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G. V. JUGGAROW OBSERVATORY,
DABA GARDENS, VIZAGAPATAM.

—
RESULTS OF
METEOROLOGICAL OBSERVATIONS, 1889,

WITH

An Introduction,

Containing astronomical observations, stellar and solar, with an explanation of the points mooted; the determination of the variation of magnetic meridian in the latitude of Vizagapatam; the determination of the distances by sound; and some explanation of the composition of the atmosphere; and an elaborate statement of the methods of agriculture observed chiefly in the district of Vizagapatam.

BY

A. V. NURSINGROW, ESQ., F.R.A.S., F.R.G.S.

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REGISTER OF CONTENTS.

	Page.
INDEX	6
Introduction	8 to 28
Astronomical Department	8
Initials to indicate general weather	29
Monthly Reports of Meteorological Observations	30 to 66
General Abstract, showing means and extremes of different meteorological elements	66
Table	
I.—Averages and extremes of different meteorological elements during 20 years	68
II.—Meteorological summary for the year 1889	70
III.—The mean maximum and minimum pressure of air for each month of the year and for 20 years	80
IV.—Normal pressure for each day of the year computed from the observations for 20 years	86
V.—Mean pressure of gaseous atmosphere for every month and for 20 years	88
VI, VII, VIII, IX.—Mean indications of the Barometer and Thermometer at 4 A.M., 10 A.M., 4 P.M., and 10 P.M., from 1870 to 1889	90 to 105
X.—Monthly means of pressure for 20 years reduced to sea-level	106
XI.—Comparison of monthly means for 1889 with the averages of 20 years	108
XII.—Monthly oscillations of pressure of air for each month of 20 years	112
XIII.—Mean Barometric oscillations of summer and winter for 20 years	113
XIV.—Mean maximum and minimum temperature of air for each month of the year and for 20 years	114
XV.—Normal temperature of each day for the year calculated from the observations of 20 years	118
XVI.—Adopted mean temperature of the air for each month of 20 years	120

Table		Page.
	XVII.—Normal temperature of evaporation for each day of the year deduced from the observations of 20 years ...	122
"	XVIII.—Mean monthly and annual temperature of evaporation for 20 years ...	126
"	XIX.—Normal daily depression for 20 years ...	128
"	XX.—Mean monthly and annual depression for 20 years ...	129
"	XXI.—Mean monthly and annual dew-point for 20 years ...	130
"	XXII.—Mean relative humidity (per cent.) for each month of 20 years ...	132
"	XXIII.—Normal daily elastic force of aqueous vapour calculated from the means of 20 years ...	134
"	XXIV.—Monthly and annual elastic force of aqueous vapour for 20 years ...	135
"	XXV.—Mean cloud proportion for each month of 20 years ...	136
"	XXVI.—Mean velocity of the wind for each month of 20 years ...	138
"	XXVII.—Rainfall for each day of the month for the year 1889 ...	140
"	XXVIII.—Normal rainfall of each day calculated for 24 years ...	142
"	XXIX.—Monthly and annual rainfall for 24 years ...	143
"	XXX.—Summer and winter rainfall totals ...	144
"	XXXI.—Number of days on which rainfall was measured in 24 years from 1866 to 1889 ...	145
"	XXXII.—Wind and rain limits of North-East monsoon for 23 years, from 1867 to 1889 ...	147
"	XXXIII.—Mean rainfall during 20 years, from 1870 to 1889, tabulated under each octant, <i>i.e.</i> , each of the eight principal points of the compass ...	148
"	XXXIV.—Mean number of rainy days during 20 years, from 1870 to 1889, tabulated under the eight principal points of the compass ...	149
"	XXXV.—Number of winds observed at 1 and 10 A.M. and 4 and 10 P.M. during 20 years, from 1870 to 1889, tabulated under the eight principal points of the compass with their resultant directions and percentage ...	149

	Page.
Table XXXVI.—Spectroscopic observations and other elements on rainy days ...	153
" XXXVII.—Observations of crops and trees in 1889...	156
" XXXVIII.—Harvest for 23 years ...	157
" XXXIX.—The means of Barometric pressure corrected and reduced to sea-level and those of air temperature, for each day of the month for 20 years ...	158
" XL.—Hourly variations of the Barometer and dry bulb temperature from daily means ...	162
Plate I.—Annual variation of pressure ...	163
" II.—Annual variation of temperature, Parts I and II ...	164
" III.—Annual variation of pressure of vapour... ..	165
" IV.—Annual variation of humidity ...	166
" V.—Annual variation of cloud proportion ...	167
" VI.—Variation of rainfall ...	168
" VII.—Mean rainfall and rainy days in curve forming wind-rose ...	169
...	171
List of presents received ...	171
Appendix A containing the mean apparent rising and setting of the sun in our latitude for every tenth day of the year ...	173
Appendix B containing the measurement of the distances between some of the principal places of Vizagapatam and Waltair ...	174

INDEX.

	Page.
Agriculture ...	22 to 25
Anomalies of weather ...	17
Atmosphere, composition of ...	18
Barometer, hourly variations of ...	162
Battery, distance of ...	13
Binary stars, micrometric survey of ...	10
Cattle folding, advantages of ...	24
Changes, tidal of barometer ...	19
Cloud, prevalence of ...	19
Crops ...	17, 156, 157
Dew point, how deduced ...	27
Distance, how ascertained by sound ...	13
Error of the evening gun, how watched ...	13
Equation of time, annual maxima and minima of ...	15
" " why it changes ...	15
Evaporation, how deduced ...	25, 26
" how deduced during rains ...	26
Fertility, substances used for ...	23, 24
Fluctuations, diurnal, of pressure ...	19
Gaseous atmosphere, composition of ...	18, 19
" " how deduced ...	19
Harvest, gathering of ...	25
Hindus ...	21
Husbandry, cattle used for ...	22
Instruments, meteorological ...	27, 28
Irrigation, methods of ...	24, 25
Jupiter, occultation of ...	8, 9
Land, when to be ploughed ...	23
Lightning ...	20
Magnetic Needle, how to adjust ...	14
Manures, description of ...	23, 24
Mars, observations of ...	9
Maximum fall of rain, years of ...	21
Means of pressure and temperature for 20 years for taking approximate heights ...	158 to 161

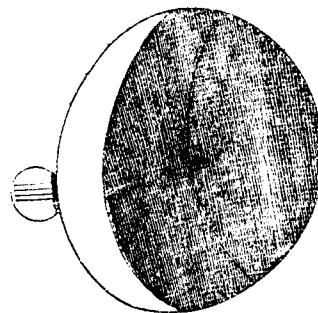
	Page.
Meridian, magnetic ...	13
" true ...	14
Meridian line, how to trace ...	14
Meteorological elements, yearly averages of ...	66, 67
" " means and extremes of ...	68, 69
Monsoon, N.-E., when took place ...	17
Moon, eclipse of ...	10
Ozone, observations of ...	23, 78
Parallactic angle, formula to calculate ...	10
Places, relative distances of ...	174 to 176
Plough, description of ...	22
Ploughing, methods of ...	23
Pressure, maximum of ...	17
" minimum of ...	17
Rain-bands ...	21, 155
Rains, periodical ...	16
" above average ...	16
" distribution of, under octants ...	21, 147
" greatest in 24 hours, one hour, and a fraction of an hour ...	69
" summer and winter ...	21, 113
Satellites of Jupiter, phenomena of ...	12
Soils, how and when to be ploughed ...	23
" description of ...	23
" how improved ...	24
Solar days, inequality of ...	15
Solar meantime, how obtained ...	14, 15
" " why required ...	14
" " equation of ...	15
Sunrise—Sunset ...	15, 173
Temperature, maximum of ...	18, 69
" minimum of ...	18, 69
Transition ...	20
Variation, deduced of magnetic meridian ...	13, 14
Venus, observations of ...	9
Winds, frequency of ...	20
" velocity of ...	17, 136, 137
Winnowing ...	25

INTRODUCTION.

1. *Astronomical Department.*—An occultation planet Jupiter took place on October 1st, 1889. The day was foggy and translucent from morning and sometimes passing clouds. At 2 p.m. the clouds cleared away from the region where the Jupiter and the moon were approaching for conjunction, and the sky there was blue. Our telescopes were turned towards them. The beautiful spectacle in the field was the golden yellow arc of the moon's bright limb on one side and white-yellow coloured Jupiter on the other side—the invisible opaque image of the moon's limb intervening.

2. The principal belts on the disc of the planet were sharp and distinct as possible. More so, the circular dark spot—little distance from the edge of the eastern limb of the inverted planet—the shadow of the Satellite III then crossing the disc for egress, in contrast with the colour of the belts which was reddish brown. No change of the colour of the belts or other parts of the planet was traced on either occasions—immersion and emersion. The appearance of the disc was normal, with the two belts—one north, the other south of the equator—separated by a bright yellow zone. It may be inferred that the contiguity to the moon's limb has no effect to produce any perceptible change on the planet's disc, except a dark shadowy streak at the end of emersion appeared projected from the moon's edge contiguous to the uncovered part of the planet's disc 4 seconds before the disc of the planet attained its circularity.

3. The marginal diagram gives the impression of what we say was seen by us at the end of emersion. At about 3 hours 26 minutes p.m. a segment of the planet's disc was



cut off by the moon's dark limb, and 43 seconds later the entire disc was occulted. The dark shadowy streak above described was noticed at 4 hours 56 minutes 9 seconds p.m., and the reappearance of circular disc of the Jupiter 4 seconds after.

4. The remarkable conjunction of Mars with Saturnian system, so much spoken of lately in the scientific papers is, of course, beyond the reach of observation in our geographical position. The nearest phenomenon of the conjunction we can avail of on a fine day with us was on 20th September—about their meridian passage.

5. The right ascension of Mars then deduced from observation was

$10^h 2^m 49^s.8.$

Saturn's

$10^h 2^m 56^s.9.$

Polar distance of Mar's

$76^\circ 41' 57''.52.$

Saturn's

$76^\circ 43' 32''.61.$

The distance of Mars at the time, from the fixed star Regulus whose right ascension = $10^h 2^m 27^s.67.$

Polar distance = $77^\circ 29' 27''.2.$

P Represents the difference of right ascension.

PS and PS' their polar distances.

$\text{tang PM} = \text{Cos } P \text{ tang PS}$

$S'M = \text{PM} - \text{PS}'$

$\text{Cos } S'M \text{ Cos } PS \text{ Sec } Pm = \text{Cos } ss' = 47' 29'' \text{ the distance.}$

Day of observation.	Satellites.	Phenomena.	Telescope.	<i>Vizagapatam</i> mean solar time of ob- servation.	<i>h. m. s.</i>	Equivalent Greenwich mean solar time.	Mean solar time of N. A.	REMARKS.
25th Sept.	I	Sh. Egr. First contact	T. Cooke & Sons Eq.	7 10 52	1 37 22	1 40 8	1 41 0	Definition poor at times.
29th "	IV	Last contact	Ditto	7 13 38	1 40 8	1 49 1	1 51 0	Satisfactory.
29th "	II	Tr. Egr. Internal contact	Ditto	7 22 31	1 49 1	1 50 4	1 51 0	Satisfactory.
29th "	II	Bisection...	Ditto	7 23 34	1 50 52	3 45 19	3 48 0	Definition good.
29th "	II	External contact	Ditto	7 24 22	3 45 19	3 46 35	3 48 0	Definition good.
29th "	II	Oc. D. External contact	Ditto	9 18 49	3 46 35	3 48 59	3 50 0	Definition excellent.
29th "	II	Bisection...	Ditto	9 20 5	1 26 56	1 28 30	1 30 0	Definition good.
29th "	II	Last seen...	Ditto	7 2 0	1 28 30	1 29 55	1 30 0	Definition good.
9th Nov.	II	Tr. Ing. First contact	Ditto	7 3 25	1 37 39	1 40 13	1 42 0	Definition good.
"	I	Bisection...	Ditto	7 9 30	1 40 13	1 36 39	1 42 0	Definition good.
"	I	Oc. D. External contact	Ditto	7 11 9	1 36 39	1 42 31	1 42 0	Definition good.
"	I	Bisection...	Ditto	7 13 43	1 42 31			
"	III	Last contact	Ditto	7 13 9				
"	III	Oc. D. Bisection	Ditto	7 13 9				
"	III	Last contact	Ditto	7 16 1				

11. If the times of the beginning of an eclipse of Jupiter's Satellites be accurately observed at two different places, the difference of these times will be the difference of longitude of the places. Since, however, the light of a Satellite diminishes gradually while entering, increases gradually on leaving it, the observed time of beginning or ending of an eclipse must depend on the power of the telescope used and also upon the eye of the observer.

eclipses, these eclipses are easy guides, but in the point of accuracy they are equally of no value where better methods are always available and where nothing but accuracy is the object.

12. We watch the flash of the time gun to find its error. The distance between the battery where the time gun is fired, and the observatory where the flash is observed, we measured, is one mile four furlongs and 70 yards. This is by the road.

13. To ascertain this distance in a direct line, we made series of observations of the interval between the flash and the report; and the temperature of the air.

The interval was 5 seconds when the temperature was $85^{\circ}6$ —we call this S .

V = velocity required, or, say, the distance required.

$V_1 = 1.12$, the increase of velocity for every degree above 32° .

$t_1 = t - 32$, t being the temperature of the air at the time of observation.

Now $V = (v, t_1 + 1086) S = 5,730$ feet = one mile 27 rods and $4\frac{1}{2}$ feet, the distance between the observatory and the time gun measured by the velocity of the sound in a direct line.

14. This distance lies as hypotenuse from the observatory. To test this by trigonometrical survey, we carefully measured a base line at the place of observation—145 feet. The angle at the base to the time gun = $88^{\circ}33'$. $Ra : base :: secant of the angle at the base : hypotenuse$

= 5,730 feet same as we ascertained before by the sound.

15. The variation of the magnetic meridian from the true meridian which we ascertained in 1886 was $1\frac{1}{2}^{\circ}$ to the east.

16. We see from the experiments repeated some years after, in some places it was found that the angle of variation is not the same, but that it has increased or decreased.

We therefore tried our observations again, and found that the magnetic meridian at Vizagapatam still lies $1\frac{1}{2}^{\circ}$ east of the true one; hence, we believe that the same difference exists, unless some very extraordinary current or the presence of magnetic ore should act upon it.

17. It is not easy to trace the true meridian. We think a simple expedient saving time and trouble can be fully appreciated by actual experience. There is a true meridian line formed out by us on the back ground of the meridian post-tower on the Kylasa hill, which we can see through the diamond in the tower. If the compass is placed, or a magnetic needle be suspended, on a pivot in the direction of the said meridian line at a distance from any iron, it is generally found that the direction the magnetic needle takes will form an angle with the true meridian.

18. A few words here about a meridian mark and sundial would not be out of place. If, upon a horizontal plane, we form a meridian line with reference to the said angle of magnetic meridian, and at the south extremity of this line erect a vertical rod freely exposed to the sun, we may determine the time of apparent noon by the passage of the shadow of the rod over the meridian line. Or, if we set up a straight rod in a position parallel to the axis of the earth, its shadow, as cast upon a horizontal plane, will have the same direction at any given hour at all seasons of the year. If, then, we graduate the horizontal plane in a suitable manner, and mark the lines with the hours of the day, we may determine the apparent time whenever the sun shines upon the rod. This may be constructed with sufficient precision to answer the ordinary purposes of the Society, and will always indicate apparent time; but mean time may be deduced from it by applying equation of time.

19. If a clock were required to keep apparent solar time, it would be necessary that its rate should change from day to day according to a complicated law. Finding in practice impossible to accomplish this, clocks are now regulated to indicate mean solar time. A clock therefore should not indicate 12 hours when the sun is on the meridian, but should sometimes indicate more than 12 hours,

and sometimes less than 12 hours, the difference being equal to the equation of time.

20. The inequality of the solar days depends on two causes—the unequal motion of the earth in its orbit, and the inclination of the equator to the ecliptic.

21. For our present purpose it is quite enough if we say that the equation of time has two annual maxima and two annual minima and there are four periods when the equation is zero. These dates and the corresponding values of the equation of time are as follows:—

Feb. 11, + 14m.	28s.	July 26, + 6m.	16s.
April 15, 0	0	Sept. 1, 0	0
May 14, 3	52	Nov. 3, 16	21
June 14, 0	0	Dec. 24, 0	0

These dates and the values of the equation of time change slightly from one year to another. Where a great accuracy is required, a table of the equation of time is necessary for each year, such a table is annually published in the Nautical Almanac.

22. A table of the mean time of the apparent rising and setting of the sun in our latitude for every tenth day of the year calculated for the second year after bissextile, we printed in the Appendix A.

23. We printed in the Appendix B a table showing in (miles, furlongs and tenths) the relative distances of some of the principal places in Waltair and Vizagapatam, and a general table of the measurement of the distance, making the old fort gate, i.e., the northern wall of the court-house, zero, and the Turner's pontoon bridge, the southern limit of the place.

Meteorology.

24. The meteorology of the year 1889 agrees with the years 1873 and 1880 in the amount of rain and in the point of rainfall, being above the average as seen in the subjoined table, wherein the years nearly agreed with the average, are also given for contrast.

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Years total.	Average of 21 years.
1873						1.9	9.2	10.2	3.7	17.6	1.5	4.4	52.2	
1880	5	6		2.1	4.5	3.4	8.9	5.1	1.7	11.4	10.5	1.1	59.1	45.95
1880				1	8	3.8	8.5	3.5	11.8	12.47	3.28	2.86	50.1	
1880							Nearly agreed with the average.							
1880	1			1	8	10.9	6.6	10.7	4.6	7.1	2.4	3	43.6	
1874	4				2.1	3.0	4.7	3.1	9.8	21.0	3.3	5	47.9	
1879					14.5	2.1	3.0	2.5	4.0	4.6	13.5	2	44.5	
1882	1		1		2.4	1.0	4.9	3.1	17.8	2.7	12.6	2.8	46.9	45.95
1883	9				7	1.9	2.8	11.9	6.3	12.9	5.4	1.1	43.9	
1885	3		1.9		3	3.0	3.7	3.8	13.2	8.2	7.4		44.6	
1887			4		1.1	8.8	6.3	5.8	6.2	11.7	3.3		3.6	

25. The rains of 1889 were timely and so continuous that they obviated the cost of stored water from the tanks, helping the crops by their down-pours off and on. At times they were abundant and more than needed, fortunately not forced by the atmospheric commotion of cyclonic character.

26. The South-West monsoon rains amounted 30.81 inches - 2.0 inches above the average.

27. The North-East monsoon of 1889 began between 2nd and 27th September as in 1870, 1874, 1877, 1878, and 1884. As for anomalies of the weather, we find it began in previous years, i.e., 1868, 1871, 1872, 1873, 1875, 1876, 1881, 1882, and 1886 as early as between 4th and 30th August, and then as late as between 1st and 30th October in 1867, 1869, 1879, 1880, 1883, and 1885; in 1888, so late as 30th October, and ceased in a week; and later than that in 1887 between 8th and 13th November.

28. The rainfall of North-East monsoon of 1889 amounted 19.3 inches - 3.2 inches above the average. During these rains, whose characteristics are more or less the stormy winds, the winds of 1889 were harmless; when strong, their velocity never exceeded 10 miles per hour.

29. The average monthly values of meteorological elements are given in Tables I to XL between pages 67 and 162.

30. Pages 30 to 65 contain the 12 monthly reports of meteorological results and the remarks on agricultural preparations and the state of crops preceded by the notes of the phenomena observed during each month.

31. General remarks on barometer, temperature, rainfall, and the direction of the wind appear under monthly phenomena described for each month.

32. The normal variation of pressure of air from month to month for 20 years including 1889:—The curves in Plate I exhibit the pressure is highest in January or December, and then it gradually falls till June or July, and afterwards rises gradually till the following December or January.

33. The pressure of June or July is less than that of any other month of the year, vide Table of normal daily pressure. In 1889 the highest pressure was on the 7th January (30.211), the lowest on the 7th July (29.327) as exhibited in the abstract, page 66.

34. *Variations of normal temperature.*—They are exhibited by two curves in Plate II. The even line curve exhibits the variation from the normals of 20 years; while the variations of 10 day periods, tabulated at the foot of the Table XV, are shown by uneven line curve. The figures in the Table XV of the normal temperature of each day of the year are the means of four equidistant variations of 4, 10, 16, and 22 hours recorded during 2 years. The highest of these normal daily temperatures (89.1) was recorded on the 4th June, the lowest (73.8) on the 21st December. The highest temperature recorded in this latitude is 105° 0, while the lowest is 59° 5.

35. *Depression of wet below dry bulb thermometer.*—Second part of the Plate II, shows by its curve the depression of wet below the dry bulb thermometer with reference to normal temperature of evaporation given in Table XVII. In October 1889 this depression was below the normal values of all the other months.

36. *Variation of pressure of vapour.*—Plate III shows by its curve the normal variation of pressure of vapour from month to month of an average year. The pressure gradually raised and reached its maximum in May and second maximum in September, and from that time forward declined to the end of the year to its minimum.

37. The pressure of gaseous atmosphere is obtained by subtracting the pressure of vapour given in Table XXIV from the entire height of the barometric column; and with the assistance of Giot's Tables, given in Smithsonian Meteorological Tables B, 50, was deduced—the elastic force of vapour present in the air—from the indications of dry and wet bulb thermometers up to 1880; and since 1881, the same was computed by the means of Glaisher's Tables, 4th edition.

38. A few words may be useful here of the composition of air to explain what is gaseous atmosphere and what it has to do with atmospheric air. Atmospheric air is not a simple substance, but consists of nitrogen and oxygen, together with more or less vapour of water and almost always a little carbonic acid. Therefore, the oscillations of pressure are due partly to the changes in the pressure

of the gaseous atmosphere and partly to the changes in the amount of vapour present in the air. Under these circumstances, if from the entire height of the barometric column we subtract the pressure of vapour, the remainder will represent the pressure of the gaseous portion of the atmosphere.

39. The height of the barometer is subject to a diurnal fluctuation of a complex effect depending partly to each of the above described changes. The height is greatest about 10 A. M., and least about 4 P. M.; smaller fluctuations are also observed during the night. Second maximum about 10 P. M., and second minimum about 4 A. M.

40. The mean pressures exhibited in the last column of the Table III are reduced to sea level Table X for the mean temperatures of Table XIV. The values are computed according to formula $\frac{f}{n} \times \frac{h'}{h} = c$ by the aid of Table XXI in the Smithsonian series of Meteorological Tables D 88, f = the elevation of the station; n = the number in the Table; h' = the normal height of the barometer at the sea level; h = the reading of the barometer, and c = the quantity required.

41. *The variation of humidity.*—The curve in Plate IV at a glance shows the increase and decrease of humidity from month to month of an average year and at the same time the comparison of 1889 with the means of last 20 years. The humidity in 1889, same as the years 1873 and 1880, was above the average in the months of July, September, and November, and the rainfalls of those months were as due to the same.

42. *Cloud proportion.*—Plate V gives the curves representing the annual variation of the proportion of the sky covered with the cloud. The dotted curve is for the year 1889, which exceeded in July and August and declined far below the mean in January and February. It is clear from the mean curve that the sky is more cloudy in July and August and least clouded in February.

43. The lightning in 1889 nearly agrees with that of 1876 as exhibited in the following Table :—

Number of days on which lightning was observed.

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	T.	Total rainfall.
1872	...	...	1	13	21	15	7	19	24	10	...	2	112	53.9
1873	...	...	2	10	22	18	3	16	17	20	1	...	109	52.2
1874	1	...	...	10	24	16	18	11	25	20	4	...	129	47.9
1875	...	...	8	6	19	13	6	13	22	15	...	...	102	29.0
1876	...	...	6	7	14	11	4	14	18	4	...	...	78	48.8
1877	3	4	7	12	17	14	8	8	23	21	...	1	120	40.1
1878	...	...	7	12	28	17	17	23	26	16	3	1	150	76.2
1879	...	1	4	1	20	15	11	12	15	13	2	...	95	44.5
1880	...	1	...	14	21	12	10	18	14	14	2	...	106	50.1
1881	...	...	4	5	9	15	6	15	18	5	5	...	82	36.1
1882	...	...	2	9	20	8	4	8	26	18	9	...	104	46.9
1883	...	...	11	9	12	15	5	15	15	21	3	...	106	48.9
1884	2	6	3	11	15	19	11	17	13	20	3	...	120	36.6
1885	...	...	11	10	16	15	10	7	13	11	8	1	97	44.6
1886	...	...	4	2	10	17	4	14	13	15	4	1	84	79.5
1887	...	...	...	2	7	10	7	11	11	10	3	...	61	43.6
1888	...	1	2	5	4	11	5	5	11	9	3	...	56	31.7
1889	...	...	...	6	9	4	7	16	12	11	6	...	71	50.11

44. *Frequency of the winds.*—The frequency of the winds deduced from the observations of 20 years is mostly from the east in December and January. February to September, winds from west and south-west are the n . . . From October southerly winds abate and transition takes place by frequency of winds from east and north, followed by rains with more or less strong north-easterly winds. In 1889 the direction of the wind was normal.

45. The monthly and annual totals of rainfall given for individual years in Table XXIX, prepared for a period of 24 years, are exhibited by curve in Plate VI, together

with the monthly mean variations of summer and winter rains at the foot of the Plate.

46. The summer rainfall of 1886 is the highest of the summers of all the years, except 1887, which was higher than 1886 by 1.5 inches. The winter rainfall in 1886 is less than that of 1878, which is the highest on record. As for total fall of rain both summer and winter, the year 1886 exceeded all the years, and is the maximum for the total rainfall and second maximum for summer and winter rainfalls respectively. The summer rainfall of 1889 exceeds the winter rainfall, but on the whole there is nothing abnormal.

47. The means of total rainfall have been plotted out in curve forming wind-rose Fig. 1, Plate VII. Fig. 2 gives a curve to indicate the number of rainy days for each octant.

48. The distribution of total rainfall of 20 years under each octant is given in Table XXXIII. The last horizontal line in the Table gives the rainfall of an average year under each octant, and the perpendicular columns give the rainfall for each month of an average year under each octant.

49. The rain bands observed are given in Table XXXVI. Our observations of rain bands are generally made between 9 and 10 A.M., and sometimes as often as necessary. Before rain the shaded band is always more or less in intensity.

50. What we profess to know now of meteorology, we, the Indians, i.e., the Hindoos and others of India, are bound to acknowledge is all due to the kind doings of the present British Government in the way of education and other similar encouragements. It is impossible to find any important section of the people of India who are united in blood, in language, and in religion. We, the Hindoos the largest of the native races of India, are not united, but split up into castes, saturated with caste hatred to despise one another. During the constant invasions from which India has suffered, our Hindoo race was so much run down that it was denuded of the means of education and promotion of knowledge, and we then lost most of our useful books of literature and science. Some of them which were

since discovered are now in print by the help and facilities introduced into India by the kind British Government, and thus available to the community at large. Although we own the antiquity regarding some branches of science, we are not now in a position to carry out such studies. ^{our ex-}perience of the past under the present Government ^{has} been encouraging, and we may possess means of ^{im-}provement hereafter if we improve ourselves with patience ^{not} making too much of ourselves.

51. For the benefit of the people of India, the Government is now doing its best in the way of opening agricultural schools; so we may as well give some account here of the style of our agriculture, the animals used to assist in the labours of husbandry, and the implements, though crude, which are more or less giving us the desired effect.

52. The plough used in this country is somewhat similar to the fluke of an anchor, valued not more than a rupee and sometimes less than that. This contains share-beam, plough-tail and draught-iron or coulter, the whole securely fastened with nails and pegs; not a merest scratch-^{ing} of the soil the said coulter gives, but meets the requirements of the local circumstances. It slides so that it may be lowered at pleasure to give a deep cut into the ground according to the character of the soil.

53. The same form of plough, having peculiar characteristics of its stability, made of substantial wood and mounted with broad or narrow pointed coulter, is adapted to the particular soil or description of the work to be done, value in all would not exceed Re. 1-12 or the most Rs. 2.

54. As to cattle.—Oxen and buffaloes are generally preferred for assisting in the labours of the husbandry; therefore they are bred, fed, and housed according to the means of the ryots and others. The sheep are likewise considered for the purposes of manuring the fields. Most of the cultivators, especially the shepherd caste, are the stock-breeders. These animals, when past labour, are fattened and sold in market for considerable sum. It is hardly necessary to say that the general use of the sheep makes meat plentiful; we say this a national benefit.

55. The shepherds and many other classes of the villagers are themselves veterinary surgeons. They cure the diseases most wonderfully. When the anomalies of the weather happen, and then when epidemics arise, we find hard to overcome them by any good feeding and housing suggested in common parlance.

56. *Methods of cultivation.*—What we know in our own estates in the districts of Vizagapatam and Ganjam.

1. Land ought not to be ploughed when in a very wet state, as it will, under such circumstances, be of no service.
2. The plough in general must enter deeply into the soil, but this depends on the nature of the land; for the most part, it will be necessary to go, if possible, to the bottom of the fertile mould, but not deeper.
3. Sandy and gravel soils rather advantaged if ploughed when wet, such soils if stirred in hot and dry weather are apt to part with their moisture too readily.
4. The stiff clay soils require more frequent stirring with the plough to break down and separate their tenacious particles than others of lighter or looser texture, as needed, according to the nature of the intended crops.
5. The ploughing should open the soil according to its character for the reception of fertilizing properties of the air. It should break up the ground according to the character of the crop to be tried, so that it affords facility to the tender fibres of the roots to spread and seek their nourishment, while it destroys weeds.

57. *Manures and Manuring.*—

1. Substances used to increase the fertility of land or restoring it where exhausted by successive crops are numerous; chiefly "animal dung and vegetable substances." These substances undergo considerable changes from decomposition before they become the food of vegetables.

2. The weeds of various kinds, chiefly the weeds of this district, called "Vempaly" and "Black Vempaly," taking care to cut them in their succulent or juicy state, are thrown in heaps of putrefaction, afterwards considerable quantities of peat earth is added to augment the value of the manure.
 3. Others of great variety, such as wood ashes, the mud taken from the rivers, ponds and tanks, are also used to promote the fertility of the land.
 4. The stock breeders of sheep and cattle use their fields as slaughtering grounds; for the blood, wool, and the contents emptied from the stomach serve as a best manure to the soil.
 5. The sweepings, containing the refuse of several matters having rapid tendency to decomposition, are spread upon and incorporated into the soil by ploughing. The same way the refuse of the cisterns of the indigo factories in our estates is used; all these quickly contribute to the support of vegetation.
 6. Grubbing up weeds and bushes with which the land may be encumbered, burning them and spreading their ashes on the surface and then ploughing, is another beneficial practice.
 7. Dung of sheep requires no putrefaction, their urine is also much serviceable; therefore the sheep are generally folded on the land to be manured.
 8. The urine of the animals of bovine genus is also serviceable as manure; therefore they are daily folded on some part of the field.
 9. Impoverished grass lands are rendered fertile by stocking them with sheep and manuring them with any of the above described substances.
58. *The irrigation and use of water.*—They supply lands with water which are naturally too dry or those crops which require more than the usual quantity. There is principal skill in irrigation gained by constant practice to know the proper time and the due proportion of water

to feed the crop and running the water with gentle current which we know the best promoters of vegetation.

59. After the cultivation the newly formed weeds, if any, are with great attention removed to obviate the waste of the fertilizing properties of the soil.

60. *Harvesting operations.*—The treading out of the corn by the feet of oxen is still observed and answers well enough to the present day. The grains of corn are separated from the chaff as well as from the stones, dirt or other matter, by the operation of winnowing, which is done by some of the relations of the ryots lifting the baskets of corn and chaff and pouring the contents against the direction of the wind. The chaff, being much lighter, was by this means, in its passage from the baskets to the ground, blown a considerable distance, and the desired separation thereby takes place with a trifling expense. This is what our estates-people easily perform.

61. In September 1889 the maximum and minimum thermometers, Nos. 9059 and 69019, kindly supplied by J. Eliot, Esq., Meteorological Reporter to the Government of India, were returned, and replaced by Negretti and Zambra's maximum and minimum thermometers, Nos. 62413 and 63933, certified by the Kew Observatory. In the same month the Mason's hygrometer, dry bulb, No. 51221, wet bulb, No. 51222, supplied by Negretti and Zambra, was introduced into use, which was also certified by the Kew Observatory. With the exception of these, no change has been made in 1889 in the instruments or in their position or in the times or details of observations.

62. In the month of September we introduced evaporation gauge into use and commenced evaporation observations.

63. The amount of evaporation from the earth's surface is measured by placing this vessel of water in open air and determining the loss of water at the end of 24 hours. It is nearly filled up with water, the quantity having been previously measured and placed out of doors freely exposed to the action of the atmosphere. At the end of 24 hours the water is again measured, and the loss of water shows the amount of evaporation that has taken place. If rain

has fallen between the two observations, the amount collected in the rain gauge is deducted from the quantity in the evaporation gauge.

64. The amount of rain is measured by the pluviometer invented by the late G. V. Juggarow, Esq., the Director of the Observatory, *vide* page 188 Buchan's Handy Meteorology, and pages 98 and 99 Chambers' Encyclopædia, Vol. VIII in the form of a funnel having a diameter of 4.697 inches or a receiving area of 17.33 square inches. Since a fluid ounce contains 1.733 inches of water, it follows that for every fluid ounce collected by this gauge the tenth of an inch of rain has fallen.

65. When we are required to deduct the amount collected in the pluviometer from the quantity in the evaporation gauge, we should know the relation existing between these two gauges.

66. The evaporation gauge having a diameter of 8 inches, or a receiving area of 50.27 square inches, it follows that one-tenth collected in the evaporation gauge is equal in volume to .29 collected in the said pluviometer; hence, when we have rainfall to one-tenth, we find the same in the measuring tubes of both the pluviometer and the evaporation gauge—only the volumes of water will be different as due to the capacity of the respective areas of the gauges as above shown.

67. *Routine work and the instruments used*—By the same staff of observers as in the previous years, were conducted the observations sent to the Meteorological Offices of the Government of India and Bengal and to the Vizagapatam District Gazette.

68. We regret that we have to record the death of our senior assistant, Munda Yerrannah. He was first, the Superintendent of our Workshops, afterwards he held a responsible post in our Revenue Department, and then he was transferred to the observatory as Examiner and Superintendent of the Computation Department. Capital hand for drawing sketches, diagrams, and maps; his devotion to duty and his high intellectual attainments won for him the affection and esteem of all who knew him.

69. The daily telegrams of 8 A.M. observations were throughout the year forwarded to the weather India and to the weather Bengal.

70. Barometric readings are obtained from the self-compressing standard barometer by Negretti and Zambra. The barometer and other instruments were compared by Mr. H. F. Blanford, the late Meteorological Reporter to the Government of India with those of Calcutta. The error of barometer is + .028. The error of wet minimum + .2.

71. The mean temperature is deduced from the readings of the standard dry bulb thermometer by Negretti and Zambra.

72. The adopted mean temperature of each month is the mean temperature obtained from dry bulb and maximum and minimum.

73. The maximum and minimum temperatures in shade are obtained from the readings of maximum and minimum thermometers of Negretti and Zambra, Nos. 62413 and 63933, certified by the Kew Observatory and from other instruments. The synoptical observations were commenced in 1888 and are still continued.

74. The other temperatures are obtained from Mason's hygrometer certified by the Kew Observatory and from other instruments.

75. The hygrometrical results, except dew point and humidity, have been calculated from Glaisher's Tables, 4th edition. Mean temperature of dew point is obtained by multiplying the difference between dry and wet bulbs by Glaisher's factors and subtracting the product from the dry bulb reading.

76. The mean humidity is obtained from the readings of dry and wet bulb thermometers by means of H. F. Blanford's Tables by August's formula.

77. The maximum and minimum temperatures of solar radiation are obtained from an exposed black bulb thermometer enclosed in a large tube with a large bulb exhausted of air and hermetically sealed.

78. At night the earth and all the objects on its surface give out by radiation towards the sky the heat they have received during the day. To ascertain the extent to which such cooling proceeds with intervening effects, the grass radiation thermometer, No. 60687, is placed on grass, but above it and quite unscreened by it. The amount of terrestrial radiation we subtract the minimum on the grass from the minimum in the shade, thus :

Shaded minimum 64.6 - grass minimum $54.2 = 10.4$ (terrestrial radiation).

79. Mean serenity is obtained by inspection of the sky registering the whole sky—when clear as 0, when completely overcast as 10.

80. The direction of the wind is given by the anemoscope by G. V. Juggarow, Esq., the deceased founder of the observatory, by whose name the observatory is called, and by whose daughter, Sri Aukitham Achayamma Garu, the observatory has been maintained and endowed with munificence and distinguished public spirit.

81. The amount of ozone is obtained by means of Negretti and Zambra's test papers according to the scale of ten tints, distinguished by number from 1 to 10. The test paper is suspended by a hook attached to the upper part of the inner cylinder of Sir James Clark's ozone cage, hanging freely exposed to the air, defended from rain and direct rays of the sun. The amount of ozone is registered once a day at 10 A.M.

82. The velocity of the wind is given as registered by Robinson's anemometer at four equidistant intervals during 24 hours.

The initials to indicate general weather by Admiral Beaufort, and used by Mr. H. F. Blanford in his Pamphlet of Instructions for Meteorological Observers in Bengal :—

Blue sky	...	...	...	<i>b</i>
Clouds—Detached passing clouds	...	...	...	<i>c</i>
Foggy	...	...	...	<i>f</i>
Gloomy—Dark weather	...	...	...	<i>g</i>
Misty—Hazy atmosphere	...	...	...	<i>m</i>
Overcast—The whole sky covered with thick clouds	...	...	...	<i>o</i>
Ugly—Threatening appearance	...	...	...	<i>u</i>
Visibility of objects—Clear atmosphere	...	...	...	<i>v</i> *
Wet—Dew	...	...	...	<i>w</i>

**v* is also intended in this pamphlet for the visibility of the objects at clear spaces of the stellar vault.

METEOROLOGICAL REPORT
For January 1889.

* Mean for 12 years.

In the month of January the highest reading of the Barometer during 20 years was on the 23rd in 1885 and was 30.223			
The lowest	"	"	3rd " 1880 " 29.701
The highest temperature	"	"	7th " 1870 " 84.5
The lowest	"	"	4th " 1889 " 60.2
The highest adopted mean temperature of the month was	"	"	1870 " 78.6
The lowest	"	"	1884 " 73.6
The highest reading of sun max. in vacuo	"	"	29th " 1876 " 131.5
The lowest	"	"	4th " 1884 " 89
The highest	"	"	2nd " 1882 " 70.7
The lowest	"	"	4th " 1889 " 48.5

General weather:—*b* and *v*. Kind of clouds:—*ci*, *cu*—s and *ci*—s. The chief feature of the sky during this month was fine clear weather. Dewy nights and cold northerly winds were prevalent. Prices high. The standing crops are suffering much for want of rain. The total quantity of rain collected since 1st January is *nil*. The quantity for the same period of last year was *nil*. The same for the year 1887 and 1886 *nil*; for 1885, 3 of an inch; for 1884, 9 of an inch; for 1883, 9 of an inch; for 1882, 1 of an inch; for 1881, was *nil*;

for 1880, .5 of an inch; for 1879 and 1878, was *nil*; for 1876, was *nil*; for 1875, .1 of an inch; for 1874, .4 of an inch; for 1873 and 1872 was *nil*; for 1871, .1 of an inch; for 1870, 3.0 inches, and for 1869, .1 of an inch.

The ranges of both the Barometer and the Thermometer rather high. The means of pressure and temperature differ from their mean values. The minimum temperature of the month was the lowest on record for the month of January, and was 3 degrees less to that of 1881, which was the next minimum record. All the hygrometrical results, except the weight of a cubic foot of air, were rather below. Both solar and terrestrial radiations were below. The prevalent direction was N.-E. with moderate intensity.

G. V. Juggarow Observatory, DABA GARDENS, VIZAGAPATAM.

Lat. 17° 42' 0" N. Long. 83° 22' 30" E. Height of the Barometer cistern above the sea-level, 31 feet.

METEOROLOGICAL REPORT For February 1889.

Results of Observations taken during the month.		Mean for 20 years.
Mean reading of the Barometer	29.997	29.953
Barometric monthly mean reduced to sea-level	30.029	29.985
Highest reading of the Barometer on the 14th	30.153	30.133
Lowest " " " " 19th	29.833	29.773
Range of Barometer readings	320	360
Highest reading recorded of the max. temperature on the 28th	88	86.9
Lowest reading recorded of the min. temperature on the 24th	66.2	70
Range of Thermometer readings	21.8	16.9
Mean of maximum readings	82.7	82.5
Mean of minimum readings	70	74.5
Mean daily range	12.7	8.0
Deduced monthly mean (from mean of max. and min.)	76.4	78.5
Mean temperature from dry bulb	79.6	79
Adopted mean temperature	78	78.8
Mean temperature of evaporation	70.5	70.7
Mean of wet minimum	65.3	64.9
Mean temperature of dew point	65	65
Mean elastic force of aqueous vapour	60.2	61.7
Mean weight of vapour in a cubic foot of air	6.5	6.7
Mean additional weight required for saturation	4.4	3.8
Mean degree of humidity (saturation 1.00)	62	65
Mean weight of a cubic foot of air	513.1	512.9
Highest reading of sun max. in vacuo on 16th	110.8	117
Lowest " " " " 4th	104.3	104.6
Mean reading	108.1	110.8
Highest reading of nocturnal radiation on 5th	64.5	68.6
Lowest " " " " 2nd	55.6	55.3
Mean reading	60.7	61.9
Mean serenity	8.9	8.6
Mean ozone	2.8	2.4
Fall of rain	...	2
Number of days on which rain fell	...	1

In the month of Feb.		the highest reading of the Barometer during 20 years was on the 7th in 1881 and was	
The lowest	"	28th	1879
The highest temperature	"	14th	1878
The lowest	"	"	92
The highest	"	1st	1881
The highest adopted mean temperature of the month was	"	18th	1878
The lowest	"	"	82.3
The highest reading of sun max. in vacuo	"	1875	76.3
The lowest	"	22nd	1874
The highest	"	26th	1870
The lowest	"	16th	1878
The highest of nocturnal radiation	"	1st	1879
The lowest	"	"	51.9

General weather.—*a* and *v*. Kind of clouds:—*of*, *cu*, *ci*—*a*, and *cu*—*a*. The chief feature of the weather was steady fine clear weather. Mango showers failed, heat gradually increasing and the anticipated results. Foodgrains are selling at high prices. New rice a premium on the market although it is season for them. The total quantity of rain collected since the 1st of the present month is 1.12 inches. The same for the year 1887 was *nil*; for 1886, *nil*; for 1885, *nil*; for 1884, *nil*; for 1883, *nil*; for 1882, *nil*; for 1881, *nil*; for 1880, *nil*; for 1879, *nil*; for 1878, *nil*; for 1877, *nil*; for 1876, *nil*; for 1875, *nil*; for 1874, *nil*; for 1873, *nil*; for 1872, *nil*; for 1871, *nil*; for 1870, *nil*; for 1869, *nil*; for 1868, *nil*; for 1867, *nil*; for 1866, *nil*; for 1865, *nil*; for 1864, *nil*; for 1863, *nil*; for 1862, *nil*; for 1861, *nil*; for 1860, *nil*; for 1859, *nil*; for 1858, *nil*; for 1857, *nil*; for 1856, *nil*; for 1855, *nil*; for 1854, *nil*; for 1853, *nil*; for 1852, *nil*; for 1851, *nil*; for 1850, *nil*; for 1849, *nil*; for 1848, *nil*; for 1847, *nil*; for 1846, *nil*; for 1845, *nil*; for 1844, *nil*; for 1843, *nil*; for 1842, *nil*; for 1841, *nil*; for 1840, *nil*; for 1839, *nil*; for 1838, *nil*; for 1837, *nil*; for 1836, *nil*; for 1835, *nil*; for 1834, *nil*; for 1833, *nil*; for 1832, *nil*; for 1831, *nil*; for 1830, *nil*; for 1829, *nil*; for 1828, *nil*; for 1827, *nil*; for 1826, *nil*; for 1825, *nil*; for 1824, *nil*; for 1823, *nil*; for 1822, *nil*; for 1821, *nil*; for 1820, *nil*; for 1819, *nil*; for 1818, *nil*; for 1817, *nil*; for 1816, *nil*; for 1815, *nil*; for 1814, *nil*; for 1813, *nil*; for 1812, *nil*; for 1811, *nil*; for 1810, *nil*; for 1809, *nil*; for 1808, *nil*; for 1807, *nil*; for 1806, *nil*; for 1805, *nil*; for 1804, *nil*; for 1803, *nil*; for 1802, *nil*; for 1801, *nil*; for 1800, *nil*; for 1799, *nil*; for 1798, *nil*; for 1797, *nil*; for 1796, *nil*; for 1795, *nil*; for 1794, *nil*; for 1793, *nil*; for 1792, *nil*; for 1791, *nil*; for 1790, *nil*; for 1789, *nil*; for 1788, *nil*; for 1787, *nil*; for 1786, *nil*; for 1785, *nil*; for 1784, *nil*; for 1783, *nil*; for 1782, *nil*; for 1781, *nil*; for 1780, *nil*; for 1779, *nil*; for 1778, *nil*; for 1777, *nil*; for 1776, *nil*; for 1775, *nil*; for 1774, *nil*; for 1773, *nil*; for 1772, *nil*; for 1771, *nil*; for 1770, *nil*; for 1769, *nil*; for 1768, *nil*; for 1767, *nil*; for 1766, *nil*; for 1765, *nil*; for 1764, *nil*; for 1763, *nil*; for 1762, *nil*; for 1761, *nil*; for 1760, *nil*; for 1759, *nil*; for 1758, *nil*; for 1757, *nil*; for 1756, *nil*; for 1755, *nil*; for 1754, *nil*; for 1753, *nil*; for 1752, *nil*; for 1751, *nil*; for 1750, *nil*; for 1749, *nil*; for 1748, *nil*; for 1747, *nil*; for 1746, *nil*; for 1745, *nil*; for 1744, *nil*; for 1743, *nil*; for 1742, *nil*; for 1741, *nil*; for 1740, *nil*; for 1739, *nil*; for 1738, *nil*; for 1737, *nil*; for 1736, *nil*; for 1735, *nil*; for 1734, *nil*; for 1733, *nil*; for 1732, *nil*; for 1731, *nil*; for 1730, *nil*; for 1729, *nil*; for 1728, *nil*; for 1727, *nil*; for 1726, *nil*; for 1725, *nil*; for 1724, *nil*; for 1723, *nil*; for 1722, *nil*; for 1721, *nil*; for 1720, *nil*; for 1719, *nil*; for 1718, *nil*; for 1717, *nil*; for 1716, *nil*; for 1715, *nil*; for 1714, *nil*; for 1713, *nil*; for 1712, *nil*; for 1711, *nil*; for 1710, *nil*; for 1709, *nil*; for 1708, *nil*; for 1707, *nil*; for 1706, *nil*; for 1705, *nil*; for 1704, *nil*; for 1703, *nil*; for 1702, *nil*; for 1701, *nil*; for 1700, *nil*; for 1699, *nil*; for 1698, *nil*; for 1697, *nil*; for 1696, *nil*; for 1695, *nil*; for 1694, *nil*; for 1693, *nil*; for 1692, *nil*; for 1691, *nil*; for 1690, *nil*; for 1689, *nil*; for 1688, *nil*; for 1687, *nil*; for 1686, *nil*; for 1685, *nil*; for 1684, *nil*; for 1683, *nil*; for 1682, *nil*; for 1681, *nil*; for 1680, *nil*; for 1679, *nil*; for 1678, *nil*; for 1677, *nil*; for 1676, *nil*; for 1675, *nil*; for 1674, *nil*; for 1673, *nil*; for 1672, *nil*; for 1671, *nil*; for 1670, *nil*; for 1669, *nil*; for 1668, *nil*; for 1667, *nil*; for 1666, *nil*; for 1665, *nil*; for 1664, *nil*; for 1663, *nil*; for 1662, *nil*; for 1661, *nil*; for 1660, *nil*; for 1659, *nil*; for 1658, *nil*; for 1657, *nil*; for 1656, *nil*; for 1655, *nil*; for 1654, *nil*; for 1653, *nil*; for 1652, *nil*; for 1651, *nil*; for 1650, *nil*; for 1649, *nil*; for 1648, *nil*; for 1647, *nil*; for 1646, *nil*; for 1645, *nil</*

General weather: *b* and *w*. Kind of clouds: *-ci, cn, ci-a*, and *cu-a*. The chief feature of the weather was steady fine clear weather. Mango showers failed, heat gradually increasing to the point where the anticipated results. Foodgrains are selling at high prices. New rice a gram. *cu-a* failed the anticipated results. The total quantity of rain collected since the beginning of the year was *nil*. The same for the year 1887 was *nil*; for 1886, *ni*.

All the Barometric readings, with the exception of the range, were rather above, and the range .040 of an inch below. The maximum temperature was 4 degrees less to that of 1878 the highest on record for the month; and the minimum temperature 2.2 degrees above that of 1881 the lowest on record. The temperature of air was rather above and the temperature of evaporation closely agreed with the average. Both solar and terrestrial radiations were below the average. The proportion of the cloud was exceedingly small. The prevalent direction of the cloud was S.-E. and S.-E. with the moderate intensity.

In the month of March	the highest reading of the Barometer during 20 years was on the	5th in 1889 and was	30.162
The lowest	"	"	"
The highest temperature	"	"	1876
The lowest	"	"	1879
The highest adopted mean temperature for the month was	"	"	1889
The lowest	"	"	1889
The highest reading of sun max. in vacuo	"	"	1885
The lowest	"	"	1879
The highest reading of nocturnal radiation	"	"	1870
The lowest	"	"	1887
The highest	"	"	1889
The lowest	"	"	1889

General weather :—*b*, *f*, and *w*. Kind of clouds :—*ci*, *cu*—*s*, *ci*—*cu*, and *ci*—*s*. On the 6th the town of Vizagapatam and the surrounding grounds about six miles were enveloped in fog from 6 to 7 A. M. The objects were not visible : after dissipation, the marks of precipitation of vapour in the form of drops of water very minute, were left on the grounds. 30th, thick fog in the western direction. 1st, 12th, 18th, and 27th, land wind from 10 A. M. to 4 P. M., from west. 7th and 8th, lunar halo from 8 to 9 P. M. 19th and 20th, mists were rising

to the hill tops from 6 to 8 A. M., but vanished soon. The chief feature of the sky, this month, was more or less clear weather, but we observe, in watching the stellar transits, the sky was translucent—a good sign of vapour condensing into clouds. The prices are high. Much small-pox in the town and many fatal cases. The total quantity of rain collected since 1867 is *nil*. The quantity for the same period of last year was 4 of an inch. The same for the year 1887, was 4 of an inch. 1886, 2 of an inch; for 1885, 2.2 inches; for 1884, 1.5 inches; for 1883, 9 of an inch; for 1882, 1 of an inch; for 1881, 7 of an inch; for 1880, 1.1 inches; for 1879, 1 of an inch; for 1878, 8 of an inch; for 1877, 4.8 inches; for 1876, was *nil*; for 1875, 2 of an inch; for 1874, 4 of an inch; for 1873 and 1872, was *nil*; for 1871, 4.1 inches; for 1870, 3.0 inches; and for 1869, 1 of an inch.

Mean readings of the Barometer and the Thermometer much above the average, and their ranges also exceed the mean values of the preceding twenty years. The highest readings of the Barometer and the Thermometer differed from their means. Both humidity and the dew point were exceedingly small. The solar and the terrestrial radiations rather above. Prevailing direction was W. and S. W.

G. V. Juggarow Observatory, DABA GARDENS, VIZAGAPATAM.

Lat. 17° 42' 9" N. Long. 83° 22' 30" E. Height of the Barometer
cistern above the sea-level, 31 feet.

METEOROLOGICAL REPORT For April 1889.

Results of Observations taken during the month.		Mean for 20 years.
Mean reading of the Barometer	29.814	29.789
Barometric monthly mean reduced to sea-level	29.845	29.825
Highest reading of the Barometer on the 2nd	29.965	29.950
Lowest reading of the Barometer on the 30th	29.621	29.622
Range of Barometer readings	344	328
Highest reading recorded of the max. temperature on the 5th	94.3	91.9
Lowest reading recorded of the min. temperature on the 3rd	77.2	80.9
Range of Thermometer readings	17.1	11
Mean of maximum readings	90.5	88.8
Mean of minimum readings	81.8	83.4
Mean daily range	8.7	5.4
Deducted monthly mean (from mean of max. and min.)	86.2	86.1
Mean temperature from dry bulb	87.5	86.3
Adopted mean temperature	86.9	86.2
Mean temperature of evaporation	78.4	77.9
Mean of wet minimum	74.7	73.3
Mean temperature of dew-point	73	73
Mean elastic force of aqueous vapour	80.1	80.0
Mean weight of vapour in a cubic foot of air	8.4	8.4
Mean additional weight required for saturation	5.4	4.9
Mean degree of humidity (saturation 1.00)	65	67
Mean weight of a cubic foot of air	501.4	502.3
Highest reading of sun max. in vacuo on 4th	115.2	119.4
Lowest reading of sun max. in vacuo on 7th	103	101.3
Mean reading of nocturnal radiation on 29th	81.2	80.2
Highest reading of nocturnal radiation on 3rd	67.2	69.8
Lowest reading of nocturnal radiation on 7th	75.4	75.3
Mean reading of nocturnal radiation on 7th	6.9	7.5
Mean serenity	2.4	2.4
Mean ozone	1	1
Fall of rain	1	1
Number of days on which rain fell	1	1

Number of Observations of each direction during the month															
		N	N by E	N. E	N. E by E	E by N	E	S by E	S	S by W	S. W	W by S	W	West	by N
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
The maximum velocity of the wind on the 23rd		...	...	...	...	...	...	...	...	...	...	...	...	...	...
The minimum " "		...	...	...	...	...	...	...	...	...	...	...	...	...	...
The total number of miles registered during the month was		...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mean daily velocity		...	...	...	...	...	...	...	...	...	...	...	...	...	...
		145.40	89.80	2681.25	89.34	...	...	...	...	...	...	...	...	...	...

In the month of April the highest reading of the Barometer during 20 years was on the 6th in 1872 and was 30.015		29th " 1875	29.491
The lowest " "		27th " 1875	29.491
The highest temperature " "		15th " 1884	94.6
The lowest " "		3rd " 1889	77.2
The highest adopted mean temperature for the month " "		" 1872 & '79	87.1
The lowest " "		" 1870	75.7
The highest reading of sun max. in vacuo " "		29th " 1871	129.5
The lowest " "		23rd " 1870	93
The highest reading of nocturnal radiation " "		26th " 1880	82.9
The lowest " "		3rd " 1880	67.2

General weather:—*b, f, and g.* Kind of clouds:—*ci, cu, and ci-cu.* Thunder heard on the 11th, 12th, 13th, 14th, 23rd, and 30th, in the directions N. E., W. S., and N. W. Lightning w^{as} the 11th, 12th, 13th, 14th, 23rd, and 30th, in the directions N. E., W. S., and N. W. On the 1st, 2nd, and 16th, mists were rising to the hill tops in the morning, but vanished soon. 3rd, 4th, and 10 A.M. to 4 P.M. from S. W. 15th, halo round the moon from 11½ to 12 P.M. 18th, 19th, and 1st, solar halo

from 11½ A.M. to 4 P.M., inner edge grey, outer edge white. The chief feature of the sky during this month was more or less vapour condensing into clouds, and heat rapidly increasing. Rain is much wanted, and the water in the wells is gradually going down. Small-pox much prevalent—also few cases of cholera. The market rules high prices. The total quantity of rain collected since 1st January is .1 of an inch. The quantity for the same period of last year was .4 of an inch. The same for the year 1887 was .4 of an inch; for the year 1886, .2 of an inch; for 1885, 2.2 inches; for 1884, 1.6 inches; for 1883, .9 of an inch; for 1882, .1 of an inch; for 1881, .9 of an inch; for 1880, 3.2 inches; for 1879, .1 of an inch; for 1878, .9 of an inch; for 1877, 4.8 inches; for 1876, was *nil*; for 1875, .2 of an inch; for 1874, .4 of an inch; for 1873, .1 of an inch; for 1872, .1 of an inch; for 1871, 11.7 inches; for 1870, 3.8 inches; and for 1869, .2 of an inch.

Both the pressure and its range stood a little above the average. On the 29th the Barometer was nearly stubborn from 10 P.M. to 9 A.M. of the following day and then went up before 10 A.M. only .052 of an inch and followed afterwards its tidal course. The Barometric Oscillations were frequent, though not of any importance. During the first two weeks of the month remarkable clearness of the atmosphere near the horizon was noticed. Distant objects, such as hills, were unusually visible, or it may be said raised apparently by refraction—not wet, but windy afterwards. Temperature and its range rather high, and the minimum temperature was the lowest on record for the month of April. Humidity and the aqueous vapour small. Solar and terrestrial radiations differed from their mean values. Rain exceedingly small. Steady and moderate current of wind from S. and S. W. was prevalent during the month.

Lat. $17^{\circ} 42' 9''$ N. Long. $83^{\circ} 22' 30''$ E. Height of
cistern above the sea-level, 31 feet

For May 1889.

Results of Observations taken during the month.	Mean for 20 years.
Mean reading of the Barometer	29.738
Barometric monthly mean reduced to sea-level	29.769
Highest reading of the Barometer on the 7th	29.908
Lowest " " " " 24th	29.530
Range of Barometer readings " " " "	378
Highest reading recorded of the max. temperature on the 13th	93.5
Lowest reading recorded of the min. temperature on the 16th	82.1
Range of Thermometer readings " " " "	11.4
Mean of maximum readings " " " "	91.6
Mean of minimum readings " " " "	84.2
Mean daily range " " " "	7.4
Deducted monthly mean (from mean of max. and min.) " " " "	87.9
Mean temperature from dry bulb " " " "	89
Adjusted mean temperature " " " "	88.5
Mean temperature of evaporation " " " "	79.9
Mean of wet minimum " " " "	76.2
Mean temperature of dew point " " " "	74
Mean elastic force of aqueous vapour " " " "	842
Mean weight of vapour in a cubic foot of air	8.9
Mean additional weight required for saturation	5.5
Mean degree of humidity (saturation 1.00) ...	66
Mean weight of a cubic foot of air ...	498.7
Highest reading of sun max. in vacuo on 25th	116
Lowest " " " " " 3rd	106
Mean reading " " " " " "	110.7
Highest reading of nocturnal radiation on 1st	83
Lowest " " " " " 23rd	74.3
Mean reading " " " " " "	79.4
Mean serenity " " " " " "	5.6
Mean ozone " " " " " "	3.0
Fall of rain " " " " " "	8
Number of days on which rain fell " " " "	3

[illegible]

In the month of May the highest reading of the Barometer during 20 years was on the 6th in 1873 and was 29.049			
The lowest	"	"	30th " 1870 " 29.379
The highest temperature	"	"	11th " 1872 " 105
The lowest	"	"	16th " 1888 " 78.2
The highest adopted mean temperature of the month was	"	"	18th " 1872 " 89.6
The lowest	"	"	1879 " 86.5
The highest reading of sun max. in vacuo	"	"	27th " 1877 " 130.5
The lowest	"	"	18th " 1886 " 87
The highest reading of nocturnal radiation	"	"	15th " 1883 " 85.9
The lowest	"	"	5th " 1887 " 68.3

General weather:—*b, f, g, and o.* Kind of clouds:—*cu, ci, cu, N, and ot-s.* Thunder was heard on the 15th, 16th, 21st, 26th, 27th, and 28th in the directions N., N.-W., N.-E., S., W., S.-W., and E. Lightning was seen on the 2nd, 15th, 16th, 17th, 20th, 26th, 27th, 28th, and 29th in the directions N., E., W., N.-W., N.-E., S.-W., and S. S. Rain fell on the 16th, 28th, and 29th to the amount of .8 of an inch. 7th and 8th lunar halo from 7 to 11 P.M. The signs in the sky of a coming change are frequent. Mottled patches of white distant clouds appeared more

or less during this month almost every evening. They were followed by murky vapour finally growing into cloudiness. The scarcity of rain is much felt everywhere in the district. Water in the wells is going down. Many tanks are dry. The prices of food grain are on the increase. Small-pox much abated; but cholera is slowly making its appearance. The total quantity of rain collected since 1st January is 9 of an inch. The same period of last year was 3.6 inches. The same for 1887, was 1.5 inches; for 1886, 5.2 inches; for 1885, 2.5 inches; for 1884, 2.2 inches; for 1883, 1.6 inches; for 1882, 2.5 inches; for 1881, 2.3 inches; for 1880, 7.7 inches; for 1879, 14.6 inches; for 1878, 3.4 inches; for 1877, 18.0 inches; for 1876, 1.5 inches; for 1875, 2.1 inches; for 1874, 2.5 inches; for 1873, 3.7 inches; for 1872, 1.6 inches; for 1871, 14.1 inches; for 1870, 3.9 inches; and for 1869, 1.0 inch.

Both Barometer and Thermometer stood high and their ranges below. Almost all the hygrometrical results were somewhat below the average. Rain is much below the average. The prevalent direction was S. W.

G. V. Juggarow Observatory, DABA GARDENS, VIZAGAPATAM.

Lat. 17° 42' 9" N. Long. 83° 22' 30" E. Height of the Barometer cistern above the sea-level, 31 feet.

METEOROLOGICAL REPORT For June 1889.

Results of Observations taken during the month.		Mean for 20 years.
Mean reading of the Barometer	29.600	29.591
Barometric monthly mean reduced to sea-level	29.631	29.622
Highest reading of the Barometer on the 29th	29.752	29.752
Lowest " " " " 16th	29.448	29.412
Range of Barometer readings	304	340
Highest reading recorded of the max. temperature on the 16th	96.8	95.5
Lowest reading recorded of the min. temperature on the 26th	78.7	81.1
Range of Thermometer readings	18.1	14.4
Mean of maximum readings	90.7	90
Mean of minimum readings	84	85.2
Mean daily range	6.7	4.8
Deducted monthly mean (from mean of max. and min.)	87.4	87.6
Mean temperature from dry bulb	88.5	87.6
Adopted mean temperature	88	87.6
Mean temperature of evaporation	79.9	79.2
Mean of wet minimum	76.5	71.7
Mean temperature of dew point	75	74
Mean elastic force of aqueous vapour	851	835
Mean weight of vapour in a cubic foot of air	9.0	8.8
Mean additional weight required for saturation	5.2	5.3
Mean degree of humidity (saturation 100)	67	68
Mean weight of a cubic foot of air	496.8	497.4
Highest reading of sun max. in vacuo on 16th	120	124
Lowest " " " " 27th	97	98.6
Mean reading " " " " " "	110.3	112
Highest reading of nocturnal radiation on 18th	84.2	83.1
Lowest " " " " " " 9th	73.5	73.2
Mean reading " " " " " "	79.1	78.1
Mean serenity	4.2	4.1
Mean ozone	2.7	2.2
Fall of rain	3.8	3.5
Number of days on which rain fell	8	7

Number of Observations of each direction during the month ...	W. N. by W. ...															
	N. by E.	N. E.	N. E. by N.	N. E. by E.	N. E. by S.	S. E.	S. E. by E.	S. E. by S.	South.	S. by W.	S. W.	S. W. by S.	S. W. by W.	S. W. by N.	S. W. by E.	N. by W.
The maximum velocity of the wind on the 16th	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13874
The minimum " " " " " " " "	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2436
The total number of miles registered during the month was	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2149.34
Mean daily velocity	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	71.64

In the month of June the highest reading of the Barometer during 20 years was on the 3rd in 1874 and was	29.869
The lowest	16th " 1886 " 29.331
The highest temperature	5th " 1888 " 100.7
The lowest	24th " 1872 " 78
The highest adopted mean temperature of the month was	" 1873 " 90.1
The lowest	" 1874 " 85.8
The highest reading of sun max. in vacuo	13th " 1871 " 138
The lowest	21st " 1884 " 90
The highest reading of nocturnal radiation	15th " 1878 " 86.4
The lowest	2nd " 1889 " 71.3

General weather:—b, f, g, and o. Kind of clouds:—cu—a, cu, ci, N. and oi—s. Thunder 9th, 16th, 23rd and 30th in the directions N. E., W., S. and N. W. Lightning was seen c and 30th in the directions N. E., W., S. and S. W. Rain fell on the 23rd, 24th, 26th, 28th, 16th, 17th, 18th, 20th, and 22nd, solar halo from 10 A.M. to 4 P.M., inner edge grey, outer edge white. From 23rd the amount of 3.8 inches and closely agreed with the average. On the 11th and 12th, lunar halo from 7 1/4 to 8 1/4 P.M.

overcast and light showers of rain off and on, these rains helped great deal the agricultural preparations; the ryots almost all are engaged in ploughing and sowing. Prices of food grain are high as before. Small-pox abated and cholera making its ravages. The total quantity of rain collected since 1st January is 4.7 inches. The quantity for the same period of last year was 5.2 inches. The same for the year 1887. was 10.3 inches; for 1886, 8.4 inches; for 1885, 5.5 inches; for 1884, 6.2 inches; for 1883, 3.5 inches; for 1882, 3.5 inches; for 1881, 10.9 inches; for 1880, 11.1 inches; for 1879, 16.7 inches; for 1878, 6.3 inches; for 1877, 19.3 inches; for 1876, 3.5 inches; for 1875, 3.2 inches; for 1874, 5.5 inches; for 1873, 5.6 inches; for 1872 7.6 inches; for 1871, 17.2 inches; for 1870, 11.8 inches; and for 1869, 11.9 inches.

The pressure was high and its range low. The highest reading of the Barometer was below that of 1874, which was the highest on record for the month of June, and exactly agreed with the average. On the 13th the Barometric column was less at 10 A.M. than 8 A.M. observation, contrary to tidal change, but the difference was not of any importance; at all events, it may be the result of some atmospheric commotion at a remote region. The highest temperature was much below that of last year, the highest on record for the month. The mean temperature was in excess of the average and its range rather high. Solar and terrestrial radiations were rather identical with the averages. Humidity exceedingly small. Rainfall closely agreed with the average. Prevalent direction was S. W.

G. T. Juggarow Observatory, DABA GARDENS, VIZAGAPATAM.

Lat. 17° 42' 9" N. Long. 83° 22' 30" E. Height of cistern above the sea-level, 31 feet meter

METEOROLOGICAL REPORT For July 1889.

Results of Observations taken during the month.		Mean for 20 years.
Mean reading of the Barometer ...	29.582	29.590
Barometric monthly mean reduced to sea-level ...	29.613	29.621
Highest reading of the Barometer on the 6th ...	29.719	29.750
Lowest " " " 17th ...	29.327	29.410
Range of Barometer readings ...	392	340
Highest reading recorded of the max. temperature on the 22nd ...	92	92.8
Lowest reading recorded of the min. temperature on the 20th ...	78.6	79.1
Range of Thermometer readings ...	13.4	13.7
Mean of maximum readings ...	86.8	87.6
Mean of minimum readings ...	80.9	82.8
Mean daily range ...	5.9	4.8
Deduced monthly mean (from mean of max. and min.) ...	83.9	85.2
Mean temperature from dry bulb ...	84.9	85.2
Adopted mean temperature ...	84.4	85.2
Mean temperature of evaporation ...	78.9	77.9
Mean of wet minimum ...	74.9	73.2
Mean temperature of dew point ...	75	73
Mean elastic force of aqueous vapour ...	870	818
Mean weight of vapour in a cubic foot of air ...	9.2	8.7
Mean additional weight required for saturation ...	3.5	4.1
Mean degree of humidity (saturation 1.00) ...	78	71
Mean weight of a cubic foot of air ...	499.7	499.7
Highest reading of sun max. in vacuo on 12th ...	114.5	124.4
Lowest " " " 9th ...	98	95.5
Mean reading ...	107.7	111.9
Highest reading of nocturnal radiation on 2nd ...	78	80.1
Lowest " " " 13th ...	74	72.8
Mean reading ...	76	76.3
Mean serenity ...	2.6	3.2
Mean ozone ...	1.5	1.9
Fall of rain ...	8.5	5.2
Number of days on which rain fell ...	14	10

Number of Observations of each direction during the month		187-10 19-66 2237-20 72-17											
North	N	160	5	...	...	...	...	...	...	...	...	...	...
N. by E.	N. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. E.	N. E.	12	1	...	...	...	...	...	...	...	...	...	...
N. E. by E.	N. E. by E.	12	1	...	...	...	...	...	...	...	...	...	...
E.	E.	12	1	...	...	...	...	...	...	...	...	...	...
E. by S.	E. by S.	12	1	...	...	...	...	...	...	...	...	...	...
S.	S.	12	1	...	...	...	...	...	...	...	...	...	...
S. by S.	S. by S.	12	1	...	...	...	...	...	...	...	...	...	...
S. W.	S. W.	12	1	...	...	...	...	...	...	...	...	...	...
S. W. by S.	S. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
W.	W.	12	1	...	...	...	...	...	...	...	...	...	...
W. by N.	W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N.	N.	12	1	...	...	...	...	...	...	...	...	...	...
N. by N.	N. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. by W.	N. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W.	N. W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by E.	N. W. by E.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by N.	N. W. by N.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by W.	N. W. by W.	12	1	...	...	...	...	...	...	...	...	...	...
N. W. by S.	N. W. by S.	12	1	...	...	...	...						

district. On the 7th Rainbow in the west from 6 to 7 A.M. The tanks were half filled, water abundant for agricultural purposes. Telegrams were received on the 14th and 15th. "The storm off Orissa coast" we commenced hourly observations more than 12 hours, nothing was traced to affect our latitude. The wind was moderate, very likely the cyclonic formation must have been feeble to reach the land or continued its direction over the Bay, advancing in-land. Prices of food grain during this month somewhat abated. Cholera made its ravages all over the district. The quantity of rain collected since 1st January is 13.2 inches. The quantity for the same period of last year was 8.5 inches. The same for the year 1887 was 16.6 inches; for 1886, 15.9 inches; for 1885, 9.2 inches; for 1884, 9.1 inches; for 1883, 6.3 inches; for 1882, 8.4 inches; for 1881, 13.6 inches; for 1880, 20.0 inches; for 1879, 19.7 inches; for 1878, 15.8 inches; for 1877, 23.0 inches; for 1876, 7.3 inches; for 1875, 6.6 inches; for 1874, 10.2 inches; for 1873, 14.8 inches; for 1872, 16.8 inches; for 1871, 19.5 inches; for 1870, 15.9 inches; and for 1869, 18.5 inches.

Both pressure and temperature somewhat below the average, and their ranges differed from their mean values of 20 years preceding. The max. temperature below that of 1877, the highest on record for the month of July, and the min. temperature was high above the average. Humidity rather above, and the dew-point identical with the average. The rainfall nearly 3 inches above the average. The prevalent direction of wind was S. and W.

G. V. Juggarow Observatory, DABA GARDENS, VIZAGAPATAM.

Lat. 17° 42' 9" N. Long. 83° 22' 30" E. Height of the Barometer
cistern above the sea-level, 31 feet.

METEOROLOGICAL REPORT For August 1889.

Results of Observations taken during the month.		Mean for 20 years.
Mean reading of the Barometer	29.601	29.631
Barometric monthly mean reduced to sea-level	29.632	29.662
Highest reading of the Barometer on the 31st	29.811	29.811
Lowest " " 6th	29.373	29.445
Range of Barometer readings	438	366
Highest reading recorded of the max. temperature on the 4th	91.8	91.7
Lowest reading recorded of the min. temperature on the 19th	78.7	80.2
Range of Thermometer readings	13.1	11.5
Mean of maximum readings	87.5	87.6
Mean of minimum readings	80.6	83.1
Mean daily range	6.9	4.5
Deducted monthly mean (from mean of max. and min.)	84.1	85.4
Mean temperature from dry bulb	85	85.4
Adopted mean temperature	84.6	85.4
Mean temperature of evaporation	78	78.3
Mean of wet minimum	74.2	73.6
Mean temperature of dew-point	74	74
Mean elastic force of aqueous vapour	82.6	83.3
Mean weight of vapour in a cubic foot of air	8.7	8.8
Mean additional weight required for saturation	4.1	4.1
Mean degree of humidity (saturation 1.00)	71	72
Mean weight of a cubic foot of air	499.9	500.1
Highest reading of sun max. in vacuo on 2nd	122	124.9
Lowest " " 8th	96.5	96.7
Mean reading	110.7	113.4
Highest reading of nocturnal radiation on the 14th	77.5	79.6
Lowest " " 16th	73	72.4
Mean reading	75.5	76.1
Mean serenity	1.9	3.6
Mean ozone	1.6	1.5
Fall of rain	3.5	6.0
Number of days on which rain fell	12	11

Lat. $17^{\circ} 42' 9''$ N. Long. $83^{\circ} 22' 30''$ E. Height of the cistern above the sea-level, 31 feet.

Results of Observations taken during the month.

Mean reading of the Barometer	...	29.710	29.698
Barometric monthly mean reduced to sea-level	...	29.741	29.729
Highest reading of the Barometer on the 5th	...	29.889	29.887
Lowest	18th	29.346	29.840
Range of Barometer readings	...	5.43	.407
Highest reading recorded of the max. temperature on the 5th	...	89	90.7
Lowest reading recorded of the min. temperature on the 19th	...	77	80.1
Range of Thermometer readings	...	12	10.6
Mean of maximum readings	...	86.6	87.1
Mean of minimum readings	...	80.3	82.7
Mean daily range	...	6.3	4.4
Deducted monthly mean (from mean of max. and min.)	...	83.5	84.9
Mean temperature from dry bulb	...	85.2	85
Adopted mean temperature	...	84.4	78.5
Mean temperature of evaporation	...	79.5	73.6
Mean of wet minimum	...	74.7	74
Mean temperature of dew-point	...	76	85.0
Mean elastic force of aqueous vapour	...	89.4	9.0
Mean weight of vapour in a cubic foot of air	...	9.5	3.8
Mean additional weight required for saturation	...	3.5	.78
Mean degree of humidity (saturation 1.00)	...	.77	501.6
Mean weight of a cubic foot of air	...	501.3	125.2
Highest reading of sun max. in vacuo on 5th	...	125.5	100.7
Lowest	6th	100	113.5
Mean reading	...	110.9	78.9
Highest reading of nocturnal radiation on 28th	...	79.5	72
Lowest	19th	71	75.6
Mean reading	...	75.1	4.5
Mean serenity	...	4.2	1.3
Mean ozone	...	1.6	8.0
Fall of rain	...	14.8	11
Number of days on which rain fell	...	10	

[illegible]

In the month of Sept. the highest reading of the Barometer during 20 years was on the 22nd in 1888 and was			29.972
The lowest	"	"	29.346
The highest temperature	"	"	95.5
The lowest	"	"	76.5
The highest adopted mean temperature of the month was	"	"	86.1
The lowest	"	"	83.5
The highest reading of sun max. in vacuo	"	"	132
The lowest	"	"	88.8
The highest	"	"	80.4
The lowest	"	"	70.7

General Weather:—*b*, and *o*. Kind of clouds:—*cu-s*, *ci* on, *ci-s*, and *N*. Thunder was heard on the 7th, 16th, 17th, and 29th in the directions *N*, *N-E*, *S*, & *W*. Lightning was seen on the 6th, 7th, 9th, 12th, 13th, 16th, 22nd, 23rd, 26th, 27th, and 28th in the directions, *N-W*, *N*, *W*, *S*, *N-E*, and *S-W*. Rain fell on the 2nd, 5th, 8th, 16th, 16th, 17th, 19th, 22nd, 23rd, and 29th amounted to 14.8 inches. On the 1st, 2nd, and 3rd halo round the moon between 7 and 9 P.M., 6th solar halo between 7 and 12 A.M. inner edge grey, outer edge white. On the

17th morning between 8 and 10 A.M. the Barometric column seemed reluctant to rise according to the force of the tidal change. On the following day, largest fall of the Barometer 1.73 of an inch took place followed by continuous rain collected 10.8 inches in 24 hours, not squally or stormy weather. On the largest rise on the 21st which was (.15 of an inch) the layers of nimbus clouds cleared up. Transplantation of paddy had been over. Prices of food-grain same as last month. The total quantity of rain collected since 1st January is 31.5 inches. The quantity for the same period of last year was 11.4 inches. The same for the year 1887, was 28.6 inches; for 1886, 34.8 inches; for 1885, 26.2 inches; for 1884, 30.6 inches; for 1883, 24.5 inches; for 1882, 29.3 inches; for 1881, 26.9 inches; for 1880, 26.8 inches; for 1879, 26.2 inches; for 1878, 28.0 inches; for 1877, 36.1 inches; for 1876, 19.3 inches; for 1875, 19.8 inches; for 1874, 23.1 inches; for 1873, 26.7 inches; for 1872, 33.2 inches; for 1871, 26.4 inches; for 1870, 37.1 inches; and for 1869, 33.8 inches.

Barometer and Thermometer stood a little above the means of previous 20 years. The temperature of dew point and the humidity rather high. Rainfall nearly 7 inches above the average. Prevailing wind was West and S.-W.

G. V. Juggarow Observatory, DABA GARDENS, VIZAGAPATAM.

Lat. 17° 42' 9" N. Long. 83° 22' 30" E. Height of the Barometer
cistern above the sea-level, 31 feet.

METEOROLOGICAL REPORT For October 1889.

Results of Observations taken during the month.		Mean for 20 years
Mean reading of the Barometer	29.778	29.818
Barometric monthly mean reduced to sea-level	29.810	29.840
Highest reading of the Barometer on the 31st	29.977	29.988
Lowest	29.581	29.631
Range of Barometer readings	396	357
Highest reading recorded of the max. temperature on the 1st	88	88.9
Lowest reading recorded of the min. temperature on the 31st	74.8	76.6
Range of Thermometer readings	13.2	12.3
Mean of maximum readings	83.9	85.5
Mean of minimum readings	78.6	80.7
Mean daily range	5.3	4.8
Deduced monthly mean (from mean of max. and min.)	81.3	83.1
Mean temperature from dry bulb	83	83.3
Adopted mean temperature	82.2	83.2
Mean temperature of evaporation	77.7	76.4
Mean of wet minimum	73.3	71.6
Mean temperature of dew-point	75	72
Mean elastic force of aqueous vapour	842	779
Mean weight of vapour in a cubic foot of air	9.0	8.3
Mean additional weight required for saturation	3.0	3.8
Mean degree of humidity (saturation 1.00)	78	72
Mean weight of a cubic foot of air	504.8	505.4
Highest reading of sun max. in vacuo on the 27th	119	123.7
Lowest	6th 100	98.7
Mean reading	109.3	113.3
Highest reading of nocturnal radiation on 9th	76	76.5
Lowest	81st 67	66.1
Mean reading	73.2	72.5
Mean serenity	6.4	5.6
Mean ozone	1.1	1.7
Fall of rain	12.47	11.50
Number of days on which rain fell	20	11

Number of Observations of each direction during the month	North															
	N	N.E.	N.E. by N.	N.E. by E.	N.E.	N.	E.	E. by N.	E. by E.	E.	S.E.	S.E. by E.	S.E.	S.	S. by E.	S.
	N	N.E.	N.E. by N.	N.E. by E.	N.E.	N.	E.	E. by N.	E. by E.	E.	S.E.	S.E. by E.	S.E.	S.	S. by E.	S.
	6	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
The maximum velocity of the wind on the 16th	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
The minimum " registered during the month was	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mean daily velocity	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

In the month of October the highest reading of the Barometer during 20 years was on the 19th in 1876 and was 30.061

The lowest	8th	1876	28.920
The highest temperature	1st	1888	92.1
The lowest	31st	1873	72
The highest adopted mean temperature of the month was	1871	86	
The lowest	1873	81.1	
The highest reading of sun max. in vacuo	2nd	1871	131.0
The lowest	13th	1886	91
The highest	12th	1882	78.9
The lowest	28th	1881	60.2

General weather:—b, g, and o. Kind of clouds:—ou-a, ci—s, N. ci, and cu. Thunder was heard on the 2nd, 6th, 7th, 9th, 10th, 15th, 18th, 20th, 22nd, and 26th, in the directions W., S. W., and N. Lightning was seen on the 6th, 10th, 11th, 12th, 13th, 15th, 16th, 18th, 20th, 22nd, and 26th in the directions S. W., N., S. E., and N. E. Rain fell on the 2nd, 4th, 6th, 7th, 8th, 9th, 10th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 23rd, 24th, and 26th amounted to 12.47 inches. On the 2nd, 3rd, 8th and 9th halo round the moon from 9.34 to 10 P.M.; 14th double rainbow

in the west at 7 A.M. 15th and 16th fragments of rainbow were seen at 7 A.M. in the west. 17th mists were rising to the hill tops, and in the same parts of the hills they commenced passing off in the shape of clouds perpendicularly from their base to the clouds hanging above, this phenomenon resembled the figure of the water spouts sometimes seen at sea. 19th, 20th, and 21st solar halo from 8 to 10 A.M. inner edge grey, outer edge white. 19th a large fire ball was observed at 12 P.M. in the east passing perpendicular to the earth with a train of light lasting 5 seconds. On the 30th the same phenomenon was seen at 10 P.M. in the west, but no train of light. The rain we have had during this month made the country as fertile as possible. water abundant. The prices of food grain are slowly going down. The total quantity of rain collected since 1st January is 43.97 inches. The quantity for the same period of last year was 17.4 inches. The same for the year 1887 was 40.3 inches; for 1886, 65.0 inches; for 1885, 34.1 inches; for 1884, 36.6 inches; for 1883, 37.4 inches; for 1882, 32.0 inches; for 1881, 31.2 inches; for 1880, 38.2 inches; for 1879, 30.8 inches; for 1878, 43.6 inches; for 1877, 30.8 inches; for 1876, 38.5 inches; for 1875, 28.8 inches; for 1874, 44.1 inches; for 1873, 46.3 inches; for 1872, 46.4 inches; for 1871, 26.7 inches; for 1870, 57.0 inches, and for 1869, 40.9 inches.

The ranges of the Barometer and the Thermometer were rather high and their means below. Humidity much above and the proportion of the cloud identical with the average. The quantity of rain for the month much below that of October 1886, which was the highest on record for the October of the preceding 20 years; but the rainy days of the month agreed with the rainy days of 1886, and are nearly half above the average. The prevalent direction of the wind chiefly came from west, and some milder winds from other points of the compass.

Lat. $17^{\circ} 42' 9''$ N. Long. $83^{\circ} 22' 30''$ E. Height of the cistern above the sea-level, 31 feet. meter

For November 1889.

Results of Observations taken during the month.		Mean for 20 years.
Mean reading of the Barometer ...	29·861	29·928
Barometric monthly mean reduced to sea-level ...	29·893	29·960
Highest reading of the Barometer on the 27th ...	30·027	30·085
Lowest " " " " " " " " " " " " " " " "	29·645	29·725
Range of Barometer readings " " 19th ...	·482	·360
Highest reading recorded of the max. temperature on the 6th ...		
Lowest reading recorded of the min. temperature on the 30th ...	85·0	85·0
Range of Thermometer readings ...	65	70·5
Mean of maximum readings ...	20	14·5
Mean of minimum readings ...	81·7	81·7
Mean daily range ...	72	76
Deducted monthly mean (from mean of max. and min.) ...	9·7	5·7
Mean temperature from dry bulb ...	76·9	78·9
Adopted mean temperature ...	78·7	79·2
Mean temperature of evaporation ...	77·8	79
Mean of wet minimum ...	71	71·4
Mean temperature of dew-point ...	66·2	66·3
Mean elastic force of aqueous vapour ...	66	66
Mean weight of vapour in a cubic foot of air ...	·632	·640
Mean additional weight required for saturation ...	6·8	7·0
Mean degree of humidity (saturation 1·00) ...	3·8	3·7
Mean weight of a cubic foot of air ...	·67	·68
Highest reading of sun max. in vacuo on the 22nd ...	511·3	512·1
Lowest " " " " " " " " " " " " " " " "	113·8	119·9
Mean reading " " " " " " " " " " " " " " " "	99·0	95·5
Highest reading of nocturnal radiation on 16th ...	108·7	110·7
Lowest " " " " " " " " " " " " " " " "	78·5	78·8
Mean reading " " " " " " " " " " " " " " " "	54	55·7
Mean serenity " " " " " " " " " " " " " " " "	64·8	65·8
Mean ozone " " " " " " " " " " " " " " " "	5·9	6·6
Fall of rain " " " " " " " " " " " " " " " "	1·7	2·5
Number of days on which rain fell ...	3·28	5·45
	6	5

[illegible]

General Weather: $-b$, ϕ , and w . Kind of clouds: $-o_{1-4}$, cl , cu , sc , and n . z_{max} and z_{min} . Direction of wind: W , N , E , and N . Lightning was seen on the 17th, 18th, 19th, 20th, 19th, 21st, and 22nd in the directions N , W , N , E , and N . Rain fell on the 17th, 18th, 19th, 21st, and 22nd. On the 21st, and 22nd in the directions N , W , S , S , E , W , N , E , and N . A large fire ball was observed at 10 $\frac{1}{2}$ P. M., in the west with a train of light passing to east lasted 5 seconds. On the same phenomenon was observed at 8 P. M., in the east passing perpendicular to the earth with a train of light

lasted 6 seconds. On the 10th about 11 h. 45 m. P.M., a shock of an earthquake was felt at Daba Gardens passing in the line of wind's poles—i. e., from N.E. to S.W.—A subterranean noise accompanying it—also an undulation of the earth which awoke the people. All lasted a minute with the rattling of the doors and the vibration of the hanging lamps. 19th we had strong wind, the intensity of which was between 1 and 2 when the velocity was 10 miles per hour attended with little amounting to 8 tenths of an inch followed by clear weather. On the 20th we received a telegram from weather Bengal "the closed at Gopalpoor at 4 A.M." Our tanks are full. The crops are in splendid condition, sufficient supply of water for pyra crops. We anticipate very good harvest of paddy. The cold rapidly increased. The prices of food grain are same as last month. The total quantity of rain collected since 1st January is 47.26 inches. The quantity for the same period of last year was 81.7 inches. The same for the year 1887 was 13.6 inches; for 1886, was 77.0 inches; for 1885, 41.8 inches; for 1884, 36.6 inches; for 1883, 42.8 inches; for 1882, 44.6 inches; for 1881, 36.0 inches; for 1880, 48.7 inches; for 1879, 44.8 inches; for 1878, 50.4 inches; for 1877, 40.1 inches; for 1876, 40.8 inches; for 1875, 28.9 inches; for 1874, 47.4 inches; for 1873, 47.8 inches; for 1872, 49.9 inches; for 1871, 27.2 inches; for 1870, 60.3 inches; and for 1869, 43.3 inches.

The mean reading of the Barometer and the Thermometer stood a little below the average and their ranges above their means of last 20 years. The highest reading of the Barometer of the present year was more than one-tenth of an inch below that of the last year, which was the greatest on record for November and also below the average. The dew point was exactly equal to the average and the humidity little above. The temperature of evaporation was small. The rest of all the Hygrometrical results, with the exception of mean additional weight required for saturation, were less to their averages. Both solar and terrestrial radiations were somewhat below the average. Although the quantity of rain collected this month considerably smaller to that of last year, the highest for the month of November, yet the crops are in splendid condition, being fed by the previous falls of rain which were timely. N.E. monsoon current blew with moderate intensity.

G. V. Juggarow Observatory, DABA GARDENS, VIZAGAPATAM.

Lat. 17° 42' 9" N. Long. 83° 22' 30" E. Height of the Barometer
cistern above the sea-level, 31 feet.

METEOROLOGICAL REPORT For December 1889.

Results of observations taken during the month.		Mean for 20 years.
Mean reading of the Barometer	29.903	29.992
Barometric monthly mean reduced to sea-level	29.935	30.024
Highest reading of the Barometer on the 15th	30.105	30.140
Lowest " " " 25th	29.781	29.821
Range of Barometer readings	324	319
Highest reading recorded of the max. temperature on the 31st	80.0	81.2
Lowest reading recorded of the min. temperature on the 14th	60.0	65.1
Range of the Thermometer readings	20.0	16.1
Mean of maximum readings	77.4	78.2
Mean of minimum readings	66.1	70.0
Mean daily range	11.3	8.2
Deducted monthly mean (from mean of max. and min.)	71.8	74.1
Mean temperature from dry bulb	74	75.1
Adopted mean temperature	72.9	74.6
Mean temperature of evaporation	65.8	66.8
Mean of wet minimum	60.4	61
Mean temperature of dew point	60	61
Mean elastic force of aqueous vapour	516	535
Mean weight of vapour in a cubic foot of air	5.5	5.7
Mean additional weight required for saturation	3.6	3.7
Mean degree of humidity (saturation 1.00)	63	63
Mean weight of a cubic foot of air	517.5	517.9
Highest reading of sun max. in vacuo on 12th	115	115.4
Lowest " " " 8th	102.2	98.0
Mean reading	108.4	107.5
Highest reading of nocturnal radiation on 25th	70	70.7
Lowest " " " 13th	49.5	50.9
Mean reading	56.8	59.2
Mean serenity	7.2	7.5
Mean ozone	1.0	2.7
Fall of rain	2.86	2.41
Number of days on which rain fell	5	2

in the Bay probably decreased in the intensity and passed off without crossing the coast. The velocity of the wind here was only 6 miles per hour. Paddy crops yielded good harvest. Nevertheless the prices of food grain are high, perhaps owing to the loss of produce last year. Preparations are now being made for the second crop of paddy and pyre crops. The total quantity of rain collected since 1st January is 50.11 inches. The quantity for the same period of last year was 31.7 inches. The same for the year 1887, was 43.6 inches; for 1886, 79.5 inches; for 1885, 44.6 inches; for 1884, 36.6 inches; for 1883, 48.9 inches; for 1882, 46.9 inches; for 1881, 36.1 inches; for 1880, 50.1 inches; for 1879, 44.5 inches; for 1878, 76.2 inches; for 1877, 40.1 inches; for 1876, 40.6 inches; for 1875, 29.0 inches; for 1874, 47.9 inches; for 1873, 52.7 inches; for 1872, 52.9 inches; for 1871, 27.3 inches; for 1870, 60.3 inches; and for 1869, 43.6 inches.

Both the Barometer and the Thermometer considerably below and their ranges above. The highest reading of the max. temperature was 1.2 degrees below the average and the min. temperature 5.1 degrees less to the average of 20 years. The min. temperature was 5 of a degree above that of last year which was the lowest on record for this latitude. The adopted mean temperature and the temperature of evaporation below the average of 20 years. The dew point and the humidity small. The strong wind blew from N. and N.-E., and frequent milder winds from other points of the compass. The total quantity of rain collected during this year exactly agreed with that of 1880 and 5 inches above the average.

Abstract for the year 1889.

Means and Extremes of different Meteorological Elements made at
G. V. Jugguraw Observatory, Daba Gardens, V.
the year 1889. Height of the Barometer cistern,
level, 31 feet.

made at
2m. for
the sea-
level.

Mean for
20 years.

Mean reading of the Barometer	29.797	29.796
Maximum " " on the 7th Jany.	30.211	30.179
Minimum " " " 7th July	29.327	29.328
Mean of maximum readings	29.973	29.968
Mean of minimum readings	29.580	29.615
Range of Barometer readings during the year	8.84	8.51
Greatest monthly range in September	5.43	5.59
Smallest " in June	3.04	2.63
Mean daily range	3.08	3.53
Mean temperature of air	82.9	82.8
Highest reading recorded of the max. tempera- ture on the 16th June	96.8	97.2
Lowest reading recorded of the min. tempera- ture on the 14th December	60	64.6
Yearly range of thermometer readings	36.8	32.6
Greatest monthly range in January	22.7	18.8
Smallest " in May	11.4	9.8
Mean of maximum readings	89.4	89.4
Mean of minimum readings	75.6	75.6
Mean daily range for the year	13.8	8.7
Greatest mean daily range in January	14.9	8.7
Smallest " in October	5.3	3.9
Deduced yearly mean (from mean of max. and min.)	80.0	82.5
Adopted mean temperature...	81.9	82.7
Mean temperature of evaporation	75	75
Mean of wet minimum	70.5	69.9
Mean temperature of dew-point	70	70
Mean elastic force of aqueous vapour	758	728
Mean weight of vapour in a cubic foot of air	7.7	7.7
Mean additional weight required for saturation	4.3	4.8
Mean degree of humidity (saturation 1.00)	68	68
Mean weight of a cubic foot of air...	505.8	505.9
Highest reading of sun max. in vacuo on the 5th September	125.5	127.7
Lowest reading of sun max. in vacuo on the 5th August	96.5	89.9
Mean reading	109.2	111.4

Abstract for the year 1889.—(Continued.)

	Mean for 20 years.
Highest reading of nocturnal radiation on the 18th June	84.2 84.3
Lowest reading of nocturnal radiation on the 4th January	48.5 49.4
Mean reading	69.7 70.6
Mean serenity	5.5 6.1
Mean ozone	2.1 2.2
Maximum daily velocity of the wind on the 20th July	187.10 245.53
Minimum daily velocity of the wind on the 5th January	70 5.68
Mean daily velocity	49.19 63.73
Highest mean daily velocity of the wind in May	98.28 107.01
Lowest mean daily velocity of the wind in January	6.79 29.79
Total fall of rain in the year	50.11 45.95
Greatest monthly fall of rain in September	14.8 17.9
Smallest " in April	1 4
Number of days on which rain fell	79 63
Greatest number in October	20 17
Smallest number in April	1 2

TABLE I.
YEARLY AVERAGE.

<i>Averages and Extremes of different Meteorological E</i>	<i>ade</i>
<i>at G. V. Juggarun Observatory, Daba Gardens,</i>	<i>am.</i>
<i>Height of the Barometer cistern above the sea-level, 81 feet.</i>	
Mean reading of the Barometer	29.796
The maximum monthly mean height of the Barometer was in January 1877	30.069
The minimum monthly mean height of the Barometer was in July 1882	29.546
The maximum yearly mean height of the Barometer was in 1877	29.841
The minimum yearly mean height of the Barometer was in 1879	29.781
The greatest monthly range of the Barometer was in November 1879	1.349
The smallest monthly range of the Barometer was in December 1879	.223
The greatest mean yearly range of the Barometer was in December 1889	.493
The smallest mean yearly range of the Barometer was in December 1885	.328
The greatest range of the Barometer during 20 years	1.466
The maximum pressure of air was on the 23rd January 1885	30.228
The minimum pressure of air was on the 5th November 1870	28.757
The next minimum pressure of air was on the 6th October 1876	28.920
Mean temperature of air	82.8
The greatest monthly range in temperature of air was in February 1887	26.3
The smallest monthly range in temperature of air was in April 1878	8.2
The greatest yearly range in temperature of air was in 1888	41.6
The greatest range during 20 years	45.5
Mean daily range	18.8
The greatest mean daily range during 20 years in January 1889	14.9
The smallest mean daily range during 20 years in September 1872	2.6
The highest temperature in the shade was on the 11th May 1872	105
The next highest temperature in the shade was on the 20th May 1883	101.1
The lowest temperature in the shade was on the 29th December 1888	59.5

During 20 years.

TABLE I.—(Continued.)

The next highest temperature in the shade was on the 14th December 1889	60	During 20 years.
The highest solar radiation was on the 13th June 1871	158	
The lowest solar radiation was on the 2nd December 1883	85	
The maximum velocity of the wind during 20 years was on the 8th October 1876	788.50	
The minimum velocity of the wind was on the 20th year was on the 7th October 1886	.05	
Mean daily velocity	63.73	
The greatest mean daily velocity was in July 1876	159.22	
The smallest mean daily velocity was in Decr. 1886	8.30	
Mean amount of rain	45.95	
Mean number of rainy days	63	
The greatest yearly fall of rain was in 1886	79.5	During 24 years.
The next greatest yearly fall of rain was in 1878	76.2	
The lowest yearly fall of rain was in 1871	27.3	
The greatest yearly range in rainfall during 24 years	52.2	
The greatest number of days in a year on which rain fell was in 1880	90	
The lowest number of days in a year on which rain fell was in 1888	42	
The greatest yearly range in number of days of rain during 24 years	48	
The greatest fall of rain in a month was in Oct. 1886	30.2	
The lowest fall of rain in a month was in Jan. 1869	.1	
The greatest monthly range in rainfall during 24 years	30.1	
The greatest number of days on which rain fell in a month was in October 1886	23	During 24 years.
The lowest number of days on which rain fell in a month was in January 1869	1	
The greatest monthly range in number of days of rain during 24 years	22	
* The greatest fall of rain in 24 hours was on the 18th September 1889	10.8	
The greatest fall of rain in one hour was on the 2nd September 1877	4.2	
The greatest fall of rain in two hours when the preceding weather was only fine weather with passing clouds was on the 18th December 1885	7.6	
The greatest fall of rain in a fraction of an hour (20 minutes) on the 30th August 1887	2.0	
The next greatest fall of rain in a fraction of an hour (15 minutes) was on the 31st May 1878	1.5	

* In a cyclonic time it was 17.6 inches in 24 hours October 1876.

'LE

Meteorological Summary

MEANS AND EXTRE

MEASURE

MONTHS.	Mean.	4 hour.	10 hour.	16 hour.	22 hour.	Range.
	29 +	29 +	29 +	29 +	29 +	.....
January ...	1034	966	1076	956	1028	120
February ...	997	929	1045	910	992	135
March ...	940	873	988	854	932	134
April ...	814	755	851	729	807	123
May ...	738	669	778	651	740	127
June ...	600	543	617	518	611	99
July ...	582	519	601	508	589	93
August ...	601	540	624	518	610	106
September ...	710	650	742	621	716	121
October ...	778	711	811	693	785	118
November ...	861	794	889	777	872	112
December ...	903	905	1000	887	966	113
Year ...	29797	29738	29835	29719	29804	117
Means of Ex- tremes ...	...	...	...	...	...	...

(71)

II.

for the year 1889.

[illegible]

TABLE

Meteorological Summary

MEAN AND EXTREME AIR TEMPERATURE IN THE						DE.
MONTHS.	Mean daily range.	Mean of minimum.	Highest maximum.	Absolute range.	Lowest minimum.	Mean.
January ...	14.9	64.6	82.9	22.7	60.2	67
February ...	12.7	70	88	21.8	66.2	70.5
March ...	11.2	75.7	90	22	68	73.8
April ...	8.7	81.8	94.3	17.1	77.2	78.4
May ...	7.4	84.2	93.5	11.4	82.1	79.9
June ...	6.7	84	96.8	18.1	78.7	79.9
July ...	5.9	80.9	92	13.4	78.6	78.9
August ...	6.9	80.6	91.8	13.1	78.7	78
September ...	6.3	80.3	89	13	77	79.5
October ...	5.3	78.6	88	13.2	74.8	77.7
November ...	9.7	72.0	85.0	20	65	71
December ...	11.3	68.1	80	20	60	65.8
Year ...	8.9	76.6	89.3	17.1	72.2	75.0
Means of Extremes ...	.....	.....	96.8	.....	60	...

II.—(Continued.)

for the year 1889.—(Continued.)

TEMPERATURE OF EVAPORATION.

					Difference, Dry and Wet Bulb.				
4-hour.	10-hour.	16-hour.	22-hour.	Minimum.	Mean.	4-hour.	10-hour.	16-hour.	22-hour.
64.6	67.2	68.6	67.3	60.3	8.2	6.7	8.8	10.8	6.7
69.6	70.6	71.1	70.7	65.3	9.1	6.8	10.0	11.5	8.0
72.8	73.4	74.3	74.7	69.4	9.9	7.9	11.4	11.6	8.5
77.8	77.7	78.7	79.1	74.7	9.1	7.3	11.5	10.2	7.6
79.6	79.7	80.6	79.9	76.2	9.1	7.5	11.0	9.6	8.1
79.8	79.4	80.4	80	76.5	8.6	7.3	9.7	9.3	8.1
78.7	79	79.2	78.9	74.9	6.0	4.9	6.2	6.9	5.7
77.5	77.9	79	77.8	74.2	7.0	6.2	7.3	7.7	6.8
79.1	79.3	79.8	79.5	74.7	5.7	4.6	6.4	6.8	5.4
77.5	77.8	77.8	77.7	73.3	5.3	4.4	5.4	6.5	4.7
70.3	71.1	71.8	71.1	66.2	7.7	6.1	8.7	9.5	6.4
64.6	65.3	67.1	66.4	60.4	8.2	6.2	9.6	10.0	6.6
74.3	74.9	75.7	75.3	70.5	7.8	6.3	8.8	9.2	6.9
.....									

(71)

TABLE
Meteorological Summary

STRICAL

MONTHS.	RELATIVE HUMIDITY.					Mean elastic force of aqueous vapour.
	Mean.	4-hour.	10-hour.	16-hour.	22-hour.	
January ...	63	68	61	66	69	539
February ...	62	70	59	55	66	602
March ...	60	66	56	56	66	668
April ...	65	71	58	62	70	801
May ...	66	71	60	65	69	842
June ...	67	71	64	66	69	851
July ...	76	80	74	73	76	870
August ...	71	75	71	69	73	826
September ...	77	81	74	73	78	894
October ...	78	81	78	74	80	845
November ...	67	73	64	61	72	632
December ...	63	70	58	57	69	616
Year ...	68	73	65	64	71	759
Means of Ex- tremes ...	...	...	...	...	...	...

II.—(Continued.)

for the year 1889.—(Continued.)

RESULTS.

Mean weight of va- pour in a cubic foot of air.	Mean additional weight required for satura- tion.	Mean weight of a cu- bic foot of air.	DEW POINT.				
			Mean.	4-hour.	10-hour.	16-hour.	22-hour.
5.8	3.7	518.1	61	60	61	62	63
6.5	4.4	513.1	65	65	65	64	66
7.1	5.2	507.9	68	68	67	67	71
8.4	5.4	501.4	73	73	71	73	75
8.9	5.5	498.7	74	75	73	75	73
9.0	5.2	496.8	75	76	74	75	75
9.2	3.5	499.7	75	76	75	75	75
8.7	4.1	499.9	74	74	74	74	74
9.5	3.4	501.3	76	76	75	76	76
9.0	3.0	504.8	75	75	75	74	75
5.8	3.8	511.8	66	66	66	65	67
5.5	3.6	517.5	60	60	59	60	62
7.7	4.3	505.8	70	70	70	70	71
...	...	...	...	...	...	...	...

(75)

29

TABLE
Meteorological Summary

EQUILIBRIUM TEMPERATURES OF SOLAR R.						
MONTHS.	Mean.	Maximum.	Minimum.	Difference, Sun and Shade.		
				Mean.	Maximum.	Minimum.
January ...	106.6	111.0	103.3	27.1	30.3	23.8
February ...	108.1	110.8	104.3	25.4	29.0	22.0
March ...	109	118	104	21.3	29.5	16.5
April ...	109.8	115.2	103	19.3	23.5	12.7
May ...	110.7	116	106	19.1	24.2	14.2
June ...	110.3	116	97	16.3	27.5	8.5
July ...	107.7	114.5	98	20	28	8.8
August ...	110.7	122	96.5	22.1	32.5	14.7
September ...	110.9	125.5	100	23.3	36.5	13.7
October ...	109.3	119	100	24.8	35.5	16.2
November ...	108.7	113.8	99	26.7	33.8	24.6
December ...	108.4	115.0	102.2	30.6	40	15.5
Year ...	109.2	116.4	101.1	23.0	30.9	8.5
Means of Ex- tremes ...	...	125.5	96.5	...	40	...

ho

II.—(Continued.)

for the year 1889.—(Continued.)

TEMPERATURE OF NOCTURNAL RADIATION.							
Mean.	Maximum.		Minimum.		Difference, Shade and Radiation.		
	Day.	.	Day.	.	Mean.	Maximum.	Minimum.
54.2	31st	63.6	1th	48.5	10.1	12.0	7.4
60.7	5th	64.5	22nd	55.6	9.4	13.0	5.7
66.2	26th	72.4	1st	58.8	9.5	13.6	5.5
75.4	29th	81.2	3rd	67.2	6.5	11.6	2.9
79.4	1st	88	23rd	74.3	8.1	8.3	1.9
79.1	16th	84.2	9th	73.5	4.9	7.6	1.1
76	2nd	78	13th	74	4.9	7.1	3.3
75.5	14th	77.5	16th	73	5.1	7.3	2.0
75.1	28th	79.5	19th	71	5.1	7.6	2.5
73.2	9th	76	31st	67	5.4	7.8	3.3
64.8	16th	73.5	30th	54	7.2	13.0	1.5
56.8	25th	70	13th	49.5	9.3	13.0	3.5
69.7	...	75.3	...	63.9	7.1	10.2	3.5
...	...	84.2	...	48.5	...	13.6	1.4

TABLE
Meteorological Summary

MONTHS.	SERENITY.					Maximum. Minimum.				
	Mean.	4-hour.	10-hour.	16-hour.	22-hour.	Mean.	Day.		Tinta.	
							Day.	Tinta.	Day.	Tinta.
January	9.0	9.3	9.0	8.3	9.6	2.9	7th	4.5	6th	1.5
February	8.9	9.1	8.4	9.1	8.9	2.8	10th	4.5	9th	1.5
March	7.2	7.7	7.5	6.2	7.3	2.7	1st	4.0	7th	1.0
April	6.9	8.3	7.4	5.9	7.1	2.4	1st	5.0	13th	0.5
May	5.6	5.9	5.8	5.4	5.2	3.0	5th	5.0	17th	0.5
June	1.2	4.5	2.7	2.8	4.0	2.7	3rd	4.5	25th	1.0
July	7.4	3.0	1.9	1.6	3.9	1.5	28th	3.5	3rd	0.5
August	1.9	2.5	1.5	1.5	2.3	1.6	23rd	3.0	4th	0.5
September	4.2	4.7	3.6	3.6	4.8	1.6	20th	3.5	27th	0.5
October	3.6	4.6	3.1	2.8	4.1	1.1	14th	2.0	9th	0.5
November	4.1	7.1	6.2	5.7	7.3	0.7	19th	2.0	1st	0.5
December	2.8	7.6	7.1	6.8	7.5	1.0	18th	3.0	1st	0.5
Year	5.5	6.2	5.4	5.0	6.0	2.1	...	4.0	...	0.8
Means of Ex-tremes	...	...	...	...	...	...	...	5.0	...	0.5

II.—(Concluded.)

for the year 1889.—(Concluded.)

DIRECTION AND MEAN MOVEMENT OF WINDS.					INCHES OF RAIN-FALL AND NUMBER OF RAINY DAYS.	
Prevailing winds.	Mean daily velocity.	Maximum.	Minimum.	Total miles.	Rainfall.	Rainy days.
S.	6.79	23.12	.70	210.40	...	...
S. & S. W.	9.48	35.06	1.01	265.57	...	...
S. W. & S.	28.79	125.25	.58	892.58	...	...
S. & S. W.	89.38	145.40	39.80	2681.25	.1	1
S. W. S.	93.28	134.00	45.74	2891.60	.8	3
S. S. W.	71.64	138.74	24.36	2149.31	3.8	8
W. S. W.	72.17	187.10	19.66	2237.20	8.5	14
W. S. W.	65.34	124.20	15.55	2025.50	3.5	12
W. S. W.	26.91	89.85	.90	807.35	14.8	10
W.	21.77	93.00	.90	674.85	12.47	20
N. N. W.	45.38	151.36	20.31	1361.35	3.28	6
N. E. N. W.	59.40	157.15	22.63	181.14	2.86	5
W. S. W.	49.19	117.02	1.601	1504.01	4.18	7
...	...	187.10	.70	...	...	...

TABLE

The Mean, Maximum and Minimum Pressure of

YEARS.	1870.		1871.		1872.	
Months.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.
January ...	30-106 29-731 30-085	29-925	30-129 29-850 30-123	29-890 29-850 29-014	30-135 29-810 30-079	30-002 29-941
February ...	29-787 30-031	29-930	29-707 30-047	29-014	29-779 30-087	29-941
March ...	29-717 29-960	29-873	29-738 29-988	29-878	29-700 30-015	29-890
April ...	29-622 29-834	29-784	29-649 29-850	29-790	29-625 29-897	29-790
May ...	29-379 29-802	29-628	29-501 29-762	29-687	29-468 29-715	29-684
June ...	29-409 29-715	29-633	29-370 29-748	29-564	29-391 29-784	29-604
July ...	29-385 29-798	29-567	29-423 29-808	29-583	29-432 29-802	29-597
August ...	29-437 29-850	29-628	29-507 29-870	29-654	29-438 29-820	29-604
September	29-479 29-918	29-684	29-454 29-985	29-660	29-529 29-904	29-706
October ...	29-683 30-106	29-796	29-604 30-045	29-805	29-552 30-020	29-780
November	28-737 30-139	29-924	29-795 30-160	29-939	29-751 30-101	29-911
December	29-818	30-016	29-838	30-007	29-787	29-959
Each year's Ex- tremes & Mean.	30-139 28-757	29-792	30-150 29-370	29-789	30-135 28-381	29-735

III.

Air for each month of the year, and for 20 years.

1873.		1874.		1875.		1876.	
Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.
30-117 29-832 30-124	29-958	30-182 29-867 30-152	30-031	30-113 29-777 30-136	29-950	30-157 29-810 30-138	29-972
29-740 30-008	29-886	29-739 30-069	29-952	29-806 30-078	29-959	29-765 30-024	29-933
29-765 29-941	29-886	29-696 29-957	29-861	29-720 29-928	29-858	29-646 29-895	29-846
29-622 29-949	29-706	29-686 29-817	29-815	29-401 29-869	29-743	29-600 29-829	29-743
29-427 29-688	29-724	29-403 29-860	29-657	29-502 29-773	29-704	29-509 29-739	29-604
29-422 29-742	29-558	29-387 29-727	29-615	29-448 29-751	29-501	29-448 29-715	29-618
29-405 29-884	29-576	29-413 29-807	29-598	29-402 29-823	29-573	29-443 29-774	29-572
29-459 29-851	29-656	29-490 29-846	29-634	29-488 29-903	29-639	29-488 29-885	29-636
29-485 29-900	29-697	29-513 29-962	29-696	29-457 29-954	29-686	29-441 30-061	29-705
29-605 30-122	29-809	29-604 30-095	29-708	29-665 30-133	29-810	29-920 30-070	29-829
29-783 30-148	29-983	29-788 30-141	29-947	29-865 30-161	29-981	29-757 30-193	29-932
29-745	29-902	29-880	30-028	29-887	30-001	29-908	30-043
30-148 29-405	29-796	30-182 29-387	29-800	30-161 29-402	29-792	30-193 28-920	29-791

TABLE

The Mean, Maximum and Minimum Pressure of

YEARS.	1877.		1878.		1879.	
Months.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.
January ...	30-212 29-020 30-179	30-059	30-168 29-704 30-137	30-017	30-111 29-421 30-130	29-400
February ...	29-747 30-085	29-980	29-429 30-068	29-800	29-733 30-023	29-044
March ...	29-783 29-074	29-918	29-671 29-991	29-926	29-744 30-044	29-557
April ...	29-671 29-889	29-850	29-648 29-913	29-538	29-556 29-817	29-755
May ...	29-549 29-795	29-733	29-594 29-739	29-743	29-551 29-729	29-651
June ...	29-436 29-781	29-632	29-410 29-800	29-505	29-441 29-794	29-508
July ...	29-482 29-805	29-640	29-373 29-877	29-619	29-402 29-771	29-628
August ...	29-444 29-934	29-635	29-444 29-867	29-644	29-417 29-841	29-606
September ...	29-553 30-057	29-771	29-472 29-905	29-668	29-445 30-039	29-656
October ...	29-774 30-098	29-900	29-580 30-027	29-756	29-512 30-133	29-810
November ...	29-759 30-102	29-960	29-427 30-084	29-840	29-735 30-067	29-916
December ...	29-775	29-001	29-503	29-807	29-834	29-911
Each year's Ex- tremes & Mean.	30-212 29-436	29-841	30-168 29-373	29-794	30-133 29-386	29-751

III.—(Continued.)

Air for each month of the year, and for 20 years.

1880.		1881.		1882.		1883.	
Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.
30-155	29-952	30-174	30-040	30-208	30-028	30-215	30-003
29-701	29-934	29-927	29-879	30-116	29-938	29-800	29-941
30-105	29-873	30-183	30-000	30-075	29-887	30-029	29-875
29-747	29-775	29-828	29-764	29-658	29-777	29-730	29-769
30-112	29-668	30-067	29-955	29-919	29-704	29-908	29-655
29-670	29-668	29-764	29-608	29-637	29-704	29-580	29-655
29-941	29-557	29-903	29-903	29-929	29-568	29-835	29-579
29-637	29-557	29-608	29-578	29-456	29-418	29-468	29-576
29-856	29-506	29-309	29-731	29-746	29-767	29-814	29-622
29-411	29-443	29-639	29-618	29-346	29-407	29-418	29-622
29-429	29-804	29-714	29-627	29-605	29-827	29-767	29-622
29-784	29-418	29-650	29-627	29-831	29-648	29-827	29-622
29-438	29-695	29-418	29-703	29-442	29-406	29-406	29-605
29-913	29-511	29-856	29-703	29-878	29-896	29-896	29-605
29-522	29-505	29-511	29-452	29-452	29-495	29-495	29-865
30-025	29-844	30-005	29-798	29-935	30-004	30-004	29-865
29-489	29-466	30-067	29-537	30-067	29-673	29-673	29-905
30-097	29-903	30-067	29-903	30-067	30-053	30-053	29-905
29-829	29-738	30-112	29-901	30-141	29-785	29-785	30-026
30-171	29-871	29-871	29-733	29-733	29-725	29-725	30-026
29-915	29-915	29-915	29-915	29-915	29-915	29-915	29-915
30-171	29-796	30-183	29-805	30-208	29-783	30-215	29-793
29-409	29-387	29-387	29-346	29-346	29-406	29-406	29-793

TABLE

The Mean, Maximum and Minimum Pressure

YEARS.	1884.		1885.		1886.	
Months.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.
January	30-174 29-801 30-156	30-038	30-223 29-033 30-073	30-062	30-206 29-810 30-124	29-989
February	29-809 30-060	29-989	29-748 30-060	29-932	29-763 30-008	29-939
March	29-714 29-033	29-830	29-754 29-971	29-917	29-670 29-945	29-889
April	29-661 29-671	29-806	29-676 29-926	29-800	29-614 29-876	29-788
May	29-472 29-719	29-673	29-641 29-916	29-777	29-484 29-740	29-704
June	29-484 29-747	29-607	29-440 29-707	29-591	29-351 29-787	29-577
July	29-345 29-835	29-572	29-421 29-793	29-600	29-368 29-813	29-568
August	29-465 29-856	29-607	29-431 29-934	29-627	29-379 29-841	29-621
September	29-448 30-132	29-672	29-571 29-961	29-742	29-532 29-982	29-686
October	29-578 30-127	29-800	29-571 30-130	29-857	29-550 30-045	29-785
November	29-802 30-165	29-941	29-732 30-153	29-943	29-648 30-176	29-903
December	29-802	30-030	29-838	29-979	29-823	29-994
Each year's Ex- tremes & Mean.	30-174 29-345	29-803	30-223 29-421	29-818	30-206 29-331	29-788

III.—(Concluded.)

Air for each month of the year, and for 20 years.

1887.		1888.		1889.		20 Years' Mean.	
Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.
30-075 29-741 30-188	29-923	30-171 29-825 30-175	30-019	30-211 29-851 30-153	30-034	30-162 29-875 30-133	29-998
29-677 30-041	29-951	29-773 30-025	29-958	29-833 30-162	29-997	29-773 30-062	29-963
29-671 29-969	29-833	29-713 29-948	29-879	29-725 29-965	29-940	29-711 29-950	29-881
29-594 29-859	29-802	29-566 29-896	29-757	29-621 29-908	29-814	29-622 29-877	29-789
29-431 29-723	29-618	29-440 29-696	29-690	29-530 29-752	29-738	29-477 29-752	29-689
29-345 29-738	29-587	29-418 29-729	29-567	29-448 29-719	29-600	29-412 29-750	29-591
29-392 29-786	29-575	29-445 29-791	29-605	29-327 29-811	29-582	29-410 29-811	29-590
29-466 29-896	29-640	29-463 29-972	29-639	29-373 29-889	29-601	29-445 29-887	29-631
29-409 29-985	29-690	29-442 30-050	29-748	29-346 29-977	29-710	29-480 29-988	29-698
29-678 30-081	29-853	29-696 30-177	29-890	29-581 30-027	29-778	29-631 30-085	29-818
29-745 30-114	29-941	29-797 30-185	29-952	29-545 30-105	29-861	29-725 30-140	29-928
29-874	29-992	29-908	30-027	29-781	29-903	29-821	29-992
30-188 29-345	29-784	30-185 29-418	29-811	30-211 29-327	29-797	30-162 29-410	29-796

TABLE IV.
Normal daily Pressure at Vizagapatam.

DATE.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1st	29-995	29-971	29-907	29-827	29-741	29-614	29-586	29-601	29-670	29-769	29-866	29-969
2nd	30-003	29-976	29-909	29-836	29-731	29-607	29-593	29-598	29-681	29-766	29-864	29-970
3rd	30-006	29-980	29-909	29-831	29-729	29-603	29-602	29-588	29-686	29-773	29-869	29-973
4th	30-007	29-976	29-906	29-816	29-725	29-604	29-608	29-599	29-700	29-781	29-876	29-968
5th	30-015	29-961	29-919	29-810	29-728	29-607	29-614	29-588	29-701	29-772	29-881	29-968
6th	30-017	29-959	29-928	29-812	29-732	29-611	29-609	29-598	29-697	29-775	29-904	29-973
7th	30-020	29-957	29-920	29-806	29-734	29-607	29-613	29-631	29-696	29-772	29-908	29-979
8th	30-014	29-964	29-916	29-796	29-720	29-608	29-614	29-641	29-691	29-773	29-906	29-986
9th	30-007	29-956	29-916	29-798	29-716	29-609	29-605	29-632	29-686	29-791	29-918	29-976
10th	30-012	29-952	29-910	29-793	29-706	29-599	29-584	29-624	29-682	29-780	29-926	29-974
11th	30-000	29-952	29-911	29-782	29-699	29-580	29-575	29-622	29-677	?	925	29-979
12th	29-998	29-950	29-910	29-778	29-702	29-588	29-569	29-635	29-689	29-791	29-946	29-988
13th	29-986	29-956	29-902	29-783	29-706	29-573	29-569	29-615	29-679	29-790	29-946	29-983
14th	29-994	29-961	29-931	29-787	29-714	29-578	29-573	29-639	29-679	29-804	29-948	30-000
15th	30-003	29-963	29-970	29-779	29-708	29-582	29-583	29-636	29-675	29-831	29-947	30-006

16th	29-995	29-945	29-865	29-786	29-708	29-583	29-580	29-623	29-679	29-833	29-947	30-015
17th	29-990	29-940	29-877	29-799	29-687	29-564	29-579	29-618	29-672	29-839	29-948	30-015
18th	30-006	29-951	29-887	29-799	29-675	29-573	29-573	29-614	29-669	29-844	29-928	30-022
19th	30-009	29-969	29-878	29-786	29-660	29-581	29-566	29-618	29-669	29-850	29-917	30-017
20th	29-998	29-975	29-872	29-795	29-656	29-581	29-571	29-641	29-678	29-856	29-922	30-008
21st	29-994	29-965	29-869	29-785	29-662	29-591	29-589	29-631	29-682	29-861	29-937	29-998
22nd	29-993	29-951	29-865	29-772	29-669	29-592	29-584	29-644	29-702	29-851	29-944	29-999
23rd	29-992	29-942	29-855	29-769	29-670	29-596	29-569	29-643	29-707	29-840	29-932	30-001
24th	29-992	29-939	29-847	29-775	29-658	29-592	29-574	29-644	29-714	29-827	29-949	30-007
25th	29-993	29-940	29-838	29-775	29-653	29-583	29-582	29-641	29-723	29-830	29-960	30-009
26th	29-986	29-938	29-839	29-802	29-664	29-586	29-600	29-618	29-739	29-856	29-969	30-017
27th	29-983	29-920	29-847	29-762	29-657	29-582	29-596	29-652	29-715	29-850	29-974	30-014
28th	29-982	29-908	29-836	29-753	29-653	29-594	29-588	29-656	29-752	29-863	29-967	30-008
29th	29-982	...	29-835	29-744	29-632	29-608	29-610	29-664	29-769	29-862	29-971	30-001
30th	29-980	...	29-838	29-740	29-632	29-601	29-616	29-668	29-765	29-858	29-969	30-006
31st	29-978	...	29-825	...	29-616	...	29-608	29-669	...	29-855	...	29-997
Mean	30-000	29-954	29-881	29-789	29-688	29-591	29-590	29-651	29-696	29-818	29-928	29-995
Mean of 1st 10 days	30-010	29-965	29-914	29-812	29-726	29-607	29-603	29-609	29-690	29-777	29-891	29-974
Mean of 2nd 10 days	30-004	29-955	29-886	29-789	29-691	29-572	29-574	29-628	29-668	29-825	29-937	30-004
Mean of remaining days	29-987	29-938	29-845	29-768	29-650	29-594	29-594	29-653	29-729	29-849	29-937	30-005

TABLE
Mean Pressure of Gaseous Atmosphere

YEARS	January.	February.	March.	April.	May.
1870	29-394	29-810	29-186	28-978	28-743
1871	29-362	29-228	29-184	28-228	28-766
1872	29-406	29-282	29-096	28-940	28-708
1873	29-370	29-288	29-138	28-900	28-681
1874	29-436	29-297	29-101	28-977	28-748
1875	29-371	29-358	29-089	28-870	28-798
1876	29-423	29-304	29-088	28-853	28-808
1877	29-451	29-286	29-189	28-130	28-818
1878	29-391	29-182	29-141	28-004	28-847
1879	29-458	29-215	29-083	28-888	28-760
1880	29-573	29-391	29-144	28-919	28-779
1881	29-536	29-474	29-253	29-088	28-828
1882	29-441	29-304	29-225	28-004	28-861
1883	29-445	29-349	29-171	28-984	28-788
1884	29-522	29-358	29-189	29-064	28-855
1885	29-465	29-301	29-232	29-085	28-928
1886	29-450	29-345	29-169	29-009	28-840
1887	29-388	29-353	29-114	29-089	28-753
1888	29-461	29-335	29-180	28-949	28-878
1889	29-495	29-395	29-272	28-018	28-896
Mean	29-427	29-317	29-155	28-978	28-806

V.
for each month of 20 years.

June.	July.	August.	September.	October.	November.	December.	Years.
28-762	28-728	28-746	28-798	28-918	29-031	29-522	29-001
28-672	28-710	28-740	28-769	29-018	29-244	29-865	28-995
28-681	28-712	28-693	28-787	28-848	29-208	29-329	28-990
28-687	28-709	28-757	28-818	29-008	29-344	29-406	29-018
28-740	28-713	28-761	28-779	28-888	29-100	29-518	29-987
28-718	28-730	28-770	28-797	29-002	29-367	29-457	29-029
28-706	28-716	28-747	28-822	29-080	29-365	29-541	29-024
28-780	28-755	28-774	28-876	29-058	29-288	29-335	29-083
28-642	28-725	28-733	28-757	28-908	29-105	29-297	28-978
28-715	28-744	28-753	28-779	28-997	29-265	29-454	29-017
28-679	28-755	28-770	28-855	29-003	29-277	29-481	29-027
28-759	28-819	28-791	28-858	29-103	29-275	29-579	29-008
28-807	28-765	28-824	28-828	29-015	29-253	29-440	29-064
28-789	28-804	28-801	28-883	29-090	29-358	29-589	29-085
28-777	28-814	28-801	28-850	29-112	29-395	29-506	29-100
28-798	28-805	28-839	28-905	29-084	29-354	29-390	29-099
28-733	28-749	28-758	28-831	28-927	29-238	29-441	29-041
28-765	28-782	28-823	28-872	29-108	29-800	29-505	29-066
28-767	28-822	28-855	28-944	29-178	29-271	29-527	29-097
28-749	28-712	28-775	28-816	28-936	29-229	29-387	29-056
28-781	29-753	28-776	28-831	29-018	29-264	29-447	29-042

TABLE
Mean Indications of the Barometer and Thermometer
The Indications of the F... have

YEARS.	JANUARY.		JANUARY.	
	Barometer.	Thermometer.	Barometer.	Thermometer.
1870	29-858	75-8	29-866	74-8
1871	29-900	72-9	29-853	76-5
1872	29-941	73-9	29-882	77-3
1873	29-866	73	29-881	76-3
1874	29-936	72-4	29-886	76-6
1875	29-889	72	29-901	73-2
1876	29-908	70-9	29-865	75-5
1877	29-905	72-9	29-930	76-7
1878	29-948	76	29-916	79-8
1879	29-925	72-4	29-877	75-2
1880	29-881	72-5	29-868	76-4
1881	29-972	70-9	29-934	73-7
1882	29-960	73-8	29-868	76-8
1883	29-943	72-5	29-871	76-5
1884	29-973	71-2	29-900	75-6
1885	29-987	73-5	29-866	77
1886	29-939	71-2	29-865	75-6
1887	29-863	73-2	29-866	75-3
1888	29-960	72-9	29-892	77-3
1889	29-966	71-3	29-929	76-4
Mean	29-934	72-8	29-888	76-1

VI.

meter at 4 A.M., between 1870 and 1889.
been corrected and reduced to 32° F.

MARCH.		APRIL.		MAY.		JUNE.	
Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.
29-823	79-4	29-729	83-6	29-586	87-2	29-584	85-6
29-816	81	29-742	83-8	29-644	85-7	29-514	85-5
29-805	82	29-739	85-1	29-614	88	29-562	85-9
29-829	80-7	29-708	84-2	29-678	86-2	29-516	88
29-800	80-2	29-755	83-2	29-607	84-9	29-565	83-8
29-794	79-8	29-690	83-7	29-656	84-4	29-545	84-9
29-788	81-5	29-689	84-2	29-616	86-6	29-587	85-9
29-853	80-2	29-800	83-5	29-676	85-5	29-590	86-6
29-867	82-7	29-778	84-7	29-690	86-5	29-546	88-3
29-795	82-6	29-701	85-1	29-593	85	29-598	85-3
29-810	80-1	29-714	84-7	29-614	85-6	29-501	85-7
29-843	80-7	29-734	84-3	29-634	85-9	29-518	85-7
29-824	84-8	29-714	84-2	29-645	85-7	29-587	86-7
29-809	81-4	29-706	84	29-604	86-6	29-530	85-5
29-798	80-6	29-748	83-3	29-622	86	29-559	85-9
29-856	79-7	29-736	84-5	29-724	85-7	29-547	85-7
29-818	81-3	29-731	83-8	29-650	85-6	29-525	85-1
29-763	81-3	29-748	83-4	29-572	87-2	29-543	85-1
29-812	81-1	29-691	84-5	29-635	86-7	29-521	87-8
29-873	80-7	29-755	85-1	29-669	87-1	29-543	87-1
29-819	81-1	29-730	84-1	29-636	86-1	29-548	86

TABLE
Mean Indications of the Barometer and Thermometer
The Indications of the ~~Barometer~~ meter have

YEARS.	JULY.		AUG.	
	Barometer.	Thermometer.	Barometer.	Thermometer.
1870	29.514	83.1	29.588	84.9
1871	29.535	83.9	29.606	84.9
1872	29.546	82.4	29.557	83.1
1873	29.527	82.6	29.606	83.8
1874	29.551	83.3	29.582	83.5
1875	29.523	83	29.590	83.3
1876	29.524	83.7	29.583	83.6
1877	29.506	86.5	29.505	85
1878	29.508	84.1	29.502	83.1
1879	29.579	83.7	29.500	83.3
1880	29.548	82.8	29.590	83.5
1881	29.570	84	29.577	84.1
1882	29.491	83.6	29.594	84.3
1883	29.529	83.4	29.538	84.5
1884	29.528	84	29.556	84.1
1885	29.554	83.9	29.582	84.3
1886	29.527	83.7	29.570	83.4
1887	29.528	82.5	29.587	84
1888	29.551	84.2	29.584	84.6
1889	22.519	83.6	29.540	83.7
Mean	29.540	83.6	29.577	83.9

VI.—(Continued.)

meter at 4 A.M., between 1870 and 1889.—(Contd.)
been corrected and reduced to 32° F.

SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.
29.627	83	29.735	81.4	29.844	77.9	29.856	79.6
29.617	84.2	29.750	83.7	29.883	80	29.947	78
29.657	82.8	29.715	80.9	29.856	77.9	29.900	74.4
29.644	83.4	29.743	79.6	29.919	75.2	29.931	72.9
29.644	83.5	29.707	81.5	29.882	76.7	29.963	69.5
29.624	81.7	29.752	80.6	29.919	75.3	29.940	61.7
29.642	82.5	29.762	79.9	29.865	75	29.977	69.6
29.715	83.7	29.842	83.4	29.906	78.2	29.929	76.8
29.616	84.6	29.692	82.4	29.779	79.1	29.845	75.4
29.595	83.8	29.743	82.2	29.847	77.8	29.891	70.9
29.634	83.2	29.774	82.3	29.900	77.6	29.968	72
29.639	84.1	29.743	81.6	29.839	78.5	29.926	72.6
29.614	83	29.690	82.1	29.844	78.3	29.908	71.6
29.639	83.2	29.808	82.1	29.845	74.2	29.958	71
29.615	82.7	29.795	80.9	29.872	75.9	29.965	73.3
29.687	84.5	29.801	81.7	29.875	77.7	29.918	75
29.630	84.5	29.721	81.6	29.843	78.2	29.928	72.2
29.639	84	29.792	81.7	29.870	76.8	29.925	72.7
29.686	83.3	29.827	82.5	29.881	77.8	29.964	72.3
29.650	83.7	29.711	81.9	29.861	76.4	29.906	70.8
29.641	83.6	29.755	81.7	29.872	77.2	29.932	72.1

TABLE
Mean Indications of the Barometer and Thermo
 The Indications of the Barometer have

YEARS.	JANUARY.		FEBRUARY.	
	Barometer.	Thermometer.	Barometer.	Thermometer.
1870	29.987	78.7	29.972	78.7
1871	1.009	78.4	29.963	79.9
1872	1.040	77.7	29.984	80.6
1873	1.022	78	29.985	80
1874	1.072	75.9	29.998	80
1875	.990	75.2	29.997	77.7
1876	1.018	78	29.978	79.1
1877	1.102	78.2	1.036	79.1
1878	1.057	79.1	1.028	83.3
1879	1.030	75.9	.988	79.1
1880	.995	75.5	.979	79.3
1881	1.080	75.4	1.046	78.1
1882	1.075	76.8	.980	80.4
1883	1.041	75.8	.989	80.1
1884	1.076	74.2	1.016	78.8
1885	1.090	76.9	.973	80.1
1886	1.038	74.8	.989	79.2
1887	.987	76.6	.997	79.1
1888	1.056	76.5	1.002	81.2
1889	1.076	78	1.045	80.5
Mean	30.040	78.3	29.998	79.7

VII.

meter at 10 A.M., between 1870 and 1889.
 been corrected and reduced to 32° F.

MARCH.		APRIL.		MAY.		JUNE.	
Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.
29.905	82.9	29.812	87.2	29.654	90.7	29.649	97.6
29.914	84.2	29.832	87.6	29.716	88.6	29.580	88
29.898	84.3	29.823	88	29.692	90.6	29.617	87.1
29.921	84.6	29.801	87.4	29.754	89.9	29.570	90.4
29.908	83.4	29.846	87.3	29.678	88.9	29.630	86.6
29.901	83.3	29.781	87.5	29.733	88.4	29.603	87.7
29.886	84.9	29.780	88.5	29.694	89.8	29.638	88.8
29.958	84.1	29.902	86.7	29.757	88.8	29.645	89.7
29.967	85.7	29.878	87.9	29.773	90.4	29.609	91
29.898	86	29.795	88.1	29.679	87.9	29.613	87.2
29.923	83.2	29.814	87.7	29.702	88.6	29.573	87.2
29.960	83.9	29.831	88.3	29.717	88.7	29.596	87.1
29.936	81	29.821	87.7	29.739	89.1	29.514	89.5
29.919	84.9	29.807	87.8	29.685	90.4	29.597	88.3
29.895	84	29.835	87.1	29.698		29.624	87.9
29.952	82.9	29.833	87.9	29.836	89.7	29.600	87.5
29.919	84.4	29.830	87.3	29.737	87.8	29.593	86.9
29.873	83.9	29.840	86.6	29.646	90.1	29.600	87.5
29.888	85.1	29.794	89.2	29.720	89.5	29.583	90.7
29.988	84.8	29.851	89.2	29.778	90.7	29.617	89.1
29.920	84.1	29.825	87.8	29.719	89.4	29.603	88.3

TABLE

Mean Indications of the Barometer and Thermometer
The Indications of the Barometer have

USE.

YEARS.	JULY.		AUG.	THERMOMETER.
	Barometer.	Thermometer.	Barometer.	
1870	...	...	...	...
1871	...	...	...	...
1872	...	...	...	...
1873	...	...	...	...
1874	...	...	...	...
1875	...	...	...	...
1876	...	...	...	...
1877	...	...	...	...
1878	...	...	...	...
1879	...	...	...	...
1880	...	...	...	...
1881	...	...	...	...
1882	...	...	...	...
1883	...	...	...	...
1884	...	...	...	...
1885	...	...	...	...
1886	...	...	...	...
1887	...	...	...	...
1888	...	...	...	...
1889	...	...	...	...
Mean	...	...	...	...

VII.—(Continued.)

meter at 10 A.M., between 1870 and 1889.—(Contd.)
been corrected and reduced to 32° F.

SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.
29.707	84.8	29.826	83	29.961	80.9	1.061	75.2
29.693	86	29.828	86.7	29.967	83.1	1.040	79.8
29.731	83.9	29.800	82	29.943	80.2	1.002	76.7
29.723	85.4	29.843	81.5	1.015	78.2	1.027	75.7
29.722	85.8	29.797	83.6	29.976	79.3	1.068	73.6
29.714	84	29.844	83.3	1.013	79.3	1.042	76.2
29.737	84.2	29.860	82.7	29.964	78.8	1.084	74.8
29.791	85.5	29.933	85.6	1.004	81.4	1.027	79.0
29.691	86	29.788	84.3	29.873	80.8	29.927	76.8
29.683	86.2	29.843	84.3	29.951	79.4	29.985	74.2
29.722	84.8	29.878	84.3	1.004	79.2	1.074	75.8
29.731	86	29.823	84.9	29.933	80.5	1.027	75.3
29.694	84.9	29.784	84.3	29.951	79.6	1.000	76.3
29.722	85	29.892	84.3	29.935	77.5	1.080	72.9
29.700	84.3	29.800	83.2	29.975	78.5	1.067	75.6
29.765	86.1	29.885	83.5	29.972	79.8	1.010	70.8
29.710	86.6	29.822	83.1	29.935	80.3	1.034	75.3
29.710	86	29.881	83.7	29.975	79.5	1.028	75.0
29.776	87.4	29.920	85.0	29.989	79.7	1.067	75.7
29.742	85.7	29.811	83.2	29.889	79.8	1.000	74.9
29.723	85.4	29.847	83.9	29.961	79.8	30.031	75.8

TABLE

Mean Indications of the Barometer and Thermometer.
The Indications of the Barometer have

YEARS.	JANUARY.		Barc	Thermo- meter.
	Barometer.	Thermo- meter.		
1870	29.860	82	29.864	81.4
1871	.892	79.1	.825	82.5
1872	.917	80.2	.852	82.7
1873	.872	78.8	.856	81.8
1874	.949	78.2	.870	81.8
1875	.879	77.4	.876	79.3
1876	.886	78.3	.847	81.7
1877	.981	77.5	.909	80.1
1878	.938	80.7	.895	84.9
1879	.905	78.3	.859	81.9
1880	.865	78.1	.853	81.2
1881	.960	78	.908	81.9
1882	.946	79.4	.850	82.1
1883	.917	78	.850	82.2
1884	.951	76.6	.875	80.3
1885	.968	79.2	.846	81.1
1886	.911	77	.863	81.5
1887	.834	79.2	.863	81.7
1888	.933	78.7	.868	83.1
1889	.956	79.4	.910	82.6
Mean	29.916	78.7	29.867	81.8

VIII.

meter at 4 P.M., between 1870 and 1889.
been corrected and reduced to 32° F.

MARCH.		APRIL.		MAY.		JUNE.	
Barometer.	Thermo- meter.	Barometer.	Thermo- meter.	Barometer.	Thermo- meter.	Barometer.	Thermo- meter.
29.788	84.7	29.704	87.3	29.544	91.1	29.552	87.9
.796	86.7	.715	87.6	.601	89.3	.486	88.9
.774	86.1	.703	88.8	.584	90.9	.522	87.5
.797	84.6	.683	87.7	.641	89.3	.475	92
.780	84.2	.736	87.2	.576	88.1	.532	87.5
.774	84.7	.655	88.1	.618	88.2	.515	88.9
.759	85.6	.655	88.1	.583	89.8	.540	89.6
.839	84.1	.778	86.9	.659	88.9	.546	90.7
.839	86.1	.753	87.8	.662	89.2	.517	91.1
.770	87	.665	88.8	.574	87.8	.523	88.7
.792	84.4	.686	87.5	.578	88.8	.477	88.6
.825	85.2	.709	88.1	.601	88.4	.499	88.3
.797	86.8	.689	87.8	.614	89.1	.483	90.3
.789	85.1	.682	87.3	.567	89.9	.498	89.1
.769	84.9	.718	87.1	.586	88.9	.525	88.7
.827	84.1	.713	88	.693	88.9	.500	88.9
.789	84.9	.700	87.4	.613	87.9	.494	87.6
.748	84.4	.705	86.9	.524	90.6	.504	87.9
.790	85.6	.669	88	.606	89.8	.482	91.6
.854	85.9	.729	88.9	.651	90.2	.518	89.7
29.795	85.3	29.702	87.8	29.604	89.3	29.510	89.2

TABLE
Mean Indications of the Barometer and Thermo-
 The Indications of the Barometer have

YEARS.	JULY.		AUGUST.	
	Barometer.	Thermometer.	Barometer	Thermometer.
1870	29.490	86.8	29.511	87.6
1871	.504	86.9	.574	88.1
1872	.519	85	.520	85.5
1873	.596	85.6	.573	86.3
1874	.516	86.9	.532	87.1
1875	.494	87.4	.551	87.2
1876	.490	88.2	.555	86.2
1877	.558	89.9	.547	88.7
1878	.539	86.8	.562	85.6
1879	.553	86.6	.526	88.7
1880	.510	86.7	.562	86.4
1881	.539	87.4	.540	87.4
1882	.469	86.8	.564	86.7
1883	.497	87.4	.538	87.1
1884	.486	88	.519	86.6
1885	.513	87.3	.535	87.5
1886	.500	86.7	.533	86.3
1887	.490	86.1	.555	86.6
1888	.523	87.5	.549	88.2
1889	.508	86.1	.518	86.7
Mean	29.515	87	29.549	86.9

VIII.—(Continued.)

meter at 4 P.M., between 1870 and 1889.—(Contd.)
 been corrected and reduced to 32° F.

SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.
29.606	85.8	29.720	84	29.856	82.5	29.939	77.8
.583	87.2	.728	88.2	.861	84.1	.927	81.4
.619	84.9	.705	82.8	.835	81.2	.878	78.8
.615	86	.734	82.3	.906	79.4	.913	77.1
.612	86.3	.685	84.5	.875	80.2	.948	75.4
.604	85	.742	84.2	.902	80.6	.923	77.8
.625	85.5	.757	83.7	.854	80.2	.960	76.3
.684	86.4	.818	86.3	.886	82.9	.907	81.5
.579	87.2	.676	85.4	.760	82	.822	78.1
.578	87.9	.730	85.8	.842	80.4	.871	76
.610	85.9	.760	85.1	.895	80	.951	77.9
.620	87	.715	87	.824	82	.909	77.3
.592	86	.671	85.6	.828	80.6	.890	77.5
.601	86.5	.776	85.1	.819	79.2	.946	74.7
.581	85.2	.779	84.2	.861	79.9	.944	77.3
.652	86.7	.768	84.5	.862	81.3	.896	78.2
.595	87.3	.701	83.8	.816	81.5	.908	77.3
.598	87.6	.772	84.4	.861	80.7	.913	77.7
.661	88.2	.807	86.7	.869	81.1	.942	77.7
.621	86.6	.693	84.3	.777	81.3	.887	77.1
29.612	86.4	29.737	84.9	29.849	81.1	29.914	77.6

TABLE
Mean Indications of the Barometer and Thermo
The Indications of the Barometer have

YEARS.	JANUARY.		FEBRUARY.	
	Barometer.	Thermometer.	Barometer.	Thermometer.
1870	29.902	78.3	29.920	77.3
1871	963	75.3	904	78.6
1872	998	76.4	936	79.5
1873	955	75.1	934	78.8
1874	1.024	74.8	949	78.7
1875	934	74.5	950	76
1876	966	74.2	928	78.1
1877	1.050	75.1	988	78
1878	1.011	78	969	81.8
1879	987	74.3	944	77.5
1880	945	74.5	928	78.3
1881	1.034	73.6	999	76.9
1882	1.019	75.6	936	78.7
1883	996	74.7	940	78.2
1884	1.041	72.8	971	77.4
1885	1.050	75.2	927	78.3
1886	997	74	963	77.7
1887	918	75.6	947	77.9
1888	1.014	75.3	958	79.7
1889	1.028	74	992	78.7
Mean	29.992	75.1	29.949	78.3

IX.

meter at 10 P.M., between 1870 and 1889.
been corrected and reduced to 32° F.

MARCH.		APRIL.		MAY.		JUNE.	
Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.
29.864	81.5	29.780	84.9	29.615			
870	83.2	793	85.4	675	88.5	29.633	86.1
857	83.9	782	86.5	659	87	564	86.8
886	82.3	760	85.6	723	88.5	601	86.5
849	81.8	811	84.7	660	87.3	560	89.7
852	81.6	737	85.3	696	85.7	620	85.2
838	83.1	734	85.6	652	85.6	588	86.5
909	81.8	847	84.8	730	87.7	614	87.3
918	83.9	831	85.9	735	86.7	636	87.8
852	84.4	746	86.4	655	87.4	594	88.7
865	82	774	85.7	670	86	597	86.6
912	82.8	795	85.7	688	86.7	564	86.6
880	83.1	770	85.6	698	87	585	86.4
870	82.8	767	85.3	652	86.9	572	87.8
862	82.1	812	84.5	673	87.8	579	86.8
920	81.4	803	85.9	773	87.2	607	87
883	82.8	793	85.1	702	87	596	86.8
835	82.6	801	84.9	617	86.4	581	86
880	83.1	759	85.9	684	88.6	589	85.9
932	83.2	807	86.7	740	87.7	574	89.1
29.877	82.7	29.785	85.5	29.685	88	611	88.1
					87.2	29.693	87.1

Mean Indications of the Barometer and Thermometer
The Indications of the Barometer and Thermometer

YEARS.	JULY.		AUGUST.	
	Barometer.	Thermometer.	Barometer.	Thermometer.
1870	...	...	...	...
1871	...	...	...	...
1872	...	...	...	...
1873	...	...	...	...
1874	...	...	...	...
1875	...	...	...	...
1876	...	...	...	...
1877	...	...	...	...
1878	...	...	...	...
1879	...	...	...	...
1880	...	...	...	...
1881	...	...	...	...
1882	...	...	...	...
1883	...	...	...	...
1884	...	...	...	...
1885	...	...	...	...
1886	...	...	...	...
1887	...	...	...	...
1888	...	...	...	...
1889	...	...	...	...
Mean	...	...	...	...

IX.—(Continued.)

meter at 10 P.M., between 1870 and 1889.—(Contd.)
been corrected and reduced to 32° F.

SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.
29.690	83.9	29.793	82.1	29.922	79.3	1.006	73.4
670	85.1	803	85.3	931	81.8	1.007	78.6
697	84.5	803	81.8	901	79.8	950	76
693	84.7	763	82.8	982	77.5	984	74.9
691	83	811	82	943	78.5	1.021	72
704	83.5	822	81.7	975	78.1	997	74.4
781	84.7	902	84.3	933	77.5	1.039	72.0
673	85.4	753	83.1	967	79.9	986	78.6
663	84.9	803	83.3	838	80	894	76.1
702	84	849	83	913	78.4	947	73.1
710	84.8	797	83.4	971	78.6	1.032	74
671	84.1	756	83.2	899	80	990	74.7
703	84.5	870	83	908	79.4	972	73
678	83.7	862	82.3	908	76	1.027	72.6
758	85.3	860	82.6	944	77.5	1.029	75.2
698	85.4	783	82.4	951	79	981	76.2
701	85	853	82.8	903	79.2	994	73.6
756	86.2	893	84.1	944	78.5	994	75.3
716	84.0	785	82.4	957	78.9	1.024	74.5
29.703	84.6	29.817	82.8	29.928	77.5	966	78.0
					78.8	29.992	74.6

TABLE
Monthly Means of Pressure for

Years.	January.	February.	March.	April.	May.
1870	29 957	29 962	29 963	29 818	29 689
1871	29 901	29 916	29 910	29 830	29 718
1872	30 034	29 973	29 892	29 831	29 685
1873	29 990	29 977	29 918	29 797	29 755
1874	30 063	29 984	29 893	29 846	29 688
1875	29 982	29 991	29 890	29 778	29 735
1876	30 004	29 965	29 878	29 774	29 686
1877	30 091	30 021	29 950	29 891	29 764
1878	30 049	30 022	29 958	29 869	29 774
1879	30 023	29 976	29 889	29 788	29 688
1880	29 984	29 966	29 903	29 806	29 699
1881	30 072	30 032	29 945	29 817	29 719
1882	30 080	29 970	29 919	29 808	29 785
1883	30 085	29 973	29 907	29 800	29 686
1884	30 070	30 001	29 891	29 837	29 704
1885	30 084	29 964	29 918	29 831	29 806
1886	30 031	29 990	29 912	29 823	29 785
1887	29 935	29 983	29 864	29 833	29 649
1888	30 061	29 990	29 910	29 768	29 731
1889	30 066	30 029	29 971	29 845	29 769
Mean	30 029	29 986	29 913	29 820	29 719

X.

20 years reduced to Sea-level.

June.	July.	August.	September.	October.	November.	December.	Year.
29 664	29 598	29 659	29 715	29 828	29 956	30 048	29 814
29 595	29 614	29 685	29 700	29 886	29 971	30 039	29 821
29 635	29 628	29 635	29 738	29 812	29 943	29 991	29 817
29 689	29 607	29 687	29 728	29 841	30 015	30 024	29 828
29 646	29 629	29 665	29 727	29 860	29 979	30 060	29 813
29 622	29 604	29 670	29 717	29 848	30 013	30 036	29 824
29 649	29 603	29 677	29 737	29 861	29 964	30 075	29 823
29 663	29 671	29 666	29 803	29 932	30 001	30 023	29 873
29 628	29 650	29 675	29 699	29 788	29 872	29 929	29 826
29 629	29 660	29 637	29 689	29 842	29 948	29 988	29 813
29 588	29 627	29 681	29 726	29 876	30 003	30 066	29 828
29 609	29 649	29 658	29 734	29 829	29 935	30 022	29 837
29 599	29 577	29 679	29 703	29 785	29 939	30 005	29 815
29 610	29 607	29 653	29 726	29 897	29 937	30 058	29 824
29 638	29 603	29 638	29 703	29 891	29 973	30 062	29 834
29 622	29 631	29 658	29 773	29 888	29 975	30 011	29 849
29 608	29 613	29 652	29 717	29 817	29 934	30 026	29 822
29 618	29 606	29 671	29 721	29 884	29 973	30 024	29 813
29 598	29 636	29 670	29 779	29 921	29 984	30 050	29 842
29 631	29 613	29 632	29 741	29 810	29 893	29 935	29 828
29 622	29 621	29 662	29 729	29 849	29 960	30 024	29 827

TABLE

Comparison of Monthly Means of

MONTHS.	PRESSURE OF AIR.					
	Mean.	Maximum.	Minimum.	Range.	Dry bulb.	Wet bulb.
January	+ .086	+ .049	-.024	+ .073	- .5	- .9
February	+ .044	+ .020	+ .060	-.040	+ .6	- .2
March	+ .059	+ .100	+ .014	+ .086	+ .4	- .9
April	+ .025	+ .015	-.001	+ .016	+ 1.2	+ .5
May	+ .049	+ .031	+ .053	-.022	+ 1.0	+ .1
June	+ .000	...	+ .036	-.036	+ .9	+ .7
July	-.008	-.031	-.083	-.052	- .3	+ 1.0
August	-.030	...	-.072	+ .072	- .4	- .8
September	+ .012	+ .002	+ .134	+ .136	+ .2	+ 1.0
October	-.040	-.011	-.050	+ .039	- .3	+ 1.3
November	-.067	-.053	-.180	+ .122	- .5	- .4
December	-.089	-.035	-.040	+ .005	- 1.1	- 1.0
Year	+ .001	+ .032	-.001	-.033	+ .01	...

XI.

1889 with the average of 20 years.

TEMPERATURE OF AIR.						
Wet minimum.	Maximum.	Minimum.	Range.	Mean of maximum.	Mean of minimum.	Mean daily range.
- 1.3	+ .8	- 6.5	+ 7.3	+ .2	- 6.5	+ 6.7
+ .4	+ 1.1	- 3.8	+ 4.9	+ .2	- 4.5	+ 4.7
- .4	- .2	- 7.2	- 7.0	+ .7	+ 4.0	+ 4.7
+ 1.4	+ 2.4	- 3.7	+ 6.1	+ 1.7	+ 1.6	+ 3.3
+ 1.3	- 2.2	+ .3	- 2.5	+ 1.3	- 1.1	+ 2.4
+ 1.6	+ 1.3	- 2.4	+ 3.7	+ .7	- 1.2	+ 1.9
+ 1.7	- .8	- .5	- .8	- .8	- 1.9	+ 1.1
+ .6	+ .1	- 1.5	+ 1.6	- .1	- 2.5	+ 2.4
+ 1.1	- 1.7	- 3.1	+ 1.4	- .5	- 2.4	+ 1.9
+ 1.7	- .9	- 1.8	+ .9	- 1.6	- 2.1	+ .5
- .1	...	- 5.5	+ 5.5	...	- .4	+ 4.0
- .6	- 1.2	- 5.1	+ 3.9	- 0.8	- 3.9	+ 3.1
+ 0.1	- 0.4	- 4.6	+ 4.2	- 3.9	+ 1.0	- 4.9

TABLE

Comparison of Monthly Means of

MONTHS.	TEMPERATURE & RADIATION.				HYGROMETRY.		
	Sun.	Difference, sun and shade.	Grass.	Difference, shade and radiation.	Dew point.	Force of vapour.	Weight of vapour in a cubic foot of air.
January ...	-1.6	-2.0	-3.8	-2.7	-1	-0.034	-1
February ...	-2.7	-2.9	-1.2	-3.3	...	-0.015	-1
March ...	+1.7	+1.0	+2.2	-6.2	-2	-0.040	-4
April ...	-2.2	-3.9	+1	-1.7	...	+0.001	...
May ...	-2.7	-4.0	+1.0	-2.1	-1	-0.014	-1
June ...	-1.7	-2.4	+7	-1.9	+1	+0.016	+2
July ...	-4.1	-3.4	-3	-1.6	+2.0	+0.032	+3
August ...	-2.7	-2.6	-5	-1.9	...	-0.007	-1
September ...	-2.6	-2.1	-5	-1.9	+2	+0.044	+2
October ...	+4.0	+2.4	+7	+2.8	+3	+0.032	+7
November ...	-2.0	-2.0	-1.0	-3.0	...	-0.008	-2
December ...	+0.9	+2.1	-2.4	-2.7	-1	-0.019	-2
Year ...	-2.2	-1.7	-0.9	-2.9	...	+0.030	...

XI.—(Continued).

with the average of 20 years.—(Contd.)

RESULTS.						
Vapour required for saturation.	Humidity.	Weight of a cubic foot of air.	Mean velocity.	Clear sky.	Amount of ozone.	Rainy days.
+ .2	+ .02	+ .9	-31.52	+ .7	+ .4	...
+ .6	- .03	+ .2	-33.51	+ .3	+ .4	...
+ .6	- .05	+ .8	-34.99	-1.0	+ .4	...
+ .5	- .02	- .9	+1.32	- .6	...	- .5
+ .5	- .03	...	+7.80	- .2	+ .6	-2.4
- .1	- .01	- .6	-15.72	+ .1	+ .5	+ .3
- .6	+ .05	...	-20.21	- .6	- .4	+3.3
...	- .01	- .2	-3.15	-1.7	+ .1	-2.5
- .4	+ .04	- .3	-23.32	- .3	+ .3	+6.8
- .3	- .06	+ .6	-24.25	+ .8	- .6	+8.8
+ .1	+ .01	- .8	-8.94	- .7	- .8	-2.17
- .1	...	- .4	+10.52	- .3	-1.7	+ .45
+ .1	...	+ .1	-14.54	- .6	- .1	+4.16
						+1.6

TABLE XII.

Monthly Oscillations of the Pressure of Air for each month of 20 years.

YEARS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
1870	375	298	314	338	455	383	330	351	371	235	1349	321	429
1871	370	296	308	339	449	382	325	351	416	351	250	312	329
1872	318	300	327	340	429	384	352	364	391	432	299	314	392
1873	285	284	243	319	322	344	337	425	326	265	339	403	344
1874	315	373	373	271	324	432	314	317	333	368	307	281	339
1875	336	330	356	437	367	432	349	335	446	289	270	274	343
1876	347	373	378	395	320	291	272	241	444	1141	313	265	335
1877	292	432	322	303	340	369	299	241	381	288	339	327	335
1878	464	308	427	343	319	329	427	333	395	325	400	401	408
1879	294	397	317	283	462	248	332	364	406	417	360	223	342
1880	454	368	442	294	445	230	305	346	347	536	268	296	356
1881	247	355	303	347	504	344	310	386	345	539	369	241	355
1882	323	338	417	382	473	400	282	389	426	376	404	408	379
1883	415	313	299	228	367	368	380	421	401	370	368	469	384
1884	347	249	279	299	399	355	402	370	413	471	373	273	343
1885	280	325	313	245	285	376	376	382	363	294	375	215	383
1886	366	369	386	381	361	449	419	434	393	432	237	233	383
1887	334	331	370	375	453	378	344	380	487	307	267	249	389
1888	346	412	412	382	447	278	283	283	430	384	267	273	382
1889	280	293	457	344	399	304	388	388	343	343	269	269	388
Mean	323	309	323	323	410	340	340	340	340	340	340	340	340

TABLE XIII.

Mean Barometric Oscillations for Summer and Winter for 20 years.

YEARS.	Summer.	Winter.	YEARS.	Summer.	Winter.
1870	375	482	1880	326	386
1871	354	305	1881	373	336
1872	385	340	1882	375	382
1873	369	320	1883	379	349
1874	340	338	1884	349	338
1875	377	309	1885	343	314
1876	318	473	1886	382	369
1877	341	329	1887	389	350
1878	374	436	1888	375	345
1879	348	335	1889	400	387

TABLE

The Mean, Maximum, and Minimum Temperature

MONTHS.	1870.		1871.		1872.		1873.		1874.	
	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.
January	84.5 70	78.7	82.7 67.7	76	82.5 70.5	77.1	81.5 65	75.8	83 68	75.5
February	83.8 70	78.1	82.5 70	79.4	82 71.5	79.9	81.8 72	79.1	80.5 72.5	79.3
March	90.2 71	82.2	83.5 76	83.8	90 75	84.1	90.8 77	81.9	87.7 74.8	82.4
April	90.5 79	85.8	92.5 79.4	86.1	92 82	87.1	94.5 86	88.2	94 81	85.8
May	102.1 84	89.3	96.8 81.6	87.7	105 84	90.5	98.6 83	90.2	98 83.5	87
June	93.7 79	86.8	94.9 80.5	87.3	92.3 78	86.7	98.3 85	90	98 81	88.8
July	92 78	84.8	92.7 79.5	85.3	89 79	83.7	92 77	84.1	92.7 79	85.4
August	91.2 81	85.9	92.5 81.6	86.4	89 80.5	84.2	90 80	85.1	91 80.5	85.8
September	89.8 80.5	84.4	92.5 81	85.7	89 80	83.9	90 79.5	84.9	89.2 81	85.1
October	89 78	82.6	92 77.1	86	97.2 77.6	81.5	95 72	81	90 78	83.1
November	86.2 72.5	80.2	87.7 75	82.2	85 74	79.8	82.5 71	77.6	84 74	79.7
December	82 65.8	74.9	82.7 71	79	83 65.8	79.3	80.3 65	75.1	79.7 68	72.9
Each year's extremes and mean	102.1 65.8	82.2	96.8 67.7	82.7	105 65.8	83.8	98.6 65	82.5	98 65	82.7

XIV.

of Air for each month of the year, and for 20 years.

1875.		1876.		1877.		1878.		1879.		1880.	
Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.
82 65	74.8	83 67	74.9	81 65	75.4	84 72	78.5	81.5 65	75.2	81.5 64.2	75.1
83.3 68	76.5	87 69	78.6	83 72.4	78.4	92 74	82.5	87.8 69.8	78.3	86.2 70.3	78.7
86.5 73	82.3	90.6 77	83.8	88 72	82.5	91 79	84.9	94 79	75.1	89.5 74.5	82.5
91.5 81.5	86.2	90.8 82	86.6	91.5 79.7	85.5	90.7 82.5	86.6	94 81.5	87.1	90.5 82.2	86.4
91.7 81.5	86.6	92.2 81.5	88.5	100.5 79.6	87.5	95.3 81.8	88.4	94.2 80.2	86.6	92.5 81.8	87.4
93 80	87	95.5 82	87.9	95.3 84	88.7	99 82.7	90.8	95.5 79.8	86.9	96.2 80	87
94 78.2	85.2	93.5 78.7	85.9	97 82	86.2	91.2 79.3	85.5	92 80	85.1	91 79	84.6
92.5 80	85.2	90.7 78.5	85.1	94 81.6	86.9	89.8 81	84.2	91.2 79.5	84.8	91.4 80	84.8
89.7 78	83.4	89 79.2	83.9	89.5 80.3	85	91 82.2	85.9	92.3 80	85.5	95.5 80.5	84.4
89 76.5	82.5	87 76.2	82	89.5 79	84.9	89 77	83.8	89.2 79.3	83.8	89.5 79	83.7
84 69	78.3	85 68.7	77.9	85.7 73	80.6	88.6 73.5	80.5	85.6 63	79	82.8 73	78.5
80.7 65	75	79 65	73.4	84 68.7	79.2	85.5 69.5	76.6	80.2 60.8	73.5	80.5 67	74.6
94 65	81.9	95.5 65	82.4	100.5 65	83.8	99 69.5	83.9	95.5 60.5	82.6	98.2 64.2	82.4

TABLE
The Mean, Maximum, and Minimum Temperature of

MONTHS.	1881.		1882.		1		1884.	
	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.
January	81.8 63	74.5	83.7 68.7	76.5	80.3 68	75.3	79 67.3	78.1
February	90.3 64	77.7	85 68.2	79.6	91 70.8	79.3	83.5 69	78
March	93 75	83.1	92 75.2	83.9	89.5 77.3	83.6	89.5 76	82.9
April	93 81.3	86.6	91 81.7	86.3	89.8 81.5	86.1	94.6 80.5	85.5
May	93.5 82.2	87.5	94.8 79.7	87.7	94.6 83.8	88.7	96.2 81.0	87.8
June	94 82.7	86.9	96.3 83	88.6	95.5 81	87.4	95.3 81.4	87.4
July	95 81	85.5	92.3 78.4	85	92.3 80.4	86.5	93.6 79.8	85.8
August	92 80.7	85.5	92.2 81.8	85.6	91.5 79	85	93.5 79.5	85.4
September	92 81.6	85.5	91.5 80	84.5	90.2 76.5	84.8	90.8 78.7	84
October	90 75.5	84.3	90.2 74.8	83.8	89 78.4	83.6	87.6 74.4	82.6
November	85.5 72.5	80.3	85 74.5	79.5	83.2 67	79.8	83.5 70	77.9
December	80.2 62	74.8	79.5 66.5	74.4	79.6 62	72.8	80.8 65.5	75.4
Each year's extremes and mean	95 62	82.7	96.3 66.5	83	95.5 62	82.5	96.2 65.5	82.2

XIV.—(Continued.)

Air for each month of the year, and for 20 years.—(Contd.)

1885.	1886.	1887.	1888.	1889.	YEARS.	
Extremes.	Mean.	Extremes.	Mean.	Extremes.	Mean.	Extremes.
81.8 65.5	76.2	81.8 65.5	74.3	82.3 68	76.2	81.8 65.5
83.6 73	73.3	83.5 69.7	78.5	88 69.5	87 71.5	80.4
82.6 75	82	87.8 77.3	83.4	87.8 77.8	90.8 75	83.7
81.4 69	80.5	90 81.5	85.9	91.8 80	92.6 81.6	86.9
83.7 82.8	87.8	93 81.5	86.9	97.5 82	101.1 78.2	88.4
95 80	87.2	92.8 82.8	86.4	94 80.5	100.7 80.1	89.8
94.7 79.5	85.5	92.4 79	85.1	91 77.5	94.7 78.1	85.9
93.5 81.6	85.9	92 79.5	84.8	91.8 80	92.8 78.8	86.4
90.5 81.8	85.7	90.8 82	86	90 82.2	92 78.7	86.8
88 77	83.1	86.7 78	82.7	90.2 76.5	92.1 72.1	84.8
85.3 69	79.5	85.7 73.5	79.8	84.4 68.5	84.8 65.7	79.4
82 66.5	76.6	82.3 65	74.6	80.7 65.8	82.3 59.5	75.1
95 66.5	82.9	93 65	82.4	97.5 65.8	101.1 59.5	83.6
						96.8 60
						82.9
						95.7 65.1
						82.8

TABLE XV.

Normal Daily Temperature at Visagapatam (from 20 years Mean of four observations daily at intervals of six hours.)

DATES	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1st	74.8	76.8	81.9	84.8	87.5	88.4	86.1	85.6	84.7	84.9	80.6	76.3
2nd	74.9	76.9	81.7	85	87.6	88.7	85.7	85.4	84.5	84.7	80.5	76.3
3rd	75	77	81.7	85.3	87.6	89	85.2	85.5	84.7	84.7	80.7	76.3
4th	75.1	77.4	81.6	85.4	87.3	89.1	85.3	85.9	85.2	84.5	80.7	76.3
5th	75.5	77.6	81.6	85.4	87.4	88.8	85.6	85.9	85.1	84.6	80.3	76
6th	75.6	77.7	81.8	85.3	87.5	88.4	85.6	85.7	84.7	84.7	80.6	75.9
7th	75.6	77.9	81.8	85.4	87.5	88.3	85.4	85.4	84.8	84.8	80.9	75.8
8th	75.8	77.8	82.1	85.5	87.9	88.4	85.6	85.9	85.2	84.8	80.8	76
9th	75.1	78	82.1	85.6	87.7	87.9	85.2	85.7	85.4	84.1	80.7	75.7
10th	75	78.3	82.5	86	88	88.2	85	85.4	85.5	83.8	80.4	75.6
11th	74.8	78.5	82.7	86.1	88.2	88.3	85.1	85.5	85.5	83.7	80.4	75.6
12th	74.6	78.8	82.8	86.6	88	88.4	84.6	85.6	85.6	83.7	80	75.7
13th	75	79.2	83.1	86.6	88	88.3	84.2	85.4	85.4	83.4	79.7	75.3

14th	75.1	78.8	83.5	86.8	87.9	87.9	87.9	84.4	86.5	84.9	83.2	79.5	75.5
15th	75.4	79.3	83.4	86.8	87.7	87.9	88.2	85	84.7	84.7	83.4	79.1	75.5
16th	75.4	79.2	83.4	86.2	87.9	88	88.4	85.1	85.1	84.9	83.1	78.9	75.5
17th	75.5	79.2	83.6	86.3	88	88	88.4	85	85.4	84.2	83.2	78.8	75.3
18th	75.8	79.2	83.4	86.2	88.4	88.4	87.9	85.4	85.4	84.1	83.2	78.6	75
19th	76	79.2	83.5	86.4	88.2	88.2	87.2	85.4	85.5	85.1	83.1	78.5	74.3
20th	76.2	79.3	83.8	86.4	88.5	88.5	87.1	85.3	85.6	84.9	83	78.9	74
21st	76.4	79.6	84	86.4	88.3	88.3	86.3	85.3	85.6	84.8	82.8	78.8	73.8
22nd	76.5	80	84.2	86.6	88.2	88.2	86.9	85.2	85.4	84.8	82.9	78.4	74.1
23rd	76.1	80.2	84.3	86.8	88	88	86.8	84.9	85.3	85	82.7	78.3	74.1
24th	76.2	80.3	84.2	86.8	88	88	87.1	84.3	85.4	85.2	82.6	78.2	74.2
25th	76.3	80.7	84.5	87	88.1	88.1	86.2	84.7	85.6	84.9	82.3	78.2	73.9
26th	76.4	80.9	84.7	87	88.5	88	86	85.1	85.4	85	82.4	78	74.0
27th	76.4	81	84.6	87.4	88.3	88.3	86	85.5	85.2	84.9	82.3	77.8	74.1
28th	76.6	81.6	84.7	87.4	88.2	88.2	86	85.6	84.7	84.6	82.1	77.2	74.3
29th	76.6	...	85	87.9	88.5	88.5	85.6	85.6	84.7	84.6	82	76.5	74.2
30th	76.8	...	84.9	87.4	88.5	88.5	86	85.7	84.7	84.8	81.6	76.4	74.4
31st	77.1	...	84.8	...	88.2	88.2	...	85.8	84.8	...	80.9	...	75.6
Mean	75.7	78.9	83.3	86.3	88	87.6	85.2	85.4	85	83.3	79.2	75.1	
Mean of first 10 days	75.2	77.5	81.9	85.4	87.6	88.5	85.5	85.6	85	84.5	80.7	76	
Mean of second 10 days	75.4	79	83.3	86.5	88.1	88	85	85.5	85.1	83.3	79.2	75.3	
Mean of remaining days	76.5	80.5	84.5	87.1	88.3	88.3	85.2	85.2	84.9	82.2	77.8	74.2	

(120)

Adopted Mean Temperature

YEARS.	January.	February.	March.	April.	May.
1870					
1871	78.6	77.9	82	86.7	87.2
1872	76	79.4	83.9	88	87.4
1873	77	79.9	84.1	87.1	86.9
1874	75.9	79	82.8	86.3	86.2
1875	75.2	79.2	82.8	86.6	87
1876	74.7	78.3	82.4	86.2	86.9
1877	74.6	78.5	83.8	86.6	86.6
1878	76.1	78.4	82.4	85.4	87.3
1879	78.3	82.3	84.5	86.5	86.5
1880	75.1	78.3	85.1	87.1	86.5
1881	75.1	78.7	82.5	86.4	87.4
1882	74.2	77.6	83.2	86.7	87.5
1883	78.3	79.4	83.9	87.4	87.6
1884	76.1	79.1	83.4	88	88.0
1885	73.6	77.9	82.9	85.4	87.6
1886	76	79.1	81.9	86.5	87.7
1887	74	78.2	85.6	85.8	87
1888	76	78.4	83	86.4	86.9
1889	75.5	80.1	85.8	86.7	87.9
1890	73.7	78	82.5	86.6	86.5
Mean	75.5	78.2	83.2	86.9	87.2

(121)

XVI.

each month of 20 years.

June.	July.	August.	September.	October.	November.	December.	Year.
86.8	84.9	86	84.5	82.8	80.3	74.2	81.9
87.4	85.3	86.4	85.8	86	82.2	79.2	83.7
86.7	83.8	84.3	83.9	81.8	79.7	76.3	82.6
90.1	84.3	85.2	85	81.1	77.4	75	82.5
85.8	85.2	85.3	85.1	83.1	78.6	72.5	82.1
87.1	85.4	85.4	83.5	82.5	78.1	74.8	81.9
88	86	85.2	84	81.9	77.7	73	82.3
88.7	88.2	86.9	85	85	80.4	79	83.5
89.9	85.6	84.3	86.1	83.9	80.5	76.7	83.9
87.1	85.1	85	85.6	83.9	79	73.4	82.6
87	84.7	84.8	84.6	83.8	78.8	74.8	82.4
87	85.6	85.7	85.5	84.1	80.2	74.4	82.7
88.7	85.1	85.7	84.5	83.8	79.5	74.3	83
87.4	85.5	85.8	84.9	83.6	76.7	72.7	82.4
87.4	85.8	85.4	84	82.6	77.9	75.4	82.2
87.3	85.6	85.9	85.6	83.2	79.4	76.5	83.1
86.6	85.2	84.9	86.2	82.8	79.0	74.5	82.4
86.7	84.2	85.4	85.7	83.2	78.7	75.1	82.6
89.2	85.2	85.9	86	83.6	78.6	73.8	83
88	84.4	84.6	84.4	82.2	77.8	72.9	82.2
87.6	85.3	85.4	85	83.2	79.1	74.9	82.7

TABLE XVII.

Normal Daily Temperature of Evaporation at Visagapatam.

Dates.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1st	66.9	66.7	72.9	76.5	78.2	80.5	78.2	78.1	78.3	78.4	77.9	66.2
2nd	66.6	66.9	72.8	76.5	79.3	80.1	78.3	78.1	78.2	78.1	77.2	67.3
3rd	66.8	66.5	72.7	76.5	79.3	80.2	78.3	78	78.3	77.9	73.5	68
4th	67.5	66.8	72.7	76.8	78.9	80.5	78.2	78.3	78.3	77.9	73.5	67.9
5th	68	69.8	73.1	76.8	78.9	80.2	78.1	78.7	78.4	78.1	73.1	67.6
6th	67.8	69.9	72.9	77	79.2	80.2	78.2	78.3	78.4	77.9	72.9	67.6
7th	67.4	70.1	73.4	77	79.2	80.1	78.2	78.1	78.3	77.6	72.5	67.7
8th	67.3	69.8	73.9	77.1	79.3	79.7	78.3	78.4	78.3	77	72.5	67.4
9th	67.2	69.7	73.7	77.6	79.6	80.5	78.3	78.4	78.3	77	72.5	67.4
10th	66.9	70	73.5	77.9	79.2	79.7	78.3	78.4	78.3	77	72.5	67.4
11th	66.8	70.5	73.2	78.1	79.1	79.5	77.7	78.5	78.5	77.7	72.4	67.7
12th	67	70.9	73.5	78.1	80.1	79.5	77.7	78.5	78.5	77.7	72.4	67.7
13th	67.2	70.9	73.8	78.1	79.8	79.5	77.7	78.5	78.5	77.7	72.4	67.7
14th	67.4	70.9	73.8	78.1	79.8	79.5	77.7	78.5	78.5	77.7	72.4	67.7

15th	67.8	70.8	74.4	78	79.6	79.2	77.7	78	78.2	77.1	70	67.1
16th	68	71.2	74.9	77.8	80	79.1	77.8	77.9	78.3	76.7	70	67.2
17th	68.2	71.4	75.3	77.9	80	78.8	77.6	77.6	78.2	76.7	69.9	66.9
18th	68.6	71.5	75.1	78.1	79.7	79.2	77.7	78.2	78.5	76.5	69.6	66.6
19th	68.3	71	75.7	78	79.6	78.9	77.7	78.1	78.5	76.3	70	65.7
20th	68.5	70.9	75.9	78	80.1	78.3	77.4	78.2	78.5	76.3	70.6	65.3
21st	68.3	70.7	75.8	78	80.2	78.6	77.5	78.2	78.6	75.9	70.2	65.5
22nd	68.6	70.9	75.6	78.2	80.4	78.4	77.7	78.2	78.6	75.7	69.5	65.3
23rd	68.5	71.2	75.7	77.9	80.4	78.4	77.7	78.3	78.4	75.2	69.5	65
24th	68.4	71.3	75.8	78.1	80	78.3	77.2	78.6	78.3	75.4	70.1	65.4
25th	68.3	71.7	75.8	78.4	80.2	78.1	77.5	78.5	78.2	75.6	70.3	65.7
26th	68.5	72	76.5	78.8	80.6	77.9	77.8	78.4	78.2	75	70.1	65.7
27th	68.5	72.5	76.4	78.7	80.3	78.1	77.8	78.4	78.2	74.6	69.4	65.8
28th	69	72.4	76.5	78.9	80.8	78.1	77.6	78.4	78.3	74.5	69	66.1
29th	68.9	...	76.8	79	80.4	78.4	77.8	78.4	78.5	73.9	68.1	66.5
30th	69	...	76.4	79	80.2	78.3	78	78.6	78.8	73.6	68	66.6
31st	69.3	...	76.4	...	80.1	...	78.1	78.3	...	73.8	...	66.5
Mean	67.9	70.7	74.7	77.9	79.8	79.2	77.8	78.3	78.4	76.3	71.1	66.8
Mean of first 10 days	67.2	69.6	73.2	77	79.2	80.1	78.2	78.3	78.4	77.8	73.4	67.7
Mean of second 10 days	67.8	71	74.6	78.1	79.8	79.2	77.7	78.3	78.5	76.6	70.7	66.9
Mean of remaining days	68.7	71.6	76.2	78.5	80.3	78.3	77.7	78.4	78.4	74.8	69.4	65.8

TABLE

Mean Monthly and Annual Temperature

YEARS.	January.	February.	March.	April.	May.
1870	70.4	69.0	73.4	77	79.8
1871	68.8	72.1	74.4	78.6	80.1
1872	68.9	71.5	75.9	78.3	81.3
1873	68.2	71.2	74.7	78.4	79.8
1874	68.2	71.2	74.8	77.6	79.7
1875	67.6	68.8	75	78.6	79.4
1876	68.8	70.3	78.5	79.1	81.3
1877	68.6	72.1	74.8	77.6	80
1878	70.2	73.6	76.1	77.8	79.7
1879	66.6	70.2	76	78.7	79.1
1880	67.7	70.7	74.1	78.4	79.4
1881	65.6	67.5	73.4	77.8	79.8
1882	68.9	71.4	73.7	77.3	79.4
1883	67.6	70.3	74.7	77.5	80.3
1884	65.7	70.3	74.1	78.3	79.3
1885	68.8	71.2	73.6	77.2	78.3
1886	66.7	70.4	74.8	77.4	79.5
1887	68.7	70	74.9	76.8	80.4
1888	67.8	71.4	74.6	78.3	79.1
1889	67	70.5	73.8	78.4	79.9
Mean	67.9	70.7	74.7	77.9	79.8

64

XVIII.

of Evaporation at Vizagapatam.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
79.7	77.4	78.7	78.3	77.7	77.7	76.4	75.4	74.4	73.4	72.4	71.4	70.4
79.3	78.3	79.5	79	76.7	73.2	70.7	75.9	75.8	75.4	75.1	75.1	75.1
79.8	78.1	78.8	78.9	76.3	72.7	69.5	75.8	75.4	75.4	75.4	75.4	75.4
80.7	77.8	78.8	78.3	75.4	69.7	67.9	75.1	75.4	75.4	75.4	75.4	75.4
78.5	78.5	78.3	79.2	77.9	70.8	64.8	75	78.9	77.6	78.2	78.1	76.1
78.9	77.6	78.2	78.1	76.1	69	60.8	74.6	79.9	78.1	78.6	78.1	74.4
79.9	78.1	78.6	78.1	74.4	68.4	64.9	75	79.9	79.4	78.5	78.7	77.6
79.9	79.4	78.5	78.7	77.6	72.3	71.2	75.9	81.3	78.8	78.8	79.3	77.3
81.3	78.8	78.8	79.3	77.3	73.6	68.8	76.3	79	78.5	77.7	78.5	76.5
79	78.5	77.7	78.5	76.5	71	64.8	74.7	78.9	74.5	78.3	77.3	77.1
78.9	74.5	78.3	77.3	77.1	72	66.9	74.9	79.2	77.6	78.4	78.6	74.7
79.2	77.6	78.4	78.6	74.7	71.5	66	74.2	77.9	77	78.2	78.2	75.6
77.9	77	78.2	78.2	75.6	71.9	66.5	74.7	78.1	77	78.2	77.6	76.4
78.1	77	78.2	77.6	76.4	68	63.4	74.1	79	76.8	77.7	77.6	75.4
79	76.8	77.7	77.6	75.4	68.2	66.6	73.9	78.2	77.5	77.5	78.5	76.2
78.2	77.5	77.5	78.5	76.2	70.1	69	74.7	78.9	78.2	78.7	79	77.9
78.9	78.2	78.7	79	77.9	72.4	67.2	75.1	78.5	77	77.9	78.1	75.7
78.5	77	77.9	78.1	75.7	71.3	65.4	74.6	79.2	77.4	77.6	78.2	75.3
79.2	77.4	77.6	78.2	75.3	72.5	65.7	74.8	79.9	78.9	78	79.5	77.7
79.9	78.9	78	79.5	77.7	71	65.8	75	79.2	77.7	78.3	78.5	76.4
79.2	77.7	78.3	78.5	76.4	71.4	66.8	75.0					

TABLE XIX.

Normal Daily Depression of Wet below Dry Bulb Thermometer for 20 years.

D A T E S.		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1st	...	79	81	90	83	83	79	79	75	64	65	70	81
2nd	...	83	80	89	85	83	86	74	73	63	66	73	85
3rd	...	82	75	90	88	83	88	69	75	64	68	72	83
4th	...	76	76	91	86	84	86	71	76	65	66	72	84
5th	...	75	78	85	86	85	86	75	72	67	65	72	84
6th	...	78	78	86	83	83	82	73	73	63	67	77	83
7th	...	82	78	84	84	83	82	72	73	65		74	81
8th	...	85	80	82	84	86	87	73	75			72	86
9th	...	79	83	84	80	81	84	71	71	7		73	84
10th	...	81	83	90	81	88	85	73	73	71		74	74
11th	...	80	80	95	80	91	84	73	72	70		80	
12th	...	76	79	94	85	79	84	69	71	67	73	84	79
13th	...	78	80	93	87	82	88	66	67	68	72	77	79
14th	...	77	80	98	84	83	86	67	81	66	65	90	85

15th	...	...	...	...	7.6	8.5	9.0	8.8	8.1	9.0	7.3	8.7	6.5	6.3	9.1	8.1
16th	...	...	...	...	7.4	8.0	8.5	8.4	7.9	9.0	7.4	7.2	6.6	6.4	8.9	8.4
17th	...	...	...	...	7.3	7.8	8.3	8.4	8.9	9.6	7.4	7.2	6.5	6.6	8.9	8.3
18th	...	...	...	...	7.2	7.7	8.3	8.1	8.7	8.7	7.7	7.2	6.6	6.7	9.0	8.4
19th	...	...	...	...	7.7	8.2	7.8	8.4	8.6	8.3	7.7	7.4	6.8	6.8	8.5	8.4
20th	...	...	...	...	7.7	8.4	7.9	8.4	8.4	8.9	7.9	7.4	6.4	6.7	8.3	8.6
21st	...	...	...	...	8.1	8.9	8.2	8.4	8.1	7.7	7.8	7.4	6.2	6.9	8.6	8.7
22nd	...	...	...	...	7.9	9.1	8.6	8.4	7.8	8.5	7.5	7.2	6.2	7.2	8.9	8.3
23rd	...	...	...	...	7.6	9.0	8.6	8.9	7.6	8.4	7.2	7.0	6.6	7.5	8.8	8.8
24th	...	...	...	...	7.8	9.0	8.3	8.7	8.0	8.8	7.1	6.8	6.9	7.2	8.1	9.1
25th	...	...	...	...	8.0	9.0	8.7	8.6	7.9	8.1	7.2	7.1	6.7	6.7	7.9	8.8
26th	...	...	...	...	7.9	8.9	8.2	8.2	7.9	8.1	7.3	7.0	6.7	7.4	7.9	8.2
27th	...	...	...	...	7.9	8.5	8.2	8.7	8.0	7.9	7.7	6.8	6.7	7.7	8.4	8.3
28th	...	...	...	...	7.6	9.2	8.2	8.5	7.4	7.9	8.0	6.3	6.3	7.6	8.2	8.3
29th	...	...	...	...	7.7	...	8.2	8.9	8.1	7.2	7.8	6.3	6.1	8.1	8.4	8.2
30th	...	...	...	...	7.8	...	8.5	8.4	8.3	7.7	7.1	6.1	6.0	8.0	8.4	7.7
31st	...	...	...	...	7.8	...	8.4	...	8.1	...	7.7	6.5	...	7.1	...	7.8 9.1
Mean	...	...	...	...	7.8	8.3	8.6	8.5	8.2	8.4	7.4	7.1	6.5	7.0	8.1	8.4
Mean of first 10 days	...	...	...	...	8.0	7.9	8.7	8.4	8.4	8.5	7.3	7.4	6.6	6.7	7.3	8.3
Mean of second 10 days	...	...	...	...	7.6	8.1	8.8	8.4	8.3	8.8	7.3	7.2	6.6	6.8	8.6	8.3
Mean of remaining days	...	...	...	...	8.6	9.0	8.4	8.6	7.9	8.0	7.5	6.8	6.4	7.4	8.4	8.4

TABLE XX.

Mean Monthly and Annual Depression of Wet below Dry Bulb Thermometer for 20 years.

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
1870	6.8	6.5	6.8	8.3	9.6	1.3	7.4	7.7	6.1	4.9	2.5	8.2	7.5
1871	7.7	6.2	9.4	7.5	7.9	8.0	7.0	6.7	6.7	9.3	9.0	8.2	7.8
1872	8.2	6.8	8.2	8.8	8.2	6.9	5.6	5.4	5.0	5.3	7.1	6.8	7.0
1873	7.6	7.9	8.2	7.8	8.4	9.3	6.3	6.3	6.8	5.6	7.9	7.2	7.4
1874	7.1	7.8	7.9	8.0	7.3	7.3	6.6	7.0	5.9	5.2	7.9	7.3	7.2
1875	7.2	7.7	8.1	7.6	7.2	8.1	7.6	7.0	5.3	8.4	9.3	8.2	7.4
1876	6.8	6.3	7.7	7.5	7.6	8.0	7.8	6.5	5.8	7.6	9.5	8.5	7.4
1877	8.3	8.9	8.5	7.9	7.5	8.8	8.6	8.4	6.3	7.3	8.3	8.0	7.7
1878	8.6	8.1	9.1	8.4	7.5	7.9	6.6	5.4	6.6	6.5	6.9	7.8	7.6
1879	7.4	8.0	8.4	8.0	8.0	8.1	7.2	6.5	7.1	6.6	8.0	8.7	7.9
1880	8.9	8.2	10.7	8.8	7.7	7.7	7.3	7.1	6.0	9.6	8.8	7.9	7.5
1881	7.6	8.2	9.7	8.6	8.3	10.7	8.0	7.4	6.3	8.2	7.6	8.8	8.5
1882	7.7	9.0	8.9	8.6	8.4	9.3	8.3	7.0	7.2	7.2	8.8	7.9	8.3
1883	8.0	7.7	8.8	9.2	8.5	8.4	9.0	7.7	6.4	7.3	8.0	8.4	8.1
1884	7.4	8.1	8.4	8.6	7.4	7.5	8.0	8.4	7.3	6.9	7.8	8.0	7.8
1885	7.5	8.8	8.6	8.5	8.7	8.1	7.5	8.1	7.9	4.8	8.4	8.4	8.1
1886	8.0	8.1	9.1	8.8	8.7	8.1	7.1	7.4	7.6	7.5	8.4	8.4	8.4
1887	8.0	8.1	9.1	8.8	8.7	8.1	7.1	7.4	7.6	7.5	8.4	8.4	8.4
1888	8.0	8.1	9.1	8.8	8.7	8.1	7.1	7.4	7.6	7.5	8.4	8.4	8.4
1889	8.2	8.1	9.0	8.9	8.8	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0

(123)

TABLE XXI.
Mean dew point for each month of 20 years.

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
1870	64	64	67	72	75	72	73	74	74	74	74	68	70
1871	63	63	67	72	75	73	74	75	74	73	73	68	71
1872	62	62	66	73	76	73	75	75	74	72	72	65	71
1873	62	62	67	73	75	74	74	74	74	71	64	63	70
1874	63	63	68	74	76	74	74	74	74	74	66	62	71
1875	61	61	65	71	75	74	73	74	74	73	63	61	70
1876	65	65	67	73	76	74	73	73	73	73	67	65	71
1877	65	65	68	74	77	74	74	75	75	73	69	63	71
1878	60	60	64	70	74	74	74	73	73	72	66	58	70
1879	62	62	66	73	76	74	73	74	74	72	67	61	70
1880	59	59	61	68	72	75	73	74	74	73	66	58	70
1881	64	64	68	73	76	74	74	74	74	73	67	61	70
1882	62	62	66	72	75	72	72	74	74	72	67	61	70
1883	62	62	66	72	75	74	72	74	74	72	67	61	70
1884	60	60	63	71	75	74	71	73	73	71	62	57	69
1885	64	64	68	73	76	74	73	74	74	72	64	64	70
1886	61	61	65	70	73	73	73	73	74	72	64	62	71
1887	63	63	67	72	75	74	74	74	75	75	68	58	71
1888	62	62	66	73	76	74	73	73	73	73	67	59	69
1889	61	61	65	73	74	75	75	74	76	75	66	60	70
Mean	62	65	70	73	75	74	73	74	74	72	66	61	70

(129)

TABLE

Mean Relative Humidity (per cent.)

YEARS.	January.	February.	March.	April.	May.	June.
1870						
1871	'64	'64	'65	'65	'65	'66
1872	'67	'68	'62	'70	'71	'69
1873	'63	'64	'67	'68	'68	'73
1874	'66	'66	'66	'69	'68	'66
1875	'67	'65	'68	'67	'71	'70
1876	'66	'65	'70	'70	'71	'68
1877	'68	'63	'70	'70	'72	'69
1878	'69	'72	'68	'68	'71	'67
1879	'65	'64	'68	'68	'67	'69
1880	'62	'65	'64	'68	'71	'68
1881	'66	'66	'66	'69	'68	'68
1882	'60	'57	'62	'66	'70	'70
1883	'67	'66	'60	'65	'68	'60
1884	'65	'63	'65	'66	'67	'64
1885	'63	'67	'65	'64	'67	'67
1886	'67	'66	'65	'64	'64	'66
1887	'66	'66	'65	'66	'71	'70
1888	'67	'64	'67	'66	'67	'69
1889	'65	'63	'63	'66	'65	'61
	'63	'62	'60	'65	'66	'67
Mean	'65	'65	'65	'67	'68	'68

XXII.

for each month of 20 years.

July.	August.	September.	October.	November.	December.	Year.
'70	'71	'75	'79	'68	'58	'68
'72	'72	'73	'64	'63	'64	'68
'77	'77	'78	'75	'70	'69	'71
'74	'74	'73	'75	'65	'67	'69
'73	'71	'76	'76	'66	'64	'69
'69	'72	'77	'73	'60	'62	'69
'69	'73	'76	'69	'59	'61	'68
'66	'67	'74	'70	'65	'65	'69
'74	'78	'74	'73	'71	'65	'69
'73	'72	'72	'71	'66	'60	'68
'71	'74	'72	'73	'71	'64	'69
'70	'72	'72	'63	'64	'61	'66
'68	'70	'74	'67	'68	'64	'67
'67	'70	'71	'70	'62	'57	'66
'65	'69	'74	'70	'58	'61	'66
'69	'68	'72	'72	'61	'66	'67
'73	'75	'72	'80	'69	'66	'70
'71	'71	'70	'70	'68	'56	'67
'67	'66	'67	'63	'70	'58	'65
'76	'71	'77	'78	'67	'63	'68
'72	'71	'73	'72	'66	'63	'68

TABLE XXIII.

Normal Daily Elastic Force of Aqueous Vapour at Vizagapatam.

DATES.	DATES.											
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1st	541	577	659	763	837	882	815	820	844	846	796	585
2nd	529	583	658	760	840	857	827	824	843	835	690	551
3rd	536	602	655	755	840	857	836	817	844	826	700	538
4th	538	608	654	765	828	870	830	824	855	828	700	535
5th	538	606	671	765	826	881	820	843	843	837	689	548
6th	561	607	664	776	837	868	829	832	849	827	678	549
7th	548	611	680	774	837	865	828	824	843	821	687	555
8th	541	603	685	777	835	844	820	829	809	799	703	541
9th	548	585	687	707	832	845	827	841	833	819	696	542
10th	539	601	674	804	828	847	813	824	823	802	682	543
11th	538	617	659	811	820	837	815	831	841	785	661	558
12th	546	628	668	803	870	835	818	839	855	773	635	539
13th	540	626	675	800	856	837	819	862	847	769	635	549

14th	555	625	667	814	849	835	821	819	841	794	603	549
15th	563	617	686	795	862	824	813	830	840	809	591	538
16th	570	633	715	796	867	822	813	820	841	788	593	542
17th	575	640	729	800	865	803	808	828	855	794	592	535
18th	586	644	722	816	844	836	808	828	848	785	593	539
19th	572	625	746	802	843	830	801	822	848	771	586	539
20th	577	620	751	802	861	804	794	824	851	779	615	561
21st	568	609	745	802	870	831	780	824	838	767	612	569
22nd	576	610	733	807	880	813	809	828	838	756	583	560
23rd	578	618	735	807	884	814	814	835	845	738	584	491
24th	573	620	745	800	865	804	799	847	836	748	606	562
25th	580	631	737	810	873	810	808	839	837	763	613	514
26th	575	638	764	828	885	804	815	838	840	735	609	513
27th	575	656	760	817	874	813	808	841	837	721	588	515
28th	589	644	764	826	889	813	797	849	846	720	581	521
29th	586	...	772	821	875	834	806	849	856	697	559	535
30th	586	...	756	830	866	822	813	859	867	691	559	536
31st	584	...	738	...	866	...	817	843	...	724	...	519
Mean	564	618	709	797	836	834	814	833	847	779	632	533
Mean of 1st 10 days	547	569	670	774	836	859	825	828	846	824	685	551
Mean of 2nd 10 days	563	628	703	803	833	828	811	829	847	785	613	537
Mean of remaining days	579	628	752	813	876	816	808	841	848	733	588	514

TABLE XXIV.

Mean Monthly and Annual Elastic Force of Aqueous Vapour for
20 years.

YEARS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
1870	631	620	687	686	887	871	839	882	886	883	893	494	782
1871	607	689	734	876	923	892	873	914	900	792	695	630	794
1872	586	659	784	830	936	923	885	911	919	832	708	630	904
1873	588	657	748	846	903	921	867	869	879	804	619	588	778
1874	585	655	760	838	914	875	885	873	917	885	647	510	780
1875	579	601	769	874	905	878	843	869	889	814	584	507	763
1876	540	629	813	891	970	912	836	889	883	749	567	502	768
1877	448	703	739	889	921	902	885	861	895	847	735	601	806
1878	426	708	785	834	896	933	894	911	911	848	651	497	763
1879	437	629	774	867	891	883	885	853	879	813	684	533	770
1880	579	643	729	863	895	878	841	880	845	695	628	512	709
1881	544	626	660	791	866	849	799	836	845	738	664	453	719
1882	587	634	662	773	843	761	772	821	812	775	622	467	708
1883	538	569	704	785	896	790	738	806	822	748	616	624	703
1884	516	616	690	742	837	830	798	788	857	773	609	599	719
1885	587	631	685	765	792	798	844	833	855	808	641	553	749
1886	540	613	711	783	864	844	833	863	855	760	641	487	717
1887	535	588	719	753	865	822	793	817	818	712	681	500	714
1888	538	623	699	801	817	800	783	784	804	642	632	516	740
1889	539	602	668	808	842	851	870	836	804	800	633	544	754
Mean	571	632	732	821	883	862	837	865	866	800	683	544	754

(134)

TABLE XXV.
Mean Cloud Proportion for each month of 20 years.

YEARS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
1870	1.2	0.8	2.0	3.2	4.0	5.2	6.9	6.4	5.2	5.4	2.0	1.7	3.8
1871	2.1	1.4	1.4	2.2	3.2	6.8	7.1	6.8	5.9	3.1	3.6	2.1	4.9
1872	1.3	1.3	1.3	2.6	3.7	6.0	6.3	6.6	4.6	5.8	3.9	2.0	3.8
1873	0.7	1.3	1.7	3.5	3.6	4.2	5.8	5.1	4.7	6.3	3.6	2.7	3.6
1874	0.7	1.5	1.7	3.7	3.7	5.8	6.4	5.9	5.6	5.2	2.2	2.4	3.5
1875	0.8	0.9	2.0	1.8	5.0	5.9	6.5	7.1	5.3	4.7	2.3	1.2	3.9
1876	0.8	4.4	2.3	2.0	3.9	6.0	6.4	6.4	6.3	4.4	2.8	2.2	4.2
1877	2.3	0.8	2.3	2.0	4.1	5.0	6.4	7.2	5.3	4.4	3.7	4.6	4.1
1878	1.1	1.3	1.6	1.8	4.6	5.5	5.7	5.7	5.5	4.2	4.1	1.5	4.0
1879	1.6	2.1	1.6	3.8	4.0	6.0	6.0	6.1	5.6	5.5	5.2	2.1	3.6
1880	0.9	0.5	2.0	2.7	3.8	6.0	7.5	6.2	6.3	4.2	5.4	2.2	3.9
1881	1.9	1.1	1.3	2.7	4.1	6.8	7.5	6.6	6.0	3.8	1.7	2.9	3.8
1882	1.3	0.7	0.7	2.7	3.3	6.8	7.0	6.2	6.0	3.8	2.0	2.8	3.8
1883	1.5	1.0	1.0	2.6	4.1	6.7	6.6	6.1	5.2	4.0	4.0	3.4	4.2
1884	1.8	2.7	2.1	1.7	3.6	6.7	7.2	7.2	5.6	5.5	3.0	2.5	4.0
1885	1.8	2.7	2.1	2.1	4.8	6.8	6.6	6.1	5.6	5.5	3.0	2.5	4.0
1886	1.8	0.6	2.3	1.4	4.8	6.2	7.6	6.8	4.9	5.1	3.9	3.1	3.9
1887	1.1	0.7	2.3	2.9	4.4	6.0	7.4	7.2	5.2	3.2	4.7	2.5	4.1
1888	2.6	1.1	1.5	3.1	4.4	5.8	7.4	8.1	5.8	6.4	4.1	2.8	4.4
1889	1.0	1.1	2.8	3.1	4.4	5.8	7.4	8.1	5.8	6.4	4.1	2.8	4.4
Mean	1.7	1.4	1.8	2.6	4.2	5.9	6.8	6.4	5.6	4.5	3.4	2.5	3.9

(135)

69

TABLE

Mean Velocity of the Wind

YEARS.	January.	February.	March.	April.	May.	June.
1870	47.79	39.21	47.61	67.68	69.35	34.50
1871	16.40	14.90	19.16	39.84	62.51	117.85
1872	61.98	76.09	105.33	124.33	128.11	139.68
1873	41.65	60.09	90.72	125.57	123.68	101.81
1874	36.08	73.05	89.54	126.24	126.39	115.83
1875	63.34	45.05	66.78	72.56	85.15	121.61
1876	53.28	68.29	114.98	135.35	114.62	113.61
1877	48.81	52.99	55.72	58.19	66.43	78.00
1878	42.90	49.77	63.51	72.28	70.20	58.84
1879	25.38	29.73	71.28	107.02	112.99	78.64
1880	46.01	49.11	96.05	106.71	104.43	96.61
1881	33.15	16.74	36.43	69.91	43.96	34.51
1882	38.55	41.29	46.23	67.15	60.87	100.27
1883	48.95	48.53	64.70	101.29	96.95	107.29
1884	48.96	50.01	81.61	108.83	120.21	113.51
1885	45.75	71.23	70.53	103.97	113.23	113.98
1886	37.53	36.05	69.47	99.00	49.28	66.64
1887	10.53	14.75	31.58	33.36	26.08	26.11
1888	17.43	17.28	24.54	58.51	41.19	59.09
1889	6.79	9.46	28.79	89.38	93.26	71.64
Mean	38.31	42.98	63.78	88.06	85.48	87.26

XXVI.

for each month of 20 years.

July.	August.	September.	October.	November.	December.	Year.
51.24	34.62	38.40	18.22	21.69	17.79	40.67
134.06	90.05	83.90	52.75	91.65	72.44	66.29
76.43	55.62	53.88	56.92	91.89	53.58	85.32
126.15	92.13	92.74	72.26	73.32	67.14	89.69
98.31	104.16	54.43	52.08	57.44	67.13	83.39
129.63	113.26	74.49	45.35	64.80	61.21	78.62
159.22	95.11	52.00	108.83	60.50	50.82	93.98
36.71	46.46	40.53	36.89	37.13	54.44	50.52
67.34	55.93	29.99	27.80	32.25	40.25	50.92
67.39	79.59	38.96	56.16	70.11	54.89	65.77
110.19	62.25	69.34	59.90	66.57	39.77	75.91
90.11	69.38	37.50	36.04	45.22	40.61	46.16
116.50	62.59	71.27	61.84	67.36	48.72	64.85
117.59	84.00	77.55	52.07	49.29	54.43	72.22
144.43	87.44	80.21	84.04	90.77	89.98	91.67
108.71	81.23	37.94	23.61	62.79	54.11	73.92
40.05	14.06	10.72	24.96	32.08	8.30	40.69
27.32	18.58	16.45	18.60	16.93	30.43	23.11
64.81	57.57	17.48	10.27	9.20	12.10	31.71
72.17	65.34	26.91	21.77	45.38	59.40	49.19
92.38	68.49	50.23	46.02	54.32	48.88	63.88

Rainfall for each day of the Month for the year 1889.

Dates.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1st							4	1	2	1		
2nd							1-1					
3rd							6			17		
4th							4	4	4	1		
5th										2		
6th										1		
7th										1		
8th									3	10		
9th							6			15		
10th												
11th							1-5					

[illegible]

TABLE XXVIII.
Normal Daily Rainfall at Vizagapatam.

DATES.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1st						.09	.23	.41	.19	.21	.33	.10
2nd					.01	.07	.30	.30	.37	.91	.45	
3rd			.03	.03	.08	.11	.30	.20	.29	.20	.10	.05
4th	.02	.03			.07	.14	.18	.03	.28	.35	.22	.05
5th		.01			.01	.32	.13	.16	.14	.49	.49	.03
6th		.01			.08	.09	.07	.25	.16	.16	.40	.46
7th					.02	.12	.11	.16	.23	.09	.08	.47
8th			.02		.03	.04	.18	.14	.08	.07	.09	.25
9th			.01		.05	.24	.25	.09	.29	.20	.10	.25
10th				.01		.05	.18	.23	.24	.44	.13	.04
11th		.01			.12	.23	.23	.28	.35	.13	.08	.05
12th	.03	.03			.05	.25	.22	.18	.14	.27	.03	

(140)

13th	.03	.05	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
14th	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05
15th	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
16th	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05
17th	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
18th												
19th												
20th												
21st												
22nd												
23rd		.01										
24th												
25th												
26th												
27th												
28th		.01										
29th		.04										
30th												
31st												
TOTAL	.31	.22	.37	.55	2.30	4.34	5.13	6.23	7.57	11.55	5.77	2.00

(141)

TABLE XXIX.
Monthly and Annual Rainfall at Vizagapatnam.

YEARS.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Decr.	Year.
1866	...	1.6	...	1.1	3.4	2.8	2.5	6.9	4.1	17.0	1.9	...	37.9
1867	...	...	...	1.8	3.6	8.6	6.5	7.6	9.1	17.7	5	...	54.3
1868	...	...	...	3	3.6	14.2	2.9	5.9	4.6	7.1	...	...	31.8
1869	...	...	...	1	8	10.9	6.6	10.7	4.6	7.1	...	...	43.6
1870	...	...	...	...	...	7.9	4.1	5.1	16.1	18.9	...	...	60.3
1871	...	...	...	...	...	3.1	2.3	3.7	3.2	3	...	...	27.3
1872	...	...	...	...	...	6.0	9.2	8.8	7.6	13.2	...	...	40.53.9
1873	...	...	...	...	...	1.9	9.2	10.2	3.7	17.6	...	...	44.52.2
1874	...	...	...	...	...	3.0	4.7	3.1	9.8	21.0	...	...	47.0
1875	...	...	...	...	...	1.1	3.4	3.3	9.9	9.0	...	...	29.0
1876	...	...	...	...	...	1.5	3.8	3.6	6.4	19.2	...	...	40.8
1877	...	...	...	...	...	13.2	3.7	3.6	9.5	3.3	...	...	40.1
1878	...	...	...	...	...	2.5	9.5	5.5	6.7	15.6	...	...	76.2
1879	...	...	...	...	...	14.5	3.0	2.5	4.0	4.6	...	...	44.5
1880	...	...	...	...	...	1.4	8.9	5.1	1.7	11.4	...	...	50.1
1881	...	...	...	...	...	1.0	9.7	7.5	5.8	4.3	...	...	38.1
1882	...	...	...	...	...	7	4.9	3.1	17.8	12.9	...	...	46.9
1883	...	...	...	...	...	1.9	2.8	11.9	6.3	12.9	...	...	38.6
1884	...	...	...	...	...	4.0	2.9	11.5	10.0	6.0	...	...	44.6
1885	...	...	...	...	...	3.0	3.7	3.8	13.2	8.2	...	...	79.5
1886	...	...	...	...	...	3.2	7.5	13.7	5.2	30.2	...	...	2.5
1887	...	...	...	...	...	1.1	8.3	5.8	6.2	11.7	...	...	43.6
1888	...	...	...	...	...	3.2	3.3	1.7	1.2	6.0	...	...	31.7
1889	...	...	...	...	...	3.8	8.5	3.5	14.8	12.47	...	...	50.11
Mean	3	2	4	6	30	4.5	51	63	76	11.32	4.77	20.2	45.85

(142)

(140)

TABLE XXX.
Summer and Winter Rainfall Totals.

YEARS.	Summer.	Winter.	YEARS.	Summer.	Winter.
1866	17.4	20.4	1878	27.2	49.0
1867	30.1	18.2	1879	26.1	18.4
1868	31.5	3	1880	25.7	24.4
1869	33.7	9.9	1881	26.2	9.9
1870	34.1	26.2	1882	29.2	17.7
1871	22.3	5.0	1883	23.6	20.3
1872	33.2	20.7	1884	29.1	7.5
1873	28.7	23.5	1885	24.0	20.6
1874	22.7	25.2	1886	34.6	44.9
1875	19.6	9.4	1887	28.2	15.4
1876	19.3	21.5	1888	11.0	20.7
1877	31.3	8.8	1889	31.5	18.61

(143)

(153)

TABLE XXXI.
Number of days on which rainfall was measured in 24 years from 1866 to 1889.

YEARS.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Novr.	Decr.	Year.
1866	...	2	...	2	...	3	6	10	9	14	4	...	50
1867	...	...	...	2	4	6	11	10	10	12	2	...	57
1868	...	...	...	2	4	11	10	8	8	2	...	...	45
1869	...	...	...	1	1	9	9	13	14	17	3	1	78
1870	...	...	...	1	1	13	11	11	13	13	1	...	68
1871	...	3	2	4	3	10	11	14	14	20	4	3	82
1872	...	...	...	1	6	3	15	11	6	4	3	2	66
1873	...	...	...	1	5	10	6	12	15	14	1	1	71
1874	...	...	...	...	7	4	7	7	11	10	1	...	49
1875	...	1	...	...	3	4	7	13	13	6	2	...	50
1876	...	...	...	...	7	6	8	9	10	9	2	...	58
1877	...	5	2	1	7	5	8	16	12	14	11	7	84
1878	...	...	1	...	8	4	7	8	15	17	9	2	90
1879	...	1	...	...	9	9	16	13	10	13	6	1	88
1880	...	...	3	1	15	13	7	13	14	3	11	1	63
1881	...	...	...	...	3	2	10	12	9	10	3	...	54
1882	...	1	...	...	7	7	10	10	13	9	...	...	50
1883	...	...	...	...	1	1	10	8	11	9	4	4	61
1884	...	...	3	...	7	7	12	16	10	23	5	...	88
1885	...	...	1	...	3	8	11	8	8	5	...	...	54
1886	...	...	1	...	2	3	7	6	14	3	11	6	42
1887	...	...	...	...	3	8	14	12	10	20	...	...	79
1888	...	...	...	...	...	...	...	...	...	...	...	...	...
1889	...	...	...	...	...	...	...	...	...	...	...	...	...
Mean	1	1	1	1	4	7	10	11	11	12	5	1	63

(144)

TABLE XXXII.
Wind and Rain Limits of the N. E. Monsoon for 23 years, from 1867 to 1889.

YEARS.	NORTHERLY WINDS.				FIRST RAIN WITH NORTHERLY WINDS.			
	BEGAN.		SETTLED.		BEGAN.		ENDED.	
	Began.	Differ- ence.	Settled.	Differ- ence.	Began.	Differ- ence.	Ended.	Differ- ence.
1867	Oct. 7th	7 late	Oct. 24th	7 late	Oct. 11th	11 late	Oct. 18th	13 late
1868	Aug. 28th	23 soon	Sep. 8th	20 soon	Aug. 28th	33 soon	Aug. 31st	28 below
1869	Oct. 1st	1 late	Oct. 17th	same as	Oct. 1st	1 late	Oct. 28th	28 below
1870	Sep. 7th	23 soon	Oct. 17th	same as	Sep. 9th	21 soon	Sep. 28th	85 above
1871	Aug. 18th	32 soon	Sep. 28th	21 soon	Aug. 25th	36 soon	Sep. 9th	35 below
1872	Aug. 29th	46 soon	Sep. 14th	34 soon	Aug. 23rd	32 soon	Sep. 2nd	41 below
1873	Aug. 15th	46 soon	Sep. 28th	19 soon	Aug. 8th	37 soon	Sep. 28th	18 above
1874	Aug. 30th	31 soon	Oct. 17th	20 soon	Aug. 23rd	32 soon	Aug. 24th	same as
1875	Aug. 23rd	38 soon	Sep. 28th	20 soon	Aug. 24th	32 soon	Sep. 19th	28 above
1876	Aug. 16th	45 soon	Sep. 28th	21 soon	Sep. 27th	28 soon	Sep. 10th	28 above
1877	Sep. 27th	3 soon	Oct. 18th	2 soon	Sep. 2nd	3 soon	Sep. 7th	12 above
1878	Oct. 28th	2 soon	Oct. 28th	12 late	Sep. 27th	28 soon	Sep. 13th	23 below
1879	Oct. 10th	20 late	Nov. 25th	20 late	Oct. 10th	30 late	Oct. 18th	18 below
1880	Oct. 4th	27 late	Nov. 17th	same as	Oct. 10th	10 late	Nov. 1st	17 below
1881	Aug. 4th	37 soon	Aug. 18th	63 soon	Aug. 4th	37 soon	Oct. 14th	17 below
1882	Aug. 19th	34 late	Sep. 7th	40 soon	Aug. 23th	32 soon	Sep. 7th	16 below
1883	Oct. 19th	13 late	Sep. 12th	2 late	Oct. 19th	13 late	Oct. 18th	22 below
1884	Sep. 19th	11 soon	Sep. 21st	20 soon	Sep. 19th	11 soon	Sep. 21st	21 below
1885	Oct. 20th	40 soon	Oct. 24th	7 late	Sep. 20th	20 late	Oct. 18th	19 below
1886	Aug. 12th	49 soon	Aug. 18th	60 soon	Aug. 12th	49 soon	Oct. 18th	2 below
1887	Oct. 8th	8 late	Oct. 14th	3 soon	Oct. 8th	8 late	Nov. 7th	93 above
1888	Oct. 14th	14 late	Oct. 18th	2 late	Oct. 23th	30 late	Nov. 11th	49 above
1889	Sep. 15th	15 soon	Sep. 18th	11 soon	Sep. 10th	14 soon	Sep. 19th	...

(145)

74

TABLE XXXII.—(Continued.)
Wind and Rain Limits of the N. E. Monsoon for 23 years, from 1867 to 1889.—(Contd.)

YEARS.	SECOND RAIN WITH NORTHERLY WINDS.				TOTAL RAIN DURING THE NORTHERLY WINDS.			
	Began.	Difference.	Ended.	Difference.	Inches.	Difference.	Inches.	Difference.
1867	Oct. 28th	9 late	Nov. 3rd	17 soon	7.7	1.4 below	16.9	.8 above
1868	Sep. 8th	38 soon	Sep. 12th	69 soon	2.4	6.7 below	6.4	8.7 below
1869	Oct. 17th	same as	Nov. 29th	6 late	5.0	4.1 below	9.2	6.9 below
1870	Oct. 17th	same as	Nov. 5th	15 soon	21.7	12.6 above	27.2	21.1 above
1871	Sep. 26th	21 soon	Sep. 29th	32 soon	1.6	7.5 below	5.1	11.0 below
1872	Sep. 14th	33 soon	Sep. 20th	31 soon	18.7	9.6 above	21.6	5.5 above
1873	Sep. 30th	17 soon	Oct. 27th	24 soon	20.0	10.9 above	28.8	12.7 above
1874	Oct. 8th	9 soon	Nov. 5th	15 soon	24.1	15.0 above	31.1	15.0 above
1875	Oct. 6th	12 soon	Nov. 1st	19 soon	6.1	same as	13.9	2.8 above
1876	Sep. 28th	21 soon	Oct. 13th	38 soon	20.0	10.9 above	29.0	12.9 above
1877	Oct. 30th	13 late	Nov. 1st	19 soon	1.6	7.5 below	9.8	6.3 below
1878	Oct. 28th	11 late	Nov. 10th	20 late	41.9	32.8 above	59.7	34.6 above
1879	Oct. 28th	33 late	Nov. 23th	5 late	12.6	3.5 above	16.3	2 above
1880	Oct. 17th	same as	Dec. 3rd	13 late	25.1	8.8 above	22.8	6.7 above
1881	Oct. 4th	13 soon	Dec. 31st	41 late	8.7	4 below	13.9	2.2 below
1882	Oct. 7th	10 soon	Dec. 10th	20 late	14.8	5.7 above	20.1	4.0 above
1883	Oct. 24th	7 late	Dec. 4th	14 late	15.8	6.7 above	19.2	3.1 above
1884	Nov. 2nd	2 soon	Oct. 24th	22 soon	5.5	3.6 below	8.3	7.8 below
1885	Oct. 10th	16 late	Nov. 8th	21 soon	7.4	1.7 below	12.3	3.6 below
1886	Oct. 23rd	7 soon	Nov. 21st	15 soon	25.5	14.4 above	28.6	12.6 above
1887	Oct. 8th	22 late	Nov. 5th	6 soon	6.4	2.7 below	13.2	5.9 below
1888	Nov. 12th	5 soon	Oct. 14th	4 late	9.6	6.8 below	15.9	2.8 above
1889	Oct. 12th	5 soon	Oct. 30th	4 late	7.4	1.7 below	19.3	3.3 above

TABLE XXXIII.
Total Rainfall during 20 years, from 1870 to 1889, tabulated under the eight principal points of the compass.

MONTHS.	TOTAL RAINFALL.								
	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total.
January	9	2.3	2.4	1.7	...	...	.5	.1	7.9
February	...	...	1.3	.2	...	...	1.8	.4	4.0
March	...	...	.5	1.9	3.0	...	2.0	.7	9.0
April	...	...	.7	7.4	...	...	1.1	1.9	11.2
May	...	...	8.8	9.5	2.6	7.6	22.4	1.8	63.3
June	...	...	3.4	3.4	4.4	12.3	37.4	7.3	70.6
July	...	...	1.3	7.7	6.1	18.5	60.5	8.5	104.3
August	...	...	10.0	5.7	4.2	22.7	54.4	18.9	119.0
September	...	...	12.3	8.8	12.1	22.6	58.6	26.9	156.1
October	...	...	50.6	22.1	7.6	9.74	29.93	39.2	229.57
November	...	...	17.4	7.6	5.1	6.7	2.82	11.26	109.08
December	...	...	13.3	6.1	1.3	1.0	1.6	7.4	48.16
Mean	2.04	6.20	6.10	4.1	2.3	5.10	13.65	6.22	46.76

TABLE XXIV.

Number of Rainy Days during 20 years, from 1870 to 1889, tabulated under the eight principal points of the compass.

MONTHS.	RAINY DAYS.								
	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total.
January	2	4	3	2	1	5	4	1	16
February	...	...	2	1	3	...	2	...	11
March	...	1	2	2	3	1	3	1	16
April	...	...	2	...	...	...	8	2	15
May	...	6	4	6	3	19	34	8	89
June	...	4	2	7	12	28	59	16	137
July	...	4	3	14	16	43	112	10	218
August	...	14	13	17	11	38	96	36	219
September	...	17	37	47	23	28	78	33	225
October	...	20	39	7	14	11	44	38	225
November	...	15	7	1	2	5	11	12	107
December	...	...	...	1	1	1	2	4	34
Total	4	6	7	4	4	9	23	6	65

(148)

TABLE XXV.

Number of Winds observed at 4 and 10 A.M. and 4 and 10 P.M. during 20 years, from 1870 to 1889, tabulated under the eight principal points of the compass with their resultant directions and percentage.

MONTHS.	4-HOUR.								RESULTS.	
	DIRECTIONS.								Directions.	Percentage.
	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.		
January	26	55	156	123	64	53	91	52	S. 53° 20' E.	23.4
February	11	4	47	80	85	110	183	45	S. 46° 59' W.	45.1
March	...	7	6	54	69	118	322	44	S. 81° 58' W.	63.1
April	...	2	7	20	50	165	330	24	S. 70° 1' W.	78.2
May	...	7	21	32	62	194	277	22	S. 62° 45' W.	69.2
June	...	4	7	25	49	149	331	30	S. 71° 36' W.	75.6
July	...	2	4	11	20	139	383	39	S. 79° 28' W.	84.8
August	...	2	10	19	23	112	404	63	S. 82° 42' W.	78.4
September	...	9	22	24	41	107	323	63	S. 79° 47' W.	67.4
October	...	66	112	66	36	68	169	73	S. 87° 46' W.	10.2
November	...	141	165	51	15	17	62	66	N. 47° 17' E.	40.1
December	...	154	192	65	19	9	53	62	N. 58° 49' E.	68.4
Total	248	453	749	570	533	1241	2928	583	S. 73° 7' W.	58.7

(149)

TABLE XXXV.—(Continued.)

Number of Winds observed at 4 and 10 A.M. and 4 and 10 P.M. during 20 years, from 1870 to 1889, tabulated under the eight principal points of the compass with their resultant directions and percentage.—(Contd.)

MONTH.	10-HOUR.										RESULTS.	
	DIRECTIONS.											
	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.				
January	44	81	104	94	55	53	142	60	S. 27° 22' W.	1.5		
February	4	17	68	96	93	84	191	22	S. 34° 8' W.	40.4		
March	3	4	20	35	132	156	202	13	S. 40° 27' W.	61.2		
April	3	2	9	64	167	178	163	17	S. 37° 2' W.	67.6		
May	1	19	24	66	170	171	168	39	S. 34° 14' W.	62.8		
June	3	3	15	51	99	136	244	41	S. 57° 18' W.	63.2		
July	3	3	13	20	44	111	236	62	S. 72° 28' W.	76.1		
August	3	3	23	33	47	69	243	63	S. 78° 7' W.	66.1		
September	7	11	46	68	57	40	148	66	N. 68° 27' E.	59		
October	69	128	165	76	48	21	83	55	N. 62° 39' E.	42.0		
November	197	187	155	103	18	21	67	54	N. 45° 45' E.	40.1		
December	111	143	168	58	30	16	67	54				
Total	269	523	694	760	948	1316	2265	472	S. 58° 41' W.	46.1		

(150)

TABLE XXXV.—(Continued.)

Number of Winds observed at 4 and 10 A.M. and 4 and 10 P.M. during 20 years, from 1870 to 1889, tabulated under the eight principal points of the compass with their resultant directions and percentage.—(Contd.)

MONTHS.	16-HOUR.										RESULTS.	
	DIRECTIONS.										Directions.	Percentage.
	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.				
January	14	49	181	224	106	28	10	8	S. 55° 49' E.	66.0		
February	1	10	55	186	218	62	32	1	S. 16° 55' E.	71.2		
March	1	2	18	122	301	110	59	7	S. 4° 30' W.	74.0		
April	...	1	9	99	258	150	77	6	S. 14° 5' W.	75.7		
May	3	...	13	113	237	169	78	7	S. 14° 20' W.	71.3		
June	...	10	14	82	179	138	152	25	S. 31° 15' W.	60.4		
July	...	5	11	41	128	174	231	28	S. 52° 38' W.	67.5		
August	...	5	22	53	136	182	173	46	S. 46° 5' W.	61.0		
September	...	9	50	82	167	133	128	23	S. 23° 15' W.	52.3		
October	...	74	166	129	106	42	50	26	S. 58° 34' E.	40.0		
November	...	162	240	81	33	8	5	13	N. 24° 33' E.	61.9		
December	...	159	241	105	34	7	16	20	N. 82° 33' E.	63.9		
Total	160	451	1020	1317	1903	1203	1011	210	S. 5° 17' E.	64.0		

(151)

TABLE XXXV.—(Concluded.)

Number of Winds observed at 4 and 10 A.M. and 4 and 10 P.M. during 20 years, from 1870 to 1889, tabulated under the eight principal points of the compass with their resultant directions and percentage.—(Concluded.)

MONTHS.	22 HOUR.									
	DIRECTIONS.					RESULTS.				
	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Directions.	Percentage.
January	14	65	196	144	69	79	49	24	S. 60° 6' E.	43.9
February	1	16	67	102	92	126	140	21	S. 22° 28' W.	43.3
March	2	1	14	60	97	140	256	30	N. 55° 33' W.	65.2
April	...	4	12	23	69	201	261	30	S. 62° 34' W.	73.8
May	...	9	24	47	88	189	223	38	S. 65° 32' W.	62.6
June	5	3	18	33	63	157	278	43	S. 66° 58' W.	68.1
July	5	4	15	14	41	140	345	56	S. 77° 19' W.	75.4
August	4	8	25	25	50	116	323	63	S. 74° 20' E.	67.0
September	12	15	20	49	52	136	250	58	S. 70° 23' E.	58.7
October	30	81	155	92	54	61	93	54	N. 70° 0' E.	17.6
November	57	167	231	74	14	16	15	26	N. 79° 50' E.	62.5
December	37	157	257	89	22	15	17	26		64.7
Total	160	530	1043	751	711	1306	2259	475	S. 50° 29' W.	58.3

TABLE XXXVI.

*Spectroscopic Observations and other Elements on
Rainy Days during the year 1889.*

MONTHS & DATES.		Barometer.	Difference between dry and wet at the com- mencement of rain.	Rain-band beforehand.	Humidity.	Rain.	Ozone.
		Inches.	"	Tints.	Cents.	Inches.	Tints.
April	30 ...	29.681	8.4	1.0	.69	.1	4.0
May	16 ...	29.808	9.1	1.5	.65	.3	3.0
"	28 ...	29.694	9.2	1.5	.66	.8	4.5
"	29 ...	29.708	9.3	1.0	.66	.2	3.5
"							
June	9 ...	29.553	8.5	2.0	.68	.5	2.0
"	10 ...	29.586	8.1	0.5	.69	.1	4.0
"	23 ...	29.617	9.7	1.0	.62	.2	3.5
"	24 ...	29.576	9.0	1.5	.66	.3	2.0
"	25 ...	29.568	6.2	2.3	.76	.5	1.0
"	26 ...	29.565	5.7	2.5	.75	1.2	1.5
"	28 ...	29.565	5.2	2.5	.79	.5	1.5
"	29 ...	29.684	5.6	2.0	.76	.5	1.0
"	30 ...	29.676					
"							
July	1 ...	29.653	5.3	1.5	.80	.4	2.0
"	2 ...	29.633	5.8	3.0	.76	1.1	2.0
"	3 ...	29.639	5.2	1.0	.79	.2	0.5
"	5 ...	29.679	5.8	1.0	.76	.4	1.5
"	8 ...	29.654	5.8	2.7	.76	.9	1.5
"	9 ...	29.609	4.9	3.0	.79	1.5	1.5
"	11 ...	29.498	5.0	2.0	.79	.3	1.5
"	14 ...	29.448	4.7	1.0	.79	.5	0.5
"	15 ...	29.375	4.9	3.5	.79	2.3	1.0
"	17 ...	29.395	5.4	1.0	.79	.1	1.5
"	18 ...	29.436	5.1	1.0	.79	.2	2.5
"	19 ...	29.498	7.3	1.0	.72	.2	3.5
"	20 ...	29.635	7.2	1.5	.72	.3	1.5
"	25 ...	29.623	6.3	1.0	.75	.1	1.5
"	28 ...						

TABLE XXXVI.—(Continued.)

Spectroscopic Observations and other Elements on
Rainy Days during the year 1889.—(Contd.)

MONTHS & DATES.		Barometer.	Difference between dry and wet at the com- mencement of rain.	Rain-band beforehand.	Humidity.	Rain.	Ozone.
		Inches.	°	Tints.	Cents.	Inches.	Tints.
August	1 ...	29.643	6.4	2.5	.75	.1	1.5
"	6 ...	29.446	7.0	3.0	.72	.4	1.5
"	13 ...	29.570	7.5	2.0	.70	.1	1.5
"	14 ...	29.518	6.8	2.5	.72	.2	1.0
"	15 ...	29.578	6.4	2.5	.75	.3	1.5
"	16 ...	29.607	6.1	3.0	.75	.2	1.5
"	18 ...	29.621	7.0	3.5	.71	.2	2.0
"	19 ...	29.675	6.2	3.0	.75	.6	1.0
"	20 ...	29.685	6.7	3.5	.72	.3	1.5
"	21 ...	29.652	5.8	3.5	.76	.8	2.5
"	27 ...	29.620	5.7	4.5	.76	.1	1.5
"	28 ...	29.661	4.0	3.0	.83		
Sept.	2 ...	29.702	6.8	2.0	.72	.2	1.5
"	5 ...	29.823	6.5	3.0	.74	.4	2.5
"	8 ...	29.778	5.4	2.5	.79	.3	1.0
"	16 ...	29.677	5.7	1.5	.76	.2	1.5
"	17 ...	29.501	5.9	3.5	.76	.7	1.5
"	18 ...	29.419	4.2	5.0	.83	10.8	1.5
"	19 ...	29.450	5.8	1.5	.75	.2	2.0
"	22 ...	29.725	4.9	3.5	.79	.9	2.5
"	23 ...	29.722	4.3	3.0	.83	.8	2.0
"	29 ...	29.705	6.1	2.5	.76	.3	1.0
October	2 ...	29.798	6.0	1.5	.76	.1	1.5
"	4 ...	29.780	5.2	3.0	.79	1.7	1.0
"	5 ...	29.810	5.3	1.0	.79	.1	1.5
"	6 ...	29.808	5.5	1.5	.77	.2	1.5

TABLE XXXVI.—(Concluded.)

Spectroscopic Observations and other Elements on
Rainy Days during the year 1889.—(Contd.)

MONTHS & DATES.		Barometer.	Difference between dry and wet at the com- mencement of rain.	Rain-band beforehand.	Humidity.	Rain.	Ozone.
		Inches.	°	Tints.	Cents.	Inches.	Tints.
October	7 ...	29.773	5.0	1.0	.70	.1	1.0
"	8 ...	29.770	5.3	2.0	.79	.1	1.0
"	9 ...	29.789	4.0	3.0	.88	1.0	1.0
"	10 ...	29.796	4.3	4.0	.83	1.5	0.5
"	12 ...	29.801	6.0	2.0	.76	.3	1.0
"	13 ...	29.775	5.2	1.0	.79	.2	0.5
"	14 ...	29.767	5.2	1.0	.79	.1	2.0
"	15 ...	29.764	5.5	1.0	.77	.1	1.5
"	16 ...	29.748	4.4	3.7	.83	1.8	0.5
"	17 ...	29.721	4.4	2.0	.83	.8	2.0
"	18 ...	29.701	3.4	5.5	.87	2.2	1.5
"	19 ...	29.736	3.6	3.0	.83	.8	1.0
"	20 ...	29.761	3.5	3.5	.85	1.1	1.0
"	23 ...	29.645	4.3	0.5	.83	.1	1.0
"	24 ...	29.687	4.2	1.5	.83	.04	1.0
"	25 ...	29.743	3.7	1.0	.83	.13	1.0
Nov.	17 ...	29.874	4.3	2.5	.82	1.58	0.5
"	18 ...	29.727	4.7	1.7	.77	.85	1.5
"	19 ...	29.613	5.9	1.0	.73	.16	2.0
"	21 ...	29.737	5.9	0.5	.74	.08	0.5
"	22 ...	29.806	4.5	2.0	.80	.50	0.5
"	25 ...	29.860	6.1	2.3	.74	.02	1.0
"	25 ...	29.828	8.3	2.5	.65	.32	2.5
Dec.	24 ...	29.834	4.3	2.5	.82	.60	3.0
"	25 ...	29.929	3.8	2.0	.82	.48	2.0
"	26 ...	30.002	4.0	1.5	.82	.31	1.0
"	27 ...	30.005	3.8	3.0	.82	1.06	1.0

TABLE XXXVII.
Observations of Crops and Trees in 1889.

GRAIN, &c.					GREEN CROPS.					FRUIT TREES.			
Names.	When sown.	In ear or pod.	In flower.	When cut.	Names.	When sown.	Above ground.	Stored.	Names.	Blossom.	Ripe.		
Paddy ..	July 15th.	July 21st	Nov. 5th.	Dec. 10th.	Chaffy ..	Oct. 30th.	Nov. 5th.	Mar. 15th, 1890.	Mango tree..	Jan. 20th.	May 25th.		
Baggy ..	June 20th.	June 25th.	Aug. 30th.	Sep. 30th.	Onions..	Dec. 20th.	Jan. 5th. 1890.	Mar. 1st. 1890.	Sapodilla ..	June 20th.	Aug. 20th.		
Cumboo ..	June 1st.	June 10th.	Aug. 30th.	Sep. 15th.	Yam ..	Mar. 1st.	Mar. 25th.	Dec. 20th. 1890.	Bullock heart apple.	Dec. 10th.	Mar. 25th.		
Gingily ..	April 5th.	April 10th.	June 10th.	Aug. 25th.	Sagaracine	Mar. 10th.	Mar. 31st. 1890.	Jun. 15th. 1890.	Jack fruit ..	Nov. 25th.	May 30th 1890.		
Cholam ..	Oct. 1st.	Oct. 8th.	Nov. 20th.	Jan. 10th. 1890.	Cotton..	Feb. 5th.	Feb. 10th.	July 20th.	Tamarind ..	April 25th.	Dec. 31st.		
Gram ..	Oct. 1st.	Oct. 5th.	Dec. 20th.	Feb. 20th.					Outard apple	May 20th.	Aug. 30th.		
									Caulerunt..	Dec. 20th.	April 10th.		
									Woodapple ..	June 25th.	Nov. 20th.		
									Pineapple ..	Feb. 10th.	June 20th.		
									Mango shoot.	Mar. 15th.	June 20th.		

TABLE XXXVIII.
The Tables showing the Harvest for 23 years, from 1867 to 1889.
The full Harvest is estimated sixteen parts.

YEARS.	Paddy.	Baggy.	Cumboo.	Gingily.	Cholam.	Gram.
1867	16	12	14	12	15	15
1868	12	15	12	12	13	14
1869	14	11	12	14	14	13
1870	16	9	13	8	15	16
1871	16	12	13	13	15	14
1872	14	14	18	11	15	16
1873	12	13	11	12	11	13
1874	15	10	15	10	14	12
1875	13	11	14	12	14	14
1876	11	8	11	13	10	13
1877	14	6	9	7	15	12
1878	16	4	11	8	12	10
1879	14	5	12	12	9	14
1880	14	10	10	6	8	14
1881	10	9	13	7	8	14
1882	11	12	12	4	9	13
1883	5	14	10	4	8	9
1884	6	10	11	4	11	12
1885	10	10	10	4	6	4
1886	14	10	8	4	14	3
1887	15	8	8	4	12	8
1888	4	7	7	6	8	8
1889	12	7	7	6	8	8

TABLE XXXIX.

The Means of Barometric Pressure and Dry Bulb for each date of the month for twenty years, also Hourly Variations of the Barometer and Dry Bulb Thermometer from Daily Means, to enable to take approximate heights in the district of Vizagapatam (and exceeding many hundred feet) with Aneroids in the absence of an Assistant at the lower stations for simultaneous observations.

DATES.	JANUARY.		FEBRUARY.		MARCH.	
	Barometer reduced to 32° and sea-level.	Temperature.	Barometer reduced to 32° and sea-level.	Temperature.	Barometer reduced to 32° and sea-level.	Temperature.
	Inches.	°	Inches.	°	Inches.	°
1st	30.027	74.8	30.003	76.8	29.939	81.9
2nd	30.135	74.9	30.008	76.9	29.941	81.7
3rd	30.038	75	30.012	77	29.938	81.3
4th	30.039	75.1	30.008	77.4	29.951	81.6
5th	30.047	75.5	29.993	77.6	29.960	81.5
6th	30.049	75.6	29.991	77.7	29.962	81.8
7th	30.052	75.6	29.989	77.9	29.948	82.1
8th	30.046	75.8	29.986	77.8	29.948	82.1
9th	30.039	75.1	29.988	78	29.942	82.5
10th	30.044	75	29.984	78.3	29.943	82.7
11th	30.062	74.8	29.984	78.5	29.942	82.9
12th	30.030	74.6	29.982	78.8	29.934	83.5
13th	30.018	75	29.988	78.9	29.923	83.5
14th	30.026	75.1	29.993	78.8	29.902	83.4
15th	30.035	75.4	29.984	79.2	29.897	83.6
16th	30.027	75.4	29.977	79.3	29.909	83.4
17th	30.022	75.5	29.972	79.2	29.919	83.5
18th	30.038	75.8	29.983	79.3	29.910	83.8
19th	30.041	76	30.001	79.3	29.904	84
20th	30.030	76.2	30.007	79.6	29.901	84.5
21st	30.026	76.1	29.997	79.6	29.897	84.5
22nd	30.025	76.5	29.983	80	29.887	84.3
23rd	30.025	76.1	29.974	80.2	29.879	84.2
24th	30.024	76.2	29.972	80.7	29.870	84.7
25th	30.025	76.3	29.970	80.9	29.871	84.7
26th	30.018	76.4	29.970	81	29.879	84.7
27th	30.015	76.4	29.952	81.6	29.868	84.7
28th	30.014	76.6	29.940	81.6	29.867	84.9
29th	30.014	76.6	.....	.....	29.870	84.9
30th	30.012	76.8	.....	.....	29.857	84.8
31st	30.010	77.1	.....	.....	.....	.....

TABLE XXXIX.—(Continued.)

The Means of Barometric Pressure and Dry Bulb for each date of the month for twenty years, also Hourly Variations of the Barometer and Dry Bulb Thermometer from Daily Means, to enable to take approximate heights in the district of Vizagapatam (and exceeding many hundred feet) with Aneroids in the absence of an Assistant at the lower stations for simultaneous observations.—(Contd.)

DATES.	APRIL.		MAY.		JUNE.	
	Barometer reduced to 32° and sea-level.	Temperature.	Barometer reduced to 32° and sea-level.	Temperature.	Barometer reduced to 32° and sea-level.	Temperature.
	Inches.	°	Inches.	°	Inches.	°
1st	29.857	84.8	29.773	87.5	29.646	88.4
2nd	29.868	85	29.763	87.6	29.639	88.7
3rd	29.863	85.3	29.761	87.6	29.635	89
4th	29.848	85.4	29.758	87.3	29.636	89.1
5th	29.842	85.4	29.760	87.4	29.639	88.8
6th	29.844	85.3	29.764	87.5	29.643	88.4
7th	29.838	85.4	29.766	87.5	29.639	88.3
8th	29.828	85.5	29.754	87.9	29.640	88.4
9th	29.825	85.6	29.748	87.7	29.640	87.9
10th	29.814	86.1	29.738	88	29.631	88.2
11th	29.810	86.1	29.731	88.2	29.612	88.3
12th	29.815	86.6	29.734	88.2	29.601	88.4
13th	29.815	86.8	29.738	88	29.605	88.3
14th	29.819	86.8	29.746	87.9	29.610	87.9
15th	29.811	86.8	29.740	87.7	29.594	88.2
16th	29.818	86.2	29.735	87.9	29.585	88.1
17th	29.831	86.3	29.719	88.4	29.586	88.4
18th	29.825	86.2	29.707	88.2	29.605	87.9
19th	29.830	86.4	29.692	88.5	29.613	87.2
20th	29.827	86.4	29.688	88.5	29.623	87.1
21st	29.817	86.4	29.694	88.3	29.623	86.3
22nd	29.804	86.6	29.701	88.2	29.624	86.9
23rd	29.801	86.8	29.702	88	29.628	86.8
24th	29.807	86.8	29.690	88.1	29.625	87.1
25th	29.807	87	29.685	88.5	29.618	86
26th	29.834	87	29.680	88.3	29.614	86
27th	29.794	87.4	29.685	88.2	29.626	86
28th	29.785	87.4	29.664	88.5	29.640	85.6
29th	29.776	87.9	29.654	88.2	29.633	86
30th	29.772	87.4	.....	.....	.....	.....
31st	.....	.....	.....	.....	.....	.....

TABLE XXXIX.—(Continued.)

The Means of Barometric Pressure and Dry Bulb for each date of the month for twenty years, also Hourly Variations of the Barometer and Dry Bulb Thermometer from Daily Means, to enable to take approximate heights in the district of Vizagapatam (not exceeding many hundred feet) with Aneroids (and an Assistant at the lower stations for simultaneous observations.—(Contd.)

DATES.	JULY.		AUGUST.		SEPTEMBER.	
	Barometer reduced to 32° and sea-level.	Temperature.	Barometer reduced to 32° and sea-level.	Temperature.	Barometer reduced to 32° and sea-level.	Temperature.
	Inches.	°	Inches.	°	Inches.	°
1st	29.618	86.1	29.633	85.6	29.702	84.7
2nd	29.625	85.7	29.625	85.4	29.713	84.5
3rd	29.634	85.2	29.620	85.5	29.727	84.7
4th	29.640	85.3	29.631	85.9	29.732	85.2
5th	29.646	85.6	29.620	85.9	29.733	85.1
6th	29.641	85.6	29.630	85.7	29.729	84.7
7th	29.645	85.4	29.663	85.4	29.728	84.8
8th	29.646	85.6	29.673	85.9	29.723	85.2
9th	29.637	85.2	29.664	85.7	29.718	85.4
10th	29.616	85	29.656	85.4	29.714	85.4
11th	29.607	85.1	29.654	85.5	29.700	85.6
12th	29.601	84.6	29.667	85.6	29.701	85.5
13th	29.601	84.2	29.677	85.4	29.711	85.4
14th	29.605	84.4	29.671	86.5	29.711	84.9
15th	29.614	85	29.682	84.7	29.707	84.7
16th	29.612	85.2	29.655	85.1	29.711	84.9
17th	29.611	85	29.650	85.4	29.704	85.2
18th	29.605	85.4	29.646	85.4	29.701	85.1
19th	29.598	85.4	29.650	85.5	29.701	85.1
20th	29.603	85.3	29.673	85.6	29.705	84.9
21st	29.621	85.3	29.683	85.6	29.714	84.8
22nd	29.616	85.2	29.676	85.4	29.734	84.8
23rd	29.601	84.9	29.675	85.3	29.739	85
24th	29.606	84.3	29.676	85.4	29.746	85.2
25th	29.624	84.7	29.673	85.6	29.755	84.9
26th	29.632	85.1	29.680	85.4	29.771	85
27th	29.628	85.6	29.684	85.2	29.777	84.9
28th	29.630	85.6	29.688	84.7	29.784	84.6
29th	29.642	85.6	29.696	84.7	29.791	84.6
30th	29.648	85.7	29.700	84.7	29.797	84.8
31st	29.640	85.8	29.701	84.3	.....	...

TABLE XXXIX.—(Concluded.)

The Means of Barometric Pressure and Dry Bulb for each date of the month for twenty years, also Hourly Variations of the Barometer and Dry Bulb Thermometer from Daily Means, to enable to take approximate heights in the district of Vizagapatam (not exceeding many hundred feet) with Aneroids in the absence of an Assistant at the lower stations for simultaneous observations.—(Concluded.)

DATES.	OCTOBER.		NOVEMBER.		DECEMBER.	
	Barometer reduced to 32° and sea-level.	Temperature.	Barometer reduced to 32° and sea-level.	Temperature.	Barometer reduced to 32° and sea-level.	Temperature.
	Inches.	°	Inches.	°	Inches.	°
1st	29.801	84.9	29.897	80.6	30.001	76.3
2nd	29.798	84.7	29.896	80.5	30.002	76.3
3rd	29.805	84.7	29.901	80.7	30.007	76.3
4th	29.813	84.5	29.907	80.7	30.000	76.3
5th	29.804	84.6	29.913	80.3	30.000	76
6th	29.807	84.6	29.936	80.6	30.005	75.9
7th	29.804	84.1	29.940	80.9	30.011	75.8
8th	29.805	84.7	29.937	80.8	30.017	76
9th	29.823	84.2	29.950	80.7	30.008	75.7
10th	29.835	84.1	29.957	80.7	30.006	75.7
11th	29.840	83.8	29.957	80.4	30.011	75.6
12th	29.830	83.7	29.969	80	30.020	75.7
13th	29.827	83.4	29.978	79.7	30.025	76.2
14th	29.836	83.2	29.980	79.5	30.032	75.5
15th	29.853	83.4	29.979	79.1	30.038	75.5
16th	29.864	83.1	29.979	78.9	30.047	75.5
17th	29.871	83.2	29.980	78.8	30.047	75.3
18th	29.876	83.2	29.960	78.6	30.054	75
19th	29.882	83.1	29.949	78.5	30.049	74.3
20th	29.890	83	29.954	78.9	30.040	74
21st	29.893	82.8	29.969	78.8	30.030	73.8
22nd	29.883	82.9	29.976	78.4	30.031	74.1
23rd	29.872	82.7	29.964	78.3	30.036	74.1
24th	29.859	82.6	29.981	78.2	30.030	74.2
25th	29.862	82.3	29.992	78.2	30.041	73.9
26th	29.868	82.4	30.001	78	30.049	74
27th	29.882	82.3	30.006	77.8	30.046	74.1
28th	29.885	82.1	29.999	77.2	30.040	74.3
29th	29.894	82	30.003	76.5	30.033	74.2
30th	29.890	81.6	30.001	76.4	30.037	74.4
31st	29.887	80.9	.....	.....	30.029	75

TABLE XL.

Hourly Variations of the Barometer and Thermometer from daily mean. Above + Below

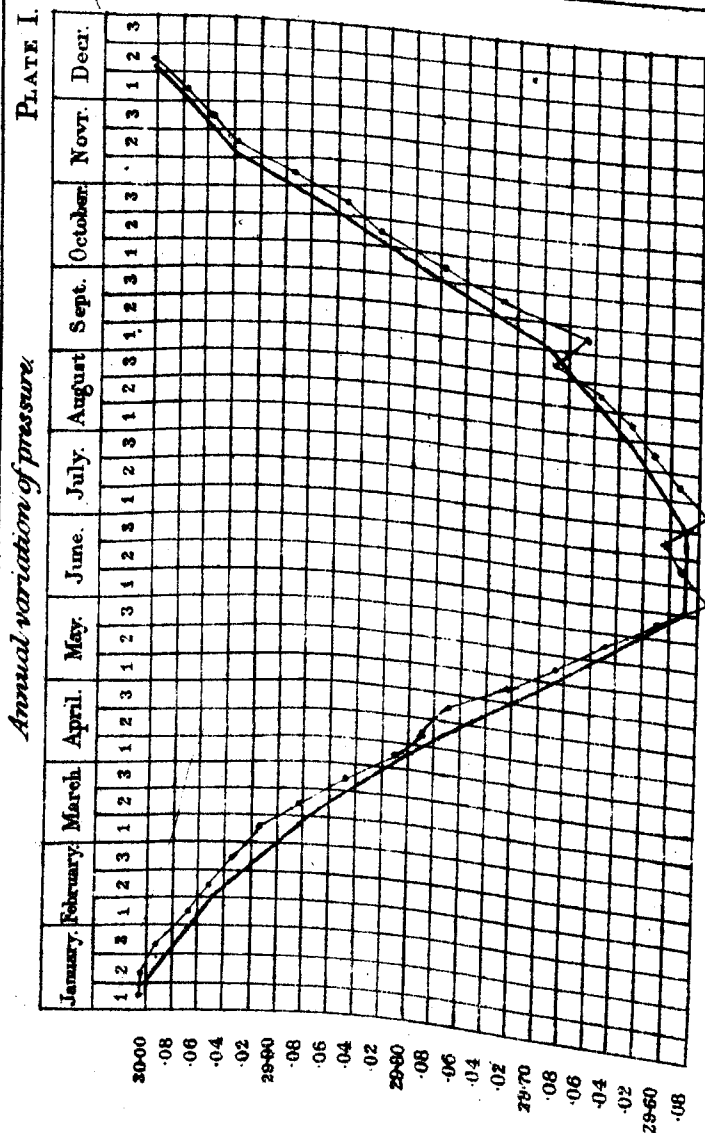
		4 A.M.	10 A.M.	4 P.	P.M.
<i>Summer Months, April to Sept.</i>					
April	Barometer in.	-.016	-.032	-.030	+.012
	Thermometer deg.	-1.1	-.8	+.8	+.4
May	Barometer in.	-.013	+.029	-.029	+.012
	Thermometer deg.	-1.0	+.7	+.7	+.4
June	Barometer in.	-.008	+.020	-.027	+.015
	Thermometer deg.	-.9	+.3	+.8	+.3
July	Barometer in.	-.012	+.021	-.025	+.015
	Thermometer deg.	-.8	+.1	+.9	+.2
August	Barometer in.	-.013	+.024	-.027	+.016
	Thermometer deg.	-.8	+.2	+.8	+.3
Sept.	Barometer in.	-.015	+.027	-.029	+.017
	Thermometer deg.	-.7	+.2	+.7	+.2
<i>Winter Months, October to March.</i>					
Oct.	Barometer in.	-.017	+.029	-.026	-.014
	Thermometer deg.	-.8	+.3	+.8	-.3
Nov.	Barometer in.	-.016	+.029	-.027	+.013
	Thermometer deg.	-1.0	+.3	+.10	-.2
Dec.	Barometer in.	-.018	+.032	-.027	+.013
	Thermometer deg.	-1.5	+.4	+.13	-.2
Jan.	Barometer in.	-.018	+.033	-.026	+.012
	Thermometer deg.	-1.5	+.3	+.15	-.3
Feb.	Barometer in.	-.019	+.036	-.030	+.012
	Thermometer deg.	-1.5	+.4	+.14	-.4
Mar.	Barometer in.	-.017	+.034	-.029	+.012
	Thermometer deg.	-1.1	+.4	+.10	-.3

1. Required the mean Barometric Pressure and Temperature at 10 o'clock in the morning on June 20th. The mean daily values from the preceding table are 29.918 inches and 86.0 degrees. The summer tidal variations for 10 morning are: +.020 inch and +.3 degree. Hence the required values are: Pressure 29.638 inches, and Temperature 86.3 degrees.

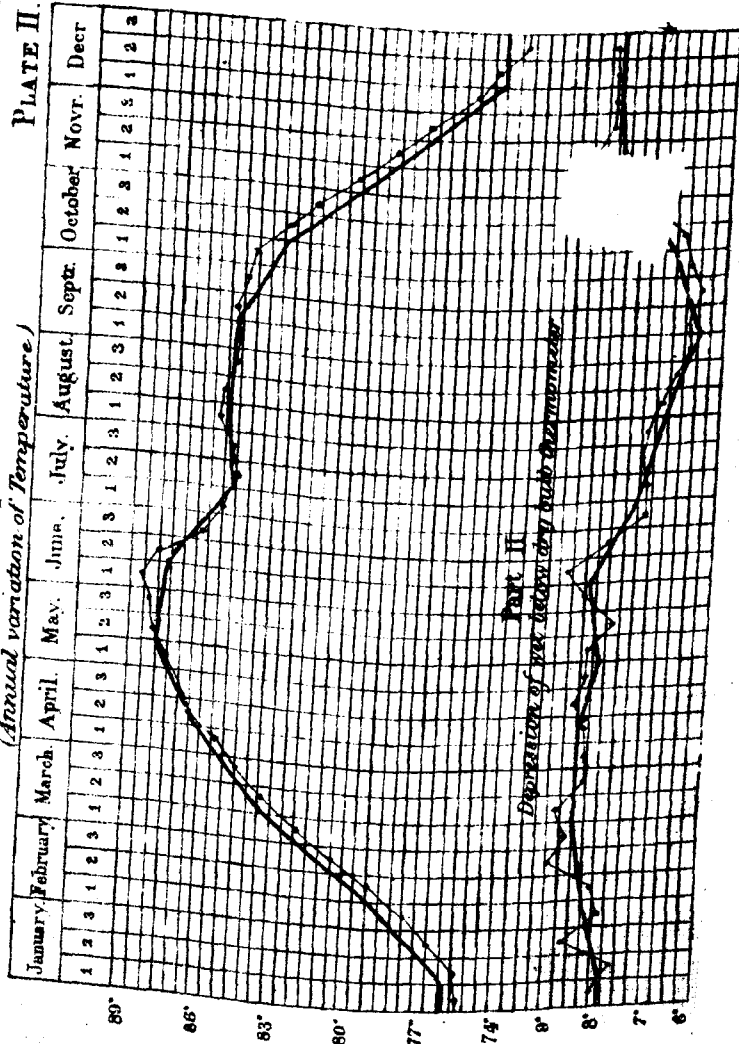
2. Required the mean Barometric Pressure and Temperature at 4 o'clock in the afternoon on January 10th. The mean daily values from the preceding table are 30.044 inches and 75 degrees. The winter tidal variations for 4 afternoon are: -.026 inch and +1.5 degrees. Hence the required values are: Pressure 30.018 inches and Temperature 76.5 degrees.

When an observer uses an Aneroid, he should first set it to read with the Mercurial Barometer at 32° Fht. Then the readings from it are supposed to require no correction.

Annual variation of pressure.



Part I
(Annual variation of Temperature)



(Annual variation of pressure of Vapour.)

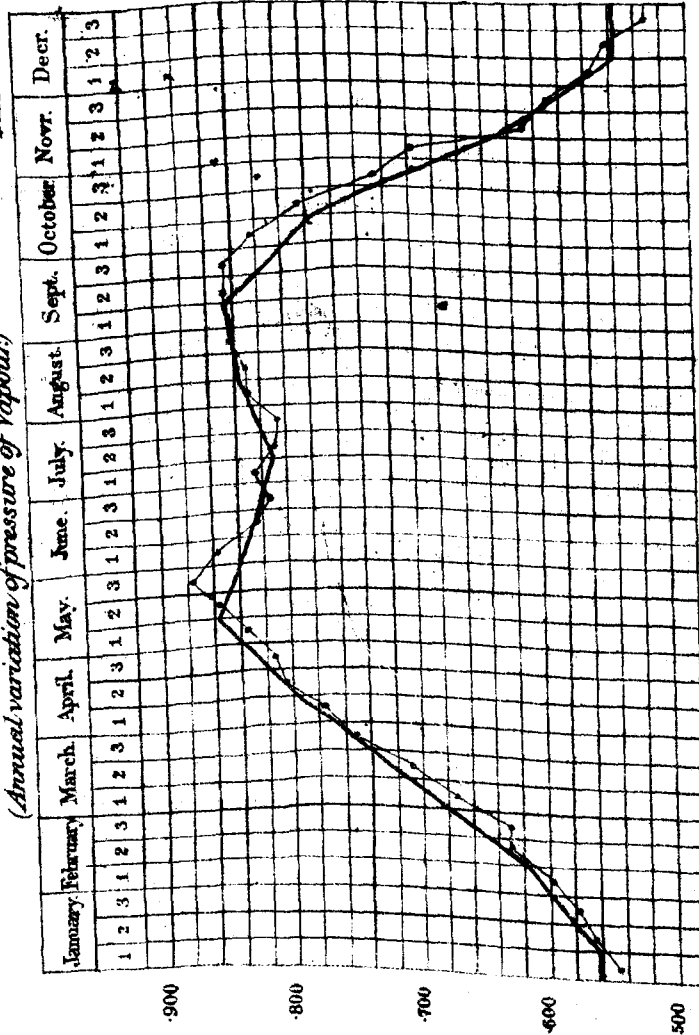


PLATE IV.

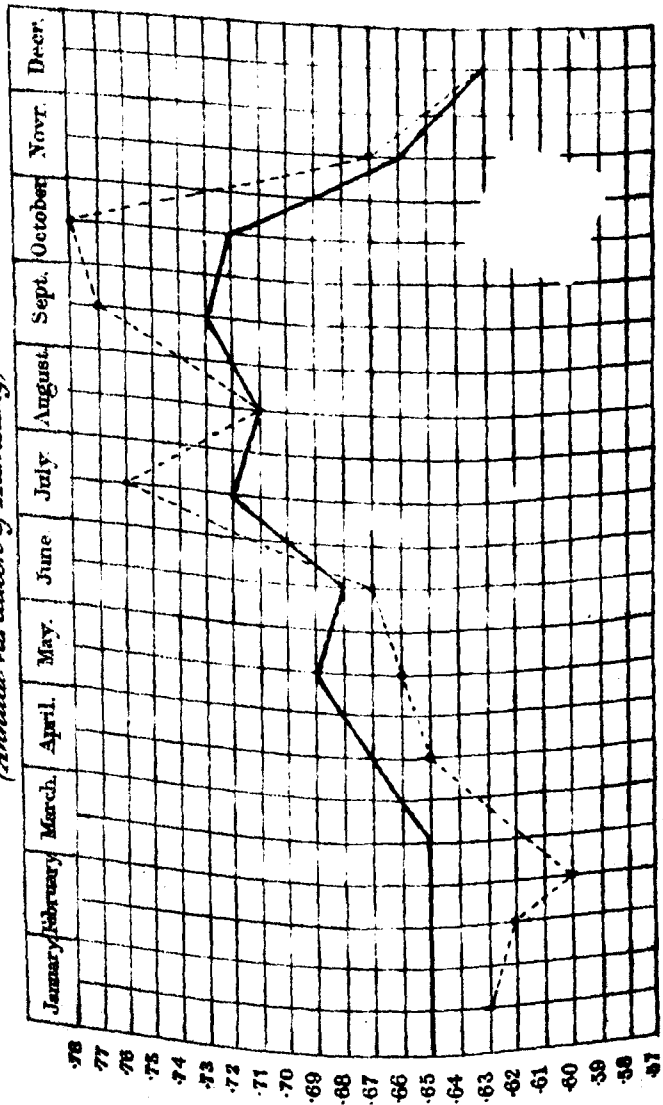
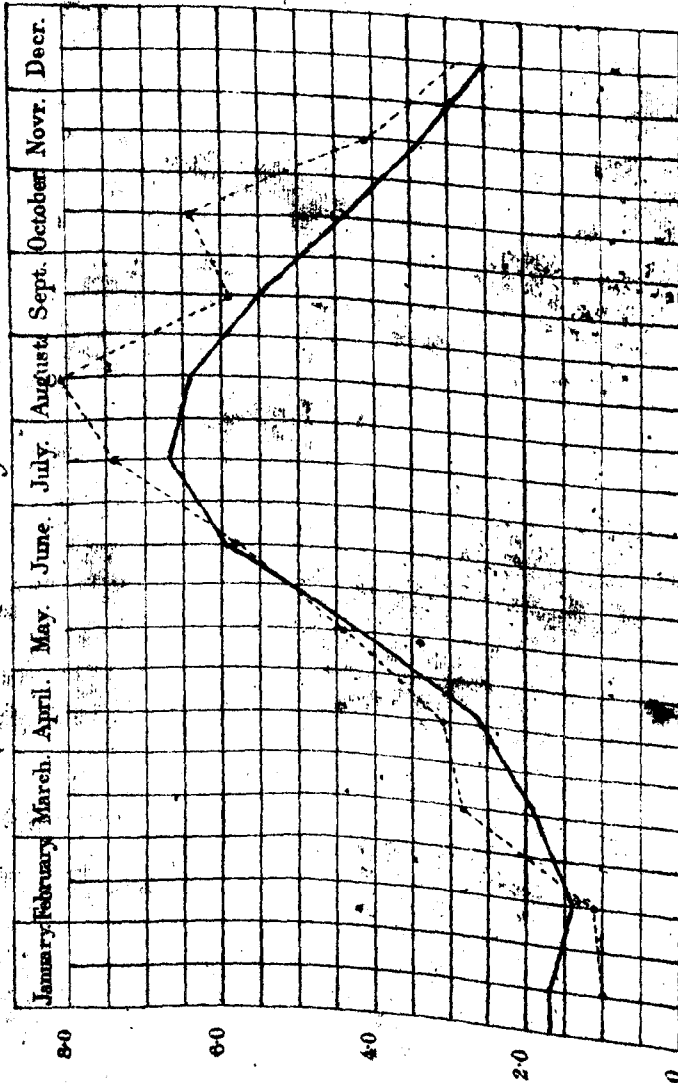
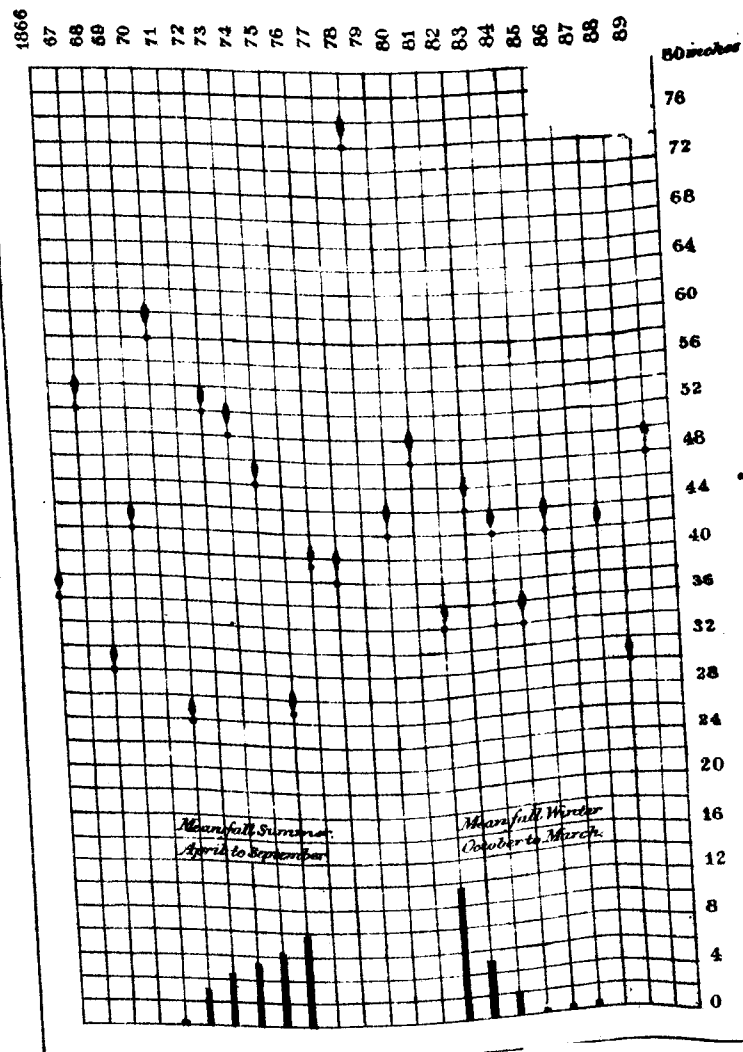
(Annual variation of Humidity)

PLATE V.

(Annual variation of Cloud)

(Variation of Rain.)



Curves of Rain-fall and Rainy days from
the means of 20 years forming
Wind-rose.

Fig. 1.

Rain-fall.

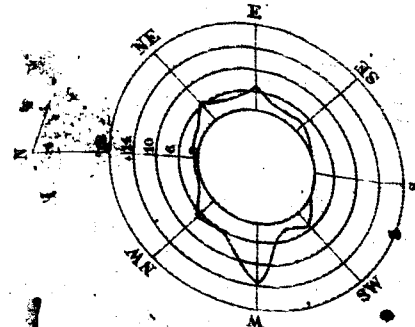
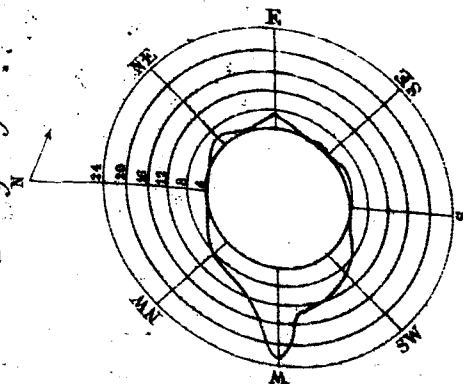


Fig. 2.

Rainy days.



PRESENTS RECEIVED

Donors.

Brief Sketch of the Meteorology of the Bombay Presidency, 1887-88	F. Chambers, Esq., Meteorological Reporter for Western India.
Report on the Meteorology of India, for 1887...	J. Eliot, Esq., M. A., The Meteorological Reporter to the Government of India.
Results of Meteorological Observations taken at Siracusa Observatory	The Observatory.
Indian Meteorological Memoirs: being occasional discussions and compilations of Meteorological Data relating to India and the neighbouring countries. Vol. IV, Part VI.	J. Eliot, Esq., M. A., The Meteorological Reporter to the Government of India.
Catalogue of Astronomical Instruments	T. Cooke & Sons, York, England.
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On the progress of Science as exemplified in the art of weighing and measuring being the presidential address delivered before the Washington Philosophical Society December 10th, 1887. By W. M. Harkness to which are appended some Historical notes and a Bibliography ...	Col. A. T. Fraser, Executive Engineer, Calicut.

APPENDIX A.

Mean time of the apparent Rising and Setting of the Sun, in the latitude of Vizagapatam for every 10th day in the year.

DATE & MONTH.	Rising.	Setting.	DATE & MONTH.	Rising.	Setting.
	H. M.	H. M.		H. M.	H. M.
January 1 ...	6 32.5	5 35.0	July 10 ...	5 32.4	6 37.3
" 11 ...	6 35.2	5 41.1	" 20 ...	5 35.7	6 35.9
" 21 ...	6 35.9	5 47.3	" 30 ...	5 39.0	6 33.0
" 31 ...	6 34.5	5 53.0	August 9 ...	5 42.0	6 28.4
February 10 ...	6 31.3	5 58.1	" 19 ...	5 44.5	6 22.5
" 20 ...	6 26.4	6 2.1	" 29 ...	5 46.5	6 15.2
March 2 ...	6 20.0	6 5.3	Sept. 8 ...	5 48.0	6 7.1
" 12 ...	6 12.7	6 7.9	" 18 ...	5 49.5	5 58.8
" 22 ...	6 4.6	6 10.0	" 28 ...	5 51.0	5 50.4
April 1 ...	5 56.6	6 11.9	October 8 ...	5 53.0	5 42.3
" 11 ...	5 48.8	6 13.9	" 18 ...	5 55.3	5 35.1
" 21 ...	5 41.6	6 16.1	" 28 ...	5 58.6	5 28.1
May 1 ...	5 35.4	6 18.8	Nov. 7 ...	6 2.7	5 24.6
" 11 ...	5 30.5	6 21.9	" 17 ...	6 7.4	5 22.1
" 21 ...	5 27.2	6 25.4	" 27 ...	6 13.5	5 21.7
" 31 ...	5 25.5	6 29.1	Dec. 7 ...	6 19.6	5 23.4
June 10 ...	5 25.4	6 32.5	" 17 ...	6 25.5	5 27.0
" 20 ...	5 26.7	6 35.2	" 27 ...	6 30.4	5 31.9
" 30 ...	5 29.0	6 36.7	" 31 ...	6 32.0	5 34.2

The intermediate days to be supplied by interpolation.

APPENDIX B.

General Table of the Measurement of Distance between some of the principal places in Waltair and Vizagapatam.

	M. F. Y.	M. F. Y.
1. Fortgate (Northern wall of the Court House) A	0 0 0	
2. Lane leading to Raja Gajapathi Row's House	0 2 180	
3. Raja Gajapathi Row's House	B 0 3 100	
4. Mrs. A. V. Nursingrow's Cottapetta House C	0 3 100	
5. Missionary School	D 0 5 120	
6. Market place	E 0 7 60	
7. Temple of Anjannayloo	1 0 20	
8. G. S. Prakasa Row, Esq.	F 1 1 0	
9. Barracks	G 1 2 60	
10. Observatory	H 1 4 20	
11. Regimental lines	1 2 30	
12. Prakasuraw Petta	I 1 3 110	
13. Road leading to Rock House	1 4 24	
14. Rock House	J 2 1 0	
15. Mullykarjan Pantaloo's	K 1 5 180	
16. Road leading to the Orphan Asylum	1 7 140	
17. Waltair Chapel	L 2 3 40	
18. Corner of the Road	2 5 0	
19. Road leading to the Racket Court	M 2 8 120	
20. Residence of the Government Agent, W. A. Wilcock, Esq.	2 7 110	
21. Aralia Appuraw Nayudu's house	3 1 40	
22. Miss Bangaramma Nursingrow's Newly Building House	N 3 1 200	
23. Aralia Ramaswajulu Nayudu's house	3 2 130	
24. Road leading through Gollalapalem Market, &c.	3 4 140	

APPENDIX B.—(Contd.)

General Table of the Measurement of Distance between some of the principal places in Waltair and Vizagapatam.—(Contd.)

	M. F. Y.	M. F. Y.
25. H. R. Farmer, Esq.'s, Civil & Sessions Judge	O 3 7 200	
26. Road leading to Gollalapalem	P 4 1 100	
27. Gymkhana Grounds	4 2 200	
28. William Arbuthnot, Esq.'s (now Raja G. N. Gajapatirow's)	Q 4 2 200	
29. Mason's House (now Raja G. N. Gajapatirow's)	R 4 3 80	
30. Rear Gate of William Arbuthnot, Esq.'s house	4 6 120	
31. Road leading to Gollalapalem	S 5 0 90	
32. Mahamajah's Bungalow	5 4 40	
33. Thatched Temple (Karakas Chettu)	6 2 120	
34. Corner of the Road (Triangle)	6 3 60	
35. Mission House, Revd. M. Thomas	T 6 3 200	
36. Mr. A. V. Nursingrow's Waltair House	7 0 10	
37. Tank of Cottapettam	7 2 174	
38. Village of old Gollalapalem	7 6 40	
39. North Gate of Daba Gardens	H 8 2 120	
40. Platform of Daba Gardens	0 0 0	
1. Post Gate	U 0 1 10	
2. Nandipilly Nursinghm's House	0 2 150	
3. Durga (Mohamedan place of Worship)	0 3 80	
4. S. S. Chatterjee Office and Steamer Agent's Office	V 1 1 90	
5. Ferry (Turner's Pontoon Bridge)	W 1 3 80	
6. Post Office House	1 6 80	
7. Collector's Office		

APPENDIX B.---(Cont'd.)

APPENDIX B. — (Contd.)

A Table showing (in miles, furlongs and tenths) the relative distances of some of the principal places in Wallia, and Vizagapatam.

The letters of the alphabet standing at the head of each column have reference to the corresponding distance in the General Table of distances. And the distance from C to N is inserted in the column denoted by N, viz., 2 miles 6 furlongs and 2 leuths or chains.

A. 0 130 337
B. 0 37
C. 0 130 340 55
D. 0 130 340 55
E. 0 130 340 55
F. 0 130 340 55
G. 0 130 340 55
H. 0 130 340 55
I. 0 130 340 55
J. 0 130 340 55
K. 0 130 340 55
L. 0 130 340 55
M. 0 130 340 55
N. 0 130 340 55
O. 0 130 340 55
P. 0 130 340 55
Q. 0 130 340 55
R. 0 130 340 55
S. 0 130 340 55
T. 0 130 340 55
U. 0 130 340 55
V. 0 130 340 55
W. 0 130 340 55
X. 0 130 340 55
Y. 0 130 340 55
Z. 0 130 340 55

My dear Sir
I have the pleasure
to inform you that
the same has been
sent to you by
express on the 1st inst.

The enclosed
is for the
Governor
Macrae
and by Mrs. Macrae

Sir,

I am
also
from the
Observer
three C
Anna
G. P.
In
H

100-443887-100

62/73

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