

Reprinted from the MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY,
Vol. 115, No. 2, 1955

Kodaikanal Observatory, Kodaikanal
(Director, Dr A. K. Das)

General.—Matters relating to the establishment of a Central Stellar Observatory for India were discussed at the third meeting of the Standing Advisory Board for Astronomy and Astrophysics in India which was held at Hyderabad in 1954 January. The Director visited Udaipur, Ujjain and Aurangabad areas to prospect for possible sites for the proposed Observatory.

The requirements under the second five-year plan in respect of scientific equipment and machinery for the continuation or expansion of the schemes

relating to Astronomy and Geophysics already included in the first five-year plan and in connection with further new schemes were submitted to Government.

Satisfactory progress has been made regarding the acquisition of the polarizing monochromator, 8-inch coronagraph and the large solar telescope and spectrograph.

International cooperation.—This Observatory will participate in the intensive programme of observations relating to Solar Physics, Geomagnetism, Atmospheric Ozone, Ionosphere and Cosmic Rays during the International Geophysical Year, 1957–1958.

This Observatory participated in the photographic programme of the Mars Committee for international cooperation in the study of Mars during the 1954 opposition. Details of the photographs of Mars taken here from 1954 June to September were supplied to the Mars Committee, Lowell Observatory, Arizona, U.S.A.

Exchange of spectroheliograms with foreign observatories was continued. 253 *K*-disk spectroheliograms for the period 1953 October to 1954 September were sent to the Director, The Observatories, Cambridge University. 6 photoheliograms together with the relevant zero plates for certain specified dates in 1953–1954 were sent to the Astronomer Royal, Royal Greenwich Observatory, on request. For the period 1953 July–December, 35 H-alpha disk and 42 *K*-disk spectroheliograms were received from Meudon Observatory, France and 66 H-alpha disk and 71 *K*-prominence spectroheliograms from the Mount Wilson Observatory, U.S.A.

Quarterly statements relating to solar flares were sent as in previous years to Dr L. d'Azambuja of the Meudon Observatory and to Mr H. W. Newton of the Royal Greenwich Observatory.

The practice of broadcasting URSIGRAMMES relating to solar and geomagnetic activity and of issuing warnings for expected ionospheric and geomagnetic disturbances was continued.

The practice of supplying to the Chief, Central Radio Propagation Laboratory, National Bureau of Standards, Boulder, Colorado, U.S.A. the monthly median values of F₂ layer critical frequency and the maximum usable frequency for 3000 km transmission was continued. Monthly median values of all other ionospheric parameters were supplied to him quarterly.

Eclipse expedition.—An expedition to observe the solar total eclipse of 1954 June 30 was organized and a party of three went to Phalodi in Rajasthan. The programme of observations was :

1. *Ionospheric observations.*—Continuous short-wave signal strength recordings for about 10 days to examine the influence of the eclipse on short-wave transmission conditions.

2. *Magnetic observations.*—Registration of the horizontal component of the Earth's magnetic field using an Askania field balance.

3. Atmospheric noise measurements from 540 kc/s to 29.5 Mc/s.

4. Photography of the solar corona with a 6-foot camera and a coelostat.

Due to poor sky conditions the optical part of the programme was not fully successful. The other observations were successfully made.

Routine observations.—Photoheliograms were taken on 299 days and visual observations of the Sun were made on 289 days as against 296 and 295 days respectively in 1953. H-alpha disk, calcium disk and calcium prominence

spectroheliograms were taken on 278, 264 and 251 days as compared to 285, 273 and 254 respectively in the previous year. Observations with the spectrohelioscope were made on 285 days.

The average definition of the Sun's image on a scale in which 1 is the worst and 5 the best was 3.1—same as in the past year. There were 17 days on which the definition was 4 or more.

Sunspot activity.—There was very little sunspot activity during the year. There were 243 spot-free days out of a total of 299 days compared to 142 spot-free days in 1953. The yearly mean latitude of all the observed spot-groups in the northern and southern hemispheres was $24^{\circ}.8$ and $20^{\circ}.2$ respectively as against $9^{\circ}.0$ and $8^{\circ}.4$ for the previous year. Details of sunspot observations are given in the following table:

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
No. of new spot-groups	N	0	1	1	0	2	0	1	1	0	2	3	2	13
	S	0	0	3	2	0	0	0	2	0	0	2	1	10
Total	0	1	4	2	2	0	1	3	0	2	5	3	23	
Mean daily no. of spot-groups	0	0.44	0.46	0.11	0.06	0	0.18	0.48	0	0.22	0.65	0.50	0.22	
Kodaikanal relative sunspot number	0	0.4	7.9	1.2	0.8	0	2.1	6.9	0	2.4	8.0	6.2	3.3	

Solar flares.—2 solar flares were recorded during the year, both of intensity 1.

Radio astronomy.—Recording of solar noise at 100 Mc/s was continued and a 200 Mc/s radio telescope was under construction. Steps were taken for the acquisition of a 10-cm receiver from Australia.

Geomagnetic observations.—Continuous photographic recording of H , V and D with Watson and La Cour magnetographs and visible recording of the horizontal force with an Askania magnetic field balance were continued. A quick-run recorder for use with the Askania magnetic field balance was acquired during the year. Absolute measurements of H and D were made once a week with a Kew magnetometer and observations of inclination on 5 days in the week with an Earth inductor. A set of QHM and BMZ instruments was received towards the end of the year and put into regular use for absolute measurements.

During the year 7 magnetic storms with ranges in H between 130 and 170 were recorded. One of them was probably of the sudden commencement type.

Ionospheric observations.—Regular ionospheric observations during daylight hours with the automatic ionosphere recorder were continued.

Cosmic ray observations.—Systematic recording of cosmic ray intensity with the Kolhörster apparatus was not possible due to shortage of staff.

Seismology.—The Milne-Shaw seismograph (E-W component) recorded 96 earthquakes.

Meteorology.—Meteorological observations with all the visual and self-recording instruments were carried out as usual.

Library.—115 books and 1317 periodicals were added to the library.

Research work.—Under the Research Training Scheme sponsored by the Government of India, Ministry of Education, one Senior and two Junior research scholars were working in this observatory. The Senior Scholar was released from the scheme in 1954 August.

The following problems in astrophysics and geophysics were investigated or were under investigation during the year :

1. Experimental study of solar line contours by means of a direct-recording photoelectric photometer and by photographic photometry.
2. Variation of continuous absorption in the near ultra-violet solar spectrum.
3. Study of the spectrum of sunspots.
4. Study of ionospheric and geomagnetic effects during the total eclipse of the Sun of 1954 June 30.
5. Study of solar-weather relationships.
6. Study of ionospheric changes associated with M-type magnetic storms.
7. Disturbance daily variation of the magnetic field at Kodaikanal.

Publications.—The following notes and papers were either published or sent for publication :

- (1) "Recurrence Tendency of Geomagnetic Activity during the current sunspot minimum", *Special Geomag. number of Indian J. of Met. and Geophys.*
- (2) "Solar Radiation in the far ultra-violet and some related geophysical phenomena", *Special Geomag. number of Indian J. of Met. and Geophys.*
- (3) "Equivalent widths of lines in sunspot spectra", *Ap. J.*
- (4) "Solar Influence on Barometric Pressure", *Indian J. of Met. and Geophys.*
- (5) Reports to the Society on (i) The work of the Kodaikanal Observatory and (ii) The prominence activity for the year 1953 for publication in the *M.N.*
- (6) Annual Report of the Kodaikanal Observatory for the year 1953.
- (7), (8) and (9) Kodaikanal Observatory Bulletin Nos. 139, 140 and 141 for the second half of 1952 and first and second halves of 1953 giving summary of the results of solar and magnetic observations.
- (10) Quarterly synopsis of results of solar, magnetic and ionospheric observations, *Indian J. of Met. and Geophys.*