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Government {1898} of Madras.
PUBLIC.

1898. }
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G.O., &c., Nos. 774, 775, 18th June 1898.

JUNE.

The Madras Observatory.

Forwarding to the Government of India the administration report of — for the year 1897.

GOVERNMENT OF MADRAS.

PUBLIC DEPARTMENT.

READ—the following paper:—

From the Government Astronomer, Madras, dated 27th May 1898, No. 104.

ABSTRACT.—Forwarding the report of the Madras Observatory for the year 1897.

ENCLOSURE.

ADMINISTRATION REPORT OF THE MADRAS OBSERVATORY
FOR THE YEAR 1897.

Staff.—From April 1, 1897, the appointment of Assistant to the Government Astronomer was revived and the Second Assistant M.R.Ry. K. V. Sivaramiah, M.A., was given the appointment. At the same time the temporary appointment of computer was abolished. On 5th August 1897 M.R.Ry. K. S. Lakshminarasa Aiyar, B.A., resigned his appointment and M.R.Ry. M. B. Subba Rau, B.A., was appointed to the staff.

2. *Buildings and Instruments.*—The buildings have been kept in good order throughout the year. The transit shutter, which has long given trouble, was replaced by one of an improved design which so far has proved entirely satisfactory.

The Lerebour and Secretan Equatorial was dismantled and forwarded to Sir Howard Grubb along with a portrait lens of 6 inches aperture and 3 feet focal length in order that the two should be mounted together for use at Kodaikānal. The siderial clock "Shelton" was removed from the large dome and placed on a pier in the transit room and its place was taken by the Haswell clock formerly used in the small dome with the Lerebour and Secretan Equatorial.

3. *Time service.*—The time service was maintained as in former years. The Fort time-gun failed on 20 occasions out of 730, giving a percentage of success of 97.3, which is less satisfactory than usual. Of the 20 failures no less than nine took place in October and November and were due, mainly at least, to the carelessness of the gunner who, on the 15th October 1897, replaced Gunner Green, who had always done his work with great care. On two days the semaphore at the Port Office failed to drop at 1 P.M., but was dropped at 2 P.M. On both occasions the failure was due to the breaking of the wire by which the semaphore is hoisted. On all other days throughout the year it dropped correctly at 1 P.M. The 4 P.M. time signal was received at the Telegraph Office on every day throughout the year. The following table shows all the failures in the time signals and their causes so far as could be ascertained:—

Date.	Signal.	Fault.	Cause.
1897.			
February 17th	Noon gun	Failed	The instrument at Fort out of adjustment.
March 22nd	8 P.M. gun	Do.	Tube broke.
" 23rd	Do.	Do.	Wire for hoisting semaphore broke.
May 2nd	Semaphore	Failed 1 P.M., dropped 2 P.M.	False current.
June 3rd	8 P.M. gun	Fired 12 minutes too early.	Gunner on leave, the work done by substitute.
" 17th	Noon gun	Failed	Tube broke.
July 17th	8 P.M. gun	Do.	Wire broke.
" 19th	Noon gun	Do.	Tube broke.
" 29th	Semaphore	Failed 1 P.M., dropped 2 P.M.	Wire broke.
" 31st	8 P.M. gun	Failed	Tube broke.
August 9th	Noon gun	Do.	Unknown, weight did not drop.
September 1st	8 P.M. gun	Do.	Tube broke.
" 19th	Do.	Do.	Unknown, weight did not drop.
October 7th	Noon gun	Do.	Tube missed fire.
" 20th	8 P.M. gun	Do.	Unknown.
" 25th	Noon gun	Do.	Tube broke.
" 27th	8 P.M. gun	Do.	Unknown.
" 28th	Do.	Fired 16 seconds late	Do.
November 11th	Do.	Failed	Apparently weight jammed.
" 18th	Noon gun	Do.	
" 22nd	Do.	Fired 3 minutes late	
" 29th	8 P.M. gun	Do. 2 do.	

4. *Observations.*—Observations for time determinations have been made as usual. The latitude observations, which were begun at the end of last year in co-operation with Major Burrard, R.E., of the Great Trigonometrical Survey, were completed and the final value obtained agrees well with the best results of former observations. A new determination of the latitude of the Observatory was made by zenith sector observations of the sun at noon on every day when it was visible from March 16 to May 29. The resulting value of the latitude was in satisfactory agreement with that obtained by the other methods. Readings for the re-determination of the flexure of the transit circle were continued at intervals during the year, but the values obtained differed so widely that it has not been possible to accept them as satisfactory. The reasons for this are, no doubt, chiefly that the collimators are far too small and their object glasses are not of a high quality so that a sharp image of the crosswires cannot be obtained. Every attempt is being made to obtain more satisfactory values.

5. *Reductions.*—The work on the catalogue has been pressed on as rapidly as possible. The right ascensions were completed and compared with the *Greenwich Catalogue for 1880*, the *Cordoba General Catalogue*, *Anwers' Fundamental Catalog* and *Anwers' Mittlere Orter von 83 südlichen sternem*. These comparisons show that the right ascensions are satisfactory. The final values of the north polar distance cannot be obtained till the value to be adopted for flexure has been fixed, but except for this and two other small corrections which will be applied at the same time, the work is complete. Considerable progress has been made with the press copy of the manuscript.

6. *Library.*—Two hundred and forty books and pamphlets were presented to the library during the year.

7. *Kodaikānal Observatory.*—In July, the Government Astronomer visited Kodaikānal and laid out a north and south line for the Observatory buildings, but building was not actually begun by the close of the year. The work has now been handed over to the Consulting Architect to Government and it is believed that there will be no more avoidable delays. The large spectrograph for solar physics work was received during the year. It consists of a polar siderostat with an 11-inch mirror, a 6-inch lens of 40-foot focal length, and a concave grating mounted on Rowland's plan. The siderostat and lens were made by Sir Howard Grubb and the rest of the instrument by the late Mr. Adam Hilger. The spectrograph has been temporarily erected in the library and has been found to be satisfactory. Several minor pieces of apparatus were also received during the year.

8. *The total eclipse of the sun.*—Sanction having been received from Government arrangements were made for taking part in the observations of the total eclipse of the sun on January 22, 1898. A considerable amount of time was spent in designing, fitting up, and testing the instruments to be used, and before the close of the year these instruments had been despatched to the eclipse camp at Sahdol in Rewa State.

9. *Meteorological.*—The meteorological observations were continued as in former years. A Richard wet and dry bulb thermograph was received towards the close of the year, but continuous records were not begun till January 1, 1898. At the request of the Chief Engineer for Irrigation, arrangements were made for beginning a series of observations on evaporation. A circular tank, 8 feet in diameter and 3 feet deep, was built in the Observatory compound, standing on a pillar 2 feet high in the centre of this masonry tank is a circular metal tank 2 feet in diameter and 1 foot deep, and it is the evaporation from this tank that is to be measured. The level of the water is kept the same in both tanks and this level is approximately that of the surrounding ground surface. It is believed that under these conditions the evaporation will be similar to that taking place from the water in an ordinary tank.

The chief features of the year's meteorology are shown in the appended tables and diagram.

The most striking feature of the meteorology of the year 1897 were the excess of temperature throughout nearly the whole year and the abnormal distribution of the rainfall.

The barometer—stood above its normal height in April and September and below it during the rest of the year; the greatest excess was 0.032 inch (in April) and the greatest defect 0.042 inch (in February). The highest daily mean was 30.116 on January 22 and the lowest 29.497 on July 9.

Temperature.—The shade temperature was above average in all months except September and December. The greatest excess was 3°.7 in February and the greatest defect 1°.4 in September. The maximum shade temperature was also above average throughout the year except in September and December. The minimum in the shade and the minimum on the grass were below average during September, November, and December and above during the rest of the year. The maximum temperature in the sun was above the average in all months except December. The highest shade temperature recorded was 107°.1 on May 16 and the lowest 64°.4 on December 22. The highest reading of the black bulb thermometer in vacuo was 165°.2 on July 1.

Humidity.—The percentage of humidity was above average in all months except November when it was in slight defect. The greatest excess was 12 per cent. in September. The driest day was July 1 with only 33 per cent. of saturation.

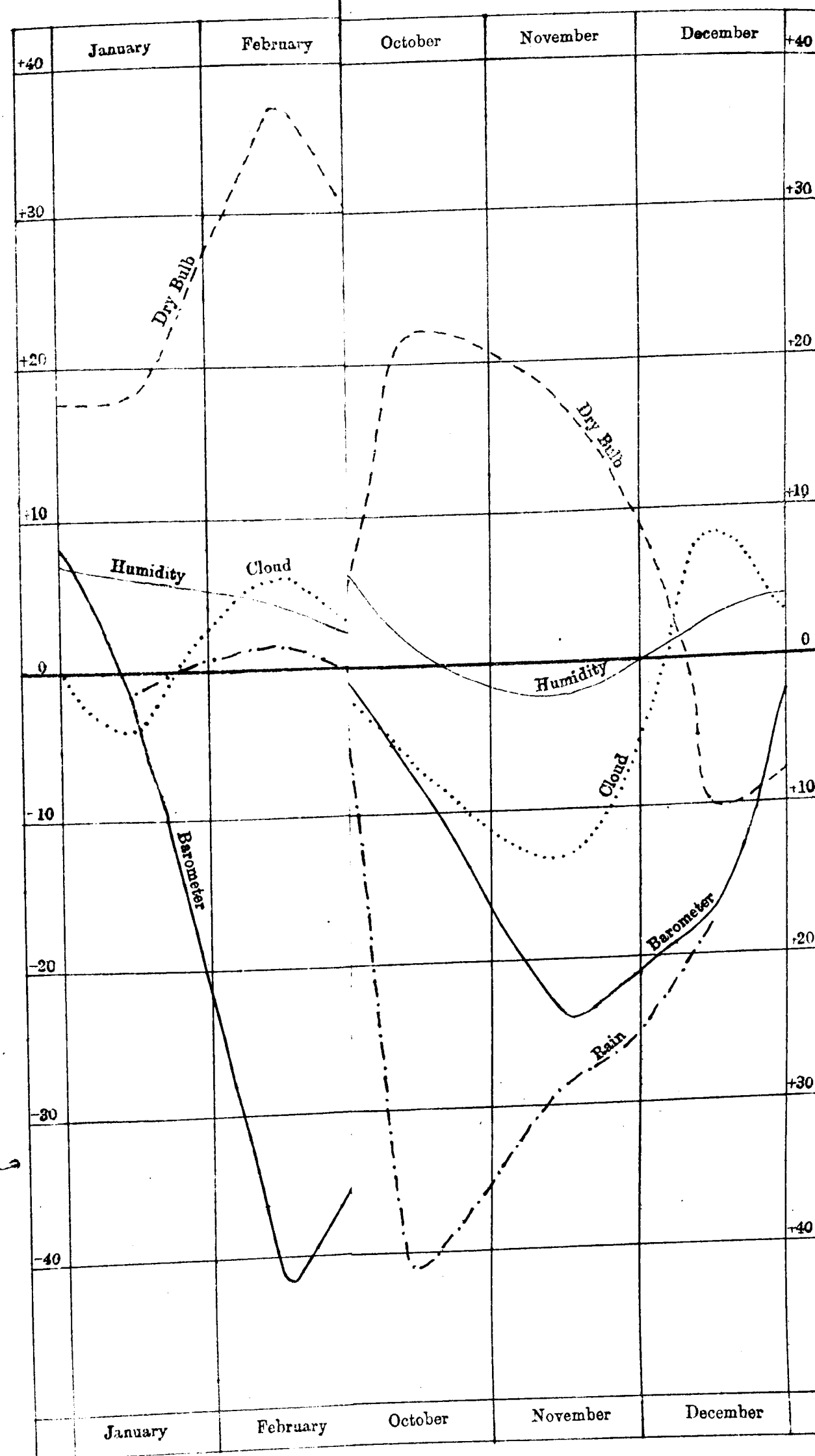
Rainfall.—The rainfall was above the average in February, June, August, and September and below it during the rest of the year. The greatest excess was 7.10 inches in September and the greatest defect 8.23 inches in October. The rainfall for the whole year was 38.47 inches on eighty-six days. The monsoon rainfall from October 15 to the close of the year was only 9.43 inches against an average of 26 inches. The greatest fall in one day was 3.11 inches on November 25.

Wind.—The wind direction was nearly normal except in February and October. In the former months it was five points more southerly and in the latter six points more northerly than the average. The amount of air movement was largely below normal in January, April, and September and slightly above normal in February, March, August, and December.

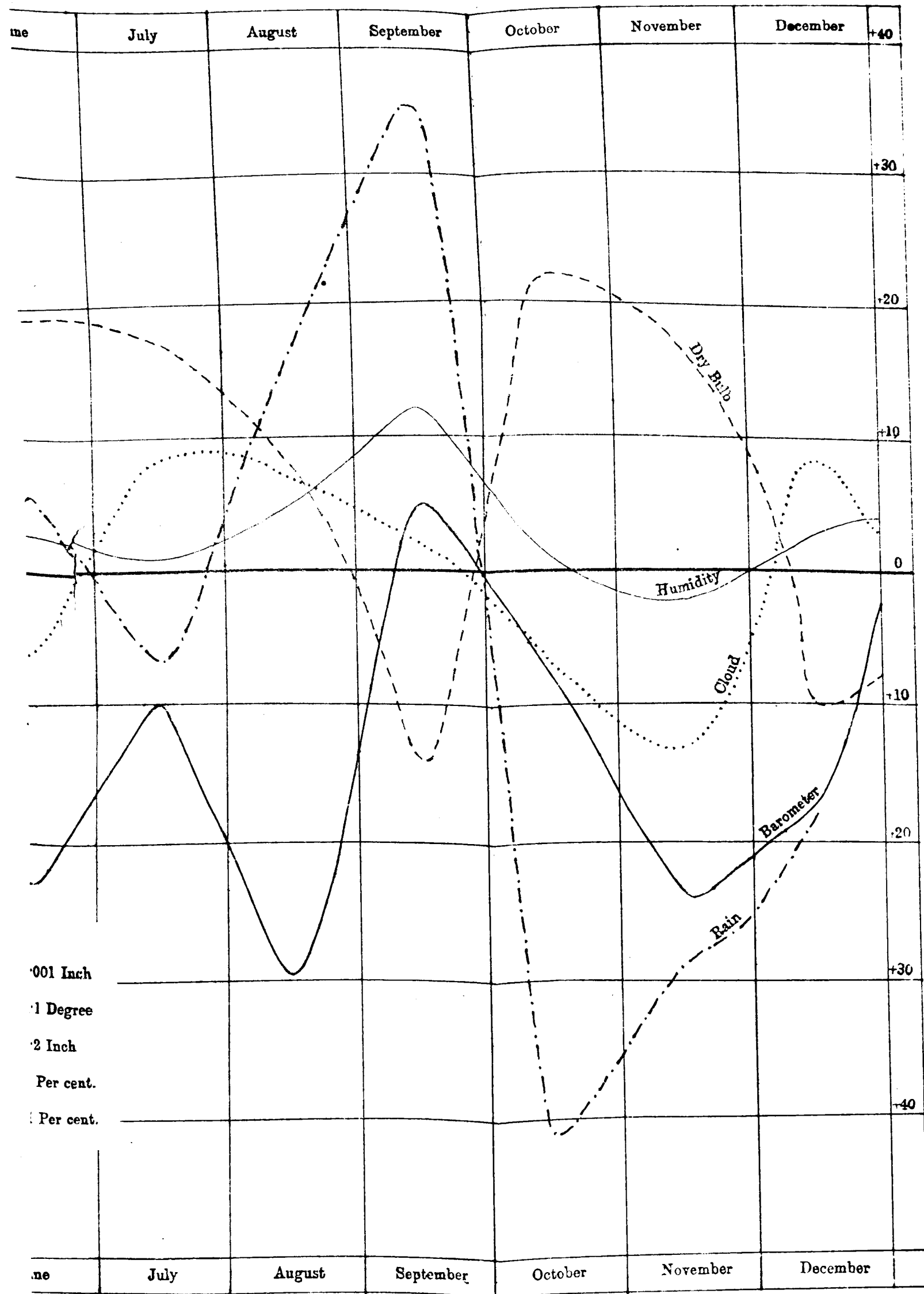
Cloud.—The weather was less cloudy than usual in January, May, June, October, and November and more cloudy in the other months.

Storms.—The southern parts of two small cyclonic storms passed over Madras one on the morning of November 25, the other on the morning of December 30, but neither did any serious damage.

(Signed) C. MICHIE SMITH,
Government Astronomer.



METEOROLOGICAL RESULTS FOR 1897
Is for Monthly Means



Litho. Survey Office, Madras.
1898.

Nos. 774, 775, PUBLIC, 18TH JUNE 1898.

5

Month.	Barometer.		Dry Bulb Thermometer.				Wet Bulb.	Tension of Vapour.	Relative Humidity.	Sun Max. in Vae.	Min. on Grass.	Wind.		Rain.		Bright Sunshine.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	Reduced to 32°.	Daily Range.	Mean.	Max.	Min.	Range.						Mean.	MILES.	POINTS.	DIRECTION.		Amount.	Days.	Clouds.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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EXTREME Monthly Meteorological Records at the Madras Observatory in 1897.

Month.	Barometer.				By Bulb Thermometer.				Humidity.		Sun Th. in Vacuum.		Grass Therm.				Wind.				Rain.
	Highest.		Lowest.		Range.		Lowest.		Highest.		Lowest.		Highest.		Lowest.		Highest.		Lowest.		
	INCHES.	DAY.	INCHES.	DAY.	INCHES.	°	DAY.	°	CENTS.	DAY.	°	DAY.	°	°	DAY.	MILES.	DAY.	MILES.	DAY.	INCHES.	
..	30.716	22	29.883	30	0.233	87.6	22	66.1	16	55	15	154.1	19	60.3	72	134	5	86	5	0.22	2
January	30.070	8	29.788	27	2.52	94.0	27	68.5	4	54	13	156.2	21	64.0	10	197	14	85	3	0.31	15
February	30.049	15	29.723	25	3.22	96.0	25	68.1	4	47	31	156.2	28	64.0	3	270	24	83	12	0.07	27
March	30.070	16	29.723	30	2.42	96.0	17	72.6	12	52	10	158.1	19	70.5	12	227	18	91	1	0.18	1
April	29.965	..	29.604	7	2.82	107.1	76	76.5	2	36	23	163.8	25	72.4	2	370	8	132	3	2.12	1
May	29.886	20	29.506	16	3.18	105.3	29	72.4	3	35	7	163.8	25	74.2	23	286	14	121	23	1.40	22
June	29.823	23	29.497	9	3.38	102.9	1	75.0	20	33	10	158.0	23	73.1	26	252	11	91	30	2.08	26
July	29.888	20	29.551	25	3.37	101.4	4	73.3	23	42	10	158.6	23	70.9	7	188	7	46	26	2.86	19
August	29.973	6	29.641	10	3.32	96.9	19	71.2	27	55	17	157.2	14	63.9	29	169	31	36	8	2.45	14
September	30.039	27	29.677	1	3.62	95.9	18	68.7	9	47	20	154.6	7	60.3	20	260	6	69	9	3.17	25
October	30.014	19	29.769	12	2.64	91.2	10	64.6	20	42	2	151.5	11	60.7	22	275	26	85	31	0.84	18
November	30.099	6	29.822	26	2.77	86.5	23	64.4	22	54	2	151.5	11	60.7	22	275	26	85	31	0.84	18
December	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

tials of
tender.

APPENDIX II.

ABNORMALS from monthly means, 1897.

	January.	February.	March.	April.	May.	June.
1	2	3	4	5	6	7
Reduced atmospheric pressure ..	- 0.003	- 0.042	- 0.023	+ 0.032	- 0.002	- 0.023
Temperature of air ..	+ 1.8	+ 3.7	+ 2.2	+ 0.6	+ 1.3	+ 1.9
Do. of evaporation ..	+ 3.1	+ 4.3	+ 2.3	+ 1.2	+ 2.1	+ 2.2
Percentage of humidity ..	+ 6	+ 4	+ 1	+ 2	+ 3	+ 3
Greatest solar heat in vacuo ..	+ 6.3	+ 9.0	+ 8.7	+ 8.2	+ 6.0	+ 9.4
Maximum in shade ..	+ 0.9	+ 2.3	+ 1.5	+ 0.1	+ 0.8	+ 1.6
Minimum in shade ..	+ 1.5	+ 4.8	+ 2.3	+ 0.3	+ 1.0	+ 1.3
Do. on grass ..	+ 2.3	+ 6.3	+ 3.7	+ 1.0	+ 1.9	+ 1.9
Rainfall in inches on ..	- 0.43	+ 0.25	- 0.33	- 0.55	- 1.04	+ 1.10
Do. since January ..		- 0.18	- 0.51	- 1.06	- 3.00	+ 1.90
General direction of wind ..	1 point E.	5 points S.	1 point S.	Same as.	Same as.	Same as.
Daily velocity in miles ..	- 49	+ 10	+ 9	- 32	- 2	- 5
Percentage of clear sky ..	+ 4	- 6	- 1	- 6	+ 3	+ 6
Do. of bright sunshine ..	- 2.8	- 7.5	- 5.5	- 7.3	+ 1.7	- 0.1

	July.	August.	September.	October.	November.	December.	Annual.
8	9	10	11	12	13	14	
Reduced atmospheric pressure ..	- 0.010	- 0.030	+ 0.005	- 0.008	- 0.024	- 0.017	- 0.011
Temperature of air ..	+ 1.7	+ 0.8	+ 1.4	+ 2.2	+ 1.7	- 1.0	+ 1.3
Do. of evaporation ..	+ 1.4	+ 1.8	+ 1.6	+ 2.0	+ 1.0	- 0.3	+ 1.9
Percentage of humidity ..	+ 1	+ 5	+ 12	+ 1	+ 2	+ 3	+ 3
Greatest solar heat in vacuo ..	+ 4.4	+ 5.4	+ 1.6	+ 10.1	+ 11.0	- 6.6	+ 6.1
Maximum in shade ..	+ 1.6	+ 1.1	+ 3.2	+ 2.8	+ 3.4	- 1.4	+ 0.9
Minimum in shade ..	+ 1.7	+ 0.7	+ 1.1	+ 0.9	+ 0.5	- 1.7	+ 0.9
Do. on grass ..	+ 2.4	+ 1.7	+ 0.4	+ 0.5	+ 0.7	+ 0.9	+ 1.7
Rainfall in inches on ..	- 1.37	+ 3.15	+ 7.10	+ 8.23	+ 5.71	- 3.59	- 10.55
Do. since January ..	- 3.27	- 0.12	+ 6.98	- 1.25	- 6.96	- 10.55	
General direction of wind ..	1 point W.	1 point W.	1 point W.	6 points N.	1 point E.	1 point N.	Same as.
Daily velocity in miles ..	- 15	- 8	- 49	- 19	6	+ 2	- 13
Percentage of clear sky ..	- 8	- 7	- 2	+ 7	+ 13	- 8	Same as.
Do. of bright sunshine ..	- 5.9	- 6.8	- 1.9	- 1.5	+ 10.6	- 16.7	- 4.0

ORDER—No. 774, Public, dated 18th June 1898.

The report will be forwarded to the Government of India.

(True Extract.)

G. STOKES,
Chief Secretary.

To the Government Astronomer.

ENDORSEMENT—No. 775, Public, dated 18th June 1898.

Copy to the Government of India, Revenue and Agricultural Department.

G. STOKES,
Chief Secretary.

Public (189) Department.

CURRENT No.



From

The Govt. Astronomer,
Madras

Order No. 774, of 18th June 1898.

A.

The report will be forwarded
to the Govt. of India.

No. 104.

Dated 27th May 1898.

Received } 2. 6. 98

Registered }

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SUBJECT.

Madras Observatory

Forwarding Administration
report of the — for the year
1897.

Madras, 27th May 1898.

No. 104.....

FROM

THE GOVERNMENT ASTRONOMER,

Madras.

To

The Honble Mr. A. J. Arundel,
Chief Secretary to Government.

SIR,

I have the honor to forward herewith -
a copy of the Administration report of the Madras
Observatory for the year 1897.

I have the honor to be,

Six.

Your most obedient-servant.
C. W. Smith

C. Machine Smith

Govt. Astronomer.

First copy sent to Press. 21/6

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CURRENT No

1432 h

ENCLOSURES TO G. No:

Final matter - fully

ORDER OF GOVERNMENT

LETTER OF GOVERNMENT.

STATEMENT WITH DITTO.

IF FILLED UP, BEING MEANT FOR DESPATCH IN ORIGINAL.

N.B. -
A = Print in full.
B = Not to be printed.
P = Print abstract only.
Q = Print heading only.