RECENT UNUSUAL SOLAR ACTIVITY.

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THE three weeks commencing the 26th August, 1939, were marked by persistent solar activity confined mostly to the neighbourhood of latitude 15° S. The first sign of activity was noticed on the 26th August when the spot group Kodaikanal No. 7152, a long-lived spot group which had gone round the Sun twice before without showing much activity, appeared at the east limb and the associated flocculus brightened up. A maximum Doppler displacement of 2·4 A to red was observed in the flocculus at 3^h 15^m G.M.T., and the prominence connected with the spot group also showed a displacement of 1 A to violet. On the same day eruptions occurred in the neighbourhood of spot group K.K.L. No. 7148 in the same latitude zone and also near the spot group K.K.L. No. 7150 in the northern hemisphere.

The spot group 7152 continued to be very active throughout its passage across the disc and gave rise to eruptions almost every day, but the most extensive eruption occurred on the 30th August when the area affected amounted to 500 millionths of the Sun's visible hemisphere. Signs of unusual activity had been observed in this region from early morning, but the outburst began at 6^h 0^m G.M.T. and rapidly extended all round in long streaks. The eruptive area showed a maximum displacement of 2·4 A to red at 6^h 25^m and its intensity as measured with a step wedge was about three times that of the undisturbed disc. Another eruption, very much brighter though of smaller extent, occurred in the same region on the 1st of September. Nothing extraordinary had been observed until about 2^h 55^m, when suddenly the flocculus adjacent to the leader of the spot group became eruptive. The eruption quickly extended towards the east in a narrow column which joined up with one of the following spots of the group. At the same time another bright column started from one of the following spots and extended south-westwards. The eruption attained its maximum brightness at about 3^h 15^m, after which the brightness steadily decreased till 4^h 0^m when the eruption subsided. No Doppler displacement was noticeable in the actual area of eruption. On September 6 a very

bright eruption was observed again in the same region. It began at 2^h 47^m, reached its maximum intensity at 2^h 57^m and faded away by 3^h 30^m. Doppler displacements varying from 1 A to 2 A were observed in the eruptive area. The spot group gave rise to active and metallic prominences at the west limb on the 7th and 8th September and the usual lines of *Na*, *Fe*, and *Mg* and Doppler displacements of about 2 A to both red and violet were observed in the prominences.

Two other very active spot groups that crossed the Sun's disc during the period were K.K.L. Nos. 7157 and 7159, both belonging to the latitude zone of 15° S. On September 1 No. 7157 gave rise to an eruptive metallic prominence which suddenly appeared at about 3^h 30^m and attained a height of 4′ in a very short time. The maximum displacements observed in the prominence were 6 A to red and 9 A to violet at 3^h 55^m. The prominence completely disappeared by 4^h 25^m. Spot group No. 7159 was associated with a number of eruptions, three of which occurred in the morning of the 6th September between 3^h 2^m and 4^h 15^m. The brightest of these was the third one, which began at 4^h 15^m. Although it reached its maximum intensity at 4^h 20^m it did not subside until two hours later.

Apart from eruptions other important phenomena noted during the period were the breaking up of hydrogen dark markings, which is not frequently observed. Instances of the breaking up of dark markings were observed on the 26th August and on the 2nd and 12th September. The most remarkable one was observed on the 12th September when a large marking which had been visible for a number of days completely disappeared in a very short time. Nothing special had been noted in the behaviour of this marking till about 4^h 2^m when the end close to the spot group 7157 began to show displacements to violet. Simultaneously the portion of the marking nearest to the west limb showed displacements to red which increased to a maximum of 2·5 A at 4^h 15^m. A streak was clearly seen starting from this part of the marking and advancing towards the limb. The resulting prominence reached a height of at least 3′, but by 4^h 56^m both the prominence and the dark marking completely disappeared. A bright marking, however, appeared

exactly in the place of the dark marking. This was clearly the base of the prominence that disappeared. This is a good example to prove the statement made by Dr. Royds in Kodaikanal Observatory Bulletin No. 89 that the lowest parts of a prominence on the disc show themselves in emission, while the higher portions only are responsible for the absorption marking.

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[In the absence of comments by the authors of the above article, references to large Doppler displacements of 1 or 2 A in eruptive areas are understood to refer to *absorption* markings accompanying the bright eruptions and not to the emission areas themselves. Doppler displacements of this order, if belonging to bright emission, would be most unusual (see *Ap. J.* **73,** 408, 1931, and *M. N.* **93,** 169, 1933).

Spectrohelioscope observations at Cambridge recorded 10 eruptions on 6 days in group K.K.L. No. 7152 and 7 eruptions on 7 days in group K.K.L. No. 7159. None of these eruptions is identical with those observed at Kodaikanal, as the Cambridge observations were usually made about 8 hours later.

The Greenwich observations during this active period are commented on in *The Observatory* for 1939 November, p. 307.

On August 29, Newbegin observed dark flocculi in about longitude 345° and latitude 14° S., with radial velocities ranging from +115 km./sec. to −75 km./sec. He also observed the bright eruption in $H\alpha$ on September 8 with a maximum at $11^h\ 41^m$.

It is of interest to note that disturbance of the Earth's magnetic field was by no means unusual during the above three weeks. Although a small storm occurred on September 17–18 and there was disturbance on September 2–3, three "great" storms previous to this epoch were recorded at Greenwich (Abinger) on August 12–13, August 16–17 and August 22–23.

A fade-out on easterly channels of short-wave wireless transmission was recorded in England on August 30 from $06^h\ 20^m$ to $07^h\ 20^m$ U.T. It will be noted that the beginning of the fade-out corresponds within a few minutes to the time of maximum activity of the extensive bright eruption as described above.—Ed.]