PUBLICATIONS OF THE
ASTRONOMICAL SOCIETY OF THE PACIFIC

Vol. 59 June 1947 No. 348

THE GREAT SUNSPOT GROUP OF MARCH AND APRIL, 1947*

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The great sunspot group of March and April, 1947, which is the most recent of a record-breaking series of three large sunspot groups (Table I), has the distinction of having maintained a larger area for a longer period of time than any previous group.

This series of groups, so large as to be seen easily with the unaided eye, might give the impression that such solar activity is rather commonplace. In reality it is most unusual, for within one year we have had the rare opportunity of observing the three largest sunspot groups ever recorded. It has been twenty years since a group has appeared that even approached the enormous area of the smallest of these three recent sunspot groups. In addition to these, many other large groups have appeared, so many in fact that naked-eye groups were visible on one-third of the days in 1946 and on about one-half of the days in the first third of 1947.

The group of March and April, 1947, was first observed on February 5, as some small spots (Mount Wilson No. 8392) at the east limb of the sun. They increased rapidly in area until by February 7 the group was large enough to be seen without a telescope. When it reappeared at the east limb on March 3, the group, renumbered 8438, had changed considerably, being much larger and more compact than in February. Its position indicated that the main spots in March had developed from the

* Read at the San Diego meeting of the Society.

preceding members of No. 8392, the following part of which had disappeared. During this transit its maximum area, measured at the Greenwich Observatory, was 4300-millionths of a solar hemisphere. On its third transit, which began on March 30, the group, renumbered 8478, was even larger than in March, although less compact. During its transit in April the group separated into several spots and lengthened, the preceding members moving westward as they do in typical spot groups. A day-by-day record from Mount Wilson photographs of the group during its transits of March and April is shown in Plate IX. On its fourth appearance the group was much smaller; the preceding spot, which was then 19° ahead of the following member, disappeared by May 7. The following spot steadily diminished in area as it approached the west limb on May 11 and failed to make a fifth appearance.

Plate X shows the group near the central meridian on its four appearances, with lines indicating the general distribution of magnetic polarities. The maximum field strength was 3800 gauss. In the following spot, between the two umbrae of opposite polarity, was a strong magnetic field parallel to the sun's surface. Several very small flares were observed at Mount Wilson within the group, but all were of low intensity. No great magnetic storms were associated with this group, although a few minor storms occurred while it was visible. The fact that little terrestrial magnetic activity was associated with this group, in spite of its large area and complex magnetic fields, indicates that intense flares are an important factor in producing great magnetic storms.

The March-April group of 1947 is the second largest group ever photographed, that of February 1946 being the largest.[1] The third largest group[2] was that of July 1946 and the fourth largest[3] that of January 1926. On its March appearance the great group of 1947, which was essentially one complex spot,

[1] *Pub. A.S.P.*, **58**, 86, 1946.

[2] *Pub. A.S.P.*, **58**, 315, 1946.

[3] *Pub. A.S.P.*, **38**, 125, 1926.

has the distinction of being the largest single sunspot ever photographed, the second largest being the following member of the great group of 1946 with an area of 3800-millionths of a solar hemisphere.

Table I lists data concerning the four largest sunspot groups, photographs of which are shown in Plate VIII.

TABLE I

LARGEST SUNSPOT GROUPS

Date First Seen	Date Last Seen	Latitude	Duration in Days	Maximum Area*	Length in Miles
1925 Dec. 3	1926 Feb. 27	+23°	87+	3700	160,000
1946 Jan. 29	1946 May 8	+27	99+	4900	200,000
1946 July 19	1946 Aug. 30	+23	43+	3950	150,000
1947 Feb. 5	1947 May 11	−23	96+	4300	200,000

* Millionths of a solar hemisphere measured at Greenwich Observatory. To express the area in units of a million square miles multiply these figures by 1.17.