

The Large Sunspot Group of July 1946*

RECENT observations reveal a steep rise in solar activity. Large and bright prominences, some of them moving with velocities of the order of 100 km. per second, bright chromospheric eruptions and active sunspots covering large areas on the sun are being observed frequently. Among these, the large sunspot group observed during the period 21st-30th July, 1946 is of special interest.

This group (Spot group, Kodaikanal No. 8146) first appeared on the east limb of the sun on 21-7-1946 at a mean latitude of 20° N. covering an area about 100 times that of the earth. As it approached the central meridian, its area increased to about 125 times that of the earth. The size of the spot group gradually decreased till on the 30th it became comparable to other spot groups. Unfavourable weather conditions precluded the study of the spot group after 30-7-1946. The umbrae covered only a small fraction, varying from 1/5 to 1/10 of the total area of the spot group and showed widely varying structure from day to day. This spot group belonged to the multipolar type which is rather infrequent; the structure and the formation of this class are not yet well understood. The faculae attending this group also covered a large area comparable to the area of the spot group itself and showed occasional brightening up, as observed in this observatory through the spectrohelioscope on 26th, 27th, 29th and 30th. (Observations could not be made on the other days in this period due to unfavourable sky conditions.)

Though the faculae associated with this group were only just "brighter than ordinary" and, therefore, not comparable in point of brightness with the considerable chromospheric eruptions that are being observed frequently these days, they were associated with large ionospheric disturbances. Even on the first day of the appearance of this spot group at the limb, a complete fade-out of all radio waves was noticed by the research laboratories of All-India Radio. The higher frequencies were affected almost throughout the whole period of activity of the spot. During the period from the 21st to the 28th

July, 1946, when the spot group was near the central meridian, complete or almost complete fade-out of all frequencies was noticed over long intervals. A spectroheliogram taken in the K line reproduced in the figure gives an idea of the structure of the spot group on the 28th, when a total fade-out of radio waves of all frequencies was noticed from 0600 to 1330 hrs. Even on the 30th, wireless reception was subnormal from 0800—0930 hrs., but this may be partly due to another fairly big spot group (Kodaikanal No. 8152) appearing on the east limb at about latitude 25° S.

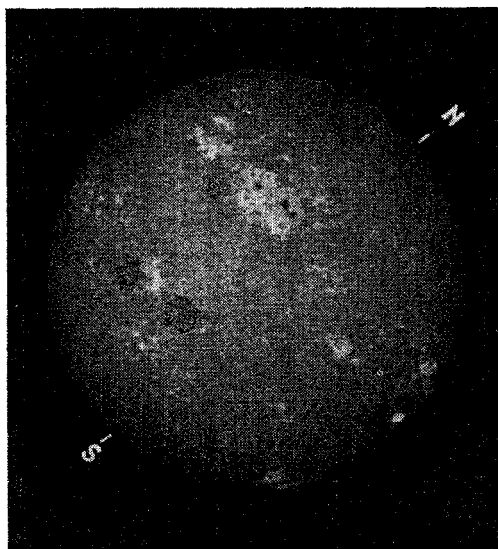


Fig. 1—Spectroheliogram taken in K Line on 28-7-1946.

It is noteworthy that on a number of days before and after this period large areas on the sun's visible hemisphere were covered by spot groups, but no marked fade-outs comparable with those observed during this period were noticed. This presumably indicates that the ionosphere is affected only by the "active" spots that are attended with bright chromospheric eruptions affecting large areas of the sun's disc, and that the size of a spot group is not the determining factor in ionospheric disturbances.

* By courtesy of the Director, Solar Physics Observatory, Kodaikanal.