Report on the Kodaikanal and Madras Observatories for 1900-1901.

The Kodaikánal Observatory.

1. *Staff.*—The staff remained throughout the year as recorded in last report except that the post of writer was filled in September by the provisional appointment of L. N. Krishnaswami.

The Director was absent for three months on privilege leave, and his place was taken by Lieutenant H. Wood, R.E., of the Survey of India. The first and second assistants were also absent on privilege leave for two months nineteen days and two months respectively.

During the year Government sanctioned a change in the menial staff by which the two menial assistants will be replaced by a bookbinder and a bookbinder's boy, but it has not yet been found possible to obtain a suitable bookbinder for the post.

2. *Buildings and Instruments.*—Work on the buildings progressed very slowly during the first nine months of the year. In October the work was transferred from the Consulting Architect to the Government of Madras to the Executive Engineer, Madura District, but it was some time before he was able to take the work fairly in hand.

The erection of the spectrograph tube was carried out most satisfactorily by Lieutenant Wood, R.E. This was a work of considerable difficulty, as the tube consisted of short length of drain pipes varying in diameter from 2 feet to 8 inches. These had to be fitted with diaphragms and placed so that the axis pointed exactly to the pole.

By the close of the year work on the main building was nearly completed with the following exceptions :—

(*a*) The siderostat pier,

(*b*) Water-supply to the dark room,

(*c*) Rendering the dark room and spectrograph room thoroughly light-tight.

The spectrograph room was in the hands of the workmen till almost the close of the year, but during the last few days the instrument was erected and is now in working order, though not in perfect adjustment. Such work as has been done has been carried on under great difficulties owing to the temporary nature of the arrangements for protecting the siderostat and lens and to the amount of dust caused by the work still going on close to the instruments.

The transit room has been begun and the walls are about half built. The erection of the anemometer tower is not yet begun.

The two equatorials are both in working order and a small grating spectroscope belonging to the Director has been fitted to the Cooke equatorial for use till such time as the large spectrograph can be brought into full work.

A mean-time chronometer, Kullberg No. 6299, which was purchased for use in the Vizagapatam Observatory was sent to the observatory in January and has proved an excellent time-keeper.

Two Dines' pressure tube anemometers, one of the recording form and one of the sight indicating and maximum form have also been received, but have not yet been set up as the anemometer tower has not yet been erected. At the same time an electrical recording anemometer by Casella (Michie Smith's pattern) was received, and this has been erected on a temporary staging and brought into regular use.

In March a Solar Calorimeter of the form recently described by Dr. J. Y. Buchanan was received, which has been kindly lent to the observatory by Dr. Buchanan. It is very easy to use and promises to give valuable results.

Two photo-theodolites for cloud measurements have also been obtained from the Meteorological Office, but they require some repairs before they can be brought into use.

As it has been decided that one of the base observatories connected with the Magnetic Survey shall be placed at Kodaikánal, Captain H. A. D. Fraser, R.E., visited the observatory in February and selected a site in consultation with the Director. The excavation for the underground building was at once begun and is far advanced. A considerable part of the material required for the building has also been collected.

3. *Observations and Reductions—(a) Astronomical.*—Observations on the sun were carried on only occasionally till the middle of March when systematic daily observations were begun. The absence of spots and the remarkable uniformity of the sun's surface up to the close of the year were the most marked features brought out by these observations. It is, however, worth noting that on almost every day, even though the sky was not free from clouds, the definition of the sun was excellent up to at least 11 o'clock. On some days, with a strong wind blowing, the sun's limb was as sharp and steady as that of the moon on a good night, while the details of the surface markings were very clear.

A watch was kept for the Leonids on November 15, 16 and 17, but the weather was unfavourable and only a very small number of meteors were seen.

Comet Giacobini was looked for on the evening of December 26th, and in spite of the strong moonlight was found. It was, however, too faint to permit of useful measures being made with a 6-inch telescope.

At the time of the discovery of Nova Persei the Director was unfortunately absent in Madras, and it was not till March 7th, that any observations on it could be made. During the following ten days a number of observations were made.

Sextant observations for rating the clocks and chronometers are made twice a week. The rates of the clocks and chronometers have remained very satisfactory throughout the year.

(*b*) *Actinometrical Observations.*—Observations with Balfour Stewart's Actinometer were made on 56 days during the year. On 17 days complete sets were obtained. These consist of double observations two hours before apparent noon, at noon, and two hours after noon. The sun's altitude for the time of each observation has been computed. A few preliminary observations with Buchanan's Solar Calorimeter were also made.

(*c*) *Meteorological Observations.*—Eye observations of the barometer, the wet and dry bulb thermometers, the wind direction and speed, and of clouds and rainfall are taken three times a day (8h, 10h and 16h) both at Kodaikánal and at Periyakulam, where one of the assistants is stationed. Sun maximum and grass minimum thermometers are now in use at both places. Continuous records of pressure have been taken at Kodaikánal since 6th

May 1899, and at Periyakulam since 1st March 1901, with Richard barographs. Continuous records of temperature (wet and dry bulb) have been taken at Kodaikánal since 1st January 1901, and at Periyakulam since 1st March 1901, with Richard thermographs. Records of bright sunshine are made at Kodaikánal with a Whipple-Casella sunshine recorder. Rainfall is also recorded by an electrically recording rain gauge, and wind velocity with an electrically recording anemometer.

All observations are at once tabulated and reduced, and monthly returns of the 8h and of the 10h and 16h observations are sent to the Meteorological Office.

The height above the sea level of the cistern of the Periyakulam barometer has not yet been ascertained, so that the readings cannot be reduced to sea level. A comparison between the barometer readings at Kodaikánal and Periyakulam gives a difference of level of about 6,750 feet. Assuming the height above sea level of the Kodaikánal barometer to be 7,688 feet, the height of the Periyakulam barometer would be 938 feet. A comparison with the barometer readings at Madura, distant about 40 miles, gives the height above sea level as 934 feet which is probably within 10 feet of the true height.

Observations of the visibility of the Nilgiris, distant about 80 miles, were continued on the same plan as last year. The result is given in the following table :—

Month.	Very clear.	Visible.	Just visible.	Tops only visible.	Total.
1900					
April	1	3	4	2	10
May	0	1	5	0	6
June	1	2	3	1	7
July	3	8	0	4	15
August	2	3	1	10	16
September	3	13	4	6	26
October	4	7	2	1	14
November	4	6	1	6	17
December	7	11	1	2	21
1901.					
January	5	6	10	0	21
February	1	6	9	1	17
March	6	7	7	3	23

It may be noted that not infrequently these hills are clearly visible by moonlight. Over the whole of South India, last year was, in many respects, an abnormal one and, it seems certain that during a considerable part of the year the cloud proportion was higher than usual. Hence the table showing the distribution of bright sunshine (Appendix II.) cannot be taken as giving the normal values. Still it is of interest as showing that even in the cloudiest months there is a large proportion of sunshine in the forenoon hours. The sunshine statistics are given for apparent time, not for mean time. The record towards sunset

is, at certain seasons, interfered with by hills. There were only 17 days in the year on which no bright sunshine was recorded, but there were 33 other days on which the duration of bright sunshine was less than an hour. A summary of the chief meteorological results is given in the appendix.

(d) Earthquake Records.—The seismograph has been in working order throughout the year and has, on the whole, given far less trouble than in previous years. Copies of the records have been sent half-yearly to Professor Milne. A list of the chief shocks recorded during the year is given in Appendix IV.

Library.—The new bookcase referred to in last report was erected and the books have now been arranged in such a way that they can be easily consulted.

The number of books and pamphlets presented to the library during the year exceeded 300. These included a complete set, up to date, of the Geographical Journal, presented by the Royal Geographical Society. The number of volumes purchased, not including periodicals, was 15.

General.—The Director General of Indian Observatories visited Kodaikánal in January, arriving on the 10th and leaving again on the 14th.

The Director inspected the Madras Observatory in February.

The Madras Observatory.—The following report has been submitted by Prof. R. Ll Jones, Deputy Director of the Madras Observatory :—

Staff.—There was no change in the staff during the year and the distribution of work was the same as in the last year.

2. *Astronomical Observations and Reductions.*—The observations for the the time determination were carried on as usual. Three hundred and nineteen observations of equatorial stars, 69 of azimuth stars and 83 determinations of level and collimation were made during the year.

3. *Meteorological Observations.*—The meteorological registers were maintained as in former years. No instrument was replaced during the year.

4. *Time Service.*—The time service was continued as usual. The time gun at Fort St. George failed on 22 occasions out of 730, giving a percentage of success of 97·0 against 96·0 for last year. The time-ball at the Port Office failed at 1 P.M. on one day, but it was correctly dropped at 2 P.M. The 4 P.M. signal was received at the Central Telegraph Office on every day during the year. The following table shows all the failures and their causes so far as these could be ascertained :—

Month and date.	Signal.	Fault.	Cause.
1900 April 10	8 P.M. gun	Failed	Defect in the firing apparatus.
12	Do.	Do.	Unknown.
13	Noon gun	Do.	Do.
May 2	Do.	Do.	Weight did not drop.
5	8 P.M. gun	Do.	Do.
17	Time-ball	Failed 1 P.M., dropped 2 P.M.	
July 4	8 P.M. gun	Failed	Gunner absent.
August 11	Noon gun	Do.	Do.

Month and date.		Signal.	Fault.	Cause.
August	13	8 P.M. gun	Failed	Wire broke.
September	10	Do.	Do.	Tube missed fire.
	12	Noon gun	Do.	Tube failed.
	16	Do.	Do.	Weight did not drop.
October	24	Do.	Do.	Tube failed.
November	19	8 P.M. gun	Do.	Do.
	27	Do.	Do.	Do.
December	12	Do.	Do.	Gunner absent.
1901 February	8	Noon gun	Do.	Do.
	25	8 P.M. gun	Fired before time	By accident.
March	3	Do.	Failed	Apparatus out of gear.
	6	Do.	Do.	Tube failed.
	19	Noon gun	Do.	Gunner absent.
	20	Do.	Do.	Do.
	28	8 P.M. gun	Fired before time	Weight slipped.

It was mentioned in the previous report that the old firing apparatus was replaced by a new one. The new one has worked satisfactorily and an examination of the old one showed that the insulation had broken down sufficiently to account for its uncertain behaviour at the end of last year.

5. *Daily weather telegrams and special storm observations.*—Daily weather messages have, as usual, been sent to Simla, Calcutta and Bombay. Observations of 10 and 16 hours were reduced and sent to the Meteorological Office, Calcutta.

Special storm observations were supplied to the Meteorological Reporter, Bengal, on six occasions, *viz.*, 27th July, 29th July to 1st August, 10th to 13th September, 3rd to 5th October, 23rd to 24th October, and 2nd November. Hourly observations were taken during the storm of the 23rd and 24th October 1900.

Observations of the clouds and those of the evaporometer were continued.

6. *Instruments.*—The sidereal clock by Haswall, the mean-time chronometer by J. Carter, and the clock work of the Thermograph were cleaned by Messrs. P. Orr and Sons, Madras. The condition of working of most of the instruments has been satisfactory.

7. *Repairs.*—Certain repairs to the Deputy Director's quarters were carried out during the year.

8. The following summary of the chief features of the meteorology of Madras for the year 1900 was published in the *Fort St. George Gazette.*

Pressure was above the average for March, April, May, September, October, and December, and below the average for the other six months. The mean pressure for the day was lowest on 13th June, 29·515 inches, and highest on 22nd December, 30·129 inches.

Temperature was above the average for every month except April, when it was equal to the average. The highest shade temperature was 109·8°F. on the

3rd June and the lowest 62·2° F. on the 2nd January. The excess was greatest in August, for which month it averaged 3·3° F.

Humidity was below the average in June and August and above the average in all the other months. Humidity was lowest on the 12th July, when it averaged 31.

Rainfall was below the average in all months except April, when it was 2·47 inches in excess, and September, when it was 0·83 inch in excess. The deficiency in October was comparatively small; in November it was large—over 10 inches. The heaviest fall in one day was 2·92 inches on the 23rd October. The deficiency for the whole year was 20·09 inches.

Wind was most abnormal in direction in February, when it was three points more southerly than usual. Velocity was highest in August, 22 miles per day above the average.

Sunshine was below normal in all months except in August, when it was 6·8 per cent higher than usual and in October, when it was about normal.

Storms.—A small storm formed in the southwest of the Bay on the 22nd of October and moved almost directly towards Madras. It crossed the coast a little to the north of Madras on the morning of the 24th. It was a storm of moderate severity and filled up rapidly after crossing the coast.

The most remarkable month was August, when temperature and wind velocity were much higher than usual, and the air drier. During that month the monsoon across the West Coast was stronger than usual, and was giving heavy rain over the greater part of Northern India. As usual, under these conditions, the south received very little rain, and hence the excessive temperature conditions and low humidities at Madras.

KODAIKANAL,
The 7th May 1901.

C. MICHIE SMITH,
Director, Kodaikánal and Madras Observatories.

Appendix I.

Longitude 5h 09m 52s E.
Latitude 10° 13′ 50″ N.

Mean monthly and annual meteorological results at the Kodaikánal Observatory in 1900.

Height of barometer cistern above sea level 7,688 feet.

Month.	Barometer.		Dry Bulb Thermometer.				Wet Bulb.		Tension of Vapour.	Relative Humidity.	Sun Max. in Vac.	Min. on Grass.	Wind.			Rain.		Clear Sky.
	Reduced to 32°.	Daily range.	Mean.	Max.	Min.	Range.	Mean.	Min.	By Blanford's Tables.				Daily velocity.	Mean direction.		Amount.	Days.	
	Inches.	Inch.	°	°	°	°	°	°	Inch.	Cents.	°	°	Miles.	Points.	Points.	Inches.	No.	Cents.
January	22·866	0·071	54·9	64·6	48·4	16·2	46 9	39·8	0·244	55	128 1	38 6	255	8	E	1 69	5	59
February	·875	·070	56·3	67·0	48·8	18 2	47·7	41 0	·238	50	131 0	37·1	171	8	E	1·39	3	67
March	·887	·067	59·3	69·8	51·7	18 1	48·3	42·1	·224	42	136·8	42·4	203	6	ENE	0 17	3	78
April	·846	069	59·2	68·2	53·5	14 7	53 9	49·0	·362	71	135 4	47 5	181	3	NE by N	5·93	14	43
May	·852	·067	60·8	69·9	55·3	14·6	55 2	50·6	·379	70	135·4	49·5	148	4	NE	6 05	16	44
June	·773	·058	58·4	65·2	54·0	11·2	54·1	50·5	·641	76	122 4	51·1	435	27	NW by W	2·63	14	24
July	·756	·058	56·2	62·4	52 6	9·8	53·7	50·0	·388	85	127 1	49·7	409	27	NW by W	5·55	21	17
August	·778	·064	56·9	63·5	52·7	10 8	54 4	50·1	·399	84	126 4	49 3	351	27	NW by W	3 36	21	29
September	·812	·070	56 6	63·4	52·4	11·0	54·5	50 5	·402	87	130 5	49 4	282	31	N by W	10 05	21	33
October	·830	.072	55·3	62·1	50·8	11·3	52 4	48 9	·381	84	127·6	45·7	188	3	NE by N	11·41	24	33
November	·827	·067	54·4	62·2	49·0	13·2	51·0	45·6	·353	81	121·1	44·3	172	4	NE	5·91	19	33
December	·857	·070	53·7	62·1	48·2	13·9	49 0	42 8	·302	70	118 4	43 0	137	7	E by N	5 77	14	45
Annual	22 830	0·067	56·8	65·0	51·4	13·6	52·2	46·7	0·359	71	128·4	45·6	244	2	NNE	59·91	175	42

NOTE.—The wind velocity here given is much below what would be given by a freely exposed anemometer.

Extreme monthly meteorological records at the Kodaikánal Observatory in 1900.

Month.	Barometer.					Dry Bulb Thermometer.				Wet Bulb.		Humidity.		Sun Th. in Vacuo.		Grass Therm.		Wind.				Rain.	
	Highest.		Lowest.		Range.	Highest.		Lowest.		Lowest.		Lowest.		Highest.		Lowest.		Highest.		Lowest.		Greatest fall.	
	Inches.	Day.	Inches.	Day.	Inch.	°	Day.	°	Day.	°	Day.	Cents.	Day.	°	Day.	°	Day.	Miles.	Day.	Miles.	Day.	Inches.	Day.
January	22 945	21	22 770	8	0 175	70 9	25	43 5	3	*32·9*	*3 & 4*	*5*	*1*	146·8	11	33·8	29	512	22	105	8	0 78	20
February	949	7	·811	13	138	70 8	6	45 2	2	34 0	7	*5*	*6*	144·7	26	32 8	17	337	3	113	21	1·11	26
March	*·994*	*27*	805	20	·189	73·9	24	46 5	13	36·3	18	6	14	153 6	27	37 2	29	390	8	113	24	0 12	27
April	·921	6	·747	24	·174	73 2	2	51 2	10	40·0	18	18	17	154·8	20	38·9	4	436	29	102	5	1·54	6
May	955	10	·766	1	·189	*76·0*	*7 & 8*	50·8	29	44 0	15	25	5	147·4	7	45 1	6 & 30	274	1	88	11	1 34	19
June	·905	4	·663	11	·242	72 3	2	50·1	7	46 2	27	39	2	148 0	9	45 9	1	*790*	*13*	126	1	0 84	18
July	830	1	·686	27	·144	68 0	4	50 4	10	47·0	4	5	4	148 2	6	44 3	22	644	31	82	23	1·58	27
August	·865	16	*656*	*8*	·209	68 6	19	49·3	1	45·1	1	52	22	*156·8*	*21*	39·2	23	646	2	88	29	0 69	24
September	901	27	718	12	183	67 7	25	50 1	24	42 0	21	36	21	144·5	29	42·3	24	513	14	77	27	*2·66*	*10*
October	947	30	·735	24	212	66 9	14	44 5	23	39 3	8	37	5	146 7	11	39·6	8	419	23	55	11	1 40	15
November	·899	5	·756	20	·143	67·1	12	43·1	2	33·1	2	20	30	149·0	8	32·4	3	367	1	72	4	1·67	22
December	·941	18& 22	·771	4	·170	67·1	27	*42·2*	*31*	34 2	27	7	27	141·3	9	*29·9*	*28*	277	2	*52*	*28*	1·48	20

Appendix II.

Station : Kodaikánal.

Mean hourly bright sunshine for the year 1900.

Month.	Mean bright hours of month.													
	5-6.	6-7.	7-8.	8-9.	9-10.	10-11.	11-12.	12-13.	13-14.	14-15.	15-16.	16-17.	17-18.	18-19.	Total.
January	...	0·2	0·7	0·8	0·8	0·8	0·9	0·9	0·9	0·8	0·8	0·5	0·1	...	8·3
February	...	0·4	0·9	0·9	1·0	1·0	0·9	0·8	0·7	0·6	0·6	0·6	0·2	...	8·5
March	...	0·1	0·8	1·0	1·0	1·0	1·0	0·9	0·7	0·7	0·7	0·7	0·3	...	9·0
April	...	0·1	0·6	0·7	0·8	0·8	0·7	0·7	0·6	0·4	0·4	0·2	0·1	...	6·1
May	...	0·1	0·5	0·7	0·8	0·9	0·8	0·7	0·6	0·5	0·3	0·3	0·1	...	6·2
June	...	0·0	0·3	0·5	0·5	0·5	0·5	0·4	0·3	0·4	0·3	0·2	0·0	...	4·0
July	..	0·0	0·3	0·4	0·4	0·4	0·4	0·3	0·2	0·1	0·1	0·0	0·0	...	2·5
August	...	0·2	0·5	0·6	0·6	0·5	0·3	0·2	0·2	0·1	0·1	0·0	0·0	...	3·3
September	...	0·0	0·3	0·6	0·6	0·5	0·4	0·3	0·3	0·1	0·2	0·1	0·0	...	3·5
October	...	0·0	0·3	0·5	0·6	0·6	0·5	0·4	0·4	0·4	0·3	0·2	0·0	...	4·5
November	...	0·1	0·4	0·5	0·5	0·5	0·4	0·5	0·5	0·4	0·3	0·2	0·0	...	4·3
December	...	0·1	0·6	0·7	0·7	0·7	0·7	0·7	0·7	0·6	0·6	0·4	0·0	...	6·4
Sum	...	1·3	6·2	7·9	8·3	8·2	7·5	6·8	6·1	5·1	4·7	3·4	0·8	...	66·6
Mean	...	0·1	0·5	0·7	0·7	0·7	0·6	0·6	0·5	0·4	0·4	0·3	0·1	...	5·6

Appendix III.

Longitude 5 h. 10 m. 10 s. E.
Latitude 10° 9′ N.

Mean monthly and annual meteorological results at the Periyakulam Observatory in 1900.

Height of barometer cistern above sea level 943 feet (?)

Month.	Barometer.		Dry Bulb Thermometer.				Wet Bulb.		Tension of vapour.	Relative humidity.	Sun Max. in Vac.	Min. on Grass.	Wind.			Rain.		Clear Sky.
	Reduced to 32°.	Daily Range.	Mean.	Max.	Min.	Range.	Mean.	Min.	By Blanford's Tables.				Daily Velocity.	Mean direction.		Amount.	Days.	
	Inches.	Inch.	°	°	°	°	°	°	Inch.	Cents.	°	°	Miles.	Points	Points.	Inches.	No.	Cents.
January	29 012	·141	76·1	89 3	63·7	25 6	68·8	62·4	0·598	66		63·2	42 0	12	SE	1 94	2	68
February	·006	·162	79·6	94 4	65·7	28 7	68 4	62 1	·556	58		65 2	57·0	12	SE	0·13	...	85
March	28 968	·161	84·0	99 5	69 8	29 7	70 2	66 2	584	55		64 7	68 0	10	ESE	0 0	...	83
April	·900	·157	83 7	98 5	72 1	26 4	74 3	71·0	·685	62		70·8	61·4	11	SE by E	3·77	4	59
May	·897	·140	84·7	98 7	73·2	25 5	74 7	70·7	·736	63		70·9	57·3	12	SE	2 83	5	63
June	·829	·106	82·5	94·4	73 3	21 1	73 3	70 1	691	63		66 6	114 3	18	SSW	1 10	3	35
July	·835	·104	81·2	92·7	72 7	20 0	71 8	69 0	·649	62		68·3	95 4	18	SSW	2 32	6	33
August	852	·117	81·7	94 4	72·3	22·1	71·8	68·9	·641	60		72·8	104 5	19	SW by S	1·44	1	46
September	·902	·118	80 6	93 0	72 2	20 8	72 6	70·1	·695	69		67·9	68 7	18	SSW	2 12	6	39
October	·938	·129	79 8	90 1	71·5	18·6	72 4	70 0	·693	70		67 9	53·1	17	S by W	6·75	13	45
November	·961	·121	77·7	86 8	70 4	16 4	71 2	68 1	685	73		66 2	44 3	16	S	4 84	9	42
December	29 024	·134	76·1	87 1	66 9	20·2	69 0	64 7	·621	72		61·0	53 6	13	SE by S	1 65	5	60
Annual	28 927	0·132	80·6	93 2	70·3	22·9	71·5	67·8	0·653	64		67·1	68 3	15	S by E	28 89	54	55

Record incomplete.

Extreme monthly meteorological records at the Periyakulam Observatory in 1900.

Monsh.	Barometer.					Dry Bulb Thermometer.				Wet Bulb		Humidity.		Sun. th. in Vacuo.		Grass Therm.		Wind.				Rain.	
	Highest.		Lowest.		Range.	Highest.		Lowest.		Lowest.		Lowest.		Highest.		Lowest.		Highest.		Lowest.		Greatest Fall.	
	Inches.	Day.	Inches.	Day.	Inch.	°	Day.	°	Day.	°	Day	Cents.	Day.	°	Day.	°	Dav	Miles	Day	Miles	Day	Inches	Day
January	29 142	14	28 854	7	0 288	93 7	7	***51·9***	***1***	***51 0***	***1***	24	4			***42·2***	***1***	76 0	21	23 0	24	***16·0***	***10***
February	***172***	***14***	·868	15	·304	98 1	20	57 6	12&13	54 7	13	16	14&15			57 5	12&13	86 7	25	30 3	17	0 07	26
March	·142	12	·795	20	·347	102 1	29	63 9	7	61·1	1	***12***	***31***			54 6	15	100 4	12	30·5	29	..	...
April	·081	18	776	29	·305	103 0	21	70·6	10	67 1	16&17	22	17			67 5	3	93 1	28	33 6	25	·1 30	8
May	·022	20	·770	1&27	·252	***103·9***	***7***	67 7	10	67 0	5	27	6			66 8	30	109 7	5	31·3	19	1 40	19
June	28 976	17&26	***·679***	***10***	·297	100 2	9	68 2	22	65 5	27	32	4			62 5	22	***206·9***	***11***	33 5	18	0·57	18
July	·944	31	·721	13	·223	99 3	21	69 9	22	66 1	11	37	10			63 7	11	164 3	15	21 8	30	1 47	27
August	·976	23	·724	8	·252	98 6	27	67·3	1	64 7	1	35	27			61 6	1	152 4	3	35 8	9	1 15	29
September	29·034	28	·766	12	·268	100 5	26	66 2	21	63 9	21	34	25			58 8	21	155 5	24	20 8	11	0 57	30
October	128	30	·789	8	·339	97 3	10	64·1	23	62 7	23	29	8			58 6	8	98 4	8	***17·7***	***24***	1·48	11
November	066	1	·850	9	·216	90 9	4	64·1	2	62·1	2	35	3			57·1	2	69 5	17	22 4	12	1·41	10
December	·146	22	863	31	·283	91·4	11	60 6	23	58·6	9	41	2&10			45 5	14	88 3	19	23·4	6	0 66	20

Appendix IV.

Kodaikánal observatory seismological register.

No.	Date.	Commencement G. M. T.	Maxima G. M. T.	Mm.	Seconds.	Duration.	Remarks.
	1900.					H. M.	
27	April 24	23 21·9	23 28 6 31·8	2·0 1·5	...	0 30·5	
30	May 9	0 38 0	1 2·8	0·75	...	1 8	Many small shocks.
31	9	2 16·8	2 49·0	1·0	...	1 9	Slight motion visible till 6h. 40m.
34	June 1	9 24·4	...	...	...	...	Small single mark.
35	6	8 38·4	...	0·5	...	...	Ditto.
39	20	3 40 0	...	...	...	..	Thickening of line.
40	21	8 0·7	...	...	...	...	Ditto.
41	21	16 12·3	...	...	...	...	Ditto.
45	July "	15 10·4	15 10·4	0·5	0·36	0 2	No P. Ts.
49	14	4 07·0	4 20·6 54·2 5 3·0 8·7 12·3	0·25 0·4 0 25 0·2 0·2	0 18 0 29 0·18 0·15 0·15	0 54	
50	15	2 51·4	2 51·4	0·6	0·44	...	
51	16	7 19·8	7 30·0 35·0	0·3 0 2	0·22 0·15	0 17	
53	16	14 20·0	14 20·2	...	...	6 40	Many small but well-marked movements.
59	18	14 45·2	14 53·7	0·5	0·36	0 11	
60	18	18 59 6	19 2·4	0·5	0·36	0 10	
64	21	4 54·4	5 59·0	1·0	0·63	1 22	
69	Aug. 3	5 34·8	...	...	...	...	Boom swung off scale, apparently large oscillation for 8m.
70	11	10 39·0	...	...	...	...	Very slight.
71	14	5 0 2	...	...	...	1 0	Several small movements.
78	Sept. 17	22 6·9	22 17 6 46·2 51·4	1·0 0·75 0·75	0·54 0·41 0·41	1 31	
80	Oct. 7	21 21·2	21 43 0 54 4 22 06 6	0·5 0·5 0·5	0·31	1 1	Well marked though small.
81	8	9 16·5	10 13·0	1	0·63	0 57	
82	9	12 44·6	13 22·3 33·2	6 4	3·77 2·51	2 35	P. Ts. 32m.
83	10	3 23·0	3 29·0	4	2·51	0 50	Time slightly uncertain—clock driving badly.
84	18	16 46·2	16 46·2	0·5	0·27	0 2½	
85	18	18 48·3	18 49·0	1	0·54	0 3	
86	22	23 56·0	23 58·5	0·5	...	0 4	
88	25	23 59·0	...	...	...	1 0	Displacements with oscillation total displacements 11mm.
89	26	4 23·8	4 23·8	0·5	...	0 2	
91	29	6 41·0	7 1·7	1·0	0·48	0 24	Venezuela earthquake.
92	...	9 34·0	10 23·6 26·7 32 8 36·0	0·5 0·5 0·5 0·5	0·24	1 11	Ditto.
92A	...	14 34·0	...	...	...	1 5	Irregular disturbances.
93	30 ...	8 20·4 ...	9 6 9 15·2	2·0 1·0	1·08 0·54	1 2	P. Ts. 36m.

No.	Date.	Commencement G. M. T.	Maxima G. M. T.	Mm.	Seconds.	Duration.	Remarks.
	1900.					H. M.	
94	Oct. 30	10 58 7	...	...	...	0 6	Very slight.
95	...	11 45·2	...	0·5	...	0 8	
96	...	13 28·6	13 31·8	1·5	0 81	0 16	
98	Nov. 3	14 14·2	...	...	...	1 12	? Irregular movements.
100	9	18 14·2	18 15 2 46 0	0·5 0·5	0·31	0 35	
102	11	4 29 3	4 32·9	1·0	0·68	0 10	P. Ts. 2m.
103	12	1 18 3	1 29·7 36·0	1·5 0·5	1·02 0·34	1 5	P. Ts. 9½m.
104	16	21 23·0	21 29·7 38 0 46 8	4·0 1·0 1·0	2·51 0·63 0·63	1 9	P. Ts. 10m.
105	18	1 15·5	1 15 5 34·1	0·2 0·5	... 0·34	0 21	
107	...	19 4 4	19 5·4	0·5	...	0 6	
108	...	22 19·0	22 21·6	0·5	...	0 9	
109	...	23 21 6	23 21·6 32 5	0·5 0·5	...	0 13	
110	20	8 12 0	...	...	...	...	Displacement W.
	20	8 45·1	...	...	...	...	Displacement E.
112	21	5 20·2	5 21·0 24·2	0·25 0·25	...	0 10	
116	23	4 11·1	4 13·3	0·5	...	0 14	
117	23	20 13·6	20 40·0 45 2	0·5 1·0	0·31 0·63	0 57	
124	Dec. 3	22 23 5	22 35 0 53 5	0·5 0 5	0·24 0·24	0 55	
129	4	6 12·1	6 17·3 28 6 43 0	0·5 1·0 0·5	0·24 0 48 0·24	0 36	
130	4	8 13·1	8 17·3	0·5	0·24	0 6	
137	7	11 13·1	11 13·1	0·5	0·24	0 5	?
152	21	16 25·6	16 26·0	0·5	0·24	0 12	
153	21	17 2·8	17 06·9	0·25	...	0 8	
155	21	18 21·4	18 29·7	0·5	...	0 12	
157	23	23 7·0	...	...	...	0 5	Very slight.
160	24	14 24·2	14 28·2	0·5	0·27	0 7	
161	24	17 36·4	17 36·4 46·5	0·5 0·5	...	0 13	
162	25	5 15·5	5 31·9 37·0	3·0 4·0	1·62 2·16	1 49	P. Ts., 9m.
165	29	19 26·2	19 26 2 20 00 2	0·5 0·25	0·27 ...	0 38	
166	30	15 31·4	15 32·0 57·2 16 4·4	0·5 0·5 0·5	0·27	0 36	
	1901.						
2	Jan. 7	1 0·2	1 57·7 2 0 2 5·9	0·5 0·75 1·0	0·3 0·4 0·5	1 24	P. Ts., 45m.
3	8	19 51·0	20 6·3	0·5	0·3	0 29	
16	Feb. 15	8 0·0	8 10·4 24 8 36·6	0·5 0·7 0·5	0·3 0·5 0·3	0 43	P. Ts., 11m.

No.	Date.	Commencement G. M. T.	Maxima G. M. T.	Mm.	Seconds.	Duration.	Remarks.
	1901.					H. M.	
26	Mar. 4	16 35 5	16 44·9	0·5	0·3		
			48 0	0 5	0·3	0 30	
			51·1	0·25	0·2		
29	15	3 59	3 31·3	0·75	0 5	0 57	P. Ts., 24m.
31	16	12 8 5	12 19 3	1·0	0 6		
			21·4	0 75	0 5	1 4	P. Ts., 3 5m. Felt at Zanzibar.
			34 9	0·75	0 5		
32	19	0 10 8	0 12·3	1·25	0 8	0 47	
33	19	20 43·0	21 3 8	0·25	0·3	0 35	
34	23	15 1 8	15 2·8	0 5	0·3	0 12	
35	25	11 26 6	11 31·8	0·5	0 3	0 10	P Ts., 4m.
36	25	22 58 7	22 59·7	1 0	0·6		
			23 1 8	0 75	0·4	0 32	
			23 8·9	0·75	0·4		
38	April 5	23 40·7	23 51·0	1·0	0 6		
			0 14 7	4·0	2·5		
			16 3	4·5	2 8		
			21 6	3·0	1·9	1 50	P. Ts., 30m.
			27·3	2·0	1·3		
			31 4	0·5	0 9		
39	6	21 16·3	21 17·3	0·5	0·3	0 52	Well marked, though small.
40	7	3 31·0	4 4·3	0·5	0·3		
			19 7	1·0	0 7	2 0	
			29 5	0 5	0 3		
			5 7 3	1 0	0 7		
42	11	11 58 3	...	...	...	0 4	Widening of line.
43	15	17 40 2	17 44·3	1 0	0·6	0 7	
44	16	17 18·7	...	...	...	...	Widening of line.
45	18	3 18·7	3 35·3	0·75	0·4		
			39 4	1·0	0·5	0 37	P. Ts., 16m.
			45 6	0·5	0·3		
46	19	11 14·2	11 14·2	0·5	0·3		
			44 1	1·5	0 8	1 20	
			12 31 7	0·5	0 3		

Appendix V.

Abstract of the mean meteorological conditions of Madras in the year 1900, compared with the averages of past years.

Mean Values of	1900.	Difference from	Average.
Reduced atmospheric pressure	29·873	0·006 above	29·867
Temperature of air	82°5	1°4 do.	81°1
Do. of evaporation	76°2	1°7 do.	74°5
Percentage of humidity	74	2 do.	72
Greatest solar heat in vacuo	139°2	0°5 below	139°7
Maximum in shade	91°8	1°0 above	90°8
Minimum in shade	75°4	0°7 do.	74°7
Do. on grass	73°6	1 7 do	71°9
Rainfall since January 1st on 87 days	28·93	20·09 below	49·02
General direction of wind	S. E.	Same as	S. E.
Daily velocity in miles	161	10 below	171
Percentage of clear sky	53	2 above	51
Do. of bright sunshine	54·7	6·3 below	61·0

Appendix VI.

Number of hours of wind from each point in the year 1900.

Month.	N	1	2	3	4	5	6	7	E.	9	10	11	12	13	14	15	S.	17	18	19	2	21	22	23	W.	25	26	27	28	29	30	31	Calm.
January	3	46	8	26	24	105	105	119	141	56	10	17	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	82
February	...	...	...	3	...	13	22	18	58	51	84	116	163	58	28	6	3	1	1	...	...	...	...	...	...	...	...	...	..	...	...	...	47
March	...	1	2	1	1	14	12	28	19	28	10	18	67	303	127	17	11	18	19	3	1	...	...	...	...	...	...	...	...	...	...	...	44
April	5	10	11	2	5	21	8	11	2	9	10	63	132	238	113	19	8	11	5	1	...	...	...	..	...	...	...	...	...	5	3	8	20
May	...	...	...	...	...	...	...	...	17	15	2	30	20	160	186	124	44	44	32	30	7	9	9	7	2	1	...	...	...	...	...	...	5
June	3	2	...	...	2	...	...	7	10	21	22	20	27	27	33	39	12	28	14	48	33	43	47	101	76	47	16	9	14	10	2	1	6
July	7	2	3	11	1	1	...	...	2	4	17	5	23	67	21	31	26	31	20	28	11	46	46	137	96	44	15	25	13	2	2	1	5
August	4	...	3	2	...	...	...	4	8	7	20	29	24	21	50	19	33	30	19	53	38	34	67	90	94	47	20	19	3	1	...	5	...
September	...	3	3	3	1	1	1	1	6	10	10	26	25	71	52	23	27	29	37	53	32	51	27	44	62	26	25	31	17	7	8	1	7
October	24	40	22	61	65	51	58	50	42	22	8	36	43	21	1	13	8	31	5	12	1	8	...	3	16	4	2	8	7	12	2	16	52
November	40	80	72	187	131	60	14	33	12	21	5	2	...	1	...	...	...	...	4	2	5	4	1	...	...	1	...	...	1	...	1	32	11
December	4	44	75	247	118	172	18	48	7	4	2	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
Annual	90	228	199	543	348	438	238	319	324	248	200	362	524	967	612	291	172	223	156	230	128	195	197	382	346	170	78	92	55	37	18	66	284

Appendix VII.

Number of miles of wind from each point in the year 1900.

Month.	N.	1.	2	3	4.	5.	6.	7	E.	9	10.	11.	12.	13.	14.	15.	S.	17.	18.	19.	20.	21.	22.	23	W.	25.	26.	27.	28	29.	30.	31.	Monthly Total.
January . .	6	130	40	104	156	626	529	543	504	252	83	76	...	...	...	...	...	...	..	...	...	...	..	...	...	...	...	...	..	...	9	3058
February . .	...	...	...	23	...	44	89	66	215	238	431	503	777	378	123	45	20	7	3	...	...	...	..	...	...	...	...	...	...	...	...	...	2962
March .	...	3	8	6	15	64	92	108	83	122	40	123	356	2224	923	156	89	172	187	29	8	...	...	...	...	...	...	...	...	...	...	...	4808
April . .	18	38	59	20	21	159	50	83	10	38	38	545	953	1929	803	163	76	99	48	6	...	...	...	...	...	...	...	...	...	44	23	49	5272
May . .	...	...	...	...	...	...	...	...	99	73	16	214	191	1570	1935	1122	439	434	261	210	68	59	56	51	10	8	..	...	...	...	...	...	6816
June . .	16	19	...	...	23	...	...	71	84	163	137	173	262	222	301	309	67	182	113	299	227	347	437	966	859	540	198	91	32	82	23	2	6245
July . . .	36	15	21	39	4	9	...	...	16	37	86	52	143	475	180	213	137	127	114	129	88	308	344	1154	988	398	116	161	52	12	17	9	5480
August . .	28	...	24	15	...	...	...	38	79	56	167	201	206	165	478	122	244	172	134	370	258	257	511	755	976	427	186	173	28	6	...	11	6087
September .	...	25	17	25	7	8	6	5	49	71	70	178	164	541	332	198	169	156	219	289	192	269	192	326	469	177	159	194	84	37	21	5	4654
October . .	194	347	175	452	329	295	226	260	201	124	52	190	206	150	4	59	34	105	42	50	21	46	...	22	55	43	15	48	45	44	16	119	3969
November .	216	480	583	1144	815	371	92	159	53	60	18	6	..	6	...	...	...	...	6	21	37	15	9	...	...	11	...	...	4	...	6	228	4340
December . .	35	382	550	1855	651	1065	253	250	25	50	23	...	...	...	...	...	...	...	...	..	...	..	...	..	...	...	...	...	...	...	...	...	5139
Annual . .	549	1439	1477	3683	2021	2641	1337	1583	1418	1284	1161	2261	3258	7660	5079	2387	1275	1454	1127	1403	899	130	1549	3274	3357	1604	674	667	245	225	106	432	58830

Appendix VIII.

Number of inches of rain from each point for the year 1900.

Month.	N	1	2	3	4	5	6	7	E	9	10	11	12	13	14	15	S	17	18	19	20	21	22	23	W	25	26	27	28	29	30	31	Calm.	Monthly Total.
January .	...	0·11	...	...	0·22	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0·33
February .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
March .	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
April .	0·02	...	...	...	...	0·11	0 64	...	0·99	0·31	0·07	0·35	0·02	0·34	0·24	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3·09
May .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	. .	...	...	...	...	...	...	...	...	...	...	...	...	...	...
June .	...	...	...	...	...	...	...	...	0·04	...	...	...	...	...	...	0·09	0·04	...	...	0·14	...	0·38	...	...	0·10	0·07	0·07	0·25	...	...	0·37	...	...	1·55
July .	...	...	...	...	...	...	...	...	...	...	0·01	...	0·08	0·07	0·10	0·24	0·03	0·03	...	0·13	...	0·03	0·01	0·02	0·37	0·20	0·17	0·43	0·01	0·06	0·15	...	...	2·04
August .	0·15	...	...	...	...	...	...	...	...	0·01	0·02	...	0·09	0·02	0·18	...	0·10	...	0·02	0·49	0·18	...	0·07	0·05	0·08	0·24	0·10	...	0·03	...	...	...	...	1·83
September .	...	0·42	0·06	1·62	...	...	...	...	...	...	0·08	0·31	...	...	...	0·89	1·15	0·69	...	0·03	0·01	...	0·13	...	0·05	...	...	...	0·02	0·06	...	...	...	5·52
October .	1·43	1·94	...	0·20	1·17	0·58	0·32	0 07	...	...	...	...	...	0·04	...	0·07	...	0·37	0·94	0·09	...	0·80	...	...	0·61	0·11	...	0·01	...	0·05	...	0·01	0 21	9·02
November .	0·16	0·07	...	0·03	0·14	0·17	0·07	0·26	0·35	0·14	0·72	...	...	...	...	...	...	...	...	...	...	...	0·23	...	...	0·66	...	...	...	...	0·01	0·09	...	3·10
December .	...	0·28	0·22	0·51	0·62	0·22	0·09	0·49	...	0·02	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	2·45
Annual .	1·76	2·82	0·28	2·36	2·15	1·08	1·12	0·82	1·38	0·48	0 90	0·66	0·19	0·47	0·52	1·29	1·32	1·09	0·96	0·88	0·19	1·21	0·44	0·07	1·21	1·28	0·34	0·69	0·06	0·17	0·53	0·10	0·21	28·93

Appendix IX.

Month.	Wind resultant.		Clouds (0-10).					Bright sun-shine.		Amount of evaporation.
	Velocity	Direction	8 h.	10 h.	16 h.	20 h.	Mean.	Average per day.	Greatest No. of hours in the day.	Average per day.
	Miles.	Point.						Hours.	Hours.	Inch.
January . . .	90	ENE	4·5	5·8	3·2	1·7	3·8	8·1	9·7	0·161
February . . .	96	SE by E	2·5	3·0	1·3	0·4	1·8	9·7	10·2	·199
March . . .	137	SE by S	2·5	2·8	0·6	0·2	1·6	9·3	10·9	·212
April . . .	147	SE	5·8	5·2	4·0	2·5	4·4	7·2	10·4	·230
May	198	SSE	3·8	3·7	2·8	1·8	3·0	7·7	9·8	·241
June	112	SW by W	5·8	5·7	7·3	6·0	6·2	4·6	9·0	·309
July	107	SW by W	7·5	7·7	8·8	6·5	7·7	3·5	10·5	·232
August . . .	112	SW by W	6·2	5·8	6·8	5·9	6·2	6·0	11·0	·283
September . . .	78	SW by S	7·2	6·5	7·1	4·3	6·3	4·6	10·2	·200
October . . .	63	NE by E	5·2	6·0	5·6	4·2	5·3	6·6	10·4	·191
November . . .	127	NE by N	5·6	6·6	5·7	4·3	5·6	5·5	10·2	·137
December . . .	157	NE	4·4	5·5	4·8	3·3	4·5	6·5	9·1	·153
Annual .	41	SE by S	5·1	5·3	4·8	3·4	4·7	6·6		

Appendix X.

Mean monthly and annual meteorological results at the Madras Observatory in 1900.

Month.	Barometer.		Dry Bulb Thermometer.				Wet Bulb.	Tension of Vapour.	Relative Humidity.	Sun Max. in Vac.	Min. on Grass.	Wind.			Rain.		Clear Sky.	Bright sunshine.	General Weather.
	Reduced to 32°.	Daily Range.	Mean.	Max.	Min.	Range.	Mean.	By Blanford's Tables.				Daily. Velocity.	Mean Direction.		Amount.	Days.			
	Inches.	Inch.	°	°	°	°	°	Inch.	Cents.	°	°	Miles.	Points.	Points.	Inches.	No.	Cents.	Hours.	
January	29·995	0·123	76 1	85 2	67·6	17 6	71·9	0·727	81	145·9	64·4	99	6	ENE	0 33	1	62	252·1	
February	·959	·128	78 5	87·7	69·1	18 6	73·0	·739	76	136·0	66 0	106	11	SE by E	...	..	82	270·6	
March	·916	·133	81·9	90·8	73·2	17 6	76 1	·824	75	138 7	70 7	155	12	SE	...	...	84	288·9	
April	·841	·132	84·0	92·0	77·4	14·6	78·9	·921	79	139·7	75·6	176	12	SE	3·09	4	56	215 1	
May	·786	·127	87 4	96·6	82·0	14·6	80·5	·951	73	140 3	80 9	220	14	SSE	...	...	70	239 2	
June	·690	·124	89 0	101·5	82·3	19·2	78·4	·834	61	141·1	80·9	208	19	SW by S	1·55	10	38	139·0	
July	·712	·119	85·2	95 5	78·9	16 6	76·9	·817	68	133·2	78·0	177	21	SW by W	2·04	18	23	108·6	
August	·731	·135	86 6	98 6	79 7	18·9	77·2	·810	64	144·9	78·4	196	19	SW by S	1·83	15	38	187·3	
September	·791	·126	83 5	93 6	77 4	16 2	77·4	·859	76	140·3	76·5	155	19	SW by S	5·52	11	37	138·2	
October*	·871	·117	81 9	89 8	75·2	14 6	76·9	·859	79	139 1	73 7	128	6	ENE	9·02	13	47	204 7	* Cyclone, October 24th, crossed the Coast a little to the north of Madras.
November	·922	·109	78·1	85·4	71·4	14 0	73 9	·781	81	136 0	69 4	145	3	NE byN	3·10	8	44	165·5	
December	·993	·112	77 6	84 9	70·9	14·0	73·0	·753	79	134·8	68·4	166	4	NE	2·45	7	55	202·0	
Annual	29 851	0·124	82 5	91·8	75·4	16·4	76 2	0·823	74	139 2	73 6	161	12	SE	28·93	87	53	2411·2	

Extreme monthly meteorological records at the Madras Observatory in 1900.

Month.	Barometer.					Dry Bulb Thermometer.				Humidity.		Sun Th. in Vacuo.		Grass Therm.		Wind.				Rain.	
	Highest.		Lowest.		Range.	Highest.		Lowest.		Lowest.		Highest.		Lowest.		Highest.		Lowest.		Greatest Fall.	
	Inches.	Day.	Inches.	Day.	Inch.	°	Day.	°	Day.	Cents.	Day.	°	Day.	°	Day.	Miles.	Day.	Miles.	Day.	Inches.	Day.
January	30·124	20	29 826	8	0 298	87·9	31	***62·2***	***2***	57	3 and 4	152·0	12	***58·0***	***1***	160	19	55	7	0 33	19
February	·104	7	·841	16	·263	89·7	12	66·2	6	54	13	140 1	25	62·6	6	138	25	83	8	...	...
March	·103	11	·737	20	·366	93·9	25	66·9	14	52	13	145·8	29	64·3	14	222	25	72	14	...	...
April	29·958	1	·726	24	·232	95 7	21	74·3	14	51	13	145·1	10	71·6	2	236	7	99	27	2·05	27
May	·945	20	·618	31	·327	107 5	31	78·3	14	38	31	147·8	24	76·2	14	***306***	***17***	118	2	...	...
June	·828	5	***·515***	***13***	313	***109·8***	***3***	76 9	22	34	13	151·3	30	74 9	22	304	13	123	5	0·37	25
July	·823	20	·550	13	·273	102·1	1	74 5	18	***31***	***12***	149 6	17	73·5	18	242	2	85	26	0·35	3
August	·861	23	·560	8	·301	103·5	16	75 6	1	34	2 and 16	***156·6***	***25***	73 3	1	253	3	138	8 and 10	0 57	31
September	·951	27	·655	12	·296	98·1	21	72·3	7	39	20	152 6	6	73 2	7 and 12	219	23	80	30	2·04	6
October	30 058	30	·601	24	·457	98 2	7	70·4	22	42	21	155·2	16	68·1	22	285	24	***53***	***5***	***2·92***	***23***
November	·005	22	·809	8	·196	88·1	15	66·3	11 and 29	51	1	145·4	6	62·8	29	221	23	77	18	1·07	18
December	***30·129***	***22***	·871	1	·258	86·9	9	65·0	26	55	4 and 22	141 5	9	61·8	26	250	18	93	26	1·18	12

Appendix XI.

Abnormals from monthly means for 1900.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Reduced Atmospheric pressure . .	—0·005	—0·008	+0·008	+0·016	+0·052	—0·013	—0·028	—0·019	+0·014	+0·030	— 0·002	+0·012	+ 0·006
Temperature of air	+1·0	+1·8	+1·9	Same as	+0·7	+2·6	+0·7	+3·3	+0·5	+1·3	+ 0·6	+2·1	+ 1·4
Do. evaporation . . .	+2·7	+2·2	+2·2	+1·3	+2·2	+1·8	+1·0	+1·2	+1·1	+1·3	+ 1·0	+2·4	+ 1·7
Percentage of humidity	+8	+3	+1	+5	+6	—1	+3	—6	+4	+1	+ 2	+2	+ 2
Gr. solar heat in vacuum . . .	+7·5	—3·7	—1·8	—2·0	—2·7	+0·6	—5·5	+4·9	—1·0	Same as	— 1·4	—1·0	— 0·5
Maximum in shade	+0·6	+1·1	+1·6	—0·9	—1·2	+3·2	—0·1	+4·9	+0·4	+0·8	+ 0·4	+1·3	+ 1·0
Minimum „	+0·1	+1·1	+1·1	+0·2	+1·2	+2·0	+0·4	+2·4	+0·3	Same as	— 0·9	+1·1	+ 0·7
Minimum on grass	+1·3	+2·2	+2·1	+0·9	+2·0	+2·3	+1·4	+3·0	+1·5	+0·9	— 0·1	+2·0	+ 1·7
Rainfall	—0·56	—0·28	—0·39	+2·47	—2·12	—0·56	—1·83	—2·73	+0·83	—1·98	—10·11	—2·83	...
Rain since January 1st	—0 56	—0·84	—1·23	+1·24	—0·88	—1·44	—3·27	—6·co	—5·17	—7·15	—17·26	—20·09	—20·09
General direction of wind . . .	1 point E	3 points S	Same as	1 point E	1 point E	Same as	1 point W	Same as	1 point W	1 point E	1 point E	2 points E	Same as
Daily velocity in miles	—45	—16	+3	—15	—7	—12	—21	+22	—1	+5	—20	—17	—10
Percentage of clear sky . . .	— 1	+ 6	+8	—16	+8	+ 2	— 6	Same as	—1	+6	+ 3	+ 7	+ 2
Do. bright sunshine . .	—4·4	—1·8	—3·4	—18·9	—8·2	—16·2	—5·1	+6·8	—6·6	+0·5	—7·2	—6·0	—10 9

+ means above normal, — below.