REPORT

OF THE

KODAIKANAL OBSERVATORY

FOR THE YEAR

1925

MADRAS
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS

1926

REPORT OF THE KODAIKANAL OBSERVATORY FOR THE YEAR 1925.

This report is concerned with the astronomical and seismological work of the Kodaikanal Observatory. The meteorological data will be published in the "India Weather Review" and administrative details will be incorporated in the annual report of the India Meteorological Department.

2. *Preliminary.*—The Director was on leave from 24th November 1924 to 17th December 1925 and Mr. A. A. Narayana Ayyar, Assistant, was in charge of the Observatory during the period. Owing to the limited staff, the work of the Observatory was confined to the usual routine, which was maintained on the same lines as in former years.

The collection of spectroheliograms from other observatories for those days on which records could not be obtained at Kodaikanal was continued as part of the programme of the International Astronomical Union. The data of solar activity given in this report are, however, based on Kodaikanal photographs only as photographs from other observatories will not be available until a considerable time after the end of the year.

At the instance of Lord Rayleigh, the Observatory has commenced, with effect from October 1925, to participate in his scheme of observations for determining the luminosity of the night sky. These observations are made on all days when sky conditions permit and results are communicated periodically to Lord Rayleigh.

3. *Weather conditions.*—Except during the last few months of the year, the observing conditions in the mornings were on the whole favourable for solar work. The mean definition in the north dome before 10 a.m. was 3·0 on a scale in which 1 is the worst and 5 the best, whilst the number of days on which the definition was estimated as 4 or above was 48.

4. *Photoheliograph.*—Photographs on a scale of 8 inches to the sun's diameter were taken on 328 days using a 6-inch achromatic object glass and green colour screen.

5. *Spectroheliographs.*—Monochromatic images of the sun's disc in K light were obtained on 327 days, prominence plates on 283 days and Hα disc plates on 285 days.

6. *Six-inch Cooke Equatorial and Spectroscope.*—Work with this instrument has been continued on the same lines as formerly for visual observations of solar phenomena which cannot be readily photographed.

Summary of sunspot and prominence observations.

7. *Sunspots.*—The following table gives the monthly numbers of new groups observed at Kodaikanal and their distribution between the

northern and southern hemispheres. The mean daily numbers of spots visible are also given.

—	January.	February.	March.	April.	May.	June.	July.	August.	September.	October	November.	December.	Year.
New groups ...	3	15	11	20	16	15	16	20	20	16	14	23	189
North	2	8	7	15	9	7	7	14	11	9	9	14	112
South	1	7	4	5	7	8	9	6	9	7	5	9	77
Mean daily numbers.	0·5	1·8	1·3	3·2	3·2	3·9	3 2	2·8	4 6	4 5	2·7	6·6	3·2

The above figures indicate a large increase of activity compared with the previous year, the activity being doubled in the northern hemisphere and increased $4\frac{1}{2}$ times in the southern.

The approximate mean latitude of the spots was 20°·1 in the northern hemisphere and 21°·6 in the southern.

With the advance of the new cycle of solar activity there was an increase in the number of long-lived spots and spots which persisted for more than one revolution of the sun.

December was by far the most active month of the year. A very large and active spot group which crossed the central meridian on the 28th of that month, was marked by violent disturbances of the spectrum lines throughout its passage across the visible disc. In addition to the hydrogen and helium lines, the D lines of sodium and the b lines of magnesium were observed to be reversed over the umbra on several occasions.

During the year, 382 bright reversals and 108 displacements of the H*a* line were observed on the disc in the neighbourhood of spots. Of the displacements, 88 or nearly 82 per cent were towards the red. D_3 was observed as a dark line on 167 occasions. The activity indicated by these disturbances during the second half of the year has been nearly 30 per cent in excess of that shown during the first half, whilst the activity for the whole year was $2\frac{1}{2}$ times that for the year 1924.

8. *Prominences.*—The mean daily areas in square minutes of arc derived from the Kodaikanal photographic records are shown below :—

—	North	South.	Total.
1925—January to June	2·98	2·26	5·24
July to December	3·46	3 42	6·88

The mean daily numbers were 16 8 and 17·6, respectively, in the two half-years.

Compared with the year 1924, these figures indicate an increase of 16 per cent in areas and 10 per cent in numbers, the increase, as in the case of sunspots, being more marked in the southern hemisphere.

The distribution in latitude was different from that of the year 1924 as a result of relatively greater increase of activity in low latitudes.

A minimum of activity in the belt 40°—50° was clearly marked in the northern hemisphere. In the second half of the year the maximum near 60° has advanced slightly towards the poles compared with the first half.

Prominences showing metallic lines were observed on 50 occasions. Of these, 33 were in the northern hemisphere.

Five hundred and forty-six displacements of the hydrogen lines were observed in the chromosphere and prominences as against 329 during 1924. Three hundred and seven displacements were towards the red, 232 towards the violet and 7 both ways simultaneously.

Prominences projected on the disc as absorption markings again showed an increase over the previous year. Their distribution shows a dissimilarity between the northern and southern hemispheres. While there are two maxima in the northern hemisphere at 30° and 60°, there is only one maximum near 30° in the southern hemisphere. The difference in distribution compared with that in 1924 is principally due to the development of activity near latitudes 30°N and 30°S.

During the first half-year, there was an excess of prominence numbers in the eastern hemisphere and of areas in the western. During the second half-year both areas and numbers were in excess in the western hemisphere. In the case of Hα absorption markings both areas and numbers showed an eastern excess during the first half-year and a western excess during the second.

9. *Time.*—The error of the standard clock is usually determined by reference to the 16-hour signal from the Madras Observatory. This is rendered possible by the courtesy of the Telegraph Department which permits the Madras wire to be joined through to this Observatory. The signal is received with accuracy on most days and all failures are at once reported to the Postmaster-General, Madras.

10. *Seismology.*—The Milne horizontal pendulum recorded 94 earthquakes during the year. For details of the records, reference may be made to the " India Weather Review."

11. *Library.*—Eighty-four volumes were bound during the year.

12. *Publications.*—The annual report for 1924 and the following bulletins were published and distributed during the year :—

LXXV. Summary of Prominence Observations for the second half of the year 1923, by T. Royds, D.Sc., F.R.A.S.

LXXVI. Summary of Prominence Observations for the first half of the year 1924, by A. A. Narayana Ayyar, B.A., F.R.A.S.

LXXVII. Summary of Prominence Observations for the second half of the year 1924, by A. A. Narayana Ayyar, B.A., F.R.A.S.

A paper by the Director entitled " The Apparent Tripling of Certain Lines in Arc Spectra " was published in the Proceedings of the Royal Society, Vol. CVII, page 360.

13. *General.*—During his leave, the Director visited the Meudon Observatory and also attended the Cambridge Meeting of the International Astronomical Union.

KODAIKANAL,
18*th February* 1926.

T. ROYDS,
Director,
Kodaikanal and Madras Observatories.