REPORT* OF THE KODAIKANAL OBSERVATORY FOR THE YEAR 1937.

Compared with last year all forms of solar activity showed a further, though not large, increase during the year 1937. The most pronounced increase, *viz.*, 41 per cent. was in the mean daily number of spots ; while the mean daily areas of calcium prominences showed an increase of less than one per cent., the mean daily numbers of calcium prominences showed an increase of 7 per cent. and Hα absorption markings an increase of 6 per cent.

The collection of spectroheliograms from other observatories for those days on which complete 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.

Daily character figures of solar activity as regards Hα bright flocculi and Hα dark markings for the year 1937 were communicated to the Observatoire Fédéral, Zürich, under the auspices of the International Astronomical Union. The character figures for K bright flocculi from Kodaikanal plates are communicated by the Solar Physics Observatory, Cambridge, combined with their own. Eight original photoheliograms were supplied to the Greenwich Observatory and 331 original calcium disc spectroheliograms to the Cambridge Observatory.

2. *Weather conditions.*—Weather conditions were slightly more favourable for solar observations than during the previous year. The mean value of the definition in the north dome before 10 A.M., however, was only 2·2 on a scale in which 1 is the worst and 5 the best, and the number of days on which the definition was estimated as 4 or above was only 11 as against 2·4 and 32 respectively during the previous year.

3. *Photoheliograph.*—Photographs of the sun on a scale of 8 inches to the sun's diameter were taken on 330 days using a 6-inch achromatic object glass and green colour screen.

4. *Spectroheliographs.*—Photographs of the monochromatic image of the sun's disc in K light were obtained on 317 days, prominence plates in K light on 315 days and Hα disc plates on 294 days. The total number of spectroheliograms secured during the year was 2545.

5. *Six-inch Cooke Equatorial and Spectroscope.*—Work with this instrument was on the same lines as in previous years, *viz.*, the visual observation of solar phenomena which cannot be readily photographed.

6. *Spectrohelioscope.*—Observations with the spectrohelioscope were made on all days of favourable weather except Sundays and holidays, special attention being given to bright chromospheric eruptions. A list of these bright eruptions was sent quarterly to the Meudon Observatory, Paris, for inclusion in the International Astronomical Union Bulletin of Character Figures.

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

7. The previous Director who was deputed by the Government of India to observe the total solar eclipse of June 19, 1936, in Japan, completed the measurements of the plates taken at the eclipse and published his results.

The presence of oxygen in solar prominences was detected by Drs. T. Royds and A. L. Narayan.

The progressive change in the inclination of hydrogen dark markings to the sun's meridian was studied by Dr. Royds and Mr. Md. Salaruddin and the results were published.

A systematic study of the contours of selected lines in different parts of the sun's disc and particularly in sunspots has been undertaken by the Director and Assistant Director. A 13-foot prismatic spectrograph of the Littrow type was constructed for the purpose.

With a view to securing photometric measures of prominences and bright Hα eruptions the designing of an improved scale for estimating intensities, using a step wedge, was begun.

8. *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 are also given.

1937.	Jan.	Feb.	Mar.	Apl.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Year.
New Groups . .	44	33	33	27	36	32	30	24	33	24	23	40	379
North . . .	24	15	19	12	18	18	14	13	18	12	11	17	191
South . . .	20	18	14	15	18	14	16	11	15	12	12	23	188
Mean daily number .	8·5	8·7	6·3	7·0	7·4	7·1	7·7	6·8	6·8	5·9	5·1	5·2	6·9

Compared with the previous year, the number of new groups observed was 34 per cent. in excess of that of last year ; also the mean daily numbers showed an increase of 41 per cent. There were no days on which the sun's disc was free from spots. The approximate mean latitude of the spots was 16°·0 in the northern hemisphere and 17°·8 in the southern. Bright reversals of the Hα line, observed with the spectroscope, over the sun's disc in the neighbourhood of sunspots numbered 891 as against 745 in the previous year, whereas the displacements of the Hα line observed in the same regions numbered 73 as against 99 in the previous year. 40 of the displacements were towards the red, 17 towards the violet and 16 both ways simultaneously. D_3 was observed as a dark line on 826 occasions as against 734 in 1936.

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

Areas.

——	North.	South.	Total.
1937 January to June	3·61	4·19	7·80 square minutes.
July to December	3·65	3·03	6·68 ,,

Numbers.

	North.	South.	Total.
1937 January to June . . .	7·11	8·08	15·19
July to December	8·79	7·67	16·46

The activity is almost equally divided between the northern and southern hemispheres.

The distribution in latitude of areas and numbers has continued to be irregular. The peak in the northern hemisphere has advanced 10° towards the poles from its position in 1936, but that in the southern hemisphere has advanced 15° towards the poles. Both the peaks have become less marked.

Sixty metallic prominences were observed during 1937 as against 64 in the previous year. Of these 39 were in the northern hemisphere and 21 in the southern hemisphere and all these were between latitudes 1° and 40°. Displacements of the hydrogen line (Hα) in the chromosphere and prominences observed during the year with the spectroscope numbered 369 as against 407 in 1936. Of these, 200 were towards the red, 144 towards the violet and 25 both ways simultaneously.

With the spectrohelioscope, 259 displacements were observed in prominences as against 197 in the previous year. Of these, 151 were in the northern hemisphere and 108 in the southern, and 145 were on the east limb and 114 on the west limb. Displacements to the red numbered 131 and those to the violet numbered 128. The largest displacement in prominences observed in 1937 was 3·4 A to the violet.

On 16th June 1937 a bright eruption was noticed in the northwest quadrant of the sun near the central meridian where a sunspot was situated. While the bright eruption itself was not noteworthy, a dark marking in its neighbourhood exhibited great activity. It rapidly changed in shape and extent from 9^h 50 to 10^h 14^m A.M. I. S. T. and became insignificant by 11^h 0^m. Displacements to the extent of 1·6 A to the red and 2·6 A to the violet were noticed on it during its active phase.

The mean daily areas of prominences projected on the disc as hydrogen absorption markings amounted to 9490 millionths of the sun's visible hemisphere as against 8973 millionths in the previous year, showing an increase of 6 per cent. Their distribution in latitude was similar to that of the calcium prominences, except that the activity in the lower latitudes became much more pronounced than in the previous year and that, towards the end of the year, the activity near the poles practically ceased.

10. *Time.**—The 16-hour time signal issued by the Alipore Observatory, Calcutta, was received accurately on most days and all failures were reported to the Postmaster-General, Madras. In addition wireless time signals were received from Colombo, Calcutta and Rugby until about the end of September when the wireless set went out of order. The installation of a new up-to-date wireless receiver was under proposal.

11. *Seismology.*—The Milne-Shaw seismograph recorded 169 earthquakes during the year. For details of records reference may be made to the India Weather Review.

12. *Publications.*—The annual report for the year 1936 and the following bulletins and papers were published during the year :—

1. Bulletin No. 111. A Progressive change in the inclination of Hydrogen Dark Markings to the Meridian of the Sun by Dr. T. Royds and Mr. Md. Salaruddin.

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*The error of the standard clock of this observatory is usually determined by reference to the 16-hour signal distributed from the Alipore Observatory, Calcutta. The reception of the signal at Kodaikanal is rendered possible by the courtesy of the Telegraph Department which permits the telegraph line to be joined through to this observatory.

2. Bulletin No. 112. Summary of Prominence Observations for the first half of the year 1936.
3. Solar Wave-length Displacements observed at the Japan Eclipse of 1936 June 19 by Dr. T. Royds, *Monthly Notices of the Royal Astronomical Society*, Volume 97, page 692, 1937.
4. Oxygen in Solar Prominences by Drs. T. Royds and A. L. Narayan,—*Current Science*, Bangalore, Volume 5, page 531, 1937.

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KODAIKANAL;

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