average of 20 years, namely, 29.975 against 29.956. No very remarkable variations have taken place, except a fall in the Barometer, which usually takes place about the 5th week on the change of the wind from north-east to a south-easterly quarter. A reference to the 1st Quarterly Chart for 1866 shows a similar, although a more marked change at this period.

The barometer stands above the average during the greater part of the first and latter half of the quarter.

The wave line of maximum temperature has been above the average the whole quarter, while that of the maximum crosses and re-crosses the latter five different times.

These two elements have been 83.7 and 69.9 against a mean of 83.2 and 70.2 respectively.

The mean temperature has been 76.5 against the 20 years' mean of 76.9 showing, on the whole, a slight decrease in the heat of the atmosphere.

An examination of the chart shows those points of the quarter where there was a rise or fall in the thermometer.

These changes occur in the 2nd, 4th, 6th, 8th, and 11th weeks, after which there is a sudden rise in the temperature, to the end of the quarter. These are points with which it is interesting to compare the increment and decrement of the mortality.

With the exception of the 10th and 11th weeks, the wave line of humidity is above the average during the whole quarter. At the above periods, the line makes a sudden dip corresponding to a fall in the temperature.

The average percentage of humidity has been 76.4, being 9° above the average. Some variations in the wave line of humidity occur at the commencement of the quarter in the 2nd and 4th weeks, when it attains a maximum of 82 and 83 per cent. respectively.

The wind has blown, as usual, at the time of the year under review, from a north-east quarter during the first five weeks, when it changed to a south-easterly one for the remainder of the quarter.

These turning points in the prevailing winds are interesting, when examined in connection with the chart of mortality.

The mean velocity of the wind has been 142.7 miles daily, being an increase of 3 miles on the average for past years.

Sudden variations are noticed in the course of the wave line of this element in the 1st, 4th, and 12th weeks. In the first of these periods, the velocity falls from 250 to 171 miles, and in the 4th week from 167 to 99; in the last period mentioned, it rises from 151 to 206, and as suddenly falls to 149 miles.

The only rain which has fallen during the first quarter was registered during the first three weeks, amounting to .17 inches. The twenty years' average rain-fall for this quarter is 1.7.

It has been before noticed there is a general tendency of the wave line showing the deaths registered under the head of fever, to follow the wave line of temperature, showing therefore that an increase of temperature seems to affect unfavourably the mortality from this class of diseases.

The wave line of Diarrhoea shows an opposite course to that of Fever, and attains its maximum and minimum points at different periods. A marked fall in this disease occurs in the 9th week, which is characterized by a rise in the temperature.

Both deaths from Dysentery and Diarrhoea rise in the 10th week ending March the 15th in a very marked manner, corresponding to a fall in the temperature, with a decrease in the percentage of humidity.

The changes in the velocity of the wind is a meteorological element of great interest in the comparison of climate and disease, as upon its action depends the thorough ventilation of over-populated towns and crowded dwelling houses.

It has been noticed by more than one observer that the deaths from diseases increase numerically during those parts of the year which are characterized by close sultry nights and periods when the air may be said to stagnate over localities thickly populated.

In examining the wave line of cholera and contrasting it with meteorological elements, we might naturally expect to find the deaths increasing with decreased ventilation, that is to say, with a stagnating atmosphere; but any such theory must be at once rejected when practical illustration of the real state of things is placed before us.

Going back to the diagrams which have accompanied these Reports, during the year 1865, it is observed that there is no connection whatever between the wave line of deaths from this, and the daily motion of the atmosphere, as an examination of these elements shews, that from the 1st of January 1865 to the 31st March 1866, the two wave lines have taken the same direction in 32, and a different one in 29 instances, which seem to lead to the conclusion at present this element has nothing whatever to do with the prevalence of this mysterious disease in Madras.

It is worthy of record in connection with this and other meteorological elements to record the very wide-spread epidemic of influenza which took place amongst horses at the Presidency, but which reached its height about the 12th week of the quarter ending March 22nd, corresponding to an increase observable in Fever and Dysentery, in the population of Madras.

In a communication from the Government Astronomer on the subject, we are informed that during March the solar heat* was far above the average, while the shade temperature was about the usual average; but the gross minimum (that is a thermometer placed on the ground outside) was extraordinarily low. Long shore winds blew throughout this period, and a stagnation of the air generally took place from midnight to sunrise, being succeeded by a sudden rise in the wind about 8 A.M., just two hours after the most chilly part of the night ground cold.

The following tabular statement, which has been kindly furnished by Mr. Pogson, shews the excesses and defects of the mean half-monthly sun and grass thermometers, and the state of the wind.

1867.	Radiation Thermometer.		Anenometer.	
	Sun above average.	Ground below average.	Midnight to 8 A.M.	8 A.M. to 6 P.M.
March 1st to 15th.....	6° 8	5.1	2 miles from S.S.E.	9½ from S.E.
March 16th to 21st....	8° 1	0.2	3 miles from S.E.	11 from S.E.

These effects, as Mr. Pogson states, are all marked enough about the period of the above epidemic (March 22), and effects of these meteorological elements upon horses might be as follows.

The animals exposed to and worked in sunshine would get over-heated during the day. The stagnation of the air at night from midnight to sunrise would keep up their over-heated state, and the sudden rise of the wind about 8 A.M., would be quite sufficient to the wide-spread epidemic, and would be more severely felt in those stables which are freely exposed to the wind.

These facts must be taken into consideration with the increased mortality which has been observed in Fever and Dysentery, when we remember the exposure suffered by the poorer classes to the sun's heat during the day, and their position on the cold ground at night.

W. ARNOLD SMITH, M.D.,

Officiating Secretary, Sanitary Commissioner.

OFFICE OF SANITARY COMMISSIONER,
MADRAS, 30th April 1867.

* "Owing to scarcity of solar spots?"

APPENDIX A.

Deaths in Madras for First Quarter, 1867.

	Europeans.		East Indians.		Hindoos.		Mahomedans.		Total.		General Total.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Small-pox	1	1	3	2	38	44	5	6	46	52	8
Fevers	4	1	7	7	311	301	29	40	348	349	67
Dysentery	2	1	1	4	205	189	34	46	244	240	484
Diarrhoea	4	2	11	12	114	103	20	32	139	138	277
Cholera	...	...	...	1	215	207	62	87	292	308	600
Other Miasmatic diseases	11	5	25	28	892	849	159	214	1,087	1,096	2,183
Total Miasmatic diseases	17	6	19	26	688	483	151	214	875	657	1,532
Total of all other diseases	28	11	44	54	1,580	1,332	310	356	1,962	1,753	3,715
Mean Mortality of ten first quarters from 1857 to 1866.	39		98		2,912		666		3,715		
Miasmatic diseases	13.2	4.2	17.4	17.8	716.8	646.9	122.0	136.1	869.4	805.0	1674.4
Other diseases	17.4	5.8	18.7	22.3	555.1	483.1	105.7	101.8	696.9	615.0	1309.9
Total	30.6	10.0	36.1	40.1	1271.9	1130.0	227.7	237.9	1566.3	1418.0	2984.9
Increase	40.6		76.2		2401.9		465.6		2984.3		730.7
Decrease	1.6		21.8		510.1		200.4				

APPENDIX B.

Table shewing the mortality from Miasmatic Diseases in the last 13 weeks.

	Jan. 4	Jan. 11	Jan. 18	Jan. 25	Feb. 1	Feb. 8	Feb. 15	Feb. 22	Mar. 1	Mar. 8	Mar. 15	Mar. 22	Mar. 29	Total.
Fevers	53	55	56	57	50	47	55	59	58	45	54	55	58	702
Diarrhoea	23	23	17	20	21	29	23	25	15	26	22	23	19	291
Dysentery	47	44	45	41	39	37	37	40	32	40	36	34	24	496
Small-pox	0	3	6	4	3	2	4	4	3	14	11	13	21	88
Cholera	81	70	82	104	70	70	45	35	35	18	18	9	2	639
Other Miasmatic Diseases	2	0	1	0	3	1	1	4	5	2	0	3	3	25
Total	211	195	207	226	186	186	165	167	148	145	141	137	127	2,241

Average of the corresponding weeks for 5 previous years.

Fevers	40.2	43.4	42.6	38.4	41.0	44.8	41.4	37.6	42.4	40.0	38.4	41.6	41.8	533.6
Diarrhoea	20.0	21.0	20.0	19.2	21.4	23.4	18.2	16.8	19.2	17.8	16.6	19.8	17.2	250.6
Dysentery	25.8	23.2	24.4	25.4	27.4	25.6	20.2	23.4	24.2	25.4	24.4	21.4	21.4	313.4
Small-pox	5.2	6.0	8.2	6.2	6.8	12.8	14.0	14.0	11.6	13.0	17.6	18.6	13.2	147.2
Cholera	30.0	43.2	66.6	67.4	58.2	58.0	59.8	59.6	54.6	53.2	32.8	34.6	39.6	665.6
Other Miasmatic Diseases	2.8	2.6	1.6	2.2	1.8	3.2	3.4	3.6	4.2	4.4	3.0	3.0	4.2	40.0
Total	132.0	139.4	163.4	158.8	156.6	167.8	157.0	155.0	156.2	153.8	131.0	142.0	137.4	1950.4

Mean Meteorological Observations, for the past 13 weeks.

Barometer reduced to 32° F.	30.004	30.016	30.024	30.031	29.999	29.951	29.939	29.969	29.993	29.939	29.982	29.899	29.930	29.975
Mean Maximum Temperature	79.5	81.8	80.3	80.8	80.6	82.7	84.8	83.6	84.9	84.3	86.4	88.0	87.5	83.7
Do. Minimum do.	69.6	71.0	69.3	66.7	67.9	70.5	70.4	66.9	68.7	67.5	71.0	74.0	75.4	69.9
Do. Temperature	74.5	76.0	74.4	73.0	74.5	76.8	76.8	74.8	76.4	76.8	78.7	80.6	81.4	76.5
Do. Humidity	76	83	76	82	74	80	80	77	78	68	74	75	71	76.4
Prevailing Wind	N. E.	E.	E.N.E.	E.	E. by N.	S. E.	S. E.	S. E.	S. E.	S. E.	S. E.	S.S.E.	E. by S.	S. E.
Mean velocity in Miles	171	141	167	99	149	146	114	116	124	123	151	206	149	142.7
Rain-fall	0.05	0.03	0.09	...	...	...	...	...	...	...	...	...	...	0.17

Table shewing the Mean Half-Monthly Meteorological condition of Madras for 20 years past.

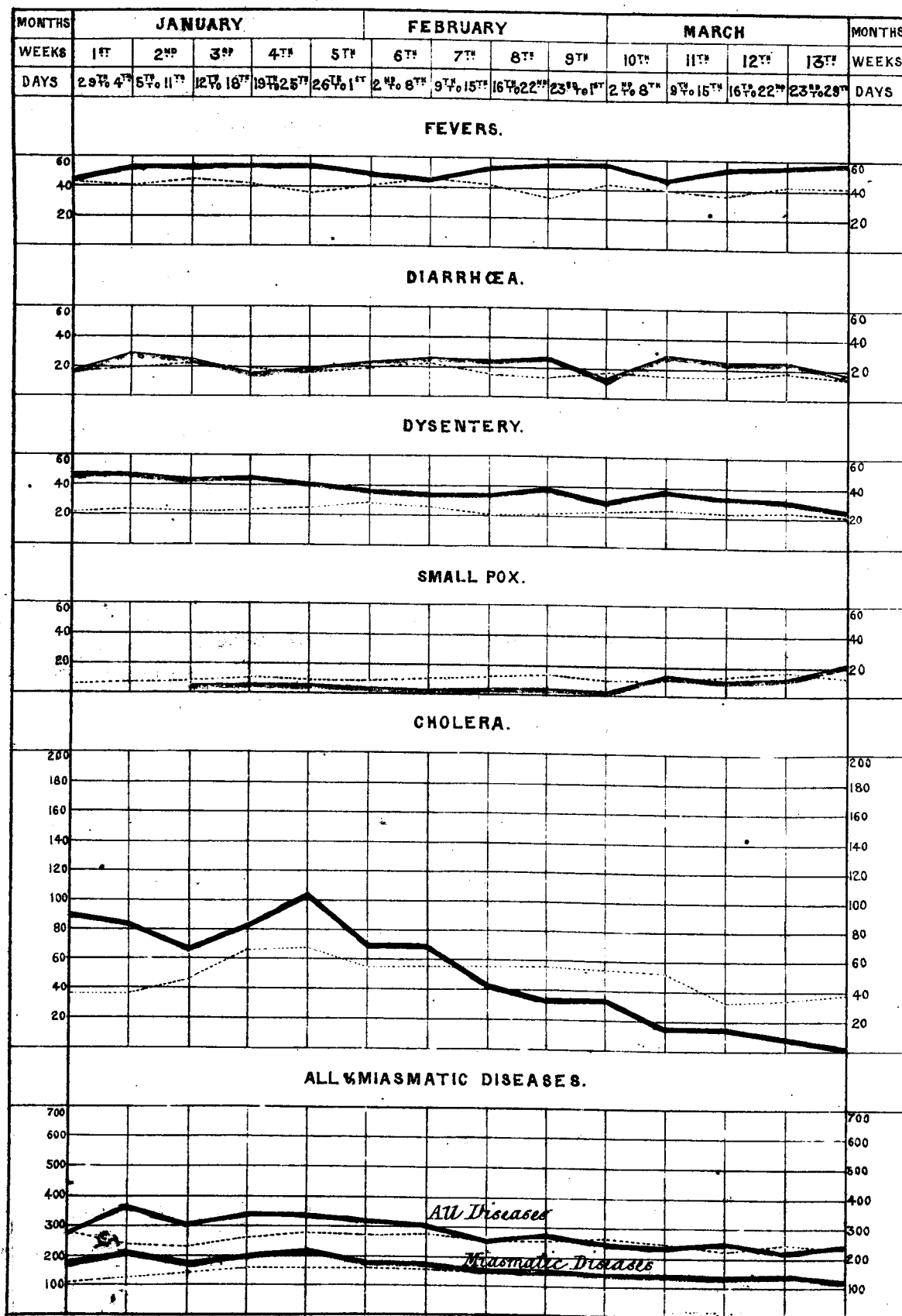
	Half month ending 15th January.	Half month ending 31st January.	Half month ending 14th February.	Half month ending 28th February.	Half month ending 15th March.	Half month ending 31st March.	Average.
Barometer reduced to 32° F.	30.004	29.991	29.982	29.958	29.920	29.886	29.956
Mean Maximum Temperature	80.0	80.6	81.8	83.8	85.5	87.5	83.2
Do. Minimum do.	69.1	68.2	69.0	69.7	71.7	74.2	70.3
Do. Temperature	74.6	74.5	75.6	76.9	78.9	80.9	76.9
Do. Humidity	76	75	75	75	75	76	75.3
Prevailing Wind	N. E.	N. E. by E.	E	E. S. E.	S. E.	S. S. E.	N. E.
Mean velocity in Miles	158	126	134	129	137	150	139.0
Rain-fall	0.64	0.37	0.27	0.05	0.05	0.32	1.7

APPENDIX C.

Deaths from Cholera in each District.

	January.	February.	March.	TOTAL.
I. Divn.				
Fort Saint George	...	1	...	1
Black Town or Mootealpettah	19	26	6	51
II. Division.				
Pedoo Naick's Pettah	20	17	9	46
Uttapolliam	1	1	1	3
Big Parcherry	4	3	2	9
John Pereira's Gardens	1	1	...	2
III. Divn.				
Triplicane	26	22	12	60
Poodoopaukum	55	25	6	86
Fisherman's Pettah	11	1	...	12
IV. Division.				
St. Thomé	...	...	...	...
Alwarpettah	66	26	6	98
Royapettah	59	14	3	76
Meer Saib's Pettah	...	1	...	1
Kistnampettah	31	12	...	43
Tanampettah	19	3	...	22
...	7	1	...	8
...	2	1	...	3
V. Division.				
Chintadrepettah	118	32	3	153
Narasingapooram	7	6	6	19
Comaleeswarapuram	7	1	...	8
Poodoopettah	1	1	...	2
Egmore	3	...	...	3
Chetput	1	...	...	1
Codumbaukum	5	...	...	5
Nungumbaukum	...	...	...	...
Mackay's Gardens	22	1	1	24
Nagatha Covil	8	4	...	12
...	3	...	1	4
VI. Division.				
Pereamettoo	57	13	8	78
New Town	2	1	...	3
Vepery	2	1	...	3
Choolay	4	1	1	6
Gunpowder Mills	9	...	2	11
Pursewaukum	...	...	...	...
Kilpaukum	6	5	3	14
Perambore	...	...	...	...
Viasarapaudy	6	3	1	10
...	...	...	...	...
VII. Division.				
Tondiarpettah	29	11	7	47
Washerman's Pettah	1	2	2	5
Monegar Choultry	21	30	11	62
Royapooram	5	3	1	9
Cashemode	16	11	...	27
...	6	1	2	9
General Total	49	47	16	112
	364	178	58	600

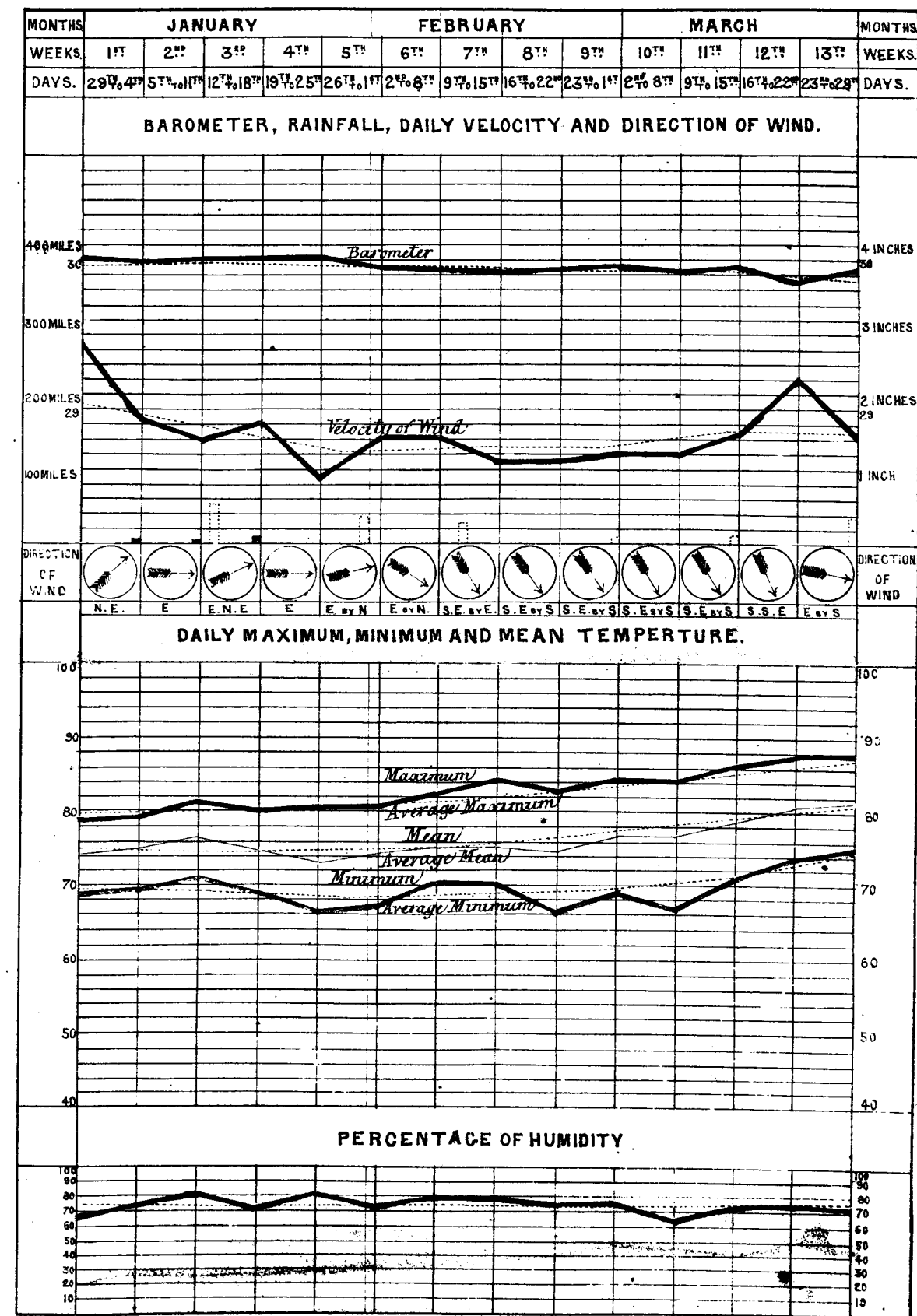
DIAGRAM SHOWING THE MORTALITY FROM MIASMATIC DISEASE IN MADRAS DURING THE 1ST QUARTER 1867



N.B. The total Mortality from each disease during each week is plotted on the perpendicular lines which represent these periods. The horizontal dotted wave lines show the average mortality from each disease for the previous five years.

Govt. Litho Press, Chennai,
Madras 6th May 1867

DIAGRAM SHOWING THE METEOROLOGICAL CONDITION OF MADRAS DURING THE 1ST QUARTER 1867



N.B. The mean weekly Meteorological elements are plotted on the perpendicular lines. The dotted wave lines show the bimonthly average for twenty years from observations kept at the Madras Observatory.

Govt. Litho Press, Chennai,
Madras 6th May 1867

No. ///.

OFFICE OF SANITARY COMMISSIONER

MADRAS, 17th May 1867.

From,

Honorable R. S. Ellis C.B.

25

To,

Sanitary Commissioner Madras.

The Secretary to Government
Public Department
Fort Saint George.

Sir,

enclosures four.

Mortuary Reports.

I have the honor to forward for
submission to Government the accompanying
Mortuary Report of the Town of Madras
for the 1st quarter in 1867.

I have the honor to be,

Sir,

Your most obedient servant
Wm. D. Smith

Sanitary Commissioner for Madras.

8-9.

Recd 400 74 June 7/67

Report on the death
in Madras for the
first quarter 1867

on Public No 709/67.

Recd. 4th June 1867

San,
The Sanitary Commissioner
Weymouth.

To
The Secretary to Government
Public Dept. without
Fort St. George

2nd Oct 17th }
R. 22. 20 } May 1867

12/11

Forwards for submission to
Government the history
book of the San of India for
the 1st quarter in 1867. - 15-

4th June 1867 Rs 600.

Recorded

Nov 1/1

29th May
1867 June
0-9.