

## REPORT\* OF THE KODAIKANAL OBSERVATORY FOR THE YEAR 1944.

This report embodies the data of the solar activity based on observations made exclusively in this observatory.

The year 1944 witnessed a further decline in all forms of solar activity. Daily character figures of solar activity according to H $\alpha$  bright flocculi and absorption markings were communicated to Mr. Newton for transmission to Prof. Brünner at Zürich for inclusion in the Quarterly Bulletin on Solar Activity. Daily character figures from calcium flocculi were also worked out and communicated to Mr. Newton for transmission to Prof. Brünner.

2. *Observing conditions.*—The number of cloudy days being unusually large as in the previous year, there has been a decrease in the number of days of observations. The conditions for solar observation were practically the same as in the previous year. The mean value of definition noted in the north dome before 11 A.M. (I. S. T.) was 2.63 on a scale in which 1 is the worst and 5 the best, as against 2.5 of the previous year; but there were 39 days on which the definition was estimated to be 4 or above as against 7 of the previous year.

3. *Photoheliograph.*—Direct photographs of the sun on a scale of 8 inches to the sun's diameter were taken on 290 days with a six-inch achromatic object glass and green filter.

4. *Spectroheliographs.*—Photographs of the monochromatic images of the sun's disc in K light were obtained on 285 days, prominence plates in K light on 265 days and H $\alpha$  disc plates on 251 days. A total of 1389 spectroheliograms were taken during the year.

5. *Six-inch Cooke Equatorial and Spectroscope.*—Visual observations of solar phenomena which cannot be readily photographed were continued with this instrument as in previous years.

6. *Spectrohelioscope.*—Observations with the Hale Spectrohelioscope were made on all days of favourable weather, except on Sundays and public holidays, special attention being paid to bright chromospheric eruptions and breaking of dark markings. Quarterly lists of chromospheric eruptions together with the times of observation were communicated to Mr. H. W. Newton for transmission to Prof. Brünner, Zürich, for incorporation in the Bulletin on Solar Activity.

7. *Research work.*—The work on the intensities and contours of Fraunhofer Lines, was continued.

Taking advantage of the minimum period of solar activity high dispersion spectrograms of the sun's chromosphere, outside the eclipse, were obtained in H $\alpha$  and H $\gamma$  for spectrophotometry of the chromosphere.

---

\* This report deals chiefly with the astronomical work of the KodaiKANal Observatory. The meteorological data will be published in the India Weather Review and the administrative details will be incorporated in the annual report of the India Meteorological Department.

8. *Sun-spots*.—The following table gives the monthly numbers of new groups observed at Kodaikanal and their distribution in the northern and southern hemispheres, and also the mean daily numbers :—

1944.	January	February	March	April	May	June	July	August	September	October	November	December	Total.
New groups ..	1	0	3	1	2	2	2	9	4	8	3	8	43
North ..	1	0	0	0	1	1	1	2	1	1	1	4	13
South ..	0	0	3	1	1	1	1	7	3	7	2	4	30
Mean daily Number	0.33	0.04	0.09	0.03	0.10	0.54	0.17	1.33	0.84	1.36	0.92	2.17	0.71

Both the number of groups and the mean daily numbers show a decrease when compared with the previous year, the former being 41.9% and the latter 40.8%. The sun's disc was free from spots on 156 days. The approximate mean latitude of the spots was  $21^{\circ} \cdot 1$  and  $19^{\circ} \cdot 1$  in the northern and southern hemispheres respectively. There has been, however, a general increase in the number of spot groups towards the end of the year, indicating the beginning of the new cycle.

A high latitude spot ( $45^{\circ}\text{N}$ ) and its attendant faculae, which indicate the beginning of a new cycle of solar activity were recorded on August 14. The spot existed only for one day and the faculae could be observed continuously for 3 days. Bright reversal of the  $\text{H}\alpha$  line and the dark reversal of the  $\text{D}_3$  line were observed, in the neighbourhood of sunspots each on one occasion.

9. *Prominences*.—The mean daily areas and numbers of calcium prominences as derived from Kodaikanal photographs are as follows :—

*Areas.*

1944.	North.	South.	Total.	
Jan.—June .. ..	0.98	1.13	2.11	(Sq. Minutes).
July—Decr. .. ..	1.07	1.14	2.21	(Sq. Minutes).
<i>Numbers.</i>				
Jan.—June .. ..	4.06	3.55	7.61	
July—Decr. .. ..	3.68	3.95	7.63	

When compared with the previous year, there is a decrease both in area and numbers, the former being 17% and the latter 20%. Both the areas and numbers show a preponderance in the southern hemisphere as in 1943. The distribution in areas and numbers shows maximum activity between  $10^{\circ}$ — $15^{\circ}$  and  $35^{\circ}$ — $40^{\circ}$  in the northern hemisphere and  $5^{\circ}$ — $10^{\circ}$  and  $45^{\circ}$ — $50^{\circ}$  in the southern hemisphere.

Thirteen metallic prominences were observed during the year, as against 2 during the previous year. Of these, 8 were in the northern hemisphere and 5 in the southern.

Displacements of the 'C' line in the chromosphere and prominences were observed during the year on 18 occasions with the spectroscope as against 47 during the last year. Of these, 11 were towards violet and 7 towards red. The largest displacement observed during the year was  $2\text{A}^\circ$  on December 26.

Twentyfive displacements in prominences were observed with the spectroheliograph as against 86 during the previous year. Of these, 14 were on the north limb and 11 on the south limb, while 13 were on the east limb and 12 on the west limb.

An eruptive prominence photographed on April 15 on the east limb reached a maximum height of 4 minutes.

The mean daily area of hydrogen absorption markings (without foreshortening correction) was 1036.9 millionths of the sun's visible hemisphere as against 1704 millionths during 1943, showing a marked decrease of 39%. The distribution of areas in latitude shows maximum activity at  $40^\circ$ — $45^\circ$  in the northern hemisphere and at  $45^\circ$ — $50^\circ$  in the southern hemisphere.

10. *Time*.—The error of the standard clock of this observatory was determined mainly by reference to the 8-45, 13-30 and 18-30 hrs. I. S. T. wireless time signals from Bombay and Greenwich and by occasional observations at the Transit Instrument.

11. *Seismology*.—The Milne-Shaw Seismograph recorded 151 earthquakes during the year and the details of the records are incorporated in the Quarterly Seismological Bulletins published by the India Meteorological Department.

12. *Library*.—The number of books added during the year was 12.

13. *General*.—Mr. N. R. Rao, M.Sc., formerly Assistant of this Observatory was awarded the Doctorate degree of the Andhra University for his thesis entitled "Studies in Electrolytic Solutions by Raman Effect".

14. *Publications*.—The Annual Report for the year 1943 and the Kodaikanal Observatory Bulletin No. 122 "Summary of Prominence Observations for the Year 1943", were kept ready for publication after the war.

KODAIKANAL ;

A. L. NARAYAN,

January, 1945.

Director.

MS6DGOB-520-2-11-48-GIPS

(11)