

SOLAR ACTIVITY AND ASSOCIATED GEOMAGNETIC AND RADIO
DISTURBANCES DURING MAY—JUNE, 1949.

The period from about 5th May to 4th June, 1949, showed considerable solar activity, the average daily number of spot groups seen being as many as 7. Two of these spot groups exhibited unusual activity during their passage across the sun's disc.

The first bears the Kodaikanal Number 9176, latitude $17^{\circ} 5$ South and central meridian passage 10th May at 17 h. It was first seen on 5th May near the east limb as a single spot. The next day the umbra of the spot was seen split up into two and an eruption of slight intensity was observed with the spectrohelioscope in its neighbourhood at 14 h. 30 m. I. S. T. On the 8th, it had become a bipolar group, the single spot having broken up into two, and a small dark marking connecting the two spots was displaced 1 Å to violet when seen with the spectrohelioscope at 8 h. 20 m. The next day the leading spot of the group was seen broken up into a number of penumbral patches. On the 10th when the spot group was at 19° east of the central meridian, an eruption of slight intensity was first observed in its neighbourhood at 0900 hours. The area and the brightness of the eruption increased till about 9 h. 15 m. when its area was 313 millionths of the sun's hemisphere and its intensity 2. After this, the intensity gradually decreased and the eruption subsided at 10 h. 00 m. A photograph of the eruption taken at 09 h. 47 m. I. S. T. is reproduced at (a) in plate I.

On the Kodaikanal magnetograms of the 10th May, no geomagnetic crochet synchronous with the flare was observed, but on the 12th, nearly 50 hrs. later, a severe and extended magnetic storm was recorded. The storm started at 12 h. 8 m. I. S. T. with a sudden commencement, the initial impulse being 90 γ . in H and 19 γ . in V. The maximum value in H was reached at 13 h. 15 m. the increase being of the order of 112 γ . Afterwards the disturbance became oscillating type, followed by a rapid fall in H. The storm finally subsided at 11 h. 30 m. on the 13th. V and D also recorded irregular and fairly rapid movements during the period.

Simultaneous with the magnetic storm, reports were received of complete fade-out of short wave radio reception. The Beam Wireless Station at Dhond reported very bad reception conditions during certain times on the 12th and 13th. The Research Engineer, All-India Radio, New Delhi also reported that on the 13th May there was a complete fade-out of BBC reception on 15 mc/s between 0938 and 1015. Reuters reported complete black out of radio transmission on the 13th throughout the world.

The spot group in question crossed the central meridian on the 11th at 17 h. and also continued to be active during the succeeding days undergoing many changes, but no eruption was noticed.

The second active spot group during the period bears the Kodaikanal Number 9197 latitude $2^{\circ} 5$ North, central meridian passage 31st May, 20 h. 30 m. This group was first seen near the east limb on the 26th of May, a small group, but was quite active and in a growing stage. On the 28th the leading spot of the group had become large and prominent. On the 29th the umbra of the leading spot was seen broken up into a number of points. When observed with the spectrohelioscope, an eruption of intensity 1 was observed in its vicinity at 11 h. 45 m. The eruption lasted for about 10 minutes. The mean position of the spot group on this day was 34° E of central meridian. The spot group continued to be active on the following days and on the 1st June, when it was about 5° west of the central meridian, another eruption was recorded in its neighbourhood. The spectroheliogram taken in Ho. light at 7 h. 33 m. I. S. T. showed this eruption clearly and is reproduced at (b) of plate I; the eruption subsided at 7 h. 49 m. The spot group was seen as a bipolar one on the 3rd June, and continued to be active till it was last seen near the west limb on the 7th June. These two solar flares caused magnetic storms which were recorded by the magnetographs at Kodaikanal. On the 30th May a magnetic storm of moderate intensity suddenly commenced at 17 h. 56 m. I. S. T. (about 30 hours after the eruption of the 29th May) with an initial impulse of

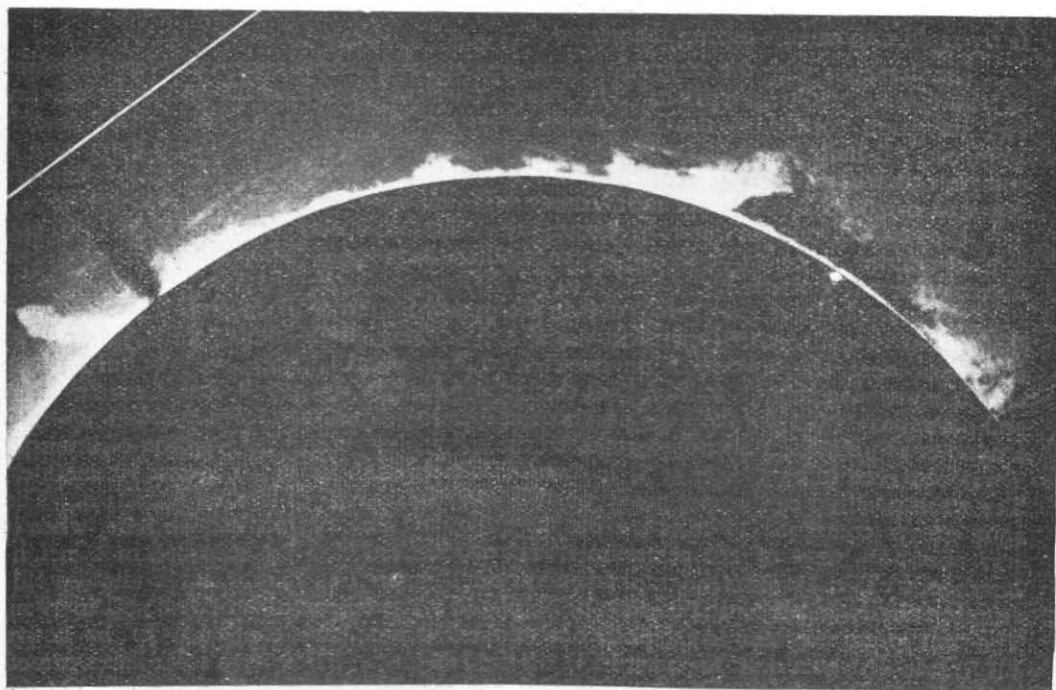
PLATE 1



(a)



(b)



(c)

41 γ . in H and 8 γ . in V. The fluctuations were more pronounced in H than in V and D. The elements reached the minimum values at 03 h. 24 m. on the 31st May and thereafter began to rise. The storm subsided at 20 h. 00 m. I. S. T. on the 1st June. The second magnetic storm began with a sudden commencement at 3 h. 24 m. on the 4th June. The initial impulse was 9 γ . in H and 2 γ . in V. The fluctuations were small till 6 h. 36 m. after which they became violent, reaching the maximum intensity at 12 h. 4 m. After this the fluctuations decreased and the storm subsided at 4 h. 42 m. on the 5th June.

Reports of Radio fade-outs synchronous with these magnetic storms were also received. The Beam Wireless Station, Dhond reported complete fade-out in all the circuits working west to east during certain periods, on the 30th and 31st May and on the 1st June. Allahabad Receiving Station reported complete and partial fade-out at intervals on the 1st and 2nd June and Delhi Receiving Station reported fade-out on the 13 metre band on the 5th June.

The prominences on the sun's limb also showed great activity during the period, especially in the latter half. An arch type prominence on east limb with a very large extent and area was photographed from the 1st to 3rd June. The photograph of this prominence taken on the 2nd June at 07 h. 49 m. is reproduced at (c) in plate I. It is the largest seen for some years, with an area of 18 sq. minutes, an extent of 64° and a height of 3 minutes.