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GREENWICH  
PHOTO-HELIOGRAPHIC RESULTS  
1950

LONDON

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RESULTS OF MEASURES  
MADE AT THE ROYAL GREENWICH OBSERVATORY  
OF  
PHOTOGRAPHS OF THE SUN  
*TAKEN AT GREENWICH, THE CAPE  
AND KODAIKANAL IN THE YEAR*

1950

UNDER THE DIRECTION OF  
SIR HAROLD SPENCER JONES, Sc.D., F.R.S.  
ASTRONOMER ROYAL

*Published by Order of the Board of Admiralty  
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# GREENWICH PHOTO-HELIOGRAPHIC RESULTS 1950

## INTRODUCTION

The photographs from which these measures were made were taken at the Royal Greenwich Observatory, the Royal Observatory, Cape of Good Hope, and the Kodaikanal Observatory, Southern India.

The photographs of the Sun obtained at Greenwich were taken with the 4-inch Photoheliograph, of which the original object-glass had been replaced in 1910 by a Grubb photographic objective. The equivalent focal length of the photoheliograph with its present enlarging system (supplied in 1926 by Ross, Ltd.) is  $67\frac{1}{2}$  feet, the diameter of the Sun's image at the secondary focus being approximately  $7\frac{1}{2}$  inches. On 1949 May 2 this photoheliograph was moved from Greenwich to Herstmonceux Castle, Sussex. Subsequent photographs continue to be designated "Greenwich" photographs.

The photographs of the Sun obtained at the Cape Observatory were taken under the superintendence of His Majesty's Astronomer at the Cape, Dr. R. H. Stoy, and those from Kodaikanal under the superintendence of the Director, Dr. A. K. Das. At the Cape Observatory the instrument employed was a 4-inch photoheliograph giving an image of the Sun about  $7\frac{1}{2}$  inches in diameter; at Kodaikanal a Cooke photo-visual objective of 6 inches aperture was used, the image of the Sun which was obtained being of about the same size.

Photographs of the Sun were available for measurement on 362 days in 1950, those finally selected for measurement being supplied by the different observatories as under:

|            |    |    |    |    |     |
|------------|----|----|----|----|-----|
| Greenwich  | .. | .. | .. | .. | 228 |
| Cape       | .. | .. | .. | .. | 131 |
| Kodaikanal | .. | .. | .. | .. | 3   |
| Total      | .. | .. | .. | .. | 362 |

For the three missing days, copies of original solar negatives were kindly supplied by the Mount Wilson Observatory, California. The names of the measurers of the photographs for the year 1950 were as follows:

|              |              |              |
|--------------|--------------|--------------|
| H. Barton    | P. A. Wayman | N. Rhodes    |
| P. S. Laurie | A. S. Milsom | R. W. Teague |

At the primary focus of the photoheliographs at Greenwich and the Cape two spider-wires are fixed by which the zero of position-angles on the photographs can be determined. These wires are inclined at an angle of  $45^\circ$  to the celestial equator. In the Kodaikanal instrument there is one wire fixed parallel to the equator.

The precise zero of position-angles for the photoheliographs has been determined by three different methods.

(i) *Zero Photographs.* Plates were exposed twice, with an interval of about 100 seconds between the two exposures, the instrument being firmly clamped. Two images of the Sun, overlapping each other by about a fifth part of the Sun's diameter, were thus produced upon the plates. The exposures were so made that the line joining the cusps passed approximately through the centre of the plates and the inclinations of the two spider-wires to this line were measured. A small correction for the inclination of the Sun's path has been applied. Two or three zero photographs were usually taken each month at Greenwich, the Cape, and Kodaikanal.

(ii) *Transits.* At Greenwich and the Cape, transits of the Sun were taken visually, the times of contact of the first and second limbs of the Sun with the two wires being noted by an eye-and-ear method. The ratio of the time taken by the Sun to pass over the NE - SW wire to the time taken to pass over the SE - NW wire was used in order to find the angle made by the Sun's path with the bisectors of the wires. From this, again incorporating a correction to allow for the inclination of the Sun's path, the orientation of the wires with respect to the N - S line could be inferred. Transits were usually taken at Greenwich and the Cape on four or more days during each month.

(iii) *Supplementary Zero Photographs.* At Greenwich supplementary partial images of the Sun were occasionally recorded on otherwise normal photographs, a second exposure being made after clamping the instrument firmly for 130 seconds. The small portion of the Sun's limb visible at the western edge of the plate could be used, together with the main image which it does not intersect, to deduce the orientation of the wires in a way similar to that used for the zero photographs. Six to ten supplementary zero photographs were taken at Greenwich each month. The values for the zero of position-angles deduced from them were given half weight in the adoption of zero-corrections to be used in the reduction of photographs.

The following table gives the zero-corrections determined by the various methods at Greenwich and the Cape during 1950, together with the adopted values.

| Greenwich      | (i)   | (ii)  | (iii) | Adopted Value |
|----------------|-------|-------|-------|---------------|
| 1950           | ° ′   | ° ′   | ° ′   | ° ′           |
| January        | -0 23 | -     | -0 19 | -0 21         |
| February       | -0 27 | -0 21 | -0 21 | -0 21         |
| March          | -0 25 | -0 28 | -0 20 | -0 21         |
| April          | -0 29 | -0 22 | -0 19 | -0 21         |
| May 1 - 10     | -0 10 | -0 24 | -0 20 | -0 21         |
| May 11 - 31    | -0 18 | -0 16 | -0 20 | -0 19         |
| June 1 - 28    | -0 20 | -0 16 | -0 23 | -0 19         |
| June 29-July 2 | +0 16 | +0 16 | +0 12 | +0 16         |
| July 3 - 31    | +0 21 | +0 18 | +0 10 | +0 15         |
| August         | +0 14 | +0 14 | +0 13 | +0 15         |
| September      | +0 11 | +0 07 | +0 10 | +0 09         |
| October        | +0 04 | +0 03 | +0 02 | +0 03         |
| November       | -0 06 | -0 07 | +0 10 | +0 03         |
| December       | +0 02 | -0 03 | -0 02 | 0 00          |

## INTRODUCTION TO GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1950.

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| Cape            | (i)   | (ii)  | Adopted Value |
|-----------------|-------|-------|---------------|
| 1950            | o /   | o /   | o /           |
| January 1 - 12  | +0 53 | +0 48 | +0 48         |
| January 13 - 20 | +1 03 | +0 58 | +1 00         |
| January 21 - 25 | -0 19 | -0 09 | -0 15         |
| January 26 - 31 | +0 10 | +0 20 | +0 15         |
| February        | +0 07 | +0 10 | +0 09         |
| March           | -0 03 | +0 02 | 0 00          |
| April 1 - 28    | -0 01 | 0 00  | 0 00          |
| April 29-May 31 | +0 47 | +0 39 | +0 38         |
| June            | +0 41 | +0 39 | +0 38         |
| July            | +0 44 | +0 38 | +0 38         |
| August          | +0 45 | +0 37 | +0 38         |
| September       | +0 36 | +0 36 | +0 38         |
| October         | +0 34 | +0 40 | +0 38         |
| November        | +0 36 | +0 38 | +0 38         |
| December        | +0 32 | +0 37 | +0 38         |

Instrumental adjustments were made at Greenwich on May 10, June 28 and July 2, and at the Cape on January 12, 20 and 25 and April 28.

In the case of the few Kodaikanal photographs individual values were adopted, as indicated by the appropriate zero photographs.

The measures of the photographs were made with a large position-micrometer that can be used for photographs of the Sun up to 12 inches in diameter. In this micrometer the photograph is held with its film-side uppermost on three pillars fixed on a circular plate, which can be turned through a small angle about a pivot in its circumference by means of a screw and antagonistic spring acting at the opposite extremity of the diameter. The pivot of this plate is mounted on the circumference of another circular plate which can be turned by a similar screw-action about a pivot in its circumference. This pivot, 90° distant from that of the upper plate, is mounted on a third circular plate, with a position-circle graduated in divisions of 30 minutes of arc, which may be rotated about its centre. By this means small movements in two directions at right angles to each other can be readily given and the photograph can be accurately centred with respect to the centre of rotation of the position-circle. When this has been done, a Ramsden eyepiece, having at its anterior focus a glass diaphragm ruled with cross-lines into squares with sides of one hundredth of an inch (for measurement of areas), is moved along a slide adjusted so that the centre of the eyepiece moves diametrically across the photograph, the diaphragm being nearly in contact with the photographic film, so that parallax is negligible. The distance of a spot or facula from the centre of the disk is read from a scale and vernier to 1/250th of an inch, corresponding to 0.001 of the Sun's radius for images 8 inches in diameter. The position-angle is read from the large position-circle which rotates with the photographic plate. The photograph is illuminated by diffused light reflected from white paper placed at an angle of 45° below the photograph.

All photographs were measured independently for spot positions by two measurers but only one measure of area was made except, for the most part, with large groups.

In the case of large or complex groups of spots, the chief components were measured individually; so also in the case of groups near to the east or west limbs of the Sun where the effects of foreshortening are appreciable. In other cases the position of the centre of a group was estimated by the measurer at the micrometer. In this respect a difference has been made from the practice during years prior to 1916 when, in the Daily Results (§1.), components of groups were given separately, and in the Ledgers (§3.) combination into groups was made.

When required, corrections have been applied to the measured distances and position-angles to allow for differential refraction. The details of this correction were given in the *Introduction* for 1909. It is necessary to apply this correction to about twenty per cent of the photographs taken at Greenwich in the months October to March.

#### §1. Positions and Areas of Sunspots and Faculae for each Day in the Year 1950.

In this section the measured positions and areas of sunspots and faculae are given for each day. The positions of sunspots are referred firstly to a system of apparent polar co-ordinates on the Sun's disk and secondly to a system of heliographic co-ordinates. The positions of faculae are given only in apparent polar co-ordinates.

The calculations of heliographic longitude and latitude are made from formulae given by W. de la Rue, B. Stewart and B. Loewy, *Phil. Trans.*, 1869. The system of heliographic co-ordinates may be defined as follows. The inclination of the Sun's axis to the ecliptic is assumed to be  $82^\circ 45'$ , the longitude of the ascending node of the Sun's equator on the ecliptic for 1950.0 to be  $75^\circ 03'.8$ , and the period of the Sun's sidereal rotation to be 25.38 days. The meridian which passed through the ascending node on 1854 January 1, Greenwich mean noon, is taken as the zero meridian and longitudes increase from east to west. The mean synodic rotation-period is 27.2753 days; synodic rotation-periods are counted from 1853 November 9, in continuation of Carrington's series.

Let  $r$  be the measured distance of a spot from the centre of the Sun's apparent disk and  $\chi$  the position-angle of the spot from the Sun's axis,  $R$  the measured radius of the Sun on the photograph,  $S$  the tabular semi-diameter of the Sun in arc, and  $\rho$ ,  $\rho'$  the angular distances of a spot from the centre of the apparent disk, as viewed from the Sun's centre and from the Earth respectively.  $\rho$  - the heliocentric angle - is obtained from the following equations:

$$\rho' = \frac{r}{R} S \text{ and } \sin(\rho + \rho') = \frac{r}{R}$$

If  $B_o$  and  $\phi$  are the heliographic latitudes and  $L_o$  and  $\lambda$  the heliographic longitudes of the Earth and the spot respectively,

$$\begin{aligned}\sin \phi &= \cos \rho \sin B_o + \sin \rho \cos B_o \cos \chi \\ \sin(L_o - \lambda) &= \sin \chi \sin \rho \sec \phi\end{aligned}$$

$\chi$  is found from the position-angle measured eastwards from the north point of the Sun's disk by subtracting  $P$ , the position-angle of the north end of the Sun's axis also measured eastwards from the north point. The three quantities

P, B<sub>o</sub> and L<sub>o</sub> for the time of the exposure of each photograph are derived from the *Ephemeris for Physical Observations of the Sun*, given on p. 388 of the *Nautical Almanac* for 1950.

### §2. General Catalogue of Groups of Sunspots for 1950.

This catalogue first contains particulars of every group of sunspots which lasted for two or more days during 1950. The group numbers are in continuation of those given in 1949 and previous years; the Mount Wilson group numbers are also given. The table includes an indication of those groups which may be considered to be members of "recurrent series" of groups, as contained in Ledger I below (§3.).

Spot groups seen on one day only are given in a separate table, where they receive a distinctive numeration.

"Revival" groups of spots have been tabulated in series in a table following the General Catalogue.

### §3. Ledgers of the Areas and Heliographic Positions of Groups of Sunspots for 1950.

The groups of which details are given in these ledgers have been abstracted from a general ledger of all spot groups seen throughout the year. Apart from the groups, there are printed in a similar manner details of individual components of the principal groups. This has been done in all cases where it appeared probable that an individual component lasted to the second or third rotation after its first appearance.

*Ledger I. - Recurrent Groups.* The groups contained in this ledger were selected upon the following plan, reference being made to the General Catalogue:- If any spot when first seen was 60° or more to the east of the central meridian, the catalogue and, if necessary, the Daily Results also (§1.), were searched some fifteen to sixteen days earlier to ascertain whether a spot group of similar heliographic longitude and latitude was then near the west limb of the Sun. Similarly, if any spot group when last seen was 60° or more to the west of the central meridian, a search was made fifteen to sixteen days later. When there appeared to be a case of probable continuity between groups in consecutive rotations of the Sun, the character of the groups, their areas and their longitude and latitude have been carefully compared before accepting them as a recurrent group.

*Ledger II. - Non-Recurrent Groups.* This ledger contains those groups lasting for six days or longer which are not members of recurrent series.

### §4. Total Areas, Mean Areas and Mean Heliographic Latitudes of Sunspots and Faculae in the Year 1950.

This section contains total areas of sunspots and faculae for each day in the year, together with mean areas and mean heliographic latitudes of sunspots and faculae for each Rotation of the Sun during 1950. Similar annual mean values are also given.

§5. *Observations of Solar Filaments and Solar Flares made with the Spectrohelioscopes in the year 1950.*

This section contains (1) measures of line-of-sight velocities of dark  $H\alpha$  filaments seen on the Sun's disk near sunspots and (2) observations of solar flares in  $H\alpha$  light. The observations were made principally with a spectrohelioscope lent by the Mount Wilson Observatory in the autumn of 1929 and set up at Greenwich in the south attic of the Main Building and, since 1950 February, at Herstmonceux in a spectrohelioscope room forming the ground floor of the dome housing the photo-heliograph. The instrument is of a type described by G. E. Hale in the *Astrophysical Journal*, 70, 265, 1929. The spectrum is formed by a Rowland grating ruled with 14,438 lines to the inch. The first order spectrum around  $H\alpha$  is normally used, the scale being 1 mm. = 4.35 Å. The width of the second slit is usually 0.1 mm. The diameter of the monochromatic image of the Sun's disk at the second slit is about 50 mm., of which a portion 28 mm. x 6 mm. is rendered visible by the rotating rectangular prisms. The eyepiece used gives an overall magnification of x40, approximately. A second spectrohelioscope of similar design, presented in 1949 by Mr. A. M. Newbegin, is also available when required so that simultaneous observations can be made by two observers. The observations during 1950 were made by H. Barton, P. S. Laurie, N. Rhodes and R. W. Teague.

ROYAL GREENWICH OBSERVATORY

*Positions and Areas  
of Sunspots and Faculæ*

For each day in the year

1950

GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1950

POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR 1950.

Col. 1. (1) Time when photograph was taken expressed in days and decimals of a day reckoning from midnight at commencement of year. (2) Place of observation - Greenwich (G), Cape of Good Hope (C), Kodaikanal (K), Mount Wilson (Mt. W). (3) Date of photograph.

Col. 2. Number of spot group in order of appearance and in continuation of the group-numbers given in previous years. Groups seen on one day only are distinguished by the number of the rotation during which they were observed and by a letter given in the order of their appearance. When there is no number in the second column it is to be understood that there is a facula unaccompanied by a spot.

Col. 3. Distance of spot group or faculae from Sun's centre in terms of the Sun's radius.

Col. 4. Position angle of spot group or faculae measured from the north pole of the Sun's axis in the direction N., E., S., W., N.

Col. 5. Heliographic longitude of the spot group derived from the measures.

Col. 6. Heliographic latitude of the spot group similarly derived.

Col. 7. Area of umbræ corrected for foreshortening and expressed in millionths of the Sun's visible hemisphere.

Col. 8. Area of whole spots composing the group similarly expressed.

Col. 9. Area of each group of faculae similarly expressed. The positions of faculae relative to the spots with which they are associated are indicated by the letters n, s, p, f, c, denoting respectively, north, south, preceding, following, concentric.

In line with the date of each day is given in brackets for the time of photograph, the position angle of the Sun's axis from the north point, the heliographic longitude and latitude of the centre of the disk and the total areas of spots and faculae for the day.

## GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1950.

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POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |                | POSITION |        | AREA   |             |        | U.T.  | Group No. | MEASURES |                | POSITION       |        | AREA   |             |         |       |       |
|---------|-----------|----------|----------------|----------|--------|--------|-------------|--------|-------|-----------|----------|----------------|----------------|--------|--------|-------------|---------|-------|-------|
|         |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |       |           | Dist.    | Pos. Angle     | Long.          | Lat.   | Umbræ  | Whole Spots | Faculæ  |       |       |
| 1950    |           |          |                | o        | o      |        |             |        | 1950  |           |          |                | o              | o      |        |             |         |       |       |
| 0.450 G | 16354     | .936     | 291.8          |          |        |        |             |        |       | 16358     | .811     | 299.3          | 210.1          | +21.1  | 115    | 780         | 213 c   |       |       |
|         | 16354     | .962     | 282.2          | 271.4    | +10.8  | 74     | 349         | 538 c  |       | 16361     | .390     | 292.5          | 182.1          | + 5.3  | 25     | 138         |         |       |       |
|         | 16355     | .591     | 317.1          | 224.2    | +22.8  | 29     | 165         |        |       | 16364     | .405     | 308.5          | 179.8          | +11.4  | 3      | 28          |         |       |       |
|         | 1288c     | .498     | 313.1          | 220.6    | +16.6  | 0      | 3           |        |       | 16359     | .338     | 291.6          | 179.3          | + 3.9  | 29     | 126         |         |       |       |
|         | 16358     | .455     | 339.8          | 208.1    | +22.1  | 105    | 900         |        |       | 16363     | .930     | 102.5          | 92.6           | -12.9  | 18     | 96          | 191 f   |       |       |
|         | 16362     | .236     | 26.2           | 192.4    | + 9.0  | 1      | 8           |        |       |           | .950     | 74.1           |                |        |        |             | 172     |       |       |
|         | 16361     | .345     | 63.5           | 180.4    | + 5.9  | 51     | 201         |        |       |           | (+0.7)   | (161.0)(- 3.4) | (201)          | (1263) | (1177) |             |         |       |       |
|         | 16359     | .350     | 70.0           | 179.2    | + 3.9  | 25     | 114         |        |       |           |          |                |                |        |        |             |         |       |       |
|         |           | .887     | 83.4           |          |        |        |             | 167    |       |           |          |                |                |        |        |             |         |       |       |
|         |           | .909     | 91.4           |          |        |        |             | 303    | 4.601 | .969      | 301.8    |                |                |        |        |             | 336     |       |       |
|         |           | .919     | 72.3           |          |        |        |             | 375    | G     | .866      | 264.3    |                |                |        |        |             | 241     |       |       |
|         |           | .974     | 57.1           |          |        |        |             | 150    |       | .851      | 301.5    |                |                |        |        |             | 495     |       |       |
| Jan.1   |           | (+2.0)   | (198.4)(- 3.1) | (285)    | (1740) | (1653) |             |        |       |           | .848     | 312.2          |                |        |        |             |         | 485   |       |
|         |           |          |                |          |        |        |             |        |       | 16355     | .989     | 294.2          | 222.6          | +23.2  | 13     | 98          | { 639 c |       |       |
|         |           |          |                |          |        |        |             |        |       | 16358     | .939     | 294.0          | 213.7          | +21.0  | 78     | 681         |         |       |       |
|         |           |          |                |          |        |        |             |        |       | 16361     | .652     | 281.5          | 183.5          | + 4.6  | 23     | 103         |         |       |       |
| 1.271 C |           | .927     | 295.8          |          |        |        |             | 172    |       | 16364     | .644     | 291.6          | 181.2          | +10.8  | 9      | 64          |         |       |       |
|         |           | .923     | 242.4          |          |        |        |             | 134    |       | 16359     | .592     | 281.2          | 179.2          | + 3.6  | 12     | 97          |         |       |       |
|         |           | .873     | 306.0          |          |        |        |             | 81     |       | 16365     | .452     | 29.2           | 130.3          | +19.6  | 2      | 15          |         |       |       |
|         |           | 16354    | .987           | 821.5    | 267.4  | +10.8  | 62          | 299    | 256 c |           | 16366    | .786           | 103.7          | 92.4   | -12.9  | 11          | 60      | 139 c |       |
|         |           | 1288d    | .904           | 283.2    | 250.9  | +10.5  | 0           | 7      | 122 c |           | 16363    | .853           | 71.9           | 87.6   | +13.4  | 0           | 10      | 94 n  |       |
|         |           | 16355    | .698           | 308.0    | 224.1  | +22.8  | 21          | 162    |       |           | 16367    | .921           | 78.8           | 78.0   | + 8.8  | 28          | 261     | 322 c |       |
|         |           | 16358    | .529           | 321.9    | 208.0  | +21.5  | 115         | 1042   |       |           |          | .880           | 62.7           |        |        |             | 147     |       |       |
|         |           | 16361    | .195           | 39.7     | 180.4  | + 5.4  | 31          | 194    |       |           |          | .946           | 110.0          |        |        |             | 198     |       |       |
|         |           | 16359    | .190           | 50.8     | 179.2  | + 3.7  | 31          | 117    |       |           |          | .948           | 98.0           |        |        |             | 202     |       |       |
|         |           |          | .821           | 72.8     |        |        |             |        | 127   |           |          | .952           | 69.4           |        |        |             | 132     |       |       |
|         |           |          | .838           | 88.8     |        |        |             |        | 194   |           |          | .975           | 60.2           |        |        |             | 181     |       |       |
|         |           |          | .856           | 65.0     |        |        |             |        | 140   |           |          | (0.0)          | (143.8)(- 3.6) | (176)  | (1389) | (3611)      |         |       |       |
|         |           |          | .930           | 54.2     |        |        |             |        | 80    | Jan.5     |          |                |                |        |        |             |         |       |       |
|         |           |          | .941           | 97.5     |        |        |             |        | 244   |           |          |                |                |        |        |             |         |       |       |
|         |           |          | .961           | 67.6     |        |        |             |        | 184   |           |          |                |                |        |        |             |         |       |       |
| Jan.2   |           | (+1.6)   | (187.6)(- 3.2) | (260)    | (1821) | (1734) |             |        |       |           |          |                |                |        |        |             |         |       |       |
|         |           |          |                |          |        |        |             |        |       | 5.398     |          |                |                |        |        |             |         |       |       |
| 2.301 C |           | .861     | 315.0          |          |        |        |             |        | 92    | G         | .924     | 261.2          |                |        |        |             | 191     |       |       |
|         |           | .828     | 293.0          |          |        |        |             |        | 97    |           | .914     | 302.3          |                |        |        |             | 426     |       |       |
|         |           | 16355    | .833           | 301.0    | 224.8  | +23.3  | 47          | 169    | 110 c |           | 16358    | .980           | 292.9          | 209.1  | +21.5  | 40          | 299     | 594 c |       |
|         |           | 16358    | .690           | 306.4    | 210.5  | +21.4  | 160         | 1084   |       |           | 16361    | .781           | 279.5          | 183.7  | + 5.0  | 21          | 112     |       |       |
|         |           | 16361    | .199           | 318.4    | 181.6  | + 5.3  | 39          | 175    |       |           | 16364    | .769           | 288.0          | 181.3  | +11.2  | 6           | 32      |       |       |
|         |           | 16359    | .151           | 324.2    | 179.1  | + 3.7  | 21          | 98     |       |           | 16359    | .730           | 278.6          | 179.4  | + 3.7  | 7           | 57      |       |       |
|         |           | 16363    | .989           | 103.0    | 92.2   | -13.4  | 20          | 125    | 216 c |           | 16365    | .400           | 6.0            | 130.8  | +19.6  | 0           | 7       |       |       |
|         |           |          | .869           | 60.2     |        |        |             |        | 150   |           | 16363    | .665           | 104.5          | 92.2   | -12.4  | 6           | 29      | 72 f  |       |
|         |           |          | .961           | 65.6     |        |        |             |        | 149   |           | 16366    | .735           | 69.0           | 88.8   | +12.6  | 21          | 107     |       |       |
| Jan.3   |           | (+1.2)   | (174.0)(- 3.3) | (287)    | (1651) | (814)  |             |        |       |           |          | 16367          | .827           | 77.3   | 78.9   | + 8.3       | 29      | 291   | 266 c |
|         |           |          |                |          |        |        |             |        |       |           |          | .842           | 63.9           |        |        |             | 151     |       |       |
|         |           |          |                |          |        |        |             |        |       |           |          | .897           | 108.7          |        |        |             | 103     |       |       |
| 3.291 C |           | .930     | 288.4          |          |        |        |             |        | 197   |           |          | .947           | 58.4           |        |        |             | 219     |       |       |
|         |           | .925     | 306.8          |          |        |        |             |        | 244   |           |          | .978           | 76.0           |        |        |             | 103     |       |       |
|         |           | 16355    | .929           | 297.1    | 225.3  | +23.6  | 11          | 95     | 160 c | Jan.6     |          | (-0.4)         | (133.3)(- 3.7) | (130)  | (934)  | (2587)      |         |       |       |

Group 16363. Jan. 3 - 7. A short-lived spot, with a companion on January 5.

Group 16363. Jan. 3 - 7. A short-lived spot, with

Group 16385. Jan. 5 = 6. A small spot.

Group 16366. Jan. 5 - 15. A pair of spots, growing fairly rapidly and coalescing into a single composite structure.

Group 16366. Jan. 5 - 16. A pair of spots, growing fairly rapidly and coalescing into a single one.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |            |                |             |       |             |         |         |           |               |               |               |      |       |             |        |
|---|-----------|----------|------------|----------------|-------------|-------|-------------|---------|---------|-----------|---------------|---------------|---------------|------|-------|-------------|--------|
| U. T.   | Group No. | MEASURES |            | POSITION       |             | AREA  |             |         | U. T.   | Group No. | MEASURES      |               | POSITION      |      | AREA  |             |        |
|   |           | Dist.    | Pos. Angle | Long.          | Lat.        | Umbræ | Whole Spots | Faculæ  |         |           | Dist.         | Pos. Angle    | Long.         | Lat. | Umbræ | Whole Spots | Faculæ |
| 1950  |           |          |            |                |             |       |             |         | 1950    |           |               |               |               |      |       |             |        |
| 6.283   | C         | .964     | 304.4      |                | o           |       |             |         | 9.285   | C         | .970          | 262.8         |               | o    |       |             | 275    |
|   |           | .962     | 293.9      |                |             |       |             |         |         |           | .965          | 290.4         |               |      |       |             | 256    |
|   |           | .954     | 313.6      |                |             |       |             |         |         |           | .940          | 243.5         |               |      |       |             | 167    |
|   |           | .921     | 249.6      |                |             |       |             |         |         |           | .867          | 266.0         |               |      |       |             | 178    |
|   |           | .881     | 307.1      |                |             |       |             |         |         |           | .833          | 291.2         |               |      |       |             | 338    |
|   |           | 16361    | .888       | 277.9          | 183.4 + 5.2 | 16    | 126         | { 243 c | 16369   | .442      | 309.0         | 102.6 +12.2   | 20            | 109  |       |             |        |
|   |           | 16359    | .845       | 276.7          | 178.6 + 3.6 | 2     | 12          |         | 16366   | .321      | 336.0         | 89.8 +12.9    | 43            | 287  |       |             |        |
|   |           | 16364    | .890       | 285.0          | 182.7 +11.5 | 4     | 30          | 182 c   | 16367   | .216      | 13.6          | 79.2 + 7.9    | 9             | 89   |       |             |        |
|   |           | 16363    | .518       | 108.0          | 91.4 -12.5  | 2     | 16          |         | 16368   | .591      | 90.6          | 45.9 - 3.7    | 2             | 13   |       |             |        |
|   |           | 16366    | .596       | 63.1           | 88.8 +12.4  | 67    | 240         |         |         | .810      | 114.8         |               |               |      |       | 196         |        |
|   |           | 16367    | .693       | 74.3           | 79.4 + 7.9  | 32    | 154         | 157 f   |         | .928      | 88.8          |               |               |      |       | 306         |        |
|   |           | 16368    | .972       | 93.0           | 45.2 - 3.8  | 4     | 36          | 301 c   |         | .953      | 76.3          |               |               |      |       | 341         |        |
|   |           |          | .843       | 53.6           |             |       |             |         |         | (-2.2)    | (82.1)(- 4.1) |               |               |      |       |             |        |
|   |           |          | .940       | 76.0           |             |       |             |         |         |           |               |               |               |      |       |             |        |
|   |           |          | .949       | 55.4           |             |       |             |         |         |           |               |               |               |      |       |             |        |
| Jan. 7  |           |          | (-0.8)     | (121.6)(- 3.8) | (127)       | (614) | (2586)      |         | 10.284  | C         | .965          | 266.1         |               |      |       |             | 149    |
|   |           |          |            |                |             |       |             |         |         |           | .938          | 274.9         |               |      |       |             | 126    |
|   |           |          |            |                |             |       |             |         |         |           | .929          | 289.1         |               |      |       |             | 293    |
|   |           |          |            |                |             |       |             |         |         |           | .856          | 267.4         |               |      |       |             | 281    |
|   |           |          |            |                |             |       |             |         |         |           | .799          | 299.9         |               |      |       |             | 113    |
| 7.280   | C         | .959     | 284.3      |                |             |       |             |         |         |           | .617          | 296.2         | 103.3 +12.3   | 40   | 220   |             |        |
|   |           | .950     | 295.0      |                |             |       |             |         |         |           | .459          | 308.9         | 90.3 +12.8    | 28   | 173   |             |        |
|   |           | .944     | 246.5      |                |             |       |             |         |         |           | .281          | 317.3         | 79.9 + 7.8    | 3    | 18    |             |        |
|   |           | .942     | 307.0      |                |             |       |             |         |         |           | .573          | 70.9          | 36.0 + 7.2    | 6    | 29    |             |        |
|   |           | .872     | 265.5      |                |             |       |             |         |         |           | .806          | 86.7          |               |      |       |             | 114    |
|   |           | .842     | 298.1      |                |             |       |             |         |         |           | .842          | 74.9          |               |      |       |             | 120    |
|   |           | 16361    | .970       | 276.3          | 183.7 + 5.1 | 20    | 73          | 196 f   |         |           | .940          | 67.9          |               |      |       |             | 136    |
|   |           | 16366    | .418       | 49.4           | 89.7 +12.0  | 53    | 226         |         |         |           | (-2.7)        | (68.9)(- 4.2) |               |      |       |             |        |
|   |           | 16367    | .520       | 67.9           | 79.5 + 7.8  | 15    | 125         |         |         |           |               |               |               |      |       |             |        |
|   |           | 16368    | .891       | 92.3           | 45.6 - 3.8  | 7     | 41          | 612 f   |         |           |               |               |               |      |       |             |        |
|   |           |          | .877       | 68.1           |             |       |             |         |         |           |               |               |               |      |       |             |        |
|   |           |          | .901       | 50.2           |             |       |             |         |         |           |               |               |               |      |       | 271         |        |
|   |           |          | .934       | 110.7          |             |       |             |         |         |           |               |               |               |      |       | 181         |        |
|   |           |          | .938       | 79.2           |             |       |             |         |         |           |               |               |               |      |       | 272         |        |
| Jan. 8  |           |          | (-1.3)     | (108.5)(- 3.9) | (95)        | (465) | (3333)      |         |         |           |               |               |               |      |       |             |        |
|   |           |          |            |                |             |       |             |         |         |           |               |               |               |      |       |             |        |
|   |           |          |            |                |             |       |             |         |         |           |               |               |               |      |       |             |        |
| 8.294   | C         | .933     | 263.6      |                |             |       |             |         |         |           |               |               |               |      |       |             |        |
|   |           | 16366    | .297       | 17.4           | 89.9 +12.4  | 30    | 293         |         |         |           |               |               |               |      |       |             |        |
|   |           | 16367    | .335       | 53.0           | 79.5 + 7.7  | 18    | 98          |         |         |           |               |               |               |      |       |             |        |
|   |           | 16368    | .761       | 91.8           | 45.6 - 4.0  | 8     | 42          | 287 f   |         |           |               |               |               |      |       |             |        |
|   |           |          | .906       | 110.4          |             |       |             |         |         |           |               |               |               |      |       | 205         |        |
|   |           |          | .914       | 122.2          |             |       |             |         |         |           |               |               |               |      |       | 346         |        |
| Jan. 9  |           |          | (-1.8)     | (95.1)(- 4.0)  | (56)        | (433) | (971)       |         | Jan. 12 |           |               | (-3.2)        | (54.4)(- 4.3) |      |       |             |        |
|   |           |          |            |                |             |       |             |         |         |           |               |               |               |      |       |             |        |

Group 16368. Jan. 7 - 10. A small spot.

Group 16369. Jan. 10 - 14. A pair of spots, suddenly appearing west of the central meridian. These are growing into a bi-polar group as they pass round the limb.

Group 16370. Jan. 11 - 12. One or two small spots.

Group 16371. Jan. 12 - 13. A small spot.

Group 16372. Jan. 12 - 19. A few small variable spots, of which only one remains by January 18.

Group 16373. Jan. 12 - 21. One or two faint spots, not seen between January 16 and 21.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

C 5

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.   | Group No. | MEASURES |               | POSITION |        | AREA   |             |        | U.T.   | Group No. | MEASURES |               | POSITION |        | AREA         |                |        |        |        |
|--------|-----------|----------|---------------|----------|--------|--------|-------------|--------|--------|-----------|----------|---------------|----------|--------|--------------|----------------|--------|--------|--------|
|        |           | Dist.    | Pos. Angle    | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |        |           | Dist.    | Pos. Angle    | Long.    | Lat.   | Umbræ        | Whole Spots    | Faculæ |        |        |
| 1950   |           |          |               |          |        |        |             |        | 1950   |           |          |               |          |        |              |                |        |        |        |
| 12.290 | C         | .955     | 260.1         |          | o o    |        | 156         |        |        | .806      | 95.9     |               | o o      |        |              | 264            |        |        |        |
|        |           | .766     | 254.5         |          |        |        | 137         |        |        | .943      | 68.0     |               |          |        |              | 216            |        |        |        |
|        | 16371     | .968     | 292.5         | 114.9    | +20.4  | 0      | 12          | 183 c  | Jan.15 |           | (-4.6)   | (16.0)(- 4.6) | (133)    | (864)  | (1620)       |                |        |        |        |
|        | 16369     | .896     | 285.9         | 104.1    | +12.1  | 81     | 536         | 234 c  |        |           |          |               |          |        |              |                |        |        |        |
|        | 16366     | .770     | 291.1         | 89.9     | +13.1  | 34     | 217         | 147 c  |        |           |          |               |          |        |              |                |        |        |        |
|        | 16367     | .677     | 290.5         | 82.5     | +10.3  | 9      | 51          |        | 15.463 |           | .947     | 303.8         |          |        |              | 117            |        |        |        |
|        | 16372     | .194     | 27.6          | 37.3     | + 5.5  | 9      | 47          |        | G      |           | .838     | 287.8         |          |        |              | 88             |        |        |        |
|        | 16373     | .760     | 102.5         | 353.3    | -12.4  | 3      | 25          | 226 f  |        |           | 16367    | .990          | 281.6    | 81.3   | +10.8        | 0              | 21     | 402 c  |        |
|        |           | .866     | 76.6          |          |        |        | 465         |        |        | 16372     | .618     | 285.5         | 37.3     | + 5.7  | 10           | 50             |        |        |        |
|        |           | .972     | 95.8          |          |        |        | 393         |        |        | 16377     | .382     | 327.3         | 12.9     | +14.1  | 3            | 21             |        |        |        |
| Jan.13 |           | (-3.7)   | (42.5)(- 4.4) | (136)    | (888)  | (1941) |             |        |        | 16373     | .226     | 136.2         | 351.5    | -14.2  | 1            | 7              |        |        |        |
|        |           |          |               |          |        |        |             |        |        | 16375     | .524     | 50.6          | 336.0    | +15.1  | 22           | 101            |        |        |        |
|        |           |          |               |          |        |        |             |        |        | 16378     | .823     | 68.2          | 308.6    | +14.9  | 8            | 36             | 205 p  |        |        |
| 13.282 | C         | .893     | 257.9         |          |        |        | 196         |        |        | 16374     | .790     | 97.6          | 308.5    | - 8.9  | 49           | 303            | 266 f  |        |        |
|        | 16369     | .968     | 283.9         | 103.2    | +12.2  | 116    | 708         | 295 c  |        |           | 16376    | .889          | 79.8     | 299.1  | + 6.8        | 14             | 72     | 312 f  |        |
|        | 16366     | .888     | 287.3         | 89.7     | +13.1  | 29     | 156         | 367 c  |        |           | 16379    | .944          | 67.1     | 293.4  | +19.8        | 3              | 16     | 169 sf |        |
|        | 16367     | .810     | 285.9         | 81.5     | +10.1  | 10     | 71          | 182 c  |        |           |          | .905          | 60.2     |        |              | 276            |        |        |        |
|        | 16372     | .221     | 319.2         | 37.7     | + 5.1  | 27     | 132         |        |        |           |          | .914          | 90.4     |        |              | 264            |        |        |        |
|        | 16373     | .616     | 105.3         | 352.0    | -12.9  | 5      | 24          |        | Jan.16 |           |          | .921          | 101.8    | (-5.2) | (0.7)(- 4.7) | (110)          | (627)  | (2345) |        |
|        | 16374     | .988     | 97.7          | 308.0    | - 8.3  | 32     | 265         | 164 c  |        |           |          |               |          |        |              |                |        |        |        |
|        |           | .747     | 98.5          |          |        |        | 78          |        |        |           |          | .949          | 302.7    |        |              | 115            |        |        |        |
|        |           | .780     | 72.5          |          |        |        | 251         |        | 16.283 |           |          | .910          | 310.3    |        |              | 124            |        |        |        |
|        |           | .911     | 96.7          |          |        |        | 552         |        | C      |           |          | .898          | 289.2    |        |              | 130            |        |        |        |
|        |           | .932     | 121.8         |          |        |        | 128         |        |        |           |          | .823          | 268.2    |        |              | 165            |        |        |        |
| Jan.14 |           | .973     | 73.5          |          |        |        | 290         |        |        |           |          | 16372         | .739     | 283.0  | 36.1         | + 6.2          | 1      | 13     | 163 n  |
|        |           | (-4.1)   | (29.4)(- 4.5) | (219)    | (1356) | (2503) |             |        |        |           |          | 16377         | .497     | 309.3  | 13.1         | +13.8          | 3      | 32     |        |
|        |           |          |               |          |        |        |             |        |        |           |          | 16375         | .413     | 32.0   | 336.8        | +15.8          | 12     | 62     |        |
| 14.300 | C         | .953     | 256.4         |          |        |        | 137         |        |        |           |          | 16378         | .677     | 62.6   | 311.7        | +14.3          | 18     | 59     |        |
|        | 16366     | .969     | 284.8         | 89.8     | +13.1  | 46     | 195         | 190 c  |        |           |          | 16374         | .664     | 98.0   | 308.3        | - 8.9          | 44     | 284    |        |
|        | 16367     | .914     | 283.4         | 80.4     | +10.3  | 13     | 103         | 224 c  |        |           |          | 16376         | .786     | 77.0   | 299.6        | + 7.1          | 11     | 98     | 205 f  |
|        | 16372     | .397     | 295.9         | 36.9     | + 5.6  | 24     | 147         |        |        |           |          | 16379         | .876     | 63.8   | 293.3        | +20.1          | 10     | 34     | 79 c   |
|        | 16373     | .431     | 110.3         | 351.6    | -12.7  | 3      | 15          |        |        |           |          | 16380         | .981     | 78.6   | 272.5        | +10.1          | 33     | 315    | 223 c  |
|        | 16375     | .689     | 64.9          | 336.3    | +13.4  | 3      | 14          |        |        |           |          |               | .827     | 90.4   |              |                | 184    |        |        |
|        | 16374     | .922     | 97.2          | 308.6    | - 8.4  | 35     | 307         | 411 f  |        |           |          |               | .903     | 53.8   |              |                | 108    |        |        |
|        | 16376     | .977     | 82.0          | 299.2    | + 6.8  | 9      | 83          | 178 f  | Jan.17 |           |          |               | .956     | 65.6   | (-5.6)       | (349.9)(- 4.8) | (132)  | (897)  | (1671) |
|        |           |          |               |          |        |        |             |        |        |           |          |               |          |        |              |                |        |        |        |

Group 16374. Jan. 14 - 26. A stable regular spot, with occasional companions.

Group 16375. Jan. 15 - 23. A stream, developing from a tiny spot when first seen. The leader becomes a regular spot and is the most stable component.

Group 16376. Jan. 15 - 19. A small spot.

Group 16377. Jan. 16 - 21. A pair of spots which are growing as they pass round the limb.

Group 16378. Jan. 16 - 25. A stream of normal type, developing from a small spot. By January 24 only the leader, a large regular spot, and a small follower remain.

Group 16379. Jan. 16 - 26. Return of Group 16348: third appearance. A single small spot until January 20. Nothing is then seen until January 24, when a pair of spots appears.

Group 16380. Jan. 17 - 28. Return of Group 16354. A stable regular spot until January 22; on the next day it splits into two and then slowly dies out.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |                | POSITION |        | AREA   |             |        | U.T.    | Group No. | MEASURES |                | POSITION |        | AREA   |             |        |
|---------|-----------|----------|----------------|----------|--------|--------|-------------|--------|---------|-----------|----------|----------------|----------|--------|--------|-------------|--------|
|         |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |
| 1950    | 17.390 G  | .962     | 306.8          | o        | o      |        | 194         |        | 1950    | 16381     | .712     | 67.0           | 266.5    | +12.3  | 1      | 7           |        |
|         |           | .927     | 268.1          |          |        |        | 201         |        |         | 16385     | .839     | 82.0           | 252.3    | + 3.8  | 5      | 25          | 66 c   |
|         |           | .816     | 249.7          |          |        |        | 84          |        |         | 16382     | .853     | 78.1           | 251.4    | + 7.4  | 28     | 200         | 136 c  |
|         |           | .885     | 281.9          | 36.1     | + 8.1  | 0      | 12          | 316 c  | Jan. 20 | 16383     | .917     | 76.0           | 243.8    | +10.7  | 16     | 169         | 135 c  |
|         |           | .682     | 297.1          | 13.9     | +14.2  | 26     | 111         |        |         |           | .866     | 58.6           |          |        |        |             | 165    |
|         |           | .356     | 354.5          | 337.3    | +15.8  | 15     | 108         |        |         |           | (-7.0)   | (308.5)(- 5.1) | (343)    | (1859) | (1698) |             |        |
|         |           | .482     | 49.2           | 313.3    | +13.8  | 34     | 173         |        |         |           |          |                |          |        |        |             |        |
|         |           | .457     | 100.4          | 308.3    | - 9.1  | 63     | 269         |        |         |           |          |                |          |        |        |             |        |
|         |           | .615     | 72.4           | 299.3    | + 6.7  | 3      | 14          |        |         | 20.489 G  | .949     | 295.0          |          |        |        |             | 170    |
|         |           | .751     | 57.9           | 292.9    | +19.8  | 3      | 11          | 85 sf  |         |           | .851     | 284.9          |          |        |        |             | 227    |
|         |           | .896     | 76.5           | 273.4    | + 9.8  | 73     | 314         | 532 nf |         |           | .779     | 254.1          |          |        |        |             | 120    |
|         |           | .797     | 47.1           |          |        |        | 80          |        |         | 16377     | .987     | 285.6          | 13.3     | +14.4  | 40     | 394         | 254 c  |
|         |           | .872     | 59.3           |          |        |        | 131         |        |         | 16373     | .864     | 258.1          | 354.4    | -12.9  | 0      | 7           | 99 c   |
|         |           | .959     | 64.9           |          |        |        | 132         |        |         | 16375     | .776     | 294.3          | 341.4    | +15.0  | 52     | 260         | 223 c  |
| Jan. 18 |           | (-6.1)   | (335.3)(- 4.9) | (217)    | (1012) | (1755) |             |        |         | 16378     | .488     | 314.3          | 315.6    | +15.0  | 118    | 693         |        |
|         | 18.487 G  | .968     | 268.2          |          |        |        | 127         |        |         | 16374     | .243     | 254.3          | 308.1    | - 8.8  | 43     | 235         |        |
|         |           | .927     | 252.2          |          |        |        | 129         |        |         | 16384     | .130     | 194.7          | 296.4    | -12.4  | 41     | 202         |        |
|         |           | .921     | 243.6          |          |        |        | 110         |        |         | 16380     | .437     | 54.2           | 273.5    | + 9.9  | 48     | 302         |        |
|         |           | .863     | 275.3          |          |        |        | 74          |        |         | 16381     | .497     | 47.9           | 272.2    | +14.6  | 2      | 16          |        |
|         |           | .969     | 280.0          | 35.3     | + 8.3  | 0      | 8           | 411 c  |         | 16385     | .685     | 78.1           | 252.4    | + 4.2  | 11     | 48          | 163 f  |
|         |           | .833     | 290.9          | 14.1     | +14.2  | 39     | 238         | 160 c  |         | 16382     | .699     | 73.0           | 252.2    | + 7.9  | 35     | 176         |        |
|         |           | .460     | 320.2          | 338.7    | +15.9  | 21     | 101         |        |         | 16383     | .804     | 70.7           | 243.8    | +12.1  | 42     | 193         | 99 c   |
|         |           | .352     | 16.3           | 315.1    | +14.7  | 44     | 393         |        |         | 16386     | .977     | 68.9           | 219.7    | +19.3  | 145    | 658         | 743 c  |
|         |           | .235     | 108.4          | 307.9    | - 9.1  | 45     | 298         |        |         |           | .854     | 52.7           |          |        |        |             | 124    |
|         |           | .422     | 61.4           | 299.1    | + 6.9  | 2      | 7           |        |         |           | .875     | 65.5           |          |        |        |             | 101    |
|         |           | .615     | 47.1           | 292.3    | +20.3  | 7      | 19          |        |         |           | .979     | 60.5           |          |        |        |             | 209    |
|         |           | .765     | 72.0           | 273.4    | +10.3  | 38     | 309         | 267 f  |         |           | (-7.5)   | (294.5)(- 5.2) | (577)    | (3184) | (2532) |             |        |
|         |           | .865     | 70.2           | 264.0    | +14.3  | 2      | 15          | 158 n  |         |           |          |                |          |        |        |             |        |
|         |           | .951     | 79.6           | 250.1    | + 8.3  | 35     | 163 }       | 144 c  | Jan. 21 | 21.303 C  | .918     | 256.5          |          |        |        |             | 196    |
|         |           | .976     | 77.9           | 244.9    | +10.7  | 25     | 171         |        |         |           | .914     | 279.5          |          |        |        |             | 148    |
| Jan. 19 |           | .903     | 61.4           |          |        |        | 113         |        |         | 16375     | .894     | 289.6          | 344.2    | +14.8  | 81     | 352         | 401 c  |
|         | 19.427 C  | (-6.6)   | (320.9)(- 5.0) | (258)    | (1722) | (1693) |             |        |         | 16378     | .602     | 303.9          | 314.8    | +15.0  | 125    | 879         |        |
|         |           | .964     | 249.3          |          |        |        | 426         |        |         | 16374     | .413     | 260.7          | 308.0    | - 8.6  | 32     | 265         |        |
|         |           | .924     | 272.6          |          |        |        | 188         |        |         | 16384     | .250     | 236.7          | 296.1    | -13.0  | 42     | 260         |        |
|         |           | .849     | 296.0          |          |        |        | 128         |        |         | 16380     | .316     | 34.7           | 273.3    | + 9.8  | 51     | 290         |        |
|         |           | .923     | 287.9          | 13.3     | +14.3  | 62     | 224         | 454 c  |         | 16381     | .387     | 29.0           | 272.7    | +14.5  | 0      | 3           |        |
|         |           | .608     | 305.1          | 339.5    | +16.0  | 47     | 217         |        |         | 16385     | .547     | 73.9           | 252.1    | + 4.2  | 14     | 57          |        |
|         |           | .354     | 342.2          | 314.9    | +14.5  | 69     | 429         |        |         | 16382     | .579     | 67.3           | 251.2    | + 8.5  | 54     | 194         |        |
|         |           | .069     | 174.0          | 308.1    | - 9.0  | 56     | 250         |        |         | 16383     | .688     | 65.7           | 244.0    | +12.4  | 41     | 202         |        |
|         |           | .219     | 121.0          | 297.5    | -11.5  | 3      | 19          |        |         | 16386     | .928     | 66.5           | 219.5    | +19.4  | 94     | 737         | 1382 c |
|         |           | .498     | 33.0           | 291.8    | +19.7  | 1      | 6           |        |         | 16387     | .979     | 79.9           | 206.8    | + 8.7  | 79     | 156         | 352 c  |
|         |           | .616     | 67.1           | 273.5    | + 9.7  | 55     | 313         |        |         |           | .859     | 67.8           |          |        |        |             | 162    |
|         |           |          |                |          |        |        |             |        |         |           | .947     | 94.1           |          |        |        |             | 136    |
|         |           |          |                |          |        |        |             |        |         |           | (-7.9)   | (283.8)(- 5.3) | (613)    | (3395) | (2777) |             |        |

Group 16381. Jan. 19 - 23. Short-lived single spots until January 23, when there is a stream.

Group 16382. Jan. 19 - 30. A variable stream, led by a composite spot.

Group 16383. Jan. 19 - 26. A spot which dies out just past the central meridian.

Group 16384. Jan. 20 - 27. A stream of changing spots, of which the follower becomes the most stable and longest-lived component.

Group 16385. Jan. 20 - 28. A string of small variable spots which spread out in longitude and die out before reaching the limb.

Group 16386. Jan. 21-Feb. 2. A composite spot, undergoing small changes as it slowly diminishes.

Group 16387. Jan. 22-Feb. 1. A stream of small variable spots, of which only the leader remains by February 1.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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## POSITIONS AND AREAS OF SUNSPOTS AND FACULAE FOR EACH DAY IN THE YEAR

| U.T.     | Group No. | MEASURES |            | POSITION |        | AREA  |             |        | U.T.     | Group No. | MEASURES        |                | POSITION |       | AREA  |             |        |       |
|----------|-----------|----------|------------|----------|--------|-------|-------------|--------|----------|-----------|-----------------|----------------|----------|-------|-------|-------------|--------|-------|
|          |           | Dist.    | Pos. Angle | Long.    | Lat.   | Umbræ | Whole Spots | Faculæ |          |           | Dist.           | Pos. Angle     | Long.    | Lat.  | Umbræ | Whole Spots | Faculæ |       |
| 1950     |           |          |            | o        | o      |       |             |        | 1950     |           |                 |                | o        | o     |       |             |        |       |
| 22.384 G |           | .970     | 250.9      |          |        |       | 154         |        | 16391    | .930      | 84.9            | 188.6          | + 2.7    | 5     | 23    |             |        |       |
|          |           | .825     | 262.3      |          |        |       | 288         |        | 16392    | .941      | 82.8            | 187.1          | + 4.9    | 6     | 29    |             | 436 c  |       |
|          | 16375     | .972     | 287.3      | 343.6    | +15.3. | 40    | 364         | 318 c  | 16393    | .942      | 80.8            | 187.1          | + 6.8    | 3     | 10    |             | 490    |       |
|          | 16378     | .774     | 295.4      | 316.0    | +15.7  | 138   | 748         | 174 c  |          | .833      | 62.6            |                |          |       |       |             | 88     |       |
|          | 16374     | .626     | 263.2      | 308.4    | - 8.5  | 49    | 241         |        |          | .835      | 96.4            |                |          |       |       |             | 121    |       |
|          | 16384     | .463     | 251.9      | 296.3    | -13.1  | 74    | 405         |        |          | .840      | 53.4            |                |          |       |       |             | 159    |       |
|          | 16380     | .263     | 346.1      | 273.3    | + 9.3  | 26    | 275         |        |          | .913      | 111.4           |                |          |       |       |             | 220    |       |
|          | 16381     | .289     | 5.5        | 268.0    | +11.2  | 6     | 16          |        |          | .963      | 55.0            |                |          |       |       |             | 245    |       |
|          | 16385     | .326     | 61.0       | 253.1    | + 3.9  | 10    | 46          |        |          | (-8.8)    | (-256.4)(- 5.4) |                |          |       |       |             | 128    |       |
|          | 16382     | .399     | 52.9       | 250.9    | + 8.8  | 57    | 273         |        |          |           |                 |                |          |       |       |             | 181    |       |
|          | 16383     | .517     | 54.2       | 244.2    | +12.7  | 19    | 135         |        |          |           |                 |                |          |       |       |             | 97     |       |
|          | 16386     | .817     | 61.6       | 220.2    | +19.3  | 116   | 634         | 507 c  |          |           |                 |                |          |       |       |             | 96     |       |
|          | 16387     | .887     | 77.6       | 208.7    | + 8.3  | 14    | 110         | 118 c  |          |           |                 |                |          |       |       |             | 107    |       |
|          | 16388     | .979     | 72.1       | 193.8    | +16.2  | 5     | 74          | 139 f  | 24.286 C |           |                 |                |          |       |       |             | 454    |       |
|          |           |          |            |          |        |       |             |        |          | .973      | 263.2           |                |          |       |       |             | 422 c  |       |
|          |           |          |            |          |        |       |             |        |          | .960      | 238.3           |                |          |       |       |             | 205 sf |       |
|          |           |          |            |          |        |       |             |        |          | .917      | 296.6           |                |          |       |       |             | 221 c  |       |
| Jan. 23  |           |          |            |          |        |       |             |        |          | .877      | 304.0           |                |          |       |       |             | 210    |       |
|          |           |          |            |          |        |       |             |        |          | .873      | 250.8           |                |          |       |       |             | 257 c  |       |
|          |           |          |            |          |        |       |             |        |          | .845      | 282.6           |                |          |       |       |             | 158    |       |
|          |           |          |            |          |        |       |             |        |          | 16378     | .963            | 288.2          | 316.4    | +15.8 | 72    | 454         |        |       |
|          |           |          |            |          |        |       |             |        |          | 16374     | .898            | 263.4          | 308.8    | - 8.4 | 37    | 234         |        |       |
|          |           |          |            |          |        |       |             |        |          | 16389     | .870            | 290.6          | 301.8    | +14.8 | 34    | 133         |        |       |
|          |           |          |            |          |        |       |             |        |          | 16384     | .770            | 257.2          | 294.9    | -13.3 | 31    | 210         |        |       |
|          |           |          |            |          |        |       |             |        |          | 16379     | .799            | 300.0          | 291.8    | +19.8 | 16    | 62          |        |       |
|          |           |          |            |          |        |       |             |        |          | 16380     | .533            | 298.1          | 273.0    | + 9.7 | 31    | 158         |        |       |
|          |           |          |            |          |        |       |             |        |          | 16385     | .274            | 306.6          | 257.3    | + 4.0 | 0     | 2           |        |       |
|          |           |          |            |          |        |       |             |        |          | 16382     | .276            | 335.8          | 251.2    | + 9.1 | 59    | 287         |        |       |
|          |           |          |            |          |        |       |             |        |          | 16383     | .319            | 3.0            | 243.6    | +13.0 | 14    | 62          |        |       |
|          |           |          |            |          |        |       |             |        |          | 16386     | .582            | 43.8           | 219.4    | +19.8 | 104   | 586         |        |       |
|          |           |          |            |          |        |       |             |        |          | 16394     | .686            | 52.6           | 209.3    | +20.1 | 1     | 10          |        |       |
|          |           |          |            |          |        |       |             |        |          | 16387     | .615            | 69.0           | 209.3    | + 8.2 | 7     | 46          |        |       |
|          |           |          |            |          |        |       |             |        |          | 16390     | .832            | 70.2           | 191.3    | +13.1 | 17    | 164         |        |       |
|          |           |          |            |          |        |       |             |        |          | 16392     | .847            | 80.5           | 187.8    | + 5.0 | 2     | 12          |        |       |
|          |           |          |            |          |        |       |             |        |          | 16391     | .854            | 83.5           | 186.7    | + 2.6 | 9     | 72          |        | 523 c |
|          |           |          |            |          |        |       |             |        |          | 16393     | .863            | 77.9           | 186.5    | + 7.5 | 2     | 15          |        |       |
|          |           |          |            |          |        |       |             |        |          | 16395     | .973            | 102.8          | 167.3    | -13.7 | 0     | 17          |        | 122 f |
|          |           |          |            |          |        |       |             |        |          |           | .827            | 54.9           |          |       |       |             | 120    |       |
|          |           |          |            |          |        |       |             |        |          |           | .849            | 63.2           |          |       |       |             | 98     |       |
|          |           |          |            |          |        |       |             |        |          |           | .908            | 92.7           |          |       |       |             | 123    |       |
|          |           |          |            |          |        |       |             |        |          |           | .941            | 47.6           |          |       |       |             | 183    |       |
|          |           |          |            |          |        |       |             |        |          |           | .942            | 61.0           |          |       |       |             | 553    |       |
|          |           |          |            |          |        |       |             |        |          |           | .943            | 70.9           |          |       |       |             | 108    |       |
|          |           |          |            |          |        |       |             |        |          |           | (-9.2)          | (244.6)(- 5.5) |          |       |       |             | 4052   |       |
|          |           |          |            |          |        |       |             |        | Jan. 25  |           |                 |                |          |       |       |             |        |       |

Group 16388. Jan. 23 - 24. A small spot.

Group 16389. Jan. 24 - 27. A stream, forming near the west limb.

Group 16390. Jan. 24-Feb. 1. A regular spot, with occasional companions.

Group 16391. Jan. 24 - 28. A small changing stream.

Group 16392. Jan. 24 - 25. A small spot.

Group 16393. Jan. 24 - 25. A small spot.

Group 16394. Jan. 25 - 27. A tiny spot.

Group 16395. Jan. 25 - 29. A small spot.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.                | Group No. | MEASURES |                | POSITION |             | AREA  |             |        | U.T.    | Group No. | MEASURES |            | POSITION       |                     | AREA                |             |         |         |     |  |
|---------------------|-----------|----------|----------------|----------|-------------|-------|-------------|--------|---------|-----------|----------|------------|----------------|---------------------|---------------------|-------------|---------|---------|-----|--|
|                     |           | Dist.    | Pos. Angle     | Long.    | Lat.        | Umbræ | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle | Long.          | Lat.                | Umbræ               | Whole Spots | Faculæ  |         |     |  |
| 1950<br>25.584<br>G |           | .955     | 278.2          |          | o o         |       | 179         |        | 1950    |           |          | .951       | 85.7           | o o                 |                     | 208         |         |         |     |  |
|                     |           | .945     | 303.0          |          |             |       |             |        |         |           |          | .973       | (-10.1)        | (215.4)(- 5.7)      | (192) (1225) (3177) |             |         |         |     |  |
|                     |           | .939     | 267.1          |          |             |       |             |        |         |           |          | .929       | 282.5          | 271.6 + 9.3         | 3 20                | 127 c       |         |         |     |  |
|                     |           | .883     | 250.6          |          |             |       |             |        |         |           |          | .839       |                |                     |                     |             |         |         |     |  |
|                     |           | .851     | 300.6          |          |             |       |             |        |         |           |          | .912       | 302.1          | 261.2 + 3.1         | 0 23                | 106 c       |         |         |     |  |
|                     |           | 16374,   | .991           | 262.4    | 310.3 - 8.3 | 47    | 329         | 185 c  | 27.288  | C         |          | .898       |                |                     |                     |             |         |         |     |  |
|                     |           | 16389    | .977           | 286.6    | 303.0 +14.9 | 72    | 491         | 221 c  | .929    |           |          |            |                |                     |                     |             |         |         |     |  |
|                     |           | 16384    | .912           | 257.4    | 293.6 -13.8 | 16    | 110         | 384 c  | 16380   | 16385     | 16382    | 16396      | 16386          | 16387               | 16390               | 16391       | 16395   | 102     | 177 |  |
|                     |           | 16379    | .934           | 294.2    | 292.5 +20.2 | 3     | 12          | 176 c  |         |           |          | .839       | 277.5          | 261.2 + 3.1         | 0 23                | 106 c       |         |         |     |  |
|                     |           | 16380    | .742           | 288.8    | 272.8 + 9.8 | 21    | 106         | 146 c  |         |           |          | .763       |                |                     |                     |             |         |         |     |  |
|                     |           | 16385    | .546           | 285.4    | 259.2 + 3.6 | 0     | 4           |        | 16380   | 16385     | 16382    | 16396      | 16386          | 16387               | 16390               | 16391       | 16395   | 157 c   | 120 |  |
|                     |           | 16382    | .474           | 302.0    | 251.4 + 9.4 | 42    | 268         |        |         |           |          | .461       |                |                     |                     |             |         |         |     |  |
|                     |           | 16383    | .418           | 320.0    | 243.5 +13.2 | 5     | 29          |        |         |           |          | .497       | 331.1          | 219.8 +20.1         | 71 604              | 122         | 178     | 163     |     |  |
|                     |           | 16396    | .118           | 193.7    | 229.1 -12.2 | 16    | 34          |        |         |           |          | .290       |                |                     |                     |             |         |         |     |  |
|                     |           | 16386    | .456           | 17.6     | 219.1 +20.1 | 99    | 634         |        | 16380   | 16385     | 16382    | 16396      | 16386          | 16387               | 16390               | 16391       | 16395   | 163     | 17  |  |
|                     |           | 16394    | .509           | 33.5     | 210.2 +19.7 | 2     | 19          |        |         |           |          | .367       |                |                     |                     |             |         |         |     |  |
|                     |           | 16387    | .381           | 51.6     | 210.0 + 8.3 | 18    | 74          |        |         |           |          | .338       | 34.4           | 192.8 +11.9         | 26 163              | 20          | 120     | 178     |     |  |
|                     |           | 16390    | .648           | 62.4     | 191.6 +12.9 | 35    | 159         |        |         |           |          | .600       |                |                     |                     |             |         |         |     |  |
|                     |           | 16391    | .680           | 79.2     | 185.7 + 3.1 | 9     | 45          |        |         |           |          | .811       | 92.7           | 80.3                | 2 17                | 167         | 231     | 286     |     |  |
|                     |           | 16395    | .877           | 103.9    | 166.0 -14.8 | 0     | 4           | 119 c  |         |           |          | .829       |                |                     |                     |             |         |         |     |  |
|                     |           | .783     | 57.7           |          |             |       |             | 347    | 16380   | 16385     | 16382    | 16396      | 16386          | 16387               | 16390               | 16391       | 16395   | 286     | 286 |  |
|                     |           | .869     | 43.1           |          |             |       |             | 152    |         |           |          | .944       | 69.9           | 92.5                | 2 9                 | 246         | 246     | 246     |     |  |
|                     |           | .910     | 53.7           |          |             |       |             | 155    |         |           |          | .946       |                |                     |                     |             |         |         |     |  |
|                     |           | .929     | 94.8           |          |             |       |             | 102    | Jan. 28 | 28.483    | G        | (-10.5)    | (205.0)(- 5.8) | (156) (1225) (2264) | 247                 | 247         | 247     |         |     |  |
|                     |           | .931     | 67.7           |          |             |       |             | 132    |         |           |          | .981       | 284.8          | 296.9               | 0 23                | 173         | 173     | 173     |     |  |
|                     |           | .944     | 104.2          |          |             |       |             | 212    |         |           |          | .946       |                |                     |                     |             |         |         |     |  |
|                     |           | (-9.8)   | (227.5)(- 5.6) |          |             | (385) | (2318)      | (2956) |         |           |          | .946       | 275.3          | 249.9 +10.4         | 28 181              | 279 c       | 279 c   | 279 c   |     |  |
| Jan. 26             |           | .964     | 292.7          |          |             |       |             | 161    | 16382   | 16396     | 1638d    | .889       | 285.0          | 258.4               | 222.3 + 9.1         | 2 13        | 2 13    | 2 13    |     |  |
|                     |           | .935     | 302.3          |          |             |       |             | 136    |         |           |          | .678       |                |                     |                     |             |         |         |     |  |
|                     |           | .850     | 293.6          |          |             |       |             | 225    |         |           |          | .592       | 294.4          | 311.8               | 219.9 +20.2         | 100 731     | 100 731 | 100 731 |     |  |
|                     |           | 16384    | .990           | 258.2    | 297.9 -12.4 | 0     | 58          | 324 s  |         |           |          | .644       |                |                     |                     |             |         |         |     |  |
|                     |           | 16389    | .993           | 286.4    | 296.6 +15.5 | 0     | 37          | 130 c  | 16387   | 16390     | 16395    | 16397      | .474           | 303.1               | 212.9 + 9.5         | 12 80       | 12 80   | 12 80   |     |  |
|                     |           | 16380    | .860           | 285.1    | 272.6 + 9.8 | 4     | 40          | 197 c  |         |           |          | .305       |                |                     |                     |             |         |         |     |  |
|                     |           | 16385    | .706           | 280.7    | 259.2 + 3.4 | 5     | 27          | 81 p   |         |           |          | .402       | 113.5          | 167.0 -14.7         | 2 9                 | 254 c       | 254 c   | 254 c   |     |  |
|                     |           | 16382    | .635           | 292.6    | 251.7 + 9.5 | 34    | 192         |        |         |           |          | .968       |                |                     |                     |             |         |         |     |  |
|                     |           | 16396    | .277           | 235.3    | 228.9 -14.5 | 11    | 70          |        | 16397   | 16398     | 16399    | 16397      | .879           | 64.2                | 100.5               | 0 23        | 249     | 249     | 249 |  |
|                     |           | 16386    | .442           | 351.9    | 219.2 +20.2 | 90    | 505         |        |         |           |          | .978       |                |                     |                     |             |         |         |     |  |
|                     |           | 16394    | .455           | 8.1      | 211.5 +20.9 | 0     | 5           |        | 16397   | 16398     | 16399    | 16397      | (-11.0)        | (189.3)(- 5.9)      | (181) (1197) (1943) | 1943        | 1943    | 1943    |     |  |
|                     |           | 16387    | .270           | 18.5     | 210.4 + 9.1 | 22    | 138         |        |         |           |          | .938       |                |                     |                     |             |         |         |     |  |
|                     |           | 16390    | .484           | 52.3     | 192.5 +11.9 | 21    | 120         |        | 29.294  | 16382     | 16396    | 16397      | .823           | 310.7               | 291.7               | 0 23        | 184     | 184     | 184 |  |
|                     |           | 16391    | .495           | 75.6     | 186.9 + 2.1 | 2     | 15          |        |         |           |          | .800       |                |                     |                     |             |         |         |     |  |
| 26.496<br>G         |           | 1289c    | .688           | 47.1     | 182.3 +23.1 | 0     | 5           | 82 c</ |         |           |          |            |                |                     |                     |             |         |         |     |  |

## GREENWICH PHOTO-HELIOGRAPHIC RESULTS. 1950.

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Group 16398. Jan. 30-Feb. 10. Return of Group 16369. A few small spots, not seen on February 6.  
Group 16399. Feb. 3 - 6. A single small spot on February 3 and 6; a pair on the other days.

Group 16399. Feb. 3 - 6. A single small spot on February 3 and 6; a pair on the other days.

Group 18400. Feb. 4 - 6. A small diminishing spot.

Group 16401. Feb. 8 - 19. Return of Group 16375. A stable regular spot.

Group 16402. Feb. 10 - 20. A stream, whose leader soon becomes a fairly stable composite spot and alone remains at the west limb. The follower, which is also composite at first, soon breaks up and dies out.

Group 16403 Feb 10 - 22 Return of Group 16374. A small stable regular spot west limb. The follower, which is also composite at first, soon breaks up as

Group 16403. Feb. 10 - 22. Return of Group 16374. A small stable regular spot.

Group 16404. Feb. 11 - 23. Return of Group 16389. A stable regular spot, with occasional

Group 16405. Feb. 13 - 15. A pair of spots, of which only one remains on February 15.

Group 16406. Feb. 13 - 25. A composite spot, immediately preceding Group 16410.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.        | Group No. | MEASURES |                | POSITION |        | AREA   |             |        | U.T.   | Group No. | MEASURES |                | POSITION |       | AREA  |                     |        |       |
|-------------|-----------|----------|----------------|----------|--------|--------|-------------|--------|--------|-----------|----------|----------------|----------|-------|-------|---------------------|--------|-------|
|             |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |        |           | Dist.    | Pos. Angle     | Long.    | Lat.  | Umbræ | Whole Spots         | Faculæ |       |
| 1950        |           |          |                | o        | o      |        |             |        | 1950   |           |          |                | o        | o     |       |                     |        |       |
| 44.561<br>C | 16405     | .943     | 272.8          |          |        |        |             |        | 1950   | 16408     | .827     | 289.9          |          |       |       |                     | 93     |       |
|             | 16408     | .968     | 283.1          | 51.1     | +10.8  | 25     | 162         | 383 c  |        | 16401     | .979     | 253.8          | 20.9     | -17.2 | 59    | 465                 | 218 c  |       |
|             | 16401     | .716     | 251.6          | 23.0     | -17.9  | 22     | 136         |        |        | 16402     | .778     | 298.9          | 346.7    | +17.2 | 27    | 173                 | 102 c  |       |
|             | 16402     | .434     | 339.0          | 346.9    | +17.1  | 28     | 177         |        |        | 16403     | .661     | 251.7          | 342.3    | -17.2 | 85    | 798                 |        |       |
|             | 16403     | .200     | 208.8          | 343.3    | -16.8  | 116    | 710         |        |        | 16404     | .142     | 260.7          | 309.5    | -8.2  | 26    | 155                 |        |       |
|             | 16404     | .465     | 94.8           | 309.8    | -8.2   | 29     | 155         |        |        | 16406     | .382     | 351.3          | 304.8    | +15.2 | 58    | 359                 |        |       |
|             | 16406     | .633     | 56.0           | 304.8    | +15.0  | 44     | 277         |        |        | 16407     | .533     | 54.9           | 275.1    | +11.6 | 44    | 398                 |        |       |
|             | 16407     | .909     | 74.5           | 274.6    | +11.0  | 35     | 277         | 168 c  |        | 16409     | .524     | 75.8           | 271.0    | +1.4  | 20    | 122                 |        |       |
|             | 16409     | .925     | 85.8           | 270.5    | +1.3   | 17     | 139         | 158 s  |        | 16410     | .685     | 45.9           | 269.3    | +22.6 | 24    | 177                 | 111 f  |       |
|             | 16410     | .967     | 63.4           | 267.3    | +23.5  | 25     | 151         | 231 c  |        |           | .675     | 65.7           | 262.8    | +10.7 | 315   | 2704                | 132 f  |       |
| Feb.14      |           | .970     | 77.0           | 263.6    | +10.8  | 232    | 1533        | 750 c  |        |           | .854     | 65.2           |          |       |       | 110                 |        |       |
|             |           | .897     | 64.9           |          |        |        |             | 105    |        |           | .923     | 74.7           |          |       |       | 177                 |        |       |
|             |           | ( -17.2) | (337.6)( -6.8) | (573)    | (3717) | (2029) |             |        |        |           | .944     | 55.8           |          |       |       | 94                  |        |       |
|             |           |          |                |          |        |        |             |        |        |           | .966     | 67.9           |          |       |       | 241                 |        |       |
|             |           |          |                |          |        |        |             |        |        |           | ( -18.1) | (301.4)( -6.9) |          |       |       | (658) (5351) (1424) |        |       |
| 45.299<br>C | 16405     | .943     | 300.0          |          |        |        |             | 87     | Feb.17 |           |          |                |          |       |       |                     |        |       |
|             | 16408     | .854     | 291.6          |          |        |        |             | 140    |        |           |          |                |          |       |       |                     |        |       |
|             | 16401     | .988     | 282.4          | 47.1     | +11.0  | 0      | 19          | 227 f  |        |           |          |                |          |       |       |                     |        |       |
|             | 16402     | .814     | 253.0          | 22.5     | -17.8  | 72     | 374         | 146 c  |        | 48.374    | .949     | 301.3          |          |       |       |                     | 110    |       |
|             | 16403     | .508     | 322.4          | 346.7    | +17.1  | 20     | 140         |        |        | G         | .936     | 286.0          |          |       |       |                     | 230    |       |
|             | 16404     | .313     | 234.4          | 343.3    | -17.1  | 139    | 827         |        |        |           | .817     | 297.6          |          |       |       |                     | 90     |       |
|             | 16405     | .315     | 96.0           | 309.5    | -8.5   | 26     | 149         |        |        |           | 16401    | .898           | 293.1    | 347.0 | +17.2 | 19                  | 128    | 142 c |
|             | 16406     | .528     | 46.6           | 304.6    | +14.9  | 48     | 267         |        |        |           | 16402    | .821           | 253.5    | 342.8 | -17.5 | 104                 | 729    | 274 c |
|             | 16407     | .834     | 71.6           | 274.3    | +11.2  | 51     | 409         | 182 c  |        |           | 16403    | .377           | 265.5    | 309.6 | -8.2  | 27                  | 146    |       |
|             | 16408     | .849     | 84.1           | 270.5    | +1.3   | 27     | 146         | 160 c  |        |           | 16404    | .472           | 321.7    | 305.0 | +15.0 | 50                  | 256    |       |
| Feb.15      | 16409     | .915     | 60.4           | 267.9    | +23.5  | 36     | 188         | 242 c  |        |           | 16406    | .376           | 32.3     | 275.6 | +11.6 | 63                  | 352    |       |
|             | 16410     | .920     | 75.9           | 263.2    | +10.0  | 240    | 1910        | 653 c  |        |           | 16407    | .327           | 62.5     | 270.6 | +1.9  | 27                  | 178    |       |
|             |           | ( -17.4) | (327.9)( -6.9) | (659)    | (4429) | (1837) |             |        |        |           | 16409    | .572           | 31.8     | 268.4 | +22.4 | 32                  | 162    |       |
|             |           |          |                |          |        |        |             |        |        |           | 16410    | .497           | 56.1     | 262.8 | +9.7  | 422                 | 2341   |       |
|             |           |          |                |          |        |        |             |        |        |           | 1290a    | .694           | 93.5     | 243.3 | -7.5  | 6                   | 18     |       |
| 46.297<br>C | 16408     | .970     | 269.3          |          |        |        |             | 127    | Feb.18 |           |          |                |          |       |       |                     |        |       |
|             | 16401     | .944     | 288.5          |          |        |        |             | 315    |        |           |          |                |          |       |       |                     |        |       |
|             | 16402     | .916     | 254.0          | 21.8     | -17.4  | 67     | 644         | 240 c  |        |           | 16411    | .953           | 70.4     | 218.4 | +16.3 | 24                  | 142    | 435 f |
|             | 16403     | .638     | 307.5          | 346.5    | +16.9  | 29     | 160         |        |        |           | .838     | 98.2           |          |       |       |                     | 56     |       |
|             | 16404     | .490     | 246.4          | 342.6    | -17.4  | 123    | 1014        |        |        |           | .854     | 66.8           |          |       |       |                     | 274    |       |
|             | 16405     | .094     | 106.2          | 309.5    | -8.4   | 39     | 162         |        |        |           | .873     | 49.8           |          |       |       |                     | 94     |       |
|             | 16406     | .404     | 24.1           | 304.9    | +14.8  | 42     | 357         |        |        |           | .949     | 62.0           |          |       |       |                     | 633    |       |
|             | 16407     | .696     | 65.9           | 274.5    | +11.2  | 75     | 431         |        |        |           | .950     | 96.3           |          |       |       |                     | 111    |       |
|             | 16408     | .706     | 81.1           | 270.7    | +1.3   | 32     | 163         |        |        |           | .961     | 77.2           |          |       |       |                     | 96     |       |
|             | 16409     | .815     | 54.9           | 268.4    | +23.2  | 22     | 132         | 168 c  |        |           | .965     | 177.9          |          |       |       |                     | 8      |       |
| Feb.16      | 16410     | .815     | 72.2           | 262.9    | +10.2  | 325    | 2856        | 457 c  |        |           | ( -18.4) | (287.4)( -7.0) |          |       |       |                     |        |       |
|             |           | .973     | 71.8           |          |        |        |             | 158    |        |           |          |                |          |       |       |                     |        |       |
|             |           | ( -17.7) | (314.7)( -6.9) | (754)    | (5919) | (1465) |             |        |        | 49.314    | .916     | 294.1          |          |       |       |                     | 117    |       |
|             |           |          |                |          |        |        |             |        |        | C         | .910     | 268.9          |          |       |       |                     | 176    |       |
| 47.311<br>C |           | .921     | 301.3          |          |        |        |             | 53     |        |           | 16401    | .786           | 297.2    |       |       |                     |        | 128   |
|             |           | .919     | 293.9          |          |        |        |             | 93     |        |           | 16402    | .967           | 289.7    | 346.9 | +16.9 | 25                  | 176    | 129 c |
|             |           |          |                |          |        |        |             |        |        |           | .934     | 253.7          | 345.0    | -17.7 | 70    | 605                 | 456 c  |       |

Group 16408. Feb. 14 - 17. A small bi-polar group, forming near the west limb.

Group 16409. Feb. 14 - 25. A small regular spot, with a distant companion on February 16.

Group 16410. Feb. 14 - 26. A notable group, in which both leader and follower are composite spots. The leader becomes regular by the time it reaches the west limb. The follower, at first the larger component, breaks up and slowly diminishes.

Group 16411. Feb. 18 - 28. The last phase of a regular spot.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |            |          |                |        |             |         |         |           |          |            |                |       |        |             |                     |      |        |
|---|-----------|----------|------------|----------|----------------|--------|-------------|---------|---------|-----------|----------|------------|----------------|-------|--------|-------------|---------------------|------|--------|
| U.T.  | Group No. | MEASURES |            | POSITION |                | AREA   |             |         | U.T.    | Group No. | MEASURES |            | POSITION       |       | AREA   |             |                     |      |        |
|   |           | Dist.    | Pos. Angle | Long.    | Lat.           | Umbrae | Whole Spots | Faculae |         |           | Dist.    | Pos. Angle | Long.          | Lat.  | Umbrae | Whole Spots | Faculae             |      |        |
| 1950  |           |          |            | o        | o              |        |             |         | 1950    |           |          |            | o              | o     |        |             |                     |      |        |
|   | 16403     | .563     | 265.5      | 309.4    | - 8.3          | 18     | 170         |         |         | 16404     | .880     | 291.6      | 304.9          | +15.2 | 54     | 277         | 326 c               |      |        |
|   | 16404     | .600     | 306.9      | 304.7    | +15.0          | 59     | 275         |         |         | 16416     | .732     | 295.2      | 289.7          | +12.9 | 4      | 26          | 82 c                |      |        |
|   | 16412     | .233     | 320.3      | 283.5    | + 3.3          | 1      | 8           |         |         | 16412     | .632     | 283.2      | 285.0          | + 2.7 | 4      | 20          |                     |      |        |
|   | 16406     | .324     | 356.7      | 276.1    | +11.8          | 84     | 410         |         |         | 16406     | .576     | 302.8      | 276.6          | +11.9 | 68     | 339         |                     |      |        |
|   | 16407     | .172     | 25.7       | 270.7    | + 1.9          | 24     | 150         |         |         | 16407     | .438     | 288.0      | 271.6          | + 1.3 | 27     | 121         |                     |      |        |
|   | 16409     | .509     | 13.1       | 267.8    | +22.6          | 52     | 177         |         |         | 16409     | .586     | 326.8      | 267.4          | +22.6 | 22     | 146         |                     |      |        |
|   | 16410     | .352     | 35.9       | 263.0    | + 9.7          | 334    | 2151        |         |         | 16410     | .407     | 314.4      | 264.2          | + 9.7 | 352    | 1882        |                     |      |        |
|   | 16411     | .875     | 66.6       | 218.3    | +16.6          | 26     | 157         | 360 nf  |         | 16411     | .606     | 49.9       | 218.3          | +16.7 | 16     | 99          |                     |      |        |
|   | 16413     | .978     | 84.5       | 197.9    | + 3.8          | 26     | 125         | 109 c   |         | 16414     | .732     | 64.2       | 204.7          | +13.3 | 14     | 80          | 168 c               |      |        |
|   |           | .829     | 55.9       |          |                |        |             | 141     |         | 16413     | .770     | 78.2       | 198.2          | + 4.4 | 16     | 85          | 225 sf              |      |        |
|   |           | .903     | 78.9       |          |                |        |             | 97      |         | 16415     | .908     | 76.8       | 183.9          | + 8.8 | 87     | 462         | 261 c               |      |        |
|   |           | .950     | 54.9       |          |                |        |             | 201     |         |           | .790     | 43.4       |                |       |        | 530         |                     |      |        |
|   |           | .972     | 72.1       |          |                |        |             | 111     |         |           | .869     | 116.0      |                |       |        | 142         |                     |      |        |
| Feb. 19   |           |          |            | (-18.7)  | (275.0)(- 7.0) | (719)  | (4404)      | (2025)  |         |           |          | .872       | 56.2           |       |        |             | 242                 |      |        |
|   |           |          |            |          |                |        |             |         |         |           |          | .903       | 91.1           |       |        |             | 163                 |      |        |
|   |           |          |            |          |                |        |             |         |         |           |          | .919       | 44.0           |       |        |             | 233                 |      |        |
|   |           |          |            |          |                |        |             |         |         |           |          | .959       | 66.4           |       |        |             | 418                 |      |        |
|   |           |          |            |          |                |        |             |         |         |           |          | .970       | 53.2           |       |        |             | 154                 |      |        |
| 50.397  |           |          |            |          |                |        |             |         |         |           |          | (-19.4)    | (247.1)(- 7.1) |       |        |             |                     |      |        |
|   | G         | .984     | 288.9      |          |                |        |             | 148     |         |           |          |            |                |       |        |             |                     |      |        |
|   |           | .888     | 291.7      |          |                |        |             | 259     |         |           |          |            |                |       |        |             |                     |      |        |
|   |           | .887     | 182.9      |          |                |        |             | 7       |         |           |          |            |                |       |        |             |                     |      |        |
|   |           | .879     | 301.6      |          |                |        |             | 159     |         |           |          |            |                |       |        |             |                     |      |        |
|   |           | 16402    | .995       | 252.7    | 346.9          | -17.9  | 125         | 594     | 625 f   |           |          |            |                |       |        |             |                     |      |        |
|   |           | 16403    | .749       | 265.4    | 309.4          | - 8.0  | 23          | 133     | 84 c    | 52.447    |          | .953       | 274.9          |       |        |             |                     | 143  |        |
|   |           | 16404    | .758       | 297.1    | 304.9          | +15.2  | 55          | 267     | 166 c   | G         |          | .947       | 294.4          |       |        |             |                     | 119  |        |
|   |           | 16412    | .427       | 291.6    | 284.0          | + 2.6  | 13          | 48      |         |           |          | .941       | 303.1          |       |        |             |                     | 207  |        |
|   |           | 16406    | .417       | 320.3    | 276.4          | +11.9  | 68          | 372     |         |           |          | .882       | 311.4          |       |        |             |                     | 104  |        |
|   |           | 16407    | .233       | 308.5    | 271.2          | + 1.4  | 22          | 121     |         |           |          | 16403      | .968           | 263.6 | 309.7  | - 8.0       | 25                  | 104  | 427 sf |
|   |           | 16409    | .510       | 347.9    | 267.3          | +22.8  | 21          | 113     |         |           |          | 16404      | .961           | 288.2 | 304.6  | +15.2       | 46                  | 257  | 274 c  |
|   |           | 16410    | .298       | 349.2    | 263.9          | +10.0  | 344         | 1948    |         |           |          | 16416      | .869           | 290.4 | 290.5  | +13.8       | 43                  | 190  | 216 c  |
|   |           | 16411    | .747       | 60.1     | 218.3          | +16.7  | 18          | 87      | 309 nf  |           |          | 16412      | .794           | 279.1 | 285.2  | + 2.8       | 2                   | 10   | 92 c   |
|   |           | 16414    | .866       | 70.0     | 204.1          | +13.4  | 15          | 39      | 147 c   |           |          | 16406      | .733           | 293.8 | 276.8  | +12.1       | 36                  | 238  |        |
|   |           | 16413    | .896       | 81.6     | 198.2          | + 4.3  | 22          | 93      | 233 f   |           |          | 16407      | .631           | 281.7 | 271.7  | + 1.8       | 15                  | 105  |        |
|   |           | 16415    | .984       | 79.3     | 182.7          | + 9.1  | 92          | 436     | 301 c   |           |          | 16409      | .699           | 313.5 | 266.9  | +22.8       | 24                  | 132  |        |
|   |           |          | .892       | 50.0     |                |        |             |         | 480     |           |          | 16410      | .576           | 299.1 | 264.3  | +10.1       | 278                 | 1476 |        |
|   |           |          | .933       | 109.7    |                |        |             |         | 179     |           |          | 16411      | .474           | 32.3  | 218.4  | +16.7       | 13                  | 84   |        |
|   |           |          | .945       | 61.7     |                |        |             |         | 427     |           |          | 16414      | .580           | 54.9  | 204.6  | +13.2       | 20                  | 78   |        |
| Feb. 20   |           |          |            | (-19.1)  | (260.7)(- 7.0) | (818)  | (4251)      | (3524)  |         |           |          | 16413      | .608           | 72.9  | 198.2  | + 4.5       | 14                  | 89   |        |
|   |           |          |            |          |                |        |             |         |         |           |          | 16415      | .792           | 73.1  | 183.9  | + 8.7       | 71                  | 374  | 282 c  |
|   |           |          |            |          |                |        |             |         |         |           |          | .820       | 37.9           |       |        |             | 210                 |      |        |
|   |           |          |            |          |                |        |             |         |         |           |          | .881       | 108.5          |       |        |             | 104                 |      |        |
| 51.436  |           |          |            |          |                |        |             |         |         |           |          | .911       | 47.4           |       |        |             | 132                 |      |        |
|   | G         | .975     | 262.2      |          |                |        |             |         |         |           |          | .914       | 63.4           |       |        |             | 508                 |      |        |
|   |           | .971     | 290.2      |          |                |        |             |         |         |           |          | .958       | 55.1           |       |        |             | 244                 |      |        |
|   |           | .887     | 279.3      |          |                |        |             |         |         |           |          | .963       | 101.6          |       |        |             | 361                 |      |        |
|   |           | .856     | 308.9      |          |                |        |             |         |         |           |          | (-19.7)    | (233.7)(- 7.1) |       |        |             | (587) (3137) (3423) |      |        |
|   | 16403     | .883     | 264.5      | 309.5    | - 8.2          | 23     | 143         | 518 sf  | Feb. 22 |           |          |            |                |       |        |             |                     |      |        |

Group 16412. Feb. 19 - 23. One or two small spots.

Group 16413. Feb. 19-Mar. 3. A small stable regular spot.

Group 16414. Feb. 20-Mar. 1. A stream of small spots, undergoing changes from day to day.

Group 16415. Feb. 20-Mar. 3. A bi-polar group, of which the leader, a regular spot, alone remains by March 1.

Group 16416. Feb. 21 - 24. A small stream, forming near the west limb.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.     | Group No. | MEASURES |            | POSITION       |                | AREA   |             |        | U.T.    | Group No. | MEASURES       |                | POSITION |        | AREA   |             |        |       |
|----------|-----------|----------|------------|----------------|----------------|--------|-------------|--------|---------|-----------|----------------|----------------|----------|--------|--------|-------------|--------|-------|
|          |           | Dist.    | Pos. Angle | Long.          | Lat.           | Umbræ  | Whole Spots | Faculæ |         |           | Dist.          | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |       |
| 1950     |           |          |            | o              | o              |        |             |        | 1950    |           |                |                | o        | o      |        |             |        |       |
| 53.427 G |           | .974     | 293.6      |                |                |        | 143         |        | 16407   | .977      | 273.1          | 272.2          | + 1.4    | 34     | 110    | 198 c       |        |       |
|          |           | .972     | 255.5      |                |                |        | 265         |        | 16409   | .971      | 295.7          | 266.3          | +22.7    | 18     | 94     | 192 nf      |        |       |
|          |           | .946     | 304.2      |                |                |        | 274         |        | 16411   | .548      | 315.9          | 218.3          | +16.5    | 12     | 55     |             |        |       |
|          |           | 16404    | .998       | 285.2          | 305.0          | +14.6  | 15          | 96     | 16414   | .392      | 333.3          | 205.4          | +13.4    | 25     | 119    |             |        |       |
|          |           | 16416    | .955       | 287.2          | 290.7          | +14.1  | 41          | 244    | 16413   | .202      | 343.3          | 198.3          | + 3.9    | 20     | 76     |             |        |       |
|          |           | 16412    | .923       | 276.4          | 287.3          | + 3.1  | 0           | 5      | 16415   | .322      | 28.1           | 186.2          | + 9.3    | 42     | 236    |             |        |       |
|          |           | 16406    | .858       | 289.2          | 276.6          | +12.4  | 34          | 270    | 1290b   | .205      | 57.4           | 185.1          | - 0.8    | 1      | 5      |             |        |       |
|          |           | 16407    | .787       | 277.6          | 271.9          | + 1.5  | 12          | 110    | 16414   | .855      | 91.7           |                |          |        |        | 231         |        |       |
|          |           | 16409    | .810       | 305.0          | 266.7          | +22.8  | 22          | 144    | 16413   | .915      | 43.3           |                |          |        |        | 458         |        |       |
|          |           | 16410    | .734       | 291.0          | 264.7          | +10.1  | 205         | 1584   | 16415   | .919      | 77.2           |                |          |        |        | 276         |        |       |
|          |           | 16411    | .407       | 5.7            | 218.4          | +16.7  | 14          | 87     |         | .929      | 64.7           |                |          |        |        | 234         |        |       |
|          |           | 16414    | .418       | 34.6           | 206.8          | +13.2  | 8           | 51     |         | .951      | 173.0          |                |          |        |        | 6           |        |       |
|          |           | 16413    | .427       | 63.7           | 198.3          | + 4.3  | 19          | 96     | Feb. 25 | (-20.5)   | (195.0)(- 7.2) | (291)          | (1694)   | (3074) |        |             |        |       |
|          |           | 16415    | .647       | 66.8           | 183.9          | + 9.1  | 45          | 365    |         |           |                |                |          |        |        |             |        |       |
|          |           |          | .786       | 55.4           |                |        |             | 195    |         |           |                |                |          |        |        |             |        |       |
|          |           |          | .837       | 103.4          |                |        |             | 164    |         |           |                |                |          |        |        |             |        |       |
|          |           |          | .917       | 58.2           |                |        |             | 149    | 56.411  | .983      | 296.6          |                |          |        |        | 117         |        |       |
|          |           |          | .923       | 42.1           |                |        |             | 212    | G       | .955      | 288.9          |                |          |        |        | 455         |        |       |
|          |           |          | .932       | 51.4           |                |        |             | 303    |         | .840      | 305.0          |                |          |        |        | 222         |        |       |
|          |           |          | .933       | 65.6           |                |        |             | 247    |         | .833      | 294.2          |                |          |        |        | 247         |        |       |
|          |           |          | .933       | 102.0          |                |        |             | 285    |         | 16410     | .993           | 279.7          | 263.2    | + 8.7  | 18     | 91          | 1489 c |       |
| Feb. 23  |           |          | (-20.0)    | (220.8)(- 7.1) | (415)          | (3052) | (3471)      |        |         | 16411     | .690           | 303.4          | 218.3    | +16.6  | 5      | 30          | 86 p   |       |
|          |           |          |            |                |                |        |             |        |         | 16414     | .519           | 311.4          | 205.0    | +13.4  | 14     | 91          |        |       |
|          |           |          |            |                |                |        |             |        |         | 16413     | .348           | 303.2          | 198.4    | + 4.0  | 10     | 74          |        |       |
|          |           |          |            |                |                |        |             |        |         | 16415     | .296           | 340.9          | 187.1    | + 9.0  | 48     | 212         |        |       |
|          |           |          |            |                |                |        |             |        |         | 16417     | .960           | 66.2           | 112.2    | +20.4  | 4      | 26          | 466 f  |       |
|          |           |          | .970       | 298.4          |                |        |             | 143    |         | .810      | 99.0           |                |          |        |        | 153         |        |       |
|          |           |          | .965       | 275.8          |                |        |             | 171    |         | .888      | 60.3           |                |          |        |        | 201         |        |       |
|          |           |          | 16416      | .988           | 285.4          | 289.0  | +13.9       | 63     | 249     | 16414     | .954           | 109.2          |          |        |        | 269         |        |       |
|          |           |          | 16406      | .935           | 285.9          | 277.1  | +12.1       | 25     | 199     | 16413     | .968           | 98.2           |          |        |        | 172         |        |       |
|          |           |          | 16407      | .886           | 275.3          | 272.1  | + 1.3       | 15     | 80      | 16415     | .976           | 75.2           |          |        |        | 148         |        |       |
|          |           |          | 16409      | .887           | 300.0          | 266.4  | +22.4       | 24     | 121     | 16417     | (-20.8)        | (181.5)(- 7.2) | (99)     | (524)  | (4025) |             |        |       |
|          |           |          | 16410      | .850           | 285.1          | 266.1  | + 9.6       | 190    | 1020    | 16411     | .814           | 301.1          |          |        |        | 210         |        |       |
|          |           |          | 16411      | .425           | 341.6          | 218.4  | +16.7       | 10     | 67      | 16414     | .928           | 288.8          |          |        |        | 364         |        |       |
|          |           |          | 16414      | .362           | 12.1           | 205.9  | +13.6       | 13     | 53      | 16413     | .842           | 304.3          |          |        |        | 272         |        |       |
|          |           |          | 16413      | .288           | 46.6           | 198.3  | + 4.5       | 19     | 75      | 16415     | .789           | 312.3          |          |        |        | 258         |        |       |
|          |           |          | 16415      | .496           | 57.2           | 185.5  | + 9.1       | 44     | 243     | 57.377    | 16411          | .814           | 296.3    | 218.2  | +16.5  | 3           | 17     | 166 c |
|          |           |          |            | .816           | 102.6          |        |             |        | 113     | G         | 16414          | .677           | 298.2    | 206.4  | +12.9  | 6           | 36     |       |
|          |           |          |            | .884           | 64.6           |        |             |        | 300     |           | 16413          | .529           | 290.1    | 198.5  | + 4.2  | 18          | 80     |       |
|          |           |          |            | .884           | 41.6           |        |             |        | 235     |           | 16415          | .413           | 310.7    | 187.2  | + 8.7  | 46          | 233    |       |
|          |           |          |            | .886           | 52.6           |        |             |        | 195     |           | 16418          | .199           | 252.2    | 179.9  | -10.5  | 7           | 25     |       |
| Feb. 24  |           |          |            | .924           | 102.3          |        |             |        | 130     |           | 1290c          | .319           | 113.4    | 151.3  | -14.1  | 1           | 11     |       |
|          |           |          |            | (-20.2)        | (210.4)(- 7.1) | (403)  | (2107)      | (2876) |         |           | 16417          | .891           | 62.7     | 111.4  | +20.4  | 4           | 26     | 325 f |
|          |           |          |            |                |                |        |             |        |         |           | .896           | 110.9          |          |        |        |             | 184    |       |
|          |           |          |            |                |                |        |             |        |         |           | .922           | 98.5           |          |        |        |             | 219    |       |
|          |           |          |            |                |                |        |             |        |         |           | .931           | 72.7           |          |        |        |             | 192    |       |
|          |           |          |            |                |                |        |             |        |         |           | (-21.1)        | (168.8)(- 7.2) | (85)     | (428)  | (2190) |             |        |       |

Group 16417. Feb. 26-Mar. 2. One or two small spots.

Group 16418. Feb. 27-Mar. 1. A pair of small spots on February 27; a single spot on the other two days.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULAE FOR EACH DAY IN THE YEAR

| U.T.   | Group No. | MEASURES |                | POSITION |       | AREA   |             |         | U.T.   | Group No. | MEASURES       |            | POSITION     |       | AREA   |             |         |       |
|--------|-----------|----------|----------------|----------|-------|--------|-------------|---------|--------|-----------|----------------|------------|--------------|-------|--------|-------------|---------|-------|
|        |           | Dist.    | Pos. Angle     | Long.    | Lat.  | Umbrae | Whole Spots | Faculae |        |           | Dist.          | Pos. Angle | Long.        | Lat.  | Umbrae | Whole Spots | Faculae |       |
| 1950   |           |          |                | o        | o     |        |             |         | 1950   |           |                |            | o            | o     |        |             |         |       |
| 58.395 | G         | .980     | 286.3          |          |       |        | 204         |         | 60.395 | G         | .973           | 286.3      |              |       |        | 317         |         |       |
|        |           | .918     | 181.7          |          |       |        | 5           |         |        |           | .953           | 301.6      |              |       |        | 315         |         |       |
|        |           | .899     | 302.5          |          |       |        | 341         |         |        |           | .940           | 311.6      |              |       |        | 128         |         |       |
|        |           | .894     | 262.2          |          |       |        | 98          |         |        |           | .899           | 271.4      |              |       |        | 144         |         |       |
|        |           | .893     | 283.2          |          |       |        | 73          |         |        |           | .822           | 301.1      |              |       |        | 143         |         |       |
|        |           | .888     | 200.3          |          |       |        | 12          |         |        |           | .812           | 313.1      |              |       |        | 127         |         |       |
|        |           | .861     | 315.8          |          |       |        | 161         |         |        |           | .771           | 324.7      |              |       |        | 128         |         |       |
| 16411  |           | .917     | 291.7          | 218.0    | +16.6 | 2      | 11          | 396 np  | 16413  | .946      | 277.3          | 199.1      | + 4.5        | 6     | 67     | 137 f       |         |       |
| 16414  |           | .811     | 291.7          | 205.8    | +12.9 | 6      | 24          | 125 c   | 16415  | .874      | 284.2          | 187.9      | + 8.7        | 45    | 210    | 210 nf      |         |       |
| 16413  |           | .705     | 283.6          | 198.6    | + 4.3 | 13     | 67          |         | 16420  | .131      | 267.6          | 136.6      | - 7.4        | 11    | 68     |             |         |       |
| 16415  |           | .586     | 295.0          | 187.7    | + 8.2 | 34     | 203         |         | 16417  | .576      | 37.8           | 107.1      | +20.3        | 1     | 9      |             |         |       |
| 16418  |           | .448     | 261.7          | 182.0    | -10.1 | 7      | 16          |         | 16421  | .771      | 111.6          | 79.1       | -21.2        | 27    | 197    | 79 c        |         |       |
| 16419  |           | .391     | 246.5          | 177.2    | -15.6 | 2      | 7           |         | 16422  | .826      | 91.7           | 73.3       | - 5.5        | 5     | 33     | 121 c       |         |       |
| 16420  |           | .324     | 90.8           | 136.4    | - 7.1 | 7      | 34          |         | 16423  | .845      | 111.8          | 71.4       | -22.2        | 0     | 2      | 145 sf      |         |       |
| 16417  |           | .788     | 57.1           | 110.7    | +20.2 | 3      | 35          | 149 c   | 16424  | .942      | 82.0           | 59.8       | + 5.0        | 35    | 173    | 275 f       |         |       |
| 16421  |           | .966     | 109.9          | 78.8     | -21.0 | 17     | 146         | 228 c   |        | .952      | 72.2           |            |              |       | 159    |             |         |       |
| 16422  |           | .991     | 91.5           | 73.1     | - 2.5 | 0      | 14          | 113 c   |        | (-21.8)   | (129.1)(- 7.2) | (130)      | (759) (2428) |       |        |             |         |       |
|        |           | .917     | 56.0           |          |       |        | 82          |         |        |           |                |            |              |       |        | 209         |         |       |
|        |           | .922     | 65.4           |          |       |        | 134         |         |        |           |                |            |              |       |        | 184         |         |       |
|        |           | .977     | 176.7          |          |       |        | 9           |         |        |           |                |            |              |       |        | 12          |         |       |
| Feb.28 |           | (-21.3)  | (155.4)(- 7.2) | (91)     | (557) | (2130) |             |         | 61.304 | C         | .980           | 296.9      |              |       |        |             | 112     |       |
|        |           |          |                |          |       |        |             |         |        |           | .974           | 309.5      |              |       |        |             | 266     |       |
|        |           |          |                |          |       |        |             |         |        |           | .969           | 206.3      |              |       |        |             | 161     |       |
|        |           |          |                |          |       |        |             |         |        |           | .908           | 306.5      |              |       |        |             | 257     |       |
| 59.407 | G         | .963     | 262.4          |          |       |        | 181         |         |        |           | .872           | 258.5      |              |       |        |             | 183 c   |       |
|        |           | .958     | 302.8          |          |       |        | 244         |         |        |           | .845           | 319.1      |              |       |        |             | 287 nf  |       |
|        |           | .952     | 294.0          |          |       |        | 388         |         |        |           | 16413          | .991       | 275.4        | 198.5 | + 4.3  | 0           | 14      |       |
|        |           | .914     | 309.8          |          |       |        | 375         |         |        |           | 16415          | .954       | 281.3        | 187.9 | + 8.5  | 41          | 180     |       |
| 16414  |           | .935     | 286.2          | 208.7    | +12.3 | 0      | 6           | 261 nf  | 16420  | .339      | 269.6          | 137.0      | - 6.9        | 6     | 51     |             |         |       |
| 16413  |           | .847     | 279.9          | 198.7    | + 4.4 | 19     | 84          | 156 f   | 16425  | .550      | 6.8            | 113.0      | +25.8        | 6     | 32     |             |         |       |
| 16415  |           | .749     | 288.4          | 187.9    | + 8.7 | 38     | 196         |         | 16421  | .638      | 114.9          | 78.9       | -21.3        | 27    | 168    |             |         |       |
| 16418  |           | .640     | 263.2          | 182.1    | - 9.9 | 3      | 10          |         | 16422  | .665      | 86.5           | 75.6       | - 3.1        | 6     | 32     |             |         |       |
| 16419  |           | .578     | 252.3          | 176.9    | -16.0 | 0      | 5           |         | 16424  | .850      | 79.5           | 60.3       | + 5.0        | 24    | 157    | 269 f       |         |       |
| 1290d  |           | .465     | 344.3          | 149.7    | +19.3 | 2      | 11          |         | 16426  | .922      | 76.1           | 52.1       | + 9.8        | 8     | 58     | 186 c       |         |       |
| 16420  |           | .086     | 93.8           | 137.2    | - 7.5 | 10     | 55          |         |        | .941      | 71.1           |            |              |       |        | 185         |         |       |
| 16417  |           | .675     | 48.8           | 109.4    | +20.3 | 2      | 18          |         | Mar.3  | (-22.1)   | (117.1)(- 7.2) | (118)      | (692) (2311) |       |        |             |         |       |
| 16421  |           | .888     | 110.3          | 79.0     | -21.3 | 30     | 157         | 270 c   |        |           |                |            |              |       |        | 212         |         |       |
| 16422  |           | .939     | 90.9           | 72.2     | - 3.4 | 10     | 29          | 138 c   |        |           |                |            |              |       |        | 274         |         |       |
| 16423  |           | .940     | 111.5          | 71.1     | -22.6 | 0      | 10          | 311 s   | 62.381 | .981      | 285.3          |            |              |       |        | 226         |         |       |
| 16424  |           | .994     | 83.9           | 59.4     | + 5.2 | 40     | 250         | 233 c   | G      | .963      | 296.9          |            |              |       |        | 194         |         |       |
|        |           | .821     | 52.8           |          |       |        | 124         |         |        |           | .912           | 313.1      |              |       |        |             |         |       |
|        |           | .878     | 68.4           |          |       |        | 193         |         |        |           | .844           | 325.5      |              |       |        |             |         |       |
|        |           | .918     | 58.4           |          |       |        | 205         |         |        |           | 16419          | .963       | 256.3        | 178.3 | -15.1  | 4           | 24      | 232 c |
| Mar.1  |           | (-21.6)  | (142.1)(- 7.2) | (154)    | (831) | (3079) |             |         | 16420  | .538      | 270.5          | 135.5      | - 5.8        | 9     | 61     |             |         |       |

Group 16419. Feb.28-Mar.4. A tiny spot, not seen on March 2 and 3.

Group 16420. Feb.28-Mar.7. A few small variable spots.

Group 16421. Feb.28-Mar.12. A small regular spot, with occasional companions until March 8, after which it breaks up and dies out.

Group 16422. Feb.28-Mar.12. Two or three small spots until March 3; on the next day the group begins to develop rapidly into a stream led by a regular spot. This is the only stable component and alone remains on March 11.

Group 16423. Mar. 1 - 2. A tiny spot.

Group 16424. Mar. 1 - 11. A small diminishing regular spot.

Group 16425. Mar. 3 - 9. A small stream, of which the leader is the most stable component.

Group 16426. Mar. 3 - 8. One or two small variable spots.

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Group 16427. Mar. 4 - 7. A pair of small short-lived spots.

Group 16428. Mar. 4 - 6. A pair of small spots on March 4; only one remains on March 5 and 6.

Group 16429. Mar. 4 - 7. A small spot.

Group 16430. Mar. 4 - 7. Return of Group 16408. One or two small spots.

Group 16431. Mar. 5 = 8. A small spot.

Group 16432. Mar. 5 = 6. A small spot.

Group 18432. Mar. 6 = 7. A small spot.  
Group 18433. Mar. 6 = 7. Two or three tiny spots.

Group 18434. Mar. 6 - 18. A stream, led by a small regular spot which becomes the largest member and alone remains by March 14. From March 10 this spot is elongated for a few days.

Group 16435. Mar. 8 - 18. A stable regular spot.

**Group 16436.** Mar. 7 - 8. A stable regular spot.  
**Group 16436.** Mar. 7 - 8. A few spots, forming near the west limb.

Group 18438. Mar. 7 - 8. A few spots, forming near the west limb.

Group 16437. Mar. 7 - 14. A stream of variable spots, appearing suddenly near the C.M. The leader is developing into a regular spot as it reaches the limb.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.     | Group No. | MEASURES |               | POSITION |                     | AREA  |             |         | U.T.    | Group No. | MEASURES |               | POSITION |               | AREA                |             |         |
|----------|-----------|----------|---------------|----------|---------------------|-------|-------------|---------|---------|-----------|----------|---------------|----------|---------------|---------------------|-------------|---------|
|          |           | Dist.    | Pos. Angle    | Long.    | Lat.                | Umbræ | Whole Spots | Faculae |         |           | Dist.    | Pos. Angle    | Long.    | Lat.          | Umbræ               | Whole Spots | Faculae |
| 1950     | 16434     | .909     | 62.2          | 3.7      | +21.5               | 52    | 285         | 346 c   | Mar. 9  | 16435     | .737     | 105.0         | 349.6    | -15.9         | 101                 | 554         | 82 c    |
|          | 16438     | .957     | 74.7          | 352.7    | +12.3               | 15    | 48          | 284 c   |         | 16439     | .840     | 106.0         | 339.6    | -17.3         | 75                  | 517         | 444 c   |
|          | 16435     | .953     | 104.4         | 349.9    | -15.8               | 101   | 549         | { 496 c |         |           | .862     | 60.8          |          |               |                     |             | 86      |
|          | 16439     | .986     | 106.6         | 341.5    | -17.5               | 38    | 450         |         |         |           | .862     | 75.8          |          |               |                     |             | 54      |
|          |           | .923     | 82.4          |          |                     |       |             | 156     |         |           | .942     | 62.4          |          |               |                     |             | 97      |
|          |           | .940     | 90.5          |          |                     |       |             | 80      |         |           | :965     | 71.4          |          |               |                     |             | 103     |
|          |           | .946     | 44.2          |          |                     |       |             | 67      |         |           | (-23.4)  | (37.1)(- 7.2) |          |               |                     |             |         |
|          |           | .952     | 98.0          |          |                     |       |             | 89      |         |           |          |               |          |               | (506) (2857) (2048) |             |         |
| Mar. 7   |           |          | (-23.0)       |          | (63.3)(- 7.2)       | (452) | (2651)      | (2501)  |         |           |          |               |          |               |                     |             |         |
| 66.373 G |           | .937     | 304.2         |          |                     |       |             | 279     |         |           | .963     | 293.4         |          |               |                     |             | 176     |
|          |           | .872     | 296.9         |          |                     |       |             | 144     |         |           | .945     | 257.4         |          |               |                     |             | 193     |
|          | 16436     | .977     | 281.3         | 126.3    | + 9.4               | 30    | 168         | 215 c   | Mar. 10 | 16422     | .831     | 269.6         | 81.0     | - 4.4         | 84                  | 454         | 239 c   |
|          | 16425     | .940     | 301.8         | 113.4    | +26.6               | 32    | 249         | 434 c   |         | 16421     | .781     | 249.5         | 77.6     | -20.5         | 3                   | 21          | 109 c   |
|          | 16422     | .484     | 273.8         | 79.1     | - 4.5               | 123   | 651         |         |         | 16440     | .771     | 305.2         | 67.1     | +21.1         | 0                   | 12          | 113 p   |
|          | 16421     | .492     | 238.6         | 76.9     | -21.2               | 14    | 78          |         |         | 16424     | .618     | 285.6         | 61.3     | + 3.7         | 13                  | 67          |         |
|          | 16424     | .271     | 315.8         | 61.2     | + 4.1               | 21    | 99          |         |         | 16437     | .726     | 320.8         | 56.0     | +28.0         | 45                  | 394         |         |
|          | 16437     | .589     | 350.8         | 56.4     | +28.2               | 41    | 221         |         |         | 16434     | .590     | 37.4          | 2.3      | +21.2         | 65                  | 649         |         |
|          | 16426     | .304     | 349.7         | 53.5     | +10.1               | 1     | 6           |         |         | 16438     | .570     | 59.2          | 355.0    | +10.7         | 13                  | 81          |         |
|          | 16431     | .440     | 135.5         | 30.5     | -25.0               | 2     | 15          |         |         | 16435     | .585     | 107.6         | 349.5    | -16.1         | 120                 | 613         |         |
|          | 16434     | .814     | 56.9          | 3.3      | +21.5               | 58    | 368         | 223 c   |         | 16439     | .713     | 107.6         | 339.5    | -17.5         | 71                  | 516         | 115 c   |
|          | 16438     | .863     | 71.8          | 353.7    | +11.7               | 9     | 69          | 387 c   |         | 16441     | .953     | 97.8          | 311.8    | - 9.6         | 7                   | 37          | 104 c   |
|          | 16435     | .865     | 104.5         | 349.9    | -16.1               | 122   | 544         | 176 c   |         |           | .967     | 103.8         |          |               |                     |             | 197     |
|          | 16439     | .934     | 105.0         | 340.4    | -16.5               | 102   | 616         | 594 c   |         |           | (-23.6)  | (24.8)(- 7.2) |          |               |                     |             |         |
| Mar. 8   |           | .824     | 79.4          |          |                     |       |             | 136     |         |           |          |               |          |               |                     |             |         |
|          |           | .905     | 94.6          |          |                     |       |             | 128     |         |           |          |               |          |               |                     |             | 113     |
|          |           | .966     | 58.8          |          |                     |       |             | 146     |         |           |          |               |          |               |                     |             | 129     |
|          |           | .972     | 73.5          |          |                     |       |             | 207     |         |           |          |               |          |               |                     |             | 171     |
|          |           | (-23.2)  | (50.3)(- 7.2) |          | (555) (3084) (3069) |       |             |         |         |           |          |               |          |               |                     |             | 116     |
| 67.378 G |           | .917     | 295.4         |          |                     |       |             | 273     | Mar. 11 | 16422     | .944     | 268.6         | 82.4     | - 3.7         | 64                  | 376         | 456 f   |
|          |           | .876     | 189.8         |          |                     |       |             | 7       |         | 16421     | .898     | 249.8         | 76.1     | -21.3         | 0                   | 7           | 253 f   |
|          |           | .876     | 310.0         |          |                     |       |             | 68      |         | 16440     | .900     | 298.6         | 69.8     | +21.8         | 0                   | 5           | 194 c   |
|          |           | .872     | 259.4         |          |                     |       |             | 122     |         | 16424     | .773     | 281.0         | 60.9     | + 3.8         | 5                   | 25          | 82 c    |
|          |           | .858     | 283.2         |          |                     |       |             | 128     |         | 16437     | .833     | 311.8         | 56.5     | +28.6         | 67                  | 473         | 285 c   |
|          |           | .854     | 301.2         |          |                     |       |             | 104     |         | 1290g     | .283     | 217.5         | 22.1     | -20.0         | 0                   | 5           |         |
|          | 16425     | .989     | 299.3         | 113.3    | +27.5               | 43    | 203         | 256 f   |         | 16434     | .501     | 17.8          | 2.2      | +21.2         | 95                  | 612         |         |
|          | 16422     | .681     | 271.3         | 80.0     | - 4.4               | 105   | 582         |         |         | 16438     | .424     | 43.2          | 354.5    | +11.0         | 8                   | 72          |         |
|          | 16421     | .651     | 245.8         | 76.4     | -21.0               | 7     | 41          |         |         | 16435     | .403     | 113.1         | 349.1    | -15.7         | 104                 | 527         |         |
|          | 16440     | .680     | 312.2         | 69.7     | +21.1               | 6     | 22          |         |         | 16439     | .545     | 111.4         | 339.6    | -17.5         | 59                  | 380         |         |
|          | 16424     | .450     | 294.4         | 61.3     | + 4.1               | 16    | 85          |         |         | 16441     | .861     | 96.4          | 311.8    | - 9.1         | 11                  | 39          | 174 f   |
|          | 16437     | .650     | 333.8         | 56.1     | +28.8               | 57    | 280         |         |         | 16442     | .970     | 74.6          | 298.2    | +12.9         | 46                  | 256         | 575 c   |
|          | 16434     | .702     | 49.0          | 2.5      | +21.4               | 85    | 507         | 50 c    |         |           | .895     | 105.0         | (-23.8)  | (11.6)(- 7.2) |                     |             | 178     |
|          | 16438     | .727     | 67.0          | 354.3    | +11.2               | 11    | 66          | 174 f   |         |           |          |               |          |               |                     |             |         |

Group 16438. Mar. 7 - 17. A small spot, with occasional companions.

Group 16439. Mar. 7 - 19. Return of Group 16402. A regular spot, followed by a few small unstable companions.

Group 16440. Mar. 9 - 11. A single spot on March 9; a pair on March 10 and 11.

Group 16441. Mar. 10 - 21. Return of Group 16403: third appearance. A single small spot until March 14; a pair on March 15 and 16. Nothing is then seen until March 19, when a few small spots appear.

Group 16442. Mar. 11 - 20. Return of Group 16416. A pair of decreasing regular spots, with a tiny companion until March 18.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.        | Group No. | MEASURES |            | POSITION       |                     | AREA  |             |        | U.T.        | Group No. | MEASURES |                | POSITION |       | AREA  |                     |        |
|-------------|-----------|----------|------------|----------------|---------------------|-------|-------------|--------|-------------|-----------|----------|----------------|----------|-------|-------|---------------------|--------|
|             |           | Dist.    | Pos. Angle | Long.          | Lat.                | Umbræ | Whole Spots | Faculæ |             |           | Dist.    | Pos. Angle     | Long.    | Lat.  | Umbræ | Whole Spots         | Faculæ |
| 1950        |           |          |            | o              | o                   |       |             |        | 1950        |           |          |                | o        | o     |       |                     |        |
| 70.307<br>C |           | .964     | 295.4      |                |                     |       | 296         |        | Mar. 14     | 16441     | .339     | 97.7           | 312.2    | - 9.4 | 3     | 20                  |        |
|             |           | .915     | 277.3      |                |                     |       | 406         |        |             | 1291b     | .435     | 111.0          | 307.2    | -15.5 | 0     | 2                   |        |
|             |           | .894     | 287.4      |                |                     |       | 224         |        |             | 16442     | .632     | 58.7           | 298.5    | +13.2 | 54    | 289                 |        |
|             |           | .809     | 281.2      |                |                     |       | 199         |        |             | 16443     | .855     | 71.2           | 276.4    | +12.0 | 105   | 601                 | 171 c  |
|             |           | 16422    | .994       | 267.9          | 82.3 - 2.8          | 66    | 364         | 498 f  |             | 16445     | .957     | 67.3           | 263.0    | +19.2 | 22    | 141                 | 404 c  |
|             |           | 16421    | .970       | 250.9          | 75.9 -20.2          | 0     | 12          | 384 f  |             |           | .836     | 80.5           |          |       |       | 126                 |        |
|             |           | 16437    | .919       | 305.7          | 56.7 +28.8          | 67    | 644         | 444 c  |             |           | .937     | 78.1           |          |       |       | 601                 |        |
|             |           | 16434    | .478       | 352.8          | 2.2 +21.0           | 80    | 611         |        |             |           | (-24.3)  | (332.0)(- 7.2) |          |       |       | (442) (2755) (2254) |        |
|             |           | 16438    | .314       | 13.2           | 354.3 +10.5         | 14    | 101         |        |             |           |          |                |          |       |       |                     |        |
|             |           | 16435    | .220       | 133.7          | 349.0 -15.8         | 108   | 495         |        |             |           |          |                |          |       |       |                     |        |
|             |           | 16439    | .355       | 122.2          | 340.2 -17.7         | 67    | 396         |        |             |           |          |                |          |       |       |                     |        |
|             |           | 16441    | .725       | 96.2           | 311.8 - 9.4         | 4     | 20          | 150 f  | 73.488<br>G | 73.488    | .960     | 289.2          |          |       |       | 232                 |        |
|             |           | 16442    | .894       | 71.5           | 298.3 +12.9         | 38    | 274         | 575 c  |             |           | .926     | 241.4          |          |       |       | 130                 |        |
|             |           | 16443    | .995       | 77.0           | 276.3 +12.1         | 134   | 498         | 332 p  |             |           | .906     | 312.6          |          |       |       | 283                 |        |
|             |           |          | .964       | 57.8           |                     |       | 178         |        |             |           | .865     | 295.2          |          |       |       | 240                 |        |
|             |           |          | (-24.0)    | (358.5)(- 7.2) | (578) (3415) (3686) |       |             |        |             | 16444     | .934     | 246.3          | 26.4     | -24.6 | 6     | 18                  | 121 c  |
|             |           |          |            |                |                     |       |             |        |             | 16434     | .797     | 304.1          | 1.5      | +21.5 | 96    | 549                 | 249 c  |
|             |           |          |            |                |                     |       |             |        |             | 1291c     | .709     | 251.5          | 1.3      | -18.1 | 4     | 19                  |        |
|             |           |          |            |                |                     |       |             |        |             | 16438     | .669     | 295.7          | 354.3    | +11.2 | 5     | 16                  |        |
|             |           |          |            |                |                     |       |             |        |             | 16435     | .538     | 252.9          | 348.6    | -15.2 | 114   | 478                 |        |
|             |           |          |            |                |                     |       |             |        |             | 16439     | .426     | 242.6          | 339.8    | -17.9 | 62    | 348                 |        |
| Mar. 12     |           | .917     | 290.6      |                |                     |       | 196         |        |             | 16441     | .095     | 117.4          | 311.6    | - 9.7 | 4     | 14                  |        |
|             |           | .914     | 203.6      |                |                     |       | 5           |        |             | 16442     | .461     | 42.3           | 298.0    | +13.1 | 38    | 193                 |        |
|             |           | 16437    | .972       | 302.4          | 54.2 +29.1          | 73    | 562         | 510 c  |             | 16443     | .703     | 64.6           | 276.2    | +12.1 | 95    | 579                 | 81 f   |
|             |           | 16434    | .546       | 329.4          | 1.7 +21.0           | 79    | 599         |        |             | 16445     | .874     | 62.9           | 261.1    | +19.4 | 26    | 225                 | 312 c  |
|             |           | 16438    | .351       | 331.3          | 354.2 +10.8         | 10    | 57          |        |             |           | .868     | 72.9           |          |       |       | 770                 |        |
|             |           | 16435    | .163       | 207.5          | 348.9 -15.5         | 123   | 535         |        |             |           | (-24.5)  | (316.5)(- 7.2) |          |       |       | (450) (2439) (2418) |        |
|             |           | 16439    | .196       | 157.0          | 339.8 -17.5         | 70    | 395         |        |             |           |          |                |          |       |       |                     |        |
|             |           | 16441    | .536       | 96.0           | 311.8 - 9.3         | 8     | 13          |        |             |           |          |                |          |       |       | 403                 |        |
|             |           | 16442    | .772       | 66.5           | 298.0 +12.9         | 51    | 303         | 267 c  |             |           |          |                |          |       |       | 194                 |        |
|             |           | 16443    | .945       | 74.4           | 276.0 +12.1         | 139   | 654         | 358 c  | 74.383<br>G | 74.383    | .942     | 290.9          |          |       |       | 71                  |        |
|             |           |          | .884       | 71.0           |                     |       | 163         |        |             |           | .842     | 282.4          |          |       |       | 81                  |        |
|             |           |          | .939       | 88.0           |                     |       | 184         |        |             |           | .841     | 255.9          |          |       |       |                     |        |
|             |           |          | (-24.2)    | (344.4)(- 7.2) | (553) (3118) (2381) |       |             |        |             | 16434     | .886     | 298.9          | 1.0      | +21.5 | 45    | 518                 | 416 c  |
|             |           |          |            |                |                     |       |             |        |             | 16438     | .798     | 290.1          | 354.3    | +11.3 | 3     | 35                  | 64 c   |
|             |           |          |            |                |                     |       |             |        |             | 16435     | .695     | 255.9          | 348.7    | -14.8 | 126   | 501                 |        |
|             |           |          |            |                |                     |       |             |        |             | 16439     | .584     | 249.3          | 339.6    | -17.8 | 59    | 376                 |        |
|             |           |          |            |                |                     |       |             |        |             | 16441     | .126     | 247.9          | 311.5    | - 9.8 | 2     | 11                  |        |
|             |           |          |            |                |                     |       |             |        |             | 16442     | .363     | 18.5           | 297.9    | +13.0 | 36    | 236                 |        |
| 72.312<br>C |           | .964     | 276.5      |                |                     |       | 196         |        |             | 16443     | .563     | 56.4           | 276.2    | +11.9 | 86    | 601                 |        |
|             |           | .857     | 291.5      |                |                     |       | 225         |        |             | 1291d     | .680     | 67.9           | 265.2    | + 9.3 | 1     | 12                  |        |
|             |           | 16437    | .998       | 300.8          | 53.3 +29.9          | 0     | 81          | 261 f  |             | 16445     | .764     | 57.3           | 262.0    | +19.1 | 27    | 256                 | 383 c  |
|             |           | 1291a    | .936       | 285.7          | 38.8 +11.9          | 3     | 18          | 205 c  |             |           | .817     | 67.8           |          |       |       | 170                 |        |
|             |           | 16444    | .811       | 244.5          | 25.5 -24.8          | 2     | 9           | 65 s   |             |           | .958     | 72.9           |          |       |       | 170                 |        |
|             |           | 16434    | .654       | 314.7          | 1.8 +21.1           | 79    | 693         |        |             |           | (-24.7)  | (304.7)(- 7.1) |          |       |       | (385) (2546) (1952) |        |
|             |           | 16438    | .483       | 308.3          | 354.6 +10.7         | 10    | 54          |        |             |           |          |                |          |       |       |                     |        |
|             |           | 16435    | .317       | 241.5          | 348.7 -15.5         | 106   | 518         |        |             |           |          |                |          |       |       |                     |        |
|             |           | 16439    | .231       | 217.1          | 340.4 -17.7         | 58    | 329         |        |             |           |          |                |          |       |       |                     |        |
|             |           |          |            |                |                     |       |             |        |             |           |          |                |          |       |       |                     |        |

Group 16443. Mar. 12 - 24. Return of Group 16410. A regular spot which becomes elongated and which has divided into two by March 18. It then slowly dies out.

Group 16444. Mar. 14 - 15. A single spot on March 14; a pair on March 15.

Group 16445. Mar. 14 - 25. A slowly-diminishing regular spot.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.   | Group No. | MEASURES |            | POSITION |                | AREA           |             |        | U.T.        | Group No. | MEASURES       |                | POSITION |        | AREA   |             |        |       |
|--------|-----------|----------|------------|----------|----------------|----------------|-------------|--------|-------------|-----------|----------------|----------------|----------|--------|--------|-------------|--------|-------|
|        |           | Dist.    | Pos. Angle | Long.    | Lat.           | Umbræ          | Whole Spots | Faculæ |             |           | Dist.          | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |       |
| 1950   |           |          |            | o        | o              |                |             |        | 1950        |           |                |                | o        | o      |        |             |        |       |
| 75.650 | G         | .959     | 254.7      |          |                |                | 153         |        | 16443       | .366      | 330.1          | 276.1          | +11.5    | 81     | 397    |             |        |       |
|        |           | .955     | 278.2      |          |                |                | 128         |        | 16445       | .456      | 8.1            | 261.5          | +19.6    | 27     | 158    |             |        |       |
|        |           | .908     | 298.5      |          |                |                | 117         |        | 16449       | .976      | 79.1           | 189.6          | + 9.0    | 25     | 104    | 194 c       | 492    |       |
|        |           | .905     | 264.4      |          |                |                | 89          |        |             | .836      | 55.3           |                |          |        |        |             | 199    |       |
|        |           | 16434    | .975       | 293.8    | 0.9            | +21.2          | 53          | 464    | 16441       | .918      | 83.1           |                |          |        |        |             | 204    |       |
|        |           |          | .959       | 287.8    | 358.6          | +14.8          | 3           | 16     | 16442       | .932      | 67.1           |                |          |        |        |             | 277    |       |
|        |           | 16438    |            |          | 348.4          | -15.0          | 98          | 472    | 16444       | .951      | 55.3           |                |          |        |        |             | 103    |       |
|        |           | 16435    | .865       | 256.8    | 339.4          | -17.2          | 63          | 353    | 16445       | .992      | 107.7          |                |          |        |        |             | 144    |       |
|        |           | 16439    | .780       | 253.6    |                |                |             |        | 16446       | (-25.1)   | (265.4)(- 7.1) | (325)          | (1619)   | (2115) |        |             |        |       |
|        |           | 16442    | .387       | 333.0    | 298.3          | +13.1          | 23          | 122    | Mar. 19     |           |                |                |          |        |        |             |        |       |
|        |           | 16446    | .356       | 358.6    | 288.5          | +13.7          | 16          | 52     |             | .982      | 253.0          |                |          |        |        |             | 228    |       |
|        |           | 16447    | .410       | 21.0     | 279.3          | +15.4          | 0           | 4      |             | .880      | 292.2          |                |          |        |        |             | 184    |       |
|        |           | 16443    | .378       | 31.0     | 276.6          | +11.9          | 69          | 462    |             | .869      | 255.8          |                |          |        |        |             | 144    |       |
|        |           | 16445    | .597       | 43.4     | 262.3          | +19.3          | 29          | 190    | 78.648      | 16441     | .852           | 264.8          | 307.2    | - 8.0  | 2      | 17          | 164 c  |       |
|        |           | 16448    | .984       | 96.1     | 207.8          | - 7.3          | 0           | 25     | G           | 16442     | .809           | 291.4          | 298.9    | +12.7  | 2      | 12          | 272 c  |       |
|        |           |          | .867       | 67.2     |                |                |             | 154    |             | 16444     | .707           | 295.0          | 289.3    | +12.1  | 13     | 63          |        |       |
|        |           |          | .949       | 61.2     |                |                |             | 207    |             | 16447     | .622           | 305.2          | 280.1    | +15.0  | 8      | 37          |        |       |
|        |           |          | .962       | 70.0     |                |                |             | 99     |             | 16443     | .550           | 303.2          | 276.4    | +11.3  | 56     | 320         |        |       |
|        |           | Mar. 17  |            | (-24.8)  | (288.0)(- 7.1) | (354)          | (2160)      | (1886) |             | 16445     | .497           | 334.6          | 261.5    | +19.8  | 36     | 142         |        |       |
|        |           |          |            |          |                |                |             |        |             | 1291e     | .497           | 97.6           | 218.6    | - 9.8  | 1      | 4           |        |       |
|        |           |          |            |          |                |                |             |        |             | 16449     | .877           | 75.4           | 189.5    | + 9.2  | 15     | 121         | 157 c  |       |
|        |           |          |            |          |                |                |             |        |             | 16450     | .923           | 106.0          | 180.4    | -17.4  | 14     | 66          | 328 c  |       |
|        |           | 76.324   | .973       | 275.5    |                |                |             | 92     |             |           | .842           | 59.1           |          |        |        |             | 112    |       |
|        |           | C        | .967       | 285.1    |                |                |             | 290    |             |           | .865           | 49.8           |          |        |        |             | 208    |       |
|        |           |          | .902       | 303.7    |                |                |             | 136    |             |           | .935           | 71.6           |          |        |        |             | 215    |       |
|        |           |          | 16434      | .995     | 292.1          | 359.9          | +21.0       | 53     | 431         | 16441     | .961           | 49.2           |          |        |        |             | 274    |       |
|        |           |          | 16435      | .931     | 256.5          | 348.6          | -15.1       | 84     | 486         | 16446     | .965           | 62.9           |          |        |        |             | 250    |       |
|        |           |          | 16439      | .865     | 254.1          | 339.6          | -17.3       | 71     | 378         | 16447     | (-25.2)        | (248.5)(- 7.0) | (147)    | (782)  | (2536) |             |        |       |
|        |           |          | 16442      | .459     | 316.5          | 298.0          | +12.7       | 17     | 92          | Mar. 20   |                |                |          |        |        |             |        |       |
|        |           |          | 16446      | .372     | 334.7          | 288.5          | +12.5       | 12     | 62          |           | .932           | 286.7          |          |        |        |             | 420    |       |
|        |           |          | 16447      | .390     | 359.9          | 279.2          | +15.7       | 0      | 6           |           | .930           | 255.2          |          |        |        |             | 148    |       |
|        |           |          | 16443      | .322     | 7.3            | 276.8          | +11.5       | 63     | 486         | 79.602    | 16441          | .962           | 264.4    | 310.5  | - 7.3  | 0           | 13     | 144 c |
|        |           |          | 16445      | .529     | 32.9           | 261.5          | +19.5       | 24     | 205         | G         | 16446          | .836           | 289.0    | 289.5  | +11.7  | 14          | 85     | 208 c |
|        |           |          | 16448      | .937     | 95.1           | 209.3          | - 7.3       | 0      | 8           | 16447     | .784           | 295.2          | 282.9    | +14.7  | 3      | 19          | 77 c   |       |
|        |           |          |            | .927     | 60.6           |                |             |        | 16443       | .704      | 293.6          | 276.8          | +11.1    | 45     | 269    |             |        |       |
|        |           | Mar. 18  |            | .971     | 85.1           |                |             | 451    | 16445       | .603      | 317.0          | 261.7          | +19.8    | 22     | 140    |             |        |       |
|        |           |          |            |          | (-24.9)        | (279.2)(- 7.1) | (324)       | (2154) | (2176)      | 16446     | .962           | 264.4          |          |        |        |             |        |       |
|        |           |          |            |          |                |                |             | 154    | 16447       | .784      | 295.2          | 282.9          | +14.7    | 3      | 19     |             |        |       |
|        |           | 77.368   | .882       | 292.2    |                |                |             | 81     | 16443       | .704      | 293.6          | 276.8          | +11.1    | 45     | 269    |             |        |       |
|        |           | G        | 16435      | .989     | 256.1          | 348.3          | -14.8       | 102    | 492 {       | 16445     | .603           | 317.0          | 261.7    | +19.8  | 22     | 140         |        |       |
|        |           |          | 16439      | .960     | 254.1          | 340.3          | -17.2       | 62     | 309 } 565 c | 16449     | .755           | 71.4           | 189.6    | + 9.1  | 17     | 93          |        |       |
|        |           |          | 16441      | .671     | 266.1          | 307.7          | - 7.9       | 1      | 13          | 16450     | .811           | 106.6          | 181.5    | -17.5  | 26     | 141         | 228 f  |       |
|        |           |          | 16442      | .617     | 301.9          | 297.8          | +13.0       | 10     | 38          |           | .861           | 68.0           |          |        |        |             | 238    |       |
|        |           |          | 16446      | .521     | 309.3          | 289.7          | +12.7       | 17     | 106         |           | .903           | 44.8           |          |        |        |             | 204    |       |
|        |           |          | 16447      | .458     | 325.0          | 281.1          | +15.1       | 0      | 2           | Mar. 21   | .931           | 60.0           |          |        |        |             | 224    |       |
|        |           |          |            |          |                |                |             |        |             | (-25.4)   | (235.9)(- 7.0) | (127)          | (760)    | (1891) |        |             |        |       |

Group 16446. Mar. 17 - 23. A stream of small changing spots with an equatorwards drift. By March 22 the rear part has disappeared and on the next day a single small spot is present.

Group 16447. Mar. 17 - 22. A single small spot until March 19; then others appear, forming a small stream.

Group 16448. Mar. 17 - 18. A small spot.

Group 16449. Mar. 19 - 30. Return of Group 16415. A small stable regular spot.

Group 16450. Mar. 20 - 28. A small cluster, slowly dying out.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.        | Group No. | MEASURES |            | POSITION |       | AREA   |             |        | U.T.        | Group No. | MEASURES |            | POSITION |       | AREA  |             |        |      |
|-------------|-----------|----------|------------|----------|-------|--------|-------------|--------|-------------|-----------|----------|------------|----------|-------|-------|-------------|--------|------|
|             |           | Dist.    | Pos. Angle | Long.    | Lat.  | Umbræ  | Whole Spots | Faculæ |             |           | Dist.    | Pos. Angle | Long.    | Lat.  | Umbræ | Whole Spots | Faculæ |      |
| 1950        |           |          |            | o        | o     |        |             |        | 1950        |           |          |            | o        | o     |       |             |        |      |
| 80.343<br>C | .970      | 254.5    |            |          |       |        | 216         |        | Mar. 24     | 16452     | .761     | 53.5       | 157.4    | +21.7 | 3     | 38          | 34 c   |      |
|             | .885      | 306.9    |            |          |       |        | 92          |        |             | 16453     | .803     | 101.8      | 145.8    | -13.6 | 10    | 66          | 113 c  |      |
|             | 16446     | .920     | 283.0      | 291.2    | + 9.0 | 5      | 33          | 355 c  |             |           | .877     | 95.7       |          |       |       |             | 102    |      |
|             | 16447     | .895     | 290.5      | 286.1    | +14.8 | 0      | 7           | 183 c  |             |           | .916     | 44.7       |          |       |       |             | 108    |      |
|             | 16443     | .805     | 289.3      | 276.7    | +11.0 | 41     | 276         | 131 c  |             |           | .918     | 51.5       |          |       |       |             | 208    |      |
|             | 16445     | .696     | 308.7      | 261.4    | +20.0 | 19     | 135         |        |             |           | .928     | 88.9       |          |       |       |             | 221    |      |
|             | 16449     | .638     | 66.3       | 190.1    | + 9.2 | 17     | 122         |        |             |           | (-25.7)  | (199.6)    | (- 6.9)  |       | (42)  | (373)       | (2378) |      |
|             | 16450     | .699     | 108.3      | 182.2    | -17.7 | 21     | 102         | 122 f  |             |           |          |            |          |       |       |             |        |      |
|             | .878      | 56.3     |            |          |       |        | 201         |        |             |           |          |            |          |       |       |             | 333    |      |
|             | .967      | 63.8     |            |          |       |        | 166         |        |             |           |          |            |          |       |       |             | 78     |      |
| Mar. 22     | .978      | 100.1    |            |          |       |        | 176         |        | 83.362<br>G |           | .931     | 297.8      |          |       |       |             | 209    |      |
|             | (-25.5)   | (226.2)  | (- 7.0)    | (103)    | (675) | (1642) |             |        |             |           | .800     | 299.5      |          |       |       |             | 148    |      |
|             |           |          |            |          |       |        |             |        |             |           | .960     | 285.8      |          |       |       |             |        |      |
|             |           |          |            |          |       |        |             |        |             |           | .935     | 291.8      |          |       |       |             |        |      |
|             |           |          |            |          |       |        |             |        |             |           | .931     | 297.8      |          |       |       |             |        |      |
|             |           |          |            |          |       |        |             |        |             |           | .800     | 299.5      |          |       |       |             |        |      |
|             |           |          |            |          |       |        |             |        |             |           | .979     | 292.6      | 260.8    | +20.4 | 17    | 79          | 160 f  |      |
|             |           |          |            |          |       |        |             |        |             |           | 16451    | .910       | 264.0    | 252.3 | - 8.3 | 5           | 39     | 72 c |
|             |           |          |            |          |       |        |             |        |             |           | 16454    | .293       | 281.5    | 203.0 | - 3.2 | 27          | 143    |      |
|             |           |          |            |          |       |        |             |        |             |           | 16449    | .287       | 347.7    | 189.9 | + 9.4 | 22          | 113    |      |
| 81.303<br>C | .915      | 312.1    |            |          |       |        | 79          |        | Mar. 25     | 16450     | .189     | 163.5      | 183.2    | -17.2 | 7     | 51          |        |      |
|             | .905      | 276.4    |            |          |       |        | 87          |        |             | 16452     | .640     | 43.2       | 158.4    | +21.8 | 17    | 122         |        |      |
|             | .900      | 299.8    |            |          |       |        | 86          |        |             | 16453     | .643     | 102.7      | 146.4    | -13.4 | 8     | 34          |        |      |
|             | .845      | 292.4    |            |          |       |        | 218         |        |             | 16455     | .863     | 74.6       | 129.1    | + 9.6 | 2     | 9           | 172 c  |      |
|             | 16446     | .965     | 281.0      | 286.6    | + 8.7 | 0      | 8           | 266 p  |             | 16456     | .998     | 61.4       | 104.4    | +27.8 | 66    | 228         | 75 p   |      |
|             | 16443     | .913     | 285.2      | 277.0    | +10.8 | 24     | 157         | 197 c  |             |           | .921     | 42.4       |          |       |       |             | 155    |      |
|             | 16445     | .813     | 301.0      | 261.2    | +20.1 | 16     | 115         | 126 c  |             |           | .979     | 99.7       |          |       |       |             | 161    |      |
|             | 16449     | .481     | 56.0       | 189.8    | + 9.3 | 15     | 108         |        |             |           | (-25.8)  | (186.4)    | (- 6.8)  |       | (171) | (818)       | (1563) |      |
|             | 16450     | .537     | 113.6      | 182.4    | -18.4 | 14     | 60          |        |             |           |          |            |          |       |       |             |        |      |
|             | .923      | 56.6     |            |          |       |        | 332         |        |             |           |          |            |          |       |       |             | 221    |      |
| Mar. 23     | .943      | 100.6    |            |          |       |        | 286         |        | 84.442<br>G |           | .975     | 294.3      |          |       |       |             | 122    |      |
|             | .972      | 81.7     |            |          |       |        | 224         |        |             |           | .974     | 257.2      |          |       |       |             | 196    |      |
|             | (-25.6)   | (213.5)  | (- 6.9)    | (69)     | (448) | (2343) |             |        |             |           | .893     | 292.1      |          |       |       |             | 242    |      |
|             |           |          |            |          |       |        |             |        |             |           | .866     | 300.5      |          |       |       |             | 302    |      |
|             |           |          |            |          |       |        |             |        |             |           | .859     | 308.3      |          |       |       |             |        |      |
|             |           |          |            |          |       |        |             |        |             |           | 16451    | .989       | 263.5    | 254.1 | - 7.4 | 0           | 23     | 96 f |
|             |           |          |            |          |       |        |             |        |             |           | 16454    | .532       | 274.8    | 204.0 | - 3.2 | 34          | 256    |      |
|             |           |          |            |          |       |        |             |        |             |           | 16449    | .412       | 312.3    | 190.0 | + 9.6 | 23          | 122    |      |
|             |           |          |            |          |       |        |             |        |             |           | 16450    | .269       | 221.0    | 182.8 | -18.4 | 5           | 27     |      |
|             |           |          |            |          |       |        |             |        |             |           | 16452    | .526       | 25.5     | 158.1 | +21.7 | 33          | 140    |      |
| 82.356<br>G | .838      | 302.9    |            |          |       |        | 201         |        | Mar. 26     | 16453     | .420     | 106.1      | 147.8    | -12.9 | 4     | 13          |        |      |
|             | 16443     | .978     | 282.9      | 275.6    | +11.0 | 0      | 16          | 338 c  |             | 16456     | .960     | 58.6       | 104.8    | +27.5 | 35    | 192         | 333 c  |      |
|             | 16445     | .917     | 295.7      | 261.2    | +20.2 | 9      | 91          | 222 c  |             |           | .873     | 57.2       |          |       |       |             | 113    |      |
|             | 16451     | .801     | 265.4      | 253.1    | - 7.8 | 0      | 11          | 37 c   |             |           | .899     | 39.1       |          |       |       |             | 214    |      |
|             | 16449     | .326     | 31.5       | 189.7    | + 9.3 | 14     | 118         |        |             |           | .919     | 100.3      |          |       |       |             | 321    |      |
|             | 16450     | .353     | 125.9      | 182.1    | -18.5 | 6      | 33          |        |             |           | (-25.9)  | (172.1)    | (- 6.8)  |       | (134) | (773)       | (2160) |      |

Group 16451. Mar. 24 - 26. A pair of small spots, of which only one remains on the last day.

Group 16452. Mar. 24 - 31. A stream of small variable spots, of which only one remains by March 30.

Group 16453. Mar. 24 - 28. A pair of small spots; one remains by March 26.

Group 16454. Mar. 25 - 29. A pair of regular spots, appearing suddenly in the western hemisphere.

Group 16455. Mar. 25 - 30. Intermittent. A single small spot on March 25 and 30; a pair on March 29.

Group 16456. Mar. 25-Apr. 6. Return of Group 16425. A small regular spot, with a tiny companion on April 4 and 5.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.     | Group No. | MEASURES |                | POSITION |        | AREA   |             |        | U.T.  | Group No. | MEASURES |                | POSITION |         | AREA           |             |                     |        |
|----------|-----------|----------|----------------|----------|--------|--------|-------------|--------|-------|-----------|----------|----------------|----------|---------|----------------|-------------|---------------------|--------|
|          |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |       |           | Dist.    | Pos. Angle     | Long.    | Lat.    | Umbræ          | Whole Spots | Faculæ              |        |
| 1950     |           |          |                | o        | o      |        |             |        | 1950  | 16461     | .975     | 94.0           | 57.0     | - 5.3   | 17             | 114         | 195 c               |        |
| 85.366 G |           | .970     | 288.7          |          |        |        | 135         |        |       |           | .823     | 96.7           |          |         |                |             | 136                 |        |
|          |           | .939     | 297.0          |          |        |        | 239         |        |       |           | .932     | 113.3          |          |         |                |             | 199                 |        |
|          |           | .900     | 303.5          |          |        |        | 228         |        |       |           | .943     | 85.1           |          |         |                |             | 191                 |        |
|          |           | .875     | 262.8          |          |        |        | 103         |        |       |           | (-26.1)  | (134.4)(- 6.7) |          |         |                |             |                     |        |
|          |           | .858     | 295.0          |          |        |        | 97          |        |       | Mar. 29   |          |                |          |         |                |             | (274) (1593) (2349) |        |
|          | 16454     | .704     | 272.1          | 204.5    | - 3.3  | 56     | 426         |        |       |           |          |                |          |         |                |             |                     |        |
|          | 16449     | .563     | 298.1          | 190.0    | + 9.4  | 20     | 107         |        |       |           |          |                |          |         |                |             |                     |        |
|          | 16450     | .433     | 242.3          | 183.5    | -17.8  | 1      | 5           |        |       | 88.589    |          | .980           | 269.0    |         |                |             |                     | 219    |
|          | 16452     | .485     | 4.2            | 157.7    | +22.0  | 24     | 97          |        |       | G         |          | .962           | 308.3    |         |                |             |                     | 180    |
|          | 16453     | .232     | 111.9          | 147.3    | -11.6  | 1      | 9           |        |       |           |          | .929           | 288.9    |         |                |             |                     | 193    |
|          | 16456     | .898     | 54.9           | 104.3    | +27.3  | 23     | 163         | 249 c  |       |           |          | .920           | 298.8    |         |                |             |                     | 154    |
|          | 16457     | .972     | 91.0           | 83.6     | - 2.6  | 38     | 311         | 179 c  |       |           |          | .914           | 251.8    |         |                |             |                     | 231    |
|          |           | .821     | 100.1          |          |        |        | 367         |        |       |           |          | .894           | 313.8    |         |                |             |                     | 184    |
|          |           | .967     | 60.9           |          |        |        | 151         |        |       | Mar. 27   | 16449    | .965           | 282.1    | 190.4   | + 9.8          | 17          | 83                  | 131 c  |
|          |           | (-25.9)  | (159.9)(- 6.8) | (163)    | (1118) | (1748) |             |        |       |           | 16452    | .730           | 310.0    | 154.6   | +22.7          | 9           | 49                  | 84 sp  |
|          |           |          |                |          |        |        |             |        |       |           | 16455    | .401           | 318.8    | 132.9   | +11.1          | 0           | 2                   |        |
|          | 86.342 C  | .967     | 297.0          |          |        |        | 228         |        |       |           | 16456    | .600           | 21.8     | 102.9   | +27.3          | 20          | 117                 |        |
|          |           | .958     | 263.0          |          |        |        | 119         |        |       |           | 16457    | .560           | 84.6     | 83.6    | - 2.5          | 40          | 213                 |        |
|          |           | .923     | 285.8          |          |        |        | 97          |        |       |           | 16458    | .839           | 69.4     | 63.8    | +13.2          | 18          | 75                  | 112 c  |
|          |           | .908     | 292.8          |          |        |        | 148         |        |       |           | 16459    | .870           | 74.2     | 59.3    | +10.3          | 27          | 114                 | 150 c  |
|          |           | .882     | 311.3          |          |        |        | 153         |        |       |           | 16461    | .851           | 91.9     | 59.0    | - 5.1          | 39          | 197                 | 237 c  |
|          |           | .845     | 270.0          | 204.6    | - 3.6  | 55     | 338         | 141 c  |       |           | 16460    | .924           | 56.2     | 57.3    | +27.8          | 94          | 481                 | 395 c  |
|          |           | 16449    | .721           | 290.5    | 190.1  | + 9.7  | 20          | 99     |       |           | 16462    | .924           | 77.2     | 51.8    | + 9.1          | 0           | 9                   | 587 c  |
|          |           | 16450    | .548           | 249.5    | 179.3  | -16.7  | 2           | 14     |       |           |          | .828           | 114.8    |         |                |             |                     | 237    |
|          |           | 16452    | .509           | 341.5    | 157.0  | +22.1  | 18          | 91     |       |           |          | .875           | 82.2     |         |                |             |                     | 137    |
|          |           | 16453    | .085           | 194.8    | 148.6  | -11.4  | 2           | 17     |       |           |          | .983           | 55.0     | (-26.2) | (117.4)(- 6.6) | (264)       | (1340)              | (3704) |
|          |           | 16456    | .811           | 48.7     | 103.8  | +27.5  | 24          | 150    | 222 c |           |          |                |          |         |                |             |                     | 473    |
|          |           | 16457    | .896           | 89.4     | 83.5   | - 2.5  | 48          | 272    | 354 c |           |          |                |          |         |                |             |                     |        |
|          |           |          | .959           | 113.8    |        |        |             | 150    |       |           |          |                |          |         |                |             |                     |        |
|          |           | (-26.0)  | (147.0)(- 6.7) | (169)    | (981)  | (1612) |             |        |       | Mar. 28   | 89.307 C | .968           | 286.8    |         |                |             |                     | 169    |
|          |           |          |                |          |        |        |             |        |       |           |          | .957           | 313.0    |         |                |             |                     | 92     |
|          |           |          |                |          |        |        |             |        |       |           |          | .950           | 254.2    |         |                |             |                     | 171    |
|          | 87.304 C  | .980     | 283.3          |          |        |        | 106         |        |       |           |          | .946           | 246.0    |         |                |             |                     | 179    |
|          |           | .952     | 295.7          |          |        |        | 299         |        |       |           |          | .938           | 303.0    |         |                |             |                     | 139    |
|          |           | .942     | 305.5          |          |        |        | 159         |        |       |           |          | .937           | 293.9    |         |                |             |                     | 106    |
|          |           | .934     | 277.7          |          |        |        | 83          |        |       |           | 16452    | .812           | 304.8    | 154.2   | +23.1          | 2           | 9                   | 134 c  |
|          |           | 16454    | .941           | 268.4    | 204.7  | - 3.8  | 46          | 291    | 251 c |           | 16456    | .563           | 8.4      | 102.6   | +27.1          | 18          | 120                 |        |
|          |           | 16449    | .849           | 285.9    | 190.1  | + 9.7  | 8           | 77     | 56 c  |           | 16457    | .415           | 82.2     | 83.7    | - 2.8          | 50          | 246                 |        |
|          |           | 16452    | .587           | 324.0    | 156.2  | +22.0  | 13          | 84     |       |           | 16458    | .741           | 65.4     | 64.3    | +13.2          | 13          | 72                  | 112 c  |
|          |           | 16455    | .279           | 1.6      | 133.9  | + 9.4  | 3           | 21     |       |           | 16461    | .738           | 90.8     | 60.3    | - 5.0          | 21          | 159                 | 179 c  |
|          |           | 16456    | .711           | 39.9     | 103.6  | +27.3  | 21          | 134    |       |           | 16459    | .779           | 71.4     | 59.5    | +10.0          | 25          | 115                 | 122 c  |
|          |           | 16457    | .776           | 88.0     | 83.7   | - 2.7  | 37          | 261    | 126 f |           | 16460    | .865           | 52.9     | 57.1    | +27.3          | 132         | 535                 | 274 c  |
|          |           | 16458    | .960           | 74.5     | 63.1   | +12.8  | 16          | 60     | 179 c |           | 16462    | .846           | 74.8     | 52.3    | + 9.1          | 0           | 10                  | 295 f  |
|          |           | 16459    | .973           | 78.3     | 59.4   | + 9.7  | 28          | 115    | 180 c |           |          | .959           | 53.2     | (-26.2) | (107.9)(- 6.6) | (261)       | (1266)              | (2532) |
|          |           | 16460    | .989           | 60.6     | 58.0   | +27.6  | 85          | 436    | 189 c | Mar. 31   |          |                |          |         |                |             |                     | 560    |

Group 16457. Mar. 27 - Apr. 8. Return of Group 16422. A stable regular spot, with a double umbra until April 7.

Group 16458. Mar. 29 - Apr. 8. A small spot until March 31, after which there is a stream to the rear, except on April 3 and 4.

Group 16459. Mar. 29 - Apr. 9. A small stable regular spot.

Group 16460. Mar. 29-Apr. 10. Return of Group 16437. A stable regular spot. The umbra is crossed by a bright "bridge" between March 30 and April 1.

Group 16461. Mar. 29 - Apr. 8. A stream of small variable spots, dying out as it nears the west limb.

Group 16462. Mar. 30 - Apr. 9. A small stream, in which the leader becomes the largest and most stable component and alone remains by April 8.

Group 16463. Apr. 2 - 9. A stream, developing rapidly near the central meridian. The leader is the most stable component.

Group 16464. APR. 3 - 11. A stream, developing rapidly near the central meridian. The leader is

Group 18464. Apr. 3 - II. A stream of small spots  
Group 18465. Apr. 3 - 5. A pair of small spots

Group 16466. Apr. 3 - 5. A pair of small spots.  
Group 16466. Apr. 3 - 15. Return of Group 16435. A diminishing regular spot, with a few tiny companions between April 6 and 12.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.     | Group No. | MEASURES |            | POSITION     |       | AREA   |             |        | U.T.    | Group No. | MEASURES |               | POSITION |        | AREA   |             |        |         |
|----------|-----------|----------|------------|--------------|-------|--------|-------------|--------|---------|-----------|----------|---------------|----------|--------|--------|-------------|--------|---------|
|          |           | Dist.    | Pos. Angle | Long.        | Lat.  | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle    | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |
| 1950     |           |          |            | o            | o     |        |             |        | 1950    | 16460     | .871     | 305.3         | 53.7     | +26.5  | 105    | 482         | 229 c  |         |
| 95.364 G |           | .957     | 257.4      |              |       |        | 190         |        |         | 16464     | .538     | 306.3         | 27.6     | +13.0  | 9      | 83          |        |         |
|          |           | .887     | 304.2      |              |       |        | 203         |        |         | 16466     | .346     | 122.8         | 343.7    | -16.6  | 48     | 272         |        |         |
|          |           | .799     | 260.4      |              |       |        | 203         |        |         | 16467     | .945     | 73.2          | 292.9    | +13.7  | 170    | 1501        | 416 c  |         |
|          |           | 16456    | .971       | 298.8        | 99.0  | +26.0  | 33          | 123    | 252 c   |           | .859     | 67.0          |          |        |        |             | 210    |         |
|          |           | 16457    | .824       | 271.7        | 83.3  | -2.2   | 35          | 200    | 236 c   | Apr. 8    | (-26.4)  | (1.3)(-6.1)   | (452)    | (3291) | (2598) |             |        |         |
|          |           | 16463    | .654       | 245.6        | 67.3  | -20.5  | 101         | 578    |         |           |          |               |          |        |        |             | 67     |         |
|          |           | 16461    | .594       | 270.8        | 64.4  | -4.5   | 14          | 71     |         |           |          |               |          |        |        |             | 293    |         |
|          |           | 16458    | .629       | 299.2        | 62.1  | +12.7  | 22          | 92     |         |           |          |               |          |        |        |             | 586    |         |
|          |           | 16459    | .585       | 297.3        | 59.8  | +10.3  | 12          | 89     |         | 98.464 G  | .970     | 274.0         |          |        |        |             |        |         |
|          |           | 16462    | .564       | 295.3        | 58.9  | +8.6   | 26          | 174    |         |           | .947     | 266.6         |          |        |        |             |        |         |
|          |           | 16460    | .672       | 322.8        | 55.0  | +26.7  | 123         | 535    |         |           | .882     | 315.6         |          |        |        |             |        |         |
|          |           | 16464    | .330       | 7.2          | 25.6  | +12.8  | 43          | 198    |         |           | 16463    | .983          | 250.0    | 67.8   | -20.7  | 93          | 527    | 543 c   |
|          |           | 16466    | .699       | 107.6        | 344.1 | -16.6  | 51          | 291    |         |           | 16462    | .965          | 280.4    | 60.5   | +8.3   | 11          | 117    | { 545 c |
|          |           |          | .831       | 111.6        |       |        |             | 318    |         |           | 16459    | .959          | 282.1    | 58.9   | +9.8   | 12          | 47     |         |
|          |           |          | .887       | 67.2         |       |        |             | 287    |         |           | 16460    | .952          | 300.4    | 53.5   | +26.5  | 108         | 496    | 324 c   |
|          |           |          | .933       | 52.1         |       |        |             | 275    |         |           | 16464    | .710          | 295.5    | 28.1   | +13.2  | 13          | 64     |         |
|          |           |          | .957       | 99.2         |       |        |             | 284    |         |           | 1292a    | .285          | 265.4    | 3.7    | -7.1   | 2           | 8      |         |
| Apr. 6   |           |          | (-26.4)    | (28.0)(-6.2) | (460) | (2351) | (2248)      |        |         |           | 16466    | .190          | 162.2    | 343.6  | -16.4  | 39          | 235    |         |
|          |           |          |            |              |       |        |             |        |         |           | 16467    | .842          | 70.0     | 292.9  | +13.2  | 280         | 1578   | 709 c   |
|          |           |          |            |              |       |        |             |        |         |           |          | .943          | 83.8     |        |        |             | 166    |         |
| 96.364 G |           | .951     | 299.2      |              |       |        | 232         |        |         | Apr. 9    | (-26.4)  | (347.1)(-6.0) | (558)    | (3072) | (3233) |             |        |         |
|          |           | .909     | 259.8      |              |       |        | 239         |        |         |           |          |               |          |        |        |             |        |         |
|          |           | 16457    | .931       | 270.2        | 83.2  | -2.1   | 57          | 238    | 346 c   |           |          |               |          |        |        |             |        |         |
|          |           | 16463    | .801       | 248.9        | 67.5  | -20.5  | 110         | 648    | 267 c   |           |          |               |          |        |        |             |        |         |
|          |           | 16461    | .766       | 269.0        | 64.8  | -4.7   | 11          | 45     | 87 c    | 99.417 C  | .977     | 245.7         |          |        |        |             | 324    |         |
|          |           | 16458    | .794       | 291.8        | 63.8  | +13.1  | 19          | 48     | { 352 c |           | .963     | 279.3         |          |        |        |             | 397    |         |
|          |           | 16459    | .737       | 290.0        | 59.4  | +10.3  | 20          | 63     | { 352 c |           | .930     | 309.6         |          |        |        |             | 117    |         |
|          |           | 16462    | .730       | 287.2        | 59.4  | +8.1   | 33          | 154    |         |           | .893     | 299.7         |          |        |        |             | 143    |         |
|          |           | 16460    | .772       | 312.4        | 54.3  | +26.6  | 122         | 520    | 408 c   |           | 16460    | .991          | 297.4    | 52.5   | +26.0  | 54          | 455    | 264 c   |
|          |           | 16464    | .379       | 329.3        | 26.2  | +13.0  | 29          | 140    |         |           | 16464    | .856          | 288.9    | 30.4   | +12.8  | 9           | 66     | 153 c   |
|          |           | 16466    | .534       | 111.6        | 343.7 | -16.6  | 50          | 277    |         |           | 16466    | .240          | 218.5    | 343.4  | -16.6  | 34          | 266    |         |
|          |           | 1291g    | .899       | 71.2         | 313.8 | +13.9  | 2           | 10     | 133 c   |           | 16467    | .711          | 64.5     | 293.4  | +13.3  | 261         | 1891   | 213 c   |
|          |           | 16467    | .985       | 74.6         | 296.9 | +13.9  | 118         | 730    | 427 c   |           |          | .836          | 82.1     |        |        |             | 89     |         |
|          |           |          | .873       | 97.3         |       |        |             | 318    |         |           |          | .934          | 77.7     |        |        |             | 299    |         |
|          |           |          | .951       | 71.6         |       |        |             | 267    |         |           |          | .935          | 66.9     |        |        |             | 302    |         |
| Apr. 7   |           |          | (-26.4)    | (14.8)(-6.1) | (571) | (2873) | (3076)      |        |         | Apr. 10   | (-26.3)  | (334.5)(-5.9) | (358)    | (2678) | (2301) |             |        |         |
| 97.391 C |           | .969     | 259.2      |              |       |        | 171         |        |         | 100.366 G | .973     | 241.1         |          |        |        |             | 96     |         |
|          |           | .924     | 274.4      |              |       |        | 139         |        |         |           | .964     | 310.1         |          |        |        |             | 394    |         |
|          |           | .824     | 238.7      |              |       |        | 76          |        |         |           | .948     | 298.7         |          |        |        |             | 140    |         |
|          |           | .809     | 321.8      |              |       |        | 312         |        |         | 16464     | .949     | 285.5         | 31.4     | +12.7  | 6      | 42          | 309 c  |         |
|          |           | 16457    | .991       | 269.0        | 83.4  | -1.8   | 22          | 148    | 156 c   |           | 16466    | .398          | 240.0    | 343.0  | -16.9  | 14          | 249    |         |
|          |           | 16463    | .919       | 250.4        | 68.5  | -20.4  | 56          | 510    | 285 c   |           | 16467    | .562          | 55.7     | 293.6  | +13.2  | 302         | 2000   |         |
|          |           | 16461    | .900       | 267.8        | 65.5  | -4.6   | 2           | 24     | 189 c   |           | 16468    | .914          | 79.6     | 257.3  | +7.0   | 0           | 5      | 335 c   |
|          |           | 16458    | .893       | 287.3        | 61.9  | +12.4  | 12          | 61     | { 415 c |           |          | .886          | 71.5     |        |        |             | 228    |         |
|          |           | 16462    | .870       | 283.0        | 60.0  | +8.1   | 15          | 137    | { 415 c |           |          | .937          | 63.9     |        |        |             | 285    |         |
|          |           | 16459    | .867       | 285.2        | 59.2  | +9.9   | 13          | 73     | { 415 c | Apr. 11   | (-26.3)  | (322.0)(-5.9) | (322)    | (2296) | (1787) |             |        |         |

Group 16467. Apr. 7 - 19. A very large group, which at first consists of two composite spots. The leader soon begins to divide into two regular spots which separate by April 13 and slowly diminish as they approach the west limb. The follower becomes elongated and undergoes slight changes during its transit.

Group 16468. Apr. 11 - 22. A tiny spot on April 11 which slowly develops, at first into a stream, and then into an irregular composite mass.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.      | Group No. | MEASURES |            | POSITION |       | AREA  |             |        | U.T.      | Group No.                                 | MEASURES |            | POSITION |       | AREA  |             |        |               |
|-----------|-----------|----------|------------|----------|-------|-------|-------------|--------|-----------|---|----------|------------|----------|-------|-------|-------------|--------|---------------|
|           |           | Dist.    | Pos. Angle | Long.    | Lat.  | Umbræ | Whole Spots | Faculæ |           |   | Dist.    | Pos. Angle | Long.    | Lat.  | Umbræ | Whole Spots | Faculæ |               |
| 1950      | 101.363 G |          |            | o        | o     |       |             |        | 1950      | 16467<br>16468<br>16469<br>16470<br>16471 |          |            | o        | o     |       |             |        |               |
| .962      | 284.3     |          |            |          |       |       | 221         |        |           |   | .515     | 307.7      | 293.7    | +13.2 | 230   | 1397        |        |               |
| .834      | 264.1     |          |            |          |       |       | 91          |        |           |   | .260     | 32.1       | 261.1    | + 7.1 | 25    | 98          |        |               |
| .795      | 309.8     |          |            |          |       |       | 239         |        |           |   | .841     | 69.9       | 215.0    | +13.5 | 179   | 916         | 561 c  |               |
| .773      | 285.7     |          |            |          |       |       | 52          |        |           |   | .894     | 90.2       | 205.8    | - 2.7 | 12    | 40          | 249 c  |               |
| 1292b     | .943      | 256.9    | 19.9       | -14.2    |       | 3     | 13          | 115 c  |           |   | .962     | 67.7       | 198.4    | +19.6 | 4     | 28          | 140 c  |               |
| 16466     | .574      | 248.5    | 342.3      | -17.0    |       | 24    | 195         |        |           |   | .813     | 52.3       |          |       |       |             | 152    |               |
| 16467     | .412      | 38.3     | 293.7      | +13.2    |       | 250   | 1923        |        |           |   | .844     | 95.3       |          |       |       |             | 84     |               |
| 16468     | .783      | 76.3     | 259.0      | + 6.9    |       | 3     | 26          | 141 c  |           |   | .876     | 1.8        |          |       |       |             | 9      |               |
|           | .858      | 71.5     |            |          |       |       | 196         |        |           |   | .876     | 5.6        |          |       |       |             | 7      |               |
|           | .905      | 61.7     |            |          |       |       | 285         |        |           |   | .920     | 52.9       |          |       |       |             | 169    |               |
|           | .957      | 71.9     |            |          |       |       | 153         |        |           |   | .945     | 76.3       |          |       |       |             | 101    |               |
| Apr.12    |           | (-26.3)  | (308.8)    | (-5.8)   |       | (280) | (2157)      | (1493) | Apr.15    |   | (-26.1)  | (269.1)    | (- 5.6)  |       | (465) | (2535)      | (2010) |               |
| 102.366 G | .925      | 261.8    |            |          |       |       | 117         |        | 105.514 C | .957                                      | 247.7    |            |          |       |       | 279         |        |               |
|           | .916      | 283.1    |            |          |       |       | 262         |        |           | .947                                      | 286.7    |            |          |       |       | 236         |        |               |
|           | .915      | 298.5    |            |          |       |       | 303         |        |           | .837                                      | 283.1    |            |          |       |       | 178         |        |               |
|           | .885      | 308.6    |            |          |       |       | 311         |        |           | .836                                      | 294.7    |            |          |       |       | 178         |        |               |
|           | 16466     | .739     | 253.2      | 342.9    | -16.2 | 23    | 156         | 172 c  |           | 16472                                     | .769     | 287.4      | 302.0    | + 9.6 | 2     | 10          |        |               |
|           | 16467     | .329     | 6.6        | 293.4    | +13.3 | 262   | 1605        |        |           | 16467                                     | .686     | 296.8      | 293.0    | +13.7 | 182   | 1372        |        |               |
|           | 16468     | .603     | 69.9       | 260.9    | + 7.2 | 8     | 72          |        |           | 16468                                     | .255     | 326.7      | 262.2    | + 6.8 | 22    | 181         |        |               |
|           | 16469     | .993     | 75.4       | 214.4    | +13.7 | 70    | 554         | 632 c  |           | 16469                                     | .679     | 62.9       | 215.8    | +13.7 | 80    | 763         |        |               |
|           |           | .823     | 56.6       |          |       |       | 138         |        |           | 16470                                     | .737     | 88.5       | 206.8    | - 2.6 | 5     | 27          |        |               |
|           |           | .900     | 68.3       |          |       |       | 255         |        |           | 16471                                     | .847     | 65.7       | 200.4    | +17.2 | 0     | 7           |        |               |
|           |           | .969     | 60.0       |          |       |       | 201         |        |           |   | .857     | 75.1       |          |       |       | 102 f       |        |               |
| Apr.13    |           | (-26.2)  | (295.6)    | (- 5.7)  |       | (363) | (2387)      | (2391) |           |   | .953     | 73.9       |          |       |       |             | 169 n  |               |
| 103.311 C | .956      | 301.4    |            |          |       |       | 190         |        | Apr.16    | 106.461 G                                 | .961     | 54.5       |          |       |       |             | 136    |               |
|           | .955      | 280.0    |            |          |       |       | 126         |        |           |   | .965     | 66.0       |          |       |       |             | 160    |               |
|           | .954      | 308.8    |            |          |       |       | 100         |        |           |   | (-26.1)  | (254.1)    | (- 5.5)  |       |       |             | 193    |               |
|           | .949      | 295.0    |            |          |       |       | 177         |        |           |   |          |            |          |       |       |             | 143    |               |
|           | .947      | 264.7    |            |          |       |       | 83          |        |           |   |          |            |          |       |       |             | 278    |               |
|           | .765      | 243.6    |            |          |       |       | 117         |        |           |   | .960     | 279.0      |          |       |       |             | 308    |               |
|           | 16466     | .860     | 254.8      | 342.5    | -15.9 | 21    | 113         | 150 s  |           |   | .933     | 256.7      |          |       |       |             | 332    |               |
|           | 16467     | .367     | 331.4      | 293.5    | +13.2 | 190   | 1505        |        |           |   | .929     | 291.0      |          |       |       |             | 297 c  |               |
|           | 16468     | .437     | 60.8       | 260.6    | + 7.1 | 14    | 85          |        |           |   | .887     | 282.6      | 302.3    | + 8.5 | 4     | 39          | 306 c  |               |
|           | 16469     | .939     | 73.4       | 215.6    | +13.5 | 116   | 540         | 498 c  |           |   | 16467    | .816       | 290.8    | 293.0 | +13.5 | 152         | 1270   |               |
|           | 16470     | .970     | 91.5       | 207.2    | - 2.8 | 8     | 26          | 244 c  |           |   | 16468    | .410       | 299.5    | 262.5 | + 6.5 | 50          | 516    |               |
|           |           | .912     | 57.1       |          |       |       | 249         |        |           |   | 16469    | .529       | 52.5     | 216.0 | +13.8 | 73          | 745    |               |
| Apr.14    |           | (-26.2)  | (283.1)    | (- 5.6)  |       | (349) | (2269)      | (1934) |           |   | 16470    | .566       | 86.3     | 207.2 | - 2.4 | 1           | 10     | 200           |
|           |           |          |            |          |       |       |             |        |           |   |          | .865       | 70.3     |       |       |             |        | 193           |
|           |           |          |            |          |       |       |             |        |           |   |          | .885       | 119.6    |       |       |             |        | 210           |
| 104.373 G | .903      | 290.9    |            |          |       |       | 77          |        |           |   |          | .917       | 62.8     |       |       |             |        | 232           |
|           | .887      | 245.6    |            |          |       |       | 192         |        |           |   |          | .923       | 49.5     |       |       |             |        | 280           |
|           | 16466     | .955     | 254.9      | 342.4    | -16.0 | 15    | 56          | 269 s  | Apr.17    |   | (-26.0)  | (241.5)    | (- 5.4)  |       |       |             |        | (2580) (2356) |

Group 16469. Apr. 13 - 25. A stream, which by April 18 has become a simple bi-polar group. The follower, a regular spot with double umbra, divides into two as the group decreases in area.

Group 16470. Apr. 14 - 19. Return of Group 16454. A small spot.

Group 16471. Apr. 15 - 16. A small spot.

Group 16472. Apr. 16 - 18. One or two small spots.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.         | Group No. | MEASURES |            | POSITION |                | AREA  |             |        | U.T.         | Group No.        | MEASURES |                | POSITION |                | AREA   |             |        |
|--------------|-----------|----------|------------|----------|----------------|-------|-------------|--------|--------------|------------------|----------|----------------|----------|----------------|--------|-------------|--------|
|              |           | Dist.    | Pos. Angle | Long.    | Lat.           | Umbræ | Whole Spots | Faculæ |              |                  | Dist.    | Pos. Angle     | Long.    | Lat.           | Umbræ  | Whole Spots | Faculæ |
| 1950         |           |          |            |          |                |       |             |        | 1950         |                  |          |                |          |                |        |             |        |
| 107.410<br>C | 16472     | .969     | 256.4      |          | o o            |       | 54          |        |              | 16468            | .894     | 288.2          |          | o o            |        |             | 112    |
|              | 16467     | .975     | 278.8      | 305.0    | + 7.3          | 4     | 29          | 184 c  |              | 16469            | .962     | 279.4          | 262.9    | + 7.5          | 133    | 855         | 871 c  |
|              | 16468     | .911     | 287.3      | 292.1    | +13.4          | 147   | 1219        | 610 c  |              | 16473            | .516     | 308.8          | 214.4    | +14.2          | 72     | 333         |        |
|              | 16469     | .586     | 288.0      | 262.9    | + 6.0          | 100   | 647         |        |              | 16474            | .765     | 70.6           | 142.8    | +11.2          | 0      | 9           | 270 c  |
|              |           | .390     | 32.0       | 216.8    | +14.1          | 114   | 610         |        |              | 16475            | .837     | 105.6          | 133.3    | -15.8          | 55     | 328         | 385 c  |
|              |           | .870     | 58.3       |          |                |       | 99          |        |              |                  | .984     | 101.5          | 109.7    | -12.2          | 0      | 25          | 145 c  |
|              |           | .885     | 44.2       |          |                |       | 140         |        |              |                  | .791     | 49.3           |          |                |        |             | 164    |
|              |           | .961     | 64.1       |          |                |       | 135         |        |              |                  | .949     | 48.5           |          |                |        |             | 159    |
|              |           |          |            | (-25.9)  | (229.0)(- 5.3) | (365) | (2505)      | (1222) |              | Apr. 21          |          |                | (-25.6)  | (190.0)(- 5.1) | (260)  | (1550)      | (2546) |
|              |           |          |            |          |                |       |             |        |              |                  |          |                |          |                |        |             |        |
| 108.316<br>C |           | .894     | 278.5      |          |                |       | 121         |        | 111.332<br>G |                  | .959     | 293.9          |          |                |        |             | 195    |
|              |           | .863     | 269.7      |          |                |       | 128         |        |              |                  | .906     | 286.0          |          |                |        |             | 118    |
|              |           | .831     | 295.5      |          |                |       | 97          |        |              |                  | .860     | 295.8          |          |                |        |             | 109    |
|              | 16467     | .975     | 285.3      | 292.2    | +13.6          | 142   | 1065        | 1053 c |              |                  | .831     | 311.1          |          |                |        |             | 150    |
|              | 16468     | .736     | 283.3      | 262.9    | + 6.1          | 116   | 953         | 136 c  |              |                  | .776     | 288.2          |          |                |        |             | 107    |
|              | 16469     | .329     | 3.1        | 216.0    | +13.9          | 99    | 538         |        |              | 16468            | .995     | 276.8          | 260.5    | + 6.2          | 0      | 86          | 442 n  |
|              | 16470     | .173     | 64.3       | 208.1    | - 0.9          | 1     | 10          |        |              | 16469            | .665     | 298.3          | 214.2    | +14.4          | 57     | 280         |        |
|              | 16473     | .976     | 77.0       | 141.2    | +11.4          | 0     | 16          | 159 c  |              | 16474            | .704     | 108.6          | 133.3    | -16.6          | 136    | 687         | 85 f   |
|              | 16474     | .994     | 105.5      | 132.5    | -15.9          | 0     | 75          | 350 c  |              | 16475            | .921     | 101.5          | 109.8    | -12.5          | 25     | 106         | 237 c  |
|              |           | .888     | 60.1       |          |                |       | 200         |        |              |                  | (-25.5)  | (177.2)(- 5.0) | (218)    | (1159)         | (1443) |             |        |
|              |           | .908     | 103.5      |          |                |       | 155         |        |              |                  |          |                |          |                |        |             |        |
|              |           | .950     | 61.3       |          |                |       | 172         |        |              |                  |          |                |          |                |        |             |        |
|              |           |          |            | (-25.9)  | (217.0)(- 5.2) | (358) | (2657)      | (2571) |              | 112.603<br>Mt. W | .924     | 302.9          |          |                |        |             | 258    |
|              |           |          |            |          |                |       |             |        |              |                  | .869     | 310.8          |          |                |        |             | 157    |
|              |           |          |            |          |                |       |             |        |              |                  | .792     | 302.8          |          |                |        |             | 61     |
| 109.362<br>G |           | .973     | 286.6      |          |                |       | 337         |        |              | 16469            | .834     | 291.8          | 213.5    | +15.1          | 59     | 242         | 411 c  |
|              |           | .908     | 290.3      |          |                |       | 172         |        |              | 16476            | .679     | 291.2          | 200.3    | +10.4          | 6      | 24          |        |
|              |           | .889     | 299.6      |          |                |       | 194         |        |              | 16477            | .611     | 266.2          | 198.0    | - 6.2          | 2      | 11          |        |
|              | 16468     | .870     | 281.1      | 262.3    | + 6.9          | 64    | 1062        | 485 c  |              | 16478            | .597     | 36.1           | 137.8    | +24.2          | 2      | 7           |        |
|              | 16469     | .386     | 328.5      | 215.1    | +14.0          | 86    | 517         |        |              | 16474            | .493     | 116.0          | 133.0    | -16.7          | 215    | 1085        |        |
|              | 16473     | .913     | 73.4       | 139.6    | +12.8          | 0     | 5           | 193 c  |              | 16475            | .774     | 101.8          | 109.8    | -12.2          | 94     | 436         | 182 c  |
|              | 16474     | .930     | 104.8      | 134.5    | -15.7          | 14    | 142         | 355 c  |              | 16479            | .972     | 90.0           | 84.2     | - 1.1          | 13     | 119         | 105 c  |
|              |           | .858     | 59.2       |          |                |       | 98          |        |              |                  | .901     | 67.2           |          |                |        |             | 98     |
|              |           | .925     | 53.4       |          |                |       | 176         |        |              |                  | .908     | 107.7          |          |                |        |             | 236    |
|              |           |          |            | (-25.7)  | (203.2)(- 5.2) | (164) | (1726)      | (2010) |              |                  | .928     | 42.4           |          |                |        |             | 137    |
| 110.365<br>G |           | .978     | 287.8      |          |                |       | 160         |        | Apr. 23      |                  | .967     | 61.0           |          |                |        |             | 116    |
|              |           | .898     | 296.2      |          |                |       | 280         |        |              |                  | .967     | 106.7          |          |                |        |             | 363    |
|              |           |          |            |          |                |       |             |        |              |                  | .978     | 74.8           | (-25.4)  | (160.4)(- 4.9) | (391)  | (1924)      | (2258) |
|              |           |          |            |          |                |       |             |        |              |                  |          |                |          |                |        | 134         |        |
|              |           |          |            |          |                |       |             |        |              |                  |          |                |          |                |        |             |        |

Group 16473. Apr. 19 - 21. One or two ephemeral spots.

Group 16474. Apr. 19-May 1. A stream, in which both leader and follower undergo slight changes; the whole is diminishing as it passes out of sight.

Group 16475. Apr. 21-May 3. A large stream developing from a small spot at the east limb. The leader, a fairly stable regular spot, is the largest component. The follower undergoes slight changes until April 30, after which it quickly breaks up and dies out.

Group 16476. Apr. 23 - 26. A pair of small spots.

Group 16477. Apr. 23 - 24. A tiny spot.

Group 16478. Apr. 23 - 24. A tiny spot.

Group 16479. Apr. 23-May 4. Return of Group 16457: third appearance. A stable regular spot.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |                | POSITION       |        | AREA   |             |        | U.T.    | Group No. | MEASURES       |                | POSITION |        | AREA   |             |        |     |  |
|---------|-----------|----------|----------------|----------------|--------|--------|-------------|--------|---------|-----------|----------------|----------------|----------|--------|--------|-------------|--------|-----|--|
|         |           | Dist.    | Pos. Angle     | Long.          | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.          | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |     |  |
| 1950    |           |          |                | o              | o      |        |             |        | 1950    |           |                |                | o        | o      |        |             |        |     |  |
| 113.333 | G         | .970     | 300.7          |                |        |        | 204         |        | 16474   | .264      | 215.0          | 132.9          | -17.0    | 119    | 794    |             |        |     |  |
|         |           | .945     | 282.3          |                |        |        | 153         |        | 16475   | .243      | 122.4          | 111.8          | -11.9    | 187    | 1099   |             |        |     |  |
|         |           | .915     | 306.7          |                |        |        | 138         |        | 16483   | .581      | 109.4          | 89.4           | -14.9    | 3      | 12     |             |        |     |  |
|         |           | .865     | 266.7          |                |        |        | 145         |        | 16479   | .612      | 86.8           | 86.3           | -1.7     | 27     | 120    |             |        |     |  |
|         |           | .847     | 299.7          |                |        |        | 231         |        | 16484   | .739      | 99.8           | 76.2           | -10.3    | 7      | 39     |             |        |     |  |
| 16469   |           | .906     | 289.4          | 213.0          | +15.2  | 39     | 191         | 544 c  | 16482   | .814      | 113.0          | 70.5           | -21.3    | 34     | 201    | 134 c       |        |     |  |
| 16476   |           | .796     | 286.1          | 201.5          | + 9.7  | 8      | 30          | 140 c  | 16485   | .980      | 62.6           | 49.2           | +25.7    | 49     | 295    | 256 n       |        |     |  |
| 16477   |           | .748     | 265.3          | 199.2          | - 6.7  | 0      | 7           |        |         | .879      | 95.2           |                |          |        |        | 129         |        |     |  |
| 16478   |           | .504     | 20.6           | 139.7          | +23.3  | 1      | 9           |        |         | .898      | 70.3           |                |          |        |        | 460         |        |     |  |
| 16474   |           | .364     | 125.9          | 132.9          | -16.9  | 158    | 1005        |        |         | .907      | 113.5          |                |          |        |        | 400         |        |     |  |
| 16480   |           | .465     | 89.5           | 123.1          | - 4.0  | 4      | 18          |        |         | .941      | 79.7           |                |          |        |        | 264         |        |     |  |
| 16475   |           | .644     | 103.5          | 111.1          | -12.3  | 102    | 553         |        | Apr. 26 | (-25.0)   | (123.8)(- 4.6) | (430)          | (2592)   | (2274) |        |             |        |     |  |
| 16481   |           | .841     | 107.9          | 93.9           | -17.6  | 0      | 13          | 186 c  |         |           |                |                |          |        |        |             |        |     |  |
| 16479   |           | .909     | 89.3           | 85.6           | - 1.4  | 30     | 124         | 156 c  |         |           |                |                |          |        |        |             |        |     |  |
| 16482   |           | .983     | 110.1          | 72.4           | -19.7  | 29     | 162         | 370 c  | 116.369 | .956      | 285.8          |                |          |        |        | 76          |        |     |  |
|         |           | .835     | 63.0           |                |        |        | 162         |        |         | .947      | 308.8          |                |          |        |        | 157         |        |     |  |
|         |           | .924     | 108.1          |                |        |        | 304         |        |         | .945      | 294.3          |                |          |        |        | 136         |        |     |  |
|         |           | .929     | 98.4           |                |        |        | 166         |        |         | .846      | 302.2          |                |          |        |        | 105         |        |     |  |
|         |           | .941     | 73.3           |                |        |        | 263         |        |         | 16474     | .428           | 237.9          | 132.8    | -17.3  | 126    | 857         |        |     |  |
|         |           | .945     | 55.6           |                |        |        | 272         |        |         | 16475     | .134           | 190.3          | 112.0    | -12.1  | 196    | 1430        |        |     |  |
| Apr. 24 |           | (-25.3)  | (150.8)(- 4.8) | (371)          | (2112) | (3434) |             |        |         | 16483     | .398           | 117.7          | 89.3     | -14.8  | 8      | 15          |        |     |  |
|         |           |          |                |                |        |        |             |        |         | 16479     | .414           | 84.7           | 86.4     | - 1.9  | 24     | 133         |        |     |  |
|         |           |          |                |                |        |        |             |        |         | 16484     | .564           | 101.6          | 76.6     | -10.3  | 13     | 69          |        |     |  |
| 114.441 | C         | .934     | 268.6          |                |        |        | 166         |        |         | 16482     | .678           | 115.9          | 70.1     | -20.6  | 49     | 242         |        |     |  |
|         |           | .928     | 295.7          |                |        |        | 88          |        |         | 16485     | .921           | 59.7           | 49.0     | +25.5  | 41     | 246         | 187 c  |     |  |
|         |           | 16469    | .975           | 286.6          | 211.2  | +15.0  | 25          | 159    | 366 c   |           | .774           | 64.6           |          |        |        |             | 143    |     |  |
|         |           | 16476    | .919           | 281.4          | 201.5  | + 8.5  | 5           | 44     | 141 c   |           | .814           | 116.3          |          |        |        |             | 272    |     |  |
|         |           | 16474    | .218           | 164.4          | 132.6  | -16.7  | 106         | 997    |         |           | .841           | 78.1           |          |        |        |             | 208    |     |  |
|         |           | 16480    | .202           | 88.5           | 124.5  | - 4.3  | 2           | 12     |         |           | .873           | 50.1           |          |        |        |             | 139    |     |  |
|         |           | 16475    | .426           | 108.2          | 111.8  | -11.9  | 171         | 963    |         |           | .974           | 74.5           |          |        |        |             | 171    |     |  |
|         |           | 16483    | .743           | 106.2          | 88.6   | -15.1  | 3           | 15     | 59 f    | Apr. 27   | (-24.9)        | (110.6)(- 4.5) | (457)    | (2992) | (1594) |             |        |     |  |
|         |           | 16479    | .769           | 88.2           | 86.1   | - 1.7  | 29          | 144    | 115 c   |           |                |                |          |        |        |             |        |     |  |
|         |           | 16484    | .845           | 99.3           | 78.3   | -10.4  | 4           | 20     | 87 s    |           |                |                |          |        |        |             |        |     |  |
|         |           | 16482    | .912           | 111.2          | 70.5   | -21.2  | 31          | 183    | 540 c   | 117.419   | .958           | 309.7          |          |        |        |             | 292    |     |  |
|         |           |          | .812           | 112.2          |        |        |             | 84     |         |           | .945           | 294.9          |          |        |        |             | 154    |     |  |
|         |           |          | .836           | 69.8           |        |        |             | 100    |         |           | .923           | 320.4          |          |        |        |             | 146    |     |  |
|         |           |          | .918           | 92.2           |        |        |             | 124    |         |           | .870           | 302.1          |          |        |        |             | 194    |     |  |
|         |           |          | .941           | 72.8           |        |        |             | 161    |         |           | .821           | 290.2          |          |        |        |             | 98     |     |  |
| Apr. 25 |           |          | .957           | 82.2           |        |        |             | 94     |         |           | .793           | 311.3          |          |        |        |             | 241    |     |  |
|         |           |          | (-25.2)        | (136.1)(- 4.7) | (376)  | (2537) | (2125)      |        |         | 16474     | .613           | 246.9          | 132.9    | -17.5  | 110    | 694         |        |     |  |
|         |           |          |                |                |        |        |             |        |         | 16475     | .296           | 242.8          | 112.3    | -11.9  | 260    | 1398        |        |     |  |
| 115.373 | G         | .920     | 293.5          |                |        |        | 171         |        |         | 16483     | .221           | 143.7          | 89.1     | -14.6  | 6      | 25          |        |     |  |
|         |           | .896     | 314.6          |                |        |        | 203         |        |         | 16479     | .178           | 76.4           | 86.9     | - 1.9  | 22     | 120         |        |     |  |
|         |           | 16476    | .978           | 280.0          | 200.6  | + 8.7  | 4           | 32     | 257 c   |           |                | 16484          | .363     | 106.7  | 76.2   | -10.1       | 15     | 102 |  |
|         |           |          |                |                |        |        |             |        |         | 16482     | .525           | 124.5          | 69.3     | -21.1  | 41     | 249         |        |     |  |

Group 16480. Apr. 24 - 25. A few tiny spots.  
 Group 16481. Apr. 24 - 30. A pair of tiny spots, seen only on April 24 and 30.  
 Group 16482. Apr. 24-May 6. Return of Group 16483. A regular spot, with a few variable companions until April 29.  
 Group 16483. Apr. 25-May 2. A small spot, with a distant companion on April 28 and 29. Nothing is seen on April 30.  
 Group 16484. Apr. 25-May 4. A few variable spots.  
 Group 16485. Apr. 26-May 4. Return of Group 16480; third appearance. A small regular spot, which dies out rapidly after May 3.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |               |          |        |        |             |        |         |           |          |            |               |         |        |             |        |       |
|---|-----------|----------|---------------|----------|--------|--------|-------------|--------|---------|-----------|----------|------------|---------------|---------|--------|-------------|--------|-------|
| U.T.  | Group No. | MEASURES |               | POSITION |        | AREA   |             |        | U.T.    | Group No. | MEASURES |            | POSITION      |         | AREA   |             |        |       |
|   |           | Dist.    | Pos. Angle    | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle | Long.         | Lat.    | Umbræ  | Whole Spots | Faculæ |       |
| 1950  | 16485     | .825     | 54.5          | 48.8     | +25.6  | 38     | 246         | 262 c  | 1950    |           | .942     | 81.2       | o             | o       |        | 182         |        |       |
|   | 16486     | .949     | 72.7          | 27.4     | +14.8  | 53     | 369         | 463 c  |         |           | .968     | 65.0       |               |         |        | 110         |        |       |
| Apr. 28   | 16487     | .988     | 76.5          | 17.2     | +12.6  | 22     | 113         | 136 c  | Apr. 30 |           | (-24.4)  | (-24.4)    | (70.6)        | (- 4.2) | (477)  | (2958)      | (2663) |       |
|   |           | .930     | 61.5          |          |        |        |             | 76     |         |           |          |            |               |         |        |             |        |       |
|   |           | .946     | 50.5          |          |        |        |             | 378    |         |           |          |            |               |         |        |             |        |       |
|   |           | (-24.7)  | (96.8)(- 4.4) | (567)    | (3316) | (2440) |             |        |         |           |          |            |               |         |        |             |        |       |
|   |           |          |               |          |        |        |             |        |         | 120.319   |          |            |               |         |        |             |        |       |
|   |           |          |               |          |        |        |             |        |         | C         | 16474    | .917       | 264.9         |         |        | 82          |        |       |
| 118.315 C   |           | .912     | 253.6         |          |        |        |             | 106    |         |           | 16475    | .968       | 253.5         | 134.2   | -17.0  | 77          | 514    | 542 c |
|   |           | .886     | 300.0         |          |        |        |             | 175    |         |           | 16479    | .812       | 258.7         | 112.6   | -11.5  | 198         | 1049   | 185 c |
|   |           | .883     | 285.2         |          |        |        |             | 93     |         |           | 16483    | .558       | 252.1         | 91.3    | -13.2  | 1           | 8      |       |
|   |           | .828     | 259.5         |          |        |        |             | 98     |         |           | 16479    | .484       | 273.6         | 87.2    | - 1.9  | 27          | 125    |       |
|   | 16474     | .761     | 250.4         | 133.5    | -17.6  | 108    | 616         | 105 c  |         |           | 16484    | .361       | 253.1         | 78.8    | - 9.8  | 10          | 35     |       |
|   | 16475     | .488     | 252.6         | 113.2    | -12.2  | 239    | 1423        |        |         |           | 16482    | .334       | 206.7         | 67.6    | -21.3  | 34          | 181    |       |
|   | 16483     | .197     | 206.2         | 90.0     | -14.4  | 4      | 16          |        |         |           | 16488    | .130       | 181.9         | 58.7    | -11.5  | 21          | 75     |       |
|   | 16479     | .055     | 315.2         | 87.1     | - 2.1  | 23     | 120         |        |         |           | 16485    | .525       | 17.3          | 48.4    | +25.9  | 34          | 171    |       |
|   | 16484     | .167     | 127.2         | 77.2     | -10.0  | 20     | 108         |        |         |           | 16486    | .574       | 57.1          | 28.7    | +14.5  | 68          | 413    |       |
|   | 16482     | .390     | 139.0         | 69.0     | -21.2  | 35     | 187         |        |         |           | 16487    | .708       | 68.0          | 16.4    | +12.3  | 27          | 165    | 89 c  |
|   | 16485     | .722     | 47.4          | 48.9     | +25.7  | 33     | 232         |        |         |           | 16489    | .951       | 71.0          | 348.8   | +16.6  | 3           | 21     | 282 c |
|   | 16486     | .859     | 69.8          | 28.6     | +14.8  | 48     | 318         | 184 c  |         |           |          | .811       | 31.1          |         |        | 75          |        |       |
|   | 16487     | .936     | 75.4          | 17.3     | +12.0  | 18     | 128         | 136 c  |         |           |          | .840       | 41.4          |         |        | 142         |        |       |
|   |           | .818     | 43.1          |          |        |        |             | 57     |         |           |          | .871       | 78.6          |         |        | 133         |        |       |
|   |           | .922     | 47.7          |          |        |        |             | 224    |         |           |          | .953       | 107.5         |         |        | 143         |        |       |
|   |           | .960     | 106.4         |          |        |        |             | 174    |         |           |          | .955       | 59.5          |         |        | 91          |        |       |
|   |           | (-24.6)  | (84.9)(- 4.3) | (528)    | (3148) | (1352) |             |        |         |           |          | (-24.3)    | (58.4)(- 4.1) | (500)   | (2757) | (1764)      |        |       |
| Apr. 29   |           |          |               |          |        |        |             |        | May 1   |           |          |            |               |         |        |             |        |       |
|   |           |          |               |          |        |        |             |        |         | 121.483   |          |            |               |         |        |             |        |       |
|   |           |          |               |          |        |        |             |        |         | G         | .983     | 249.2      |               |         |        | 181         |        |       |
|   |           |          |               |          |        |        |             |        |         |           | .929     | 316.2      |               |         |        | 121         |        |       |
|   |           |          |               |          |        |        |             |        |         |           | .854     | 294.3      |               |         |        | 107         |        |       |
|   |           |          |               |          |        |        |             |        |         |           | 16475    | .944       | 259.5         | 114.0   | -11.2  | 160         | 863    | 560 c |
|   |           |          |               |          |        |        |             |        |         |           | 16483    | .772       | 254.2         | 93.1    | -14.7  | 0           | 5      | 88 c  |
|   |           |          |               |          |        |        |             |        |         |           | 16479    | .700       | 271.2         | 87.4    | - 2.0  | 18          | 108    |       |
|   |           |          |               |          |        |        |             |        |         |           | 16484    | .591       | 258.6         | 79.0    | - 9.9  | 3           | 17     |       |
|   | 16474     | .897     | 252.6         | 134.2    | -17.5  | 85     | 601         | 486 c  |         |           | 16482    | .490       | 231.4         | 67.3    | -21.4  | 27          | 172    |       |
|   | 16475     | .671     | 256.5         | 112.3    | -12.1  | 206    | 1228        |        |         |           | 16488    | .332       | 244.6         | 60.9    | -11.9  | 19          | 53     |       |
|   | 16481     | .454     | 239.0         | 94.6     | -17.3  | 1      | 10          |        |         |           | 16485    | .505       | 350.6         | 48.3    | +25.8  | 17          | 104    |       |
|   | 16479     | .287     | 277.3         | 87.1     | - 1.9  | 23     | 127         |        |         |           | 16486    | .396       | 38.1          | 28.6    | +14.2  | 78          | 504    |       |
|   | 16484     | .172     | 234.4         | 78.7     | - 9.8  | 9      | 87          |        |         |           | 16487    | .531       | 58.7          | 15.5    | +12.4  | 22          | 109    |       |
|   | 16482     | .298     | 172.6         | 68.3     | -21.3  | 31     | 190         |        |         |           | 16489    | .875       | 69.0          | 345.0   | +16.1  | 39          | 253    | 429 c |
|   | 16488     | .244     | 123.0         | 58.6     | -11.7  | 13     | 56          |        |         |           |          | .849       | 58.1          |         |        | 128         |        |       |
|   | 16485     | .605     | 34.4          | 48.3     | +26.0  | 34     | 229         |        |         |           |          | .877       | 109.8         |         |        | 186         |        |       |
|   | 16486     | .725     | 65.0          | 28.0     | +14.7  | 49     | 281         | 106 c  |         |           |          | .930       | 48.4          |         |        | 138         |        |       |
|   | 16487     | .838     | 72.5          | 16.0     | +12.2  | 26     | 149         | 216 c  |         |           |          | .953       | 56.5          |         |        | 147         |        |       |
|   |           | .854     | 39.0          |          |        |        |             | 172    |         |           |          | .958       | 74.8          |         |        | 175         |        |       |
|   |           | .862     | 107.8         |          |        |        |             | 177    |         |           |          | .965       | 111.0         |         |        | 212         |        |       |
|   |           | .888     | 47.4          |          |        |        |             | 318    |         |           |          | (-24.0)    | (43.1)(- 4.0) | (383)   | (2188) | (2472)      |        |       |

Group 16486. Apr. 28-May 9. Return of Group 16484. A collection of spots, which by May 2 has changed to an almost regular spot followed by a composite spot. On May 5 others suddenly appear in between to form a stream in which the leader is the largest component.

Group 16487. Apr. 28-May 9. A regular spot with changes between May 1 and 3. There is a distant companion in the rear until May 2.

Group 16488. Apr. 30-May 6. Small variable spots.

Group 16489. May 1 - 8. A group of variable spots with a brief maximum on May 4 - 5.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |            | POSITION      |       | AREA   |             |        | U.T.  | Group No. | MEASURES |            | POSITION       |       | AREA   |             |        |      |       |
|---------|-----------|----------|------------|---------------|-------|--------|-------------|--------|-------|-----------|----------|------------|----------------|-------|--------|-------------|--------|------|-------|
|         |           | Dist.    | Pos. Angle | Long.         | Lat.  | Umbræ  | Whole Spots | Faculæ |       |           | Dist.    | Pos. Angle | Long.          | Lat.  | Umbræ  | Whole Spots | Faculæ |      |       |
| 1950    |           |          |            | o             | o     |        |             |        | 1950  |           |          |            | o              | o     |        |             |        |      |       |
| 122.338 | G         | .959     | 315.5      |               |       |        | 137         |        |       |           | .843     | 283.4      |                |       |        | 192         |        |      |       |
|         |           | .947     | 288.7      |               |       |        | 157         |        |       |           | .839     | 302.3      |                |       |        | 130         |        |      |       |
|         |           | .924     | 272.2      |               |       |        | 161         |        |       |           | .788     | 313.4      |                |       |        | 196         |        |      |       |
|         |           | .892     | 298.9      |               |       |        | 112         |        |       |           | .900     | 247.9      | 66.0           | -21.4 | 17     | 103         | 204 c  |      |       |
|         |           | .876     | 251.2      |               |       |        | 398         |        |       |           | .882     | 258.0      | 64.4           | -12.4 | 9      | 62          | 156 c  |      |       |
| 16475   |           | .990     | 259.3      | 113.9         | -11.1 | 147    | 704         | 738 c  |       | 16488     | .557     | 300.7      | 32.0           | +13.2 | 149    | 829         |        |      |       |
| 16479   |           | .827     | 270.3      | 87.4          | -1.9  | 16     | 98          | 79 c   |       | 16486     | .368     | 320.4      | 16.5           | +12.8 | 14     | 76          |        |      |       |
| 16484   |           | .715     | 260.5      | 77.3          | -9.5  | 1      | 8           |        |       | 16489     | .465     | 39.4       | 344.6          | +17.5 | 38     | 282         |        |      |       |
| 16490   |           | .644     | 297.3      | 67.8          | +14.0 | 5      | 23          |        |       | 16491     | .771     | 76.3       | 313.6          | + 8.1 | 5      | 36          | 144 f  |      |       |
| 16482   |           | .624     | 239.6      | 67.0          | -21.5 | 29     | 157         |        |       | 16492     | .956     | 80.6       | 290.6          | + 7.9 | 0      | 25          | 228 f  |      |       |
| 16488   |           | .512     | 252.7      | 61.7          | -12.1 | 7      | 29          |        |       |           | .887     | 74.4       |                |       |        | 424         |        |      |       |
| 16485   |           | .560     | 332.7      | 48.3          | +26.0 | 11     | 64          |        |       |           | .890     | 63.8       |                |       |        | 144         |        |      |       |
| 16486   |           | .313     | 8.3        | 29.1          | +14.1 | 81     | 498         |        |       |           | .973     | 69.7       |                |       |        | 375         |        |      |       |
| 16487   |           | .380     | 42.1       | 16.7          | +12.5 | 15     | 90          |        | May 5 |           | (-23.4)  | (2.6)      | (- 3.7)        | (232) | (1413) | (2927)      |        |      |       |
| 16489   |           | .774     | 65.3       | 344.9         | +16.2 | 40     | 211         | 182 c  |       |           |          |            |                |       |        |             |        |      |       |
| 1292c   |           | .959     | 97.7       | 318.2         | - 8.5 | 0      | 12          | 314 c  |       |           |          |            |                |       |        |             |        |      |       |
|         |           | .782     | 113.0      |               |       |        | 118         |        |       |           |          |            |                |       |        |             |        |      |       |
|         |           | .844     | 50.8       |               |       |        | 158         |        |       |           | 125.325  | .976       | 284.9          |       |        | 248         |        |      |       |
|         |           | .914     | 115.3      |               |       |        | 152         |        |       |           | C        | .918       | 282.2          |       |        | 192         |        |      |       |
|         |           | .940     | 106.9      |               |       |        | 115         |        |       |           |          | .876       | 305.8          |       |        | 272         |        |      |       |
|         |           | .968     | 81.5       |               |       |        | 223         |        |       |           |          | 16482      | .956           | 248.7 | 65.1   | -21.4       | 7      | 62   | 236 f |
| May 3   |           |          | (-23.9)    | (31.8)(- 3.9) | (352) | (1894) | (3044)      |        |       |           |          | 16488      | .950           | 258.0 | 64.2   | -12.5       | 3      | 28   | 225 c |
|         |           |          |            |               |       |        |             |        |       |           |          | 16486      | .700           | 292.7 | 33.6   | +12.9       | 114    | 1067 |       |
|         |           |          |            |               |       |        |             |        |       |           |          | 16487      | .490           | 303.9 | 16.8   | +12.5       | 13     | 70   |       |
| 123.321 | C         | .926     | 288.1      |               |       |        | 187         |        |       |           |          | 16489      | .365           | 19.7  | 345.0  | +16.4       | 18     | 190  |       |
|         |           | .924     | 251.7      |               |       |        | 369         |        |       |           |          | 16491      | .627           | 72.9  | 315.3  | + 7.7       | 4      | 24   |       |
|         |           | .905     | 305.7      |               |       |        | 191         |        |       |           |          | 16492      | .890           | 79.5  | 290.5  | + 7.7       | 2      | 20   | 236 f |
|         |           | 16479    | .931       | 269.1         | 87.2  | - 2.2  | 15          | 109    | 223 c |           |          | 16493      | .986           | 83.7  | 272.5  | + 5.6       | 44     | 327  | 151 c |
|         |           | 16484    | .882       | 260.5         | 80.6  | -10.1  | 2           | 14     | 157 f |           |          |            | .792           | 67.9  |        |             | 162    |      |       |
|         |           | 16490    | .774       | 292.1         | 66.4  | +14.4  | 6           | 29     | 158 c |           |          |            | .909           | 73.3  |        |             | 209    |      |       |
|         |           | 16482    | .762       | 244.4         | 66.3  | -21.8  | 18          | 161    | 75 c  |           |          |            | .935           | 64.8  |        |             | 275    |      |       |
|         |           | 16488    | .715       | 256.3         | 64.0  | -12.4  | 8           | 45     | 50 p  | May 6     |          | (-23.3)    | (352.3)(- 3.6) | (205) | (1788) | (2206)      |        |      |       |
|         |           | 16485    | .659       | 318.7         | 47.7  | +26.2  | 3           | 17     |       |           |          |            |                |       |        |             | 136    |      |       |
|         |           | 16486    | .356       | 326.3         | 30.5  | +13.4  | 51          | 463    |       |           |          |            |                |       |        |             | 76     |      |       |
|         |           | 16487    | .287       | 7.9           | 16.5  | +12.6  | 9           | 93     |       | 126.451   |          |            |                |       |        |             | 241    |      |       |
|         |           | 16489    | .634       | 56.9          | 345.2 | +17.0  | 38          | 309    |       | G         |          |            |                |       |        |             | 370    |      |       |
|         |           | 16491    | .926       | 80.1          | 312.1 | + 7.7  | 3           | 14     | 168 c |           |          |            |                |       |        |             | 173    |      |       |
|         |           |          |            |               |       |        |             |        |       |           |          |            |                |       |        |             | 204    |      |       |
| May 4   |           |          |            |               |       |        |             |        |       |           |          | 16494      | .954           | 272.6 | 49.6   | + 1.4       | 11     | 30   | 127 c |
|         |           |          |            |               |       |        |             |        |       |           |          | 16486      | .859           | 287.8 | 34.4   | +13.4       | 191    | 1119 | 528 c |
|         |           |          |            |               |       |        |             |        |       |           |          | 16495      | .791           | 256.0 | 29.2   | -13.2       | 22     | 61   | 93 c  |
|         |           |          |            |               |       |        |             |        |       |           |          | 16487      | .679           | 292.8 | 17.1   | +12.5       | 10     | 34   |       |
| 124.541 | C         | .960     | 261.8      |               |       |        |             | 368    |       |           |          | 16489      | .370           | 338.8 | 345.4  | +16.6       | 33     | 129  |       |
|         |           | .928     | 287.7      |               |       |        |             | 293    |       |           |          | 16491      | .403           | 61.6  | 316.5  | + 7.8       | 8      | 19   |       |
|         |           | .892     | 310.9      |               |       |        |             | 73     |       |           |          | 16492      | .746           | 76.2  | 290.6  | + 7.8       | 2      | 7    | 98 f  |

Group 16490. May 3 - 4. A small spot.

Group 16491. May 4 - 9. A single small spot until May 7; a cluster on the next two days.

Group 16492. May 5 - 9. A small spot.

Group 16493. May 6 - 18. Return of Group 16468. A regular spot, with some variable companions until May 16. The umbra is crossed by a bright "bridge" between May 14 and 17.

Group 16494. May 7 - 8. A small spot.

Group 16495. May 7 - 9. A stream, forming near the west limb.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |                |                |        |        |             |        |        |           |          |                |                |        |        |             |        |       |
|---|-----------|----------|----------------|----------------|--------|--------|-------------|--------|--------|-----------|----------|----------------|----------------|--------|--------|-------------|--------|-------|
| U.T.  | Group No. | MEASURES |                | POSITION       |        | AREA   |             |        | U.T.   | Group No. | MEASURES |                | POSITION       |        | AREA   |             |        |       |
|   |           | Dist.    | Pos. Angle     | Long.          | Lat.   | Umbræ  | Whole Spots | Faculæ |        |           | Dist.    | Pos. Angle     | Long.          | Lat.   | Umbræ  | Whole Spots | Faculæ |       |
| 1950  | 16496     | .848     | 78.0           | 280.7          | + 8.2  | 2      | 13          | 135 c  | May 7  | 16492     | .420     | 63.0           | 290.1          | + 7.9  | 0      | 4           |        |       |
|   | 16493     | .917     | 82.4           | 271.7          | + 5.5  | 135    | 800         | 947 c  |        | 16496     | .498     | 67.2           | 284.7          | + 8.2  | 1      | 10          |        |       |
|   |           | .816     | 66.2           |                |        |        |             | 224    |        | 16493     | .666     | 77.6           | 271.5          | + 5.7  | 126    | 703         | 173 f  |       |
|   |           | .835     | 57.6           |                |        |        |             | 153    |        |           | .833     | 74.5           |                |        |        |             | 347    |       |
|   |           | .924     | 70.6           |                |        |        |             | 147    |        |           | .900     | 54.8           |                |        |        |             | 90     |       |
|   |           | .943     | 178.8          |                |        |        |             | 3      |        |           | .919     | 168.2          |                |        |        |             | 11     |       |
|   |           | (-23.0)  | (337.4)(- 3.5) | (414)          | (2212) | (3655) |             |        |        |           | .941     | 64.3           |                |        |        |             | 199    |       |
|   |           |          |                |                |        |        |             |        |        |           | .970     | 77.0           |                |        |        |             | 184    |       |
|   |           |          |                |                |        |        |             |        |        |           | (-22.6)  | (312.2)(- 3.3) | (268)          | (1424) | (2949) |             |        |       |
| 127.330   | G         | .982     | 298.4          |                |        |        |             | 205    |        | May 9     |          |                |                |        |        |             |        |       |
|   |           | .937     | 305.6          |                |        |        |             | 144    |        |           | .980     | 285.1          |                |        |        |             | 197    |       |
|   |           | .924     | 313.0          |                |        |        |             | 191    |        |           | .960     | 313.6          |                |        |        |             | 141    |       |
|   |           | .868     | 322.6          |                |        |        |             | 125    |        |           | .951     | 276.5          |                |        |        |             | 91     |       |
|   |           | .851     | 293.4          |                |        |        |             | 119    |        |           | .951     | 249.1          |                |        |        |             | 109    |       |
|   |           | .837     | 316.0          |                |        |        |             | 114    |        |           | .926     | 258.5          |                |        |        |             | 89     |       |
|   |           | 16494    | .988           | 271.5          | 46.6   | + 1.0  | 22          | 107    | 288 c  |           | .881     | 305.7          |                |        |        |             | 60     |       |
|   |           | 16486    | .946           | 285.2          | 35.2   | +13.2  | 204         | 905    | 730 c  |           | .830     | 292.9          |                |        |        |             | 223    |       |
|   |           | 16495    | .879           | 256.0          | 27.0   | -13.9  | 56          | 302    | 260 c  |           | 16499    | .806           | 257.7          | 348.6  | -11.7  | 4           | 9      | 67 c  |
|   |           | 16487    | .810           | 288.6          | 17.5   | +12.8  | 2           | 12     | 124 c  |           | 16497    | .719           | 245.7          | 339.1  | -19.4  | 12          | 48     |       |
|   | May 8     | 16489    | .482           | 316.3          | 346.1  | +17.1  | 31          | 146    |        |           | 16500    | .307           | 237.1          | 310.5  | -12.5  | 7           | 22     |       |
|   |           | 16497    | .351           | 215.9          | 338.4  | -19.8  | 12          | 58     |        |           | 16501    | .014           | 249.3          | 296.0  | - 3.4  | 4           | 14     |       |
|   |           | 16491    | .264           | 43.3           | 315.3  | + 7.7  | 12          | 52     |        |           | 16496    | .302           | 48.5           | 282.1  | + 8.5  | 0           | 8      |       |
|   |           | 16498    | .497           | 53.5           | 301.6  | +14.0  | 1           | 10     |        |           | 16493    | .428           | 68.9           | 271.7  | + 6.0  | 99          | 606    |       |
|   |           | 16492    | .604           | 72.2           | 290.5  | + 7.9  | 1           | 13     |        |           | 16502    | .978           | 79.4           | 218.4  | + 9.6  | 26          | 176    | 295 c |
|   |           | 16496    | .702           | 75.2           | 282.8  | + 7.8  | 0           | 5      |        |           |          | .856           | 59.3           |        |        |             | 65     |       |
|   |           | 16493    | .821           | 80.8           | 271.5  | + 5.6  | 146         | 821    | 1022 c |           |          | .907           | 75.5           |        |        |             | 162    |       |
|   |           |          | .771           | 56.2           |        |        |             |        |        |           |          | .964           | 72.1           |        |        |             | 231    |       |
|   |           |          | .810           | 70.0           |        |        |             |        |        |           |          | (-22.3)        | (295.3)(- 3.1) | (152)  | (883)  | (1730)      |        |       |
|   |           |          | (-22.8)        | (325.8)(- 3.4) | (487)  | (2431) | (3799)      |        |        |           |          |                |                |        |        |             |        |       |
| 128.355   | G         | .955     | 305.9          |                |        |        |             | 169    | May 10 | 130.614   | .920     | 304.6          |                |        |        |             | 173    |       |
|   |           | .941     | 312.8          |                |        |        |             | 282    |        | 16499     | .920     | 291.3          |                |        |        |             | 718    |       |
|   |           | .916     | 321.6          |                |        |        |             | 97     |        | 16503     | .962     | 312.9          | 348.3          | +39.6  | 20     | 115         | 179 c  |       |
|   |           | .851     | 289.0          |                |        |        |             | 141    |        | 16497     | .852     | 249.3          | 339.6          | -19.1  | 13     | 52          | 433 c  |       |
|   |           | 16486    | .986           | 285.6          | 31.0   | +14.7  | 24          | 226    | 703 c  | 16500     | .513     | 251.5          | 312.0          | -11.9  | 4      | 29          |        |       |
|   |           | 16495    | .964           | 256.0          | 26.9   | -14.4  | 80          | 289    | 347 c  | 16501     | .251     | 267.2          | 296.8          | - 3.6  | 0      | 4           |        |       |
|   |           | 16487    | .921           | 285.4          | 17.6   | +12.8  | 3           | 9      | 206 c  | 16493     | .251     | 49.5           | 271.3          | + 6.4  | 90     | 662         |        |       |
|   |           | 16499    | .582           | 252.9          | 346.8  | -12.5  | 3           | 15     |        | 16502     | .909     | 77.7           | 218.2          | + 9.8  | 36     | 228         | 537 c  |       |
|   |           | 16489    | .622           | 303.6          | 345.0  | +17.3  | 5           | 29     |        |           | .842     | 71.5           |                |        |        | 503         |        |       |
|   |           | 16497    | .510           | 236.2          | 338.8  | -19.4  | 21          | 108    |        |           | .936     | 70.1           |                |        |        | 479         |        |       |
|   |           | 16491    | .190           | 342.9          | 315.4  | + 7.1  | 4           | 27     |        |           | .952     | 58.1           |                |        |        | 129         |        |       |
|   |           | 16498    | .357           | 33.0           | 300.7  | +14.1  | 1           | 4      |        |           | (-22.1)  | (282.3)(- 3.0) | (163)          | (1096) | (3248) |             |        |       |

Group 16496. May 7 - 10. A tiny faint spot.

Group 16497. May 8 - 12. A few small changing spots, with a brief maximum on May 9.

Group 16498. May 8 - 9. A tiny spot.

Group 16499. May 9 - 11. A small spot.

Group 16500. May 10 - 11. One or two small spots.

Group 16501. May 10 - 11. A tiny spot.

Group 16502. May 10 - 22. A stable regular spot, with one or two companions between May 11 and 15.

Group 16503. May 11 - 12. One or two high-latitude spots, appearing near the west limb.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |            |                |             |       |             |        |           |           |          |            |                |                |               |               |        |       |
|---|-----------|----------|------------|----------------|-------------|-------|-------------|--------|-----------|-----------|----------|------------|----------------|----------------|---------------|---------------|--------|-------|
| U.T.  | Group No. | MEASURES |            | POSITION       |             | AREA  |             |        | U.T.      | Group No. | MEASURES |            | POSITION       |                | AREA          |               |        |       |
|   |           | Dist.    | Pos. Angle | Long.          | Lat.        | Umbræ | Whole Spots | Faculæ |           |           | Dist.    | Pos. Angle | Long.          | Lat.           | Umbræ         | Whole Spots   | Faculæ |       |
| 1950  |           |          |            | o              | o           |       |             |        | 1950      |           |          |            | o              | o              |               |               |        |       |
| 131.624 G   |           | .979     | 257.7      |                |             |       | 120         |        | 134.334 C | May 15    | .982     | 258.5      |                |                |               | 171           |        |       |
|   |           | .973     | 288.5      |                |             |       | 379         |        |           |           | .936     | 278.8      |                |                |               | 186           |        |       |
|   |           | .940     | 302.8      |                |             |       | 132         |        |           |           | .927     | 288.3      |                |                |               | 263           |        |       |
|   |           | .855     | 245.8      |                |             |       | 171         |        |           |           | .866     | 298.3      |                |                |               | 241           |        |       |
|   |           | .771     | 283.2      |                |             |       | 133         |        |           |           | .827     | 282.7      |                |                |               | 175           |        |       |
|   |           | 16503    | .997       | 311.0          | 350.3 +40.5 | 0     | 55          | 194 f  |           |           | 16493    | .641       | 282.5          | 271.9 + 5.9    | 68            | 345           |        |       |
|   |           | 16497    | .949       | 250.8          | 340.2 -19.1 | 8     | 36          | 262 f  |           |           | 16505    | .345       | 26.6           | 224.4 +14.4    | 2             | 15            |        |       |
|   |           | 16504    | .545       | 297.9          | 298.4 +12.2 | 0     | 13          |        |           |           | 16502    | .310       | 49.1           | 219.4 + 9.1    | 34            | 169           |        |       |
|   |           | 16493    | .176       | 349.3          | 270.9 + 7.0 | 92    | 535         |        |           |           |          | (-21.1)    | (233.1)(- 2.6) | (104)          | (529) (1036)  |               |        |       |
|   |           | 16502    | .786       | 75.0           | 218.8 + 9.9 | 35    | 211         | 242 f  |           |           |          |            |                |                |               |               |        |       |
|   |           |          | .837       | 65.8           |             |       | 436         |        |           |           |          | .927       | 281.5          |                |               | 248           |        |       |
|   |           |          | .897       | 79.1           |             |       | 383         |        |           |           |          | .917       | 293.8          |                |               | 233           |        |       |
| May 12  |           |          | .908       | 54.6           |             |       | 166         |        |           |           |          |            |                |                |               |               |        |       |
|   |           |          | .944       | 64.3           |             |       | 164         |        |           |           |          |            |                |                |               |               |        |       |
| 132.322 G   |           |          | (-21.8)    | (269.0)(- 2.9) | (135)       | (850) | (2782)      |        |           |           |          |            |                |                |               |               |        |       |
|   |           | .979     | 250.2      |                |             |       | 300         |        |           |           | 16506    | .859       | 267.8          | 277.0 - 3.2    | 6             | 32            | 121 c  |       |
|   |           | .894     | 245.4      |                |             |       | 178         |        |           |           | 16493    | .815       | 279.0          | 271.7 + 5.9    | 57            | 324           | 172 c  |       |
|   |           | .855     | 280.8      |                |             |       | 328         |        |           |           | 16502    | .205       | 352.0          | 219.5 + 9.1    | 36            | 173           |        |       |
|   |           | .810     | 257.4      |                |             |       | 271         |        |           |           | 16507    | .967       | 107.1          | 142.8 -17.2    | 8             | 68            | 175 c  |       |
|   |           | .794     | 295.5      |                |             |       | 243         |        |           |           | 16508    | .993       | 104.0          | 134.5 -14.2    | 0             | 16            | 117 c  |       |
|   |           | 16504    | .673       | 288.6          | 300.0 +10.3 | 5     | 24          |        |           |           |          | (-20.8)    | (217.9)(- 2.5) | (107)          | (613) (1066)  |               |        |       |
|   |           | 16493    | .253       | 314.0          | 270.3 + 7.4 | 102   | 538         |        |           |           | 136.323  | .970       | 292.5          |                |               | 156           |        |       |
|   |           | 16502    | .678       | 72.4           | 219.0 + 9.7 | 59    | 226         |        |           |           |          | .807       | 287.4          |                |               | 186           |        |       |
|   |           |          | .764       | 62.2           |             |       | 351         |        |           |           | 16506    | .930       | 267.3          | 275.1 - 3.4    | 9             | 62            | 187 n  |       |
|   |           |          | .820       | 78.5           |             |       | 258         |        |           |           | 16493    | .915       | 277.1          | 272.4 + 5.5    | 52            | 342           | 418 n  |       |
|   |           |          | .825       | 48.8           |             |       | 180         |        |           |           | 16502    | .294       | 312.3          | 219.5 + 9.0    | 39            | 174           |        |       |
|   |           |          | .903       | 59.4           |             |       | 289         |        |           |           | 16507    | .906       | 107.9          | 142.5 -17.2    | 44            | 180           | 243 c  |       |
| May 13  |           |          | (-21.6)    | (259.8)(- 2.8) | (166)       | (788) | (2398)      |        |           |           | 16508    | .958       | 105.1          | 133.7 -15.1    | 46            | 248           | 159 c  |       |
|   |           |          |            |                |             |       |             |        |           |           |          | (-20.5)    | (206.8)(- 2.4) | (190)          | (1006) (1349) |               |        |       |
| 133.514 G   |           |          |            |                |             |       | 182         |        | 137.321 C | May 17    |          |            |                |                |               |               |        |       |
|   |           | .961     | 280.5      |                |             |       | 230         |        |           |           |          | .926       | 287.3          |                |               | 144           |        |       |
|   |           | .939     | 258.1      |                |             |       | 189         |        |           |           |          | .848       | 300.0          |                |               | 62            |        |       |
|   |           | .880     | 280.0      |                |             |       | 418         |        |           |           |          | 16506      | .989           | 267.0          | 275.0 - 3.3   | 0             | 7      | 207 c |
|   |           | .873     | 290.7      |                |             |       | 90          |        |           |           |          | 16493      | .983           | 276.2          | 272.6 + 5.7   | 40            | 277    | 696 f |
|   |           | .774     | 304.4      |                |             |       | 71          |        |           |           |          | 16509      | .598           | 259.2          | 229.9 - 8.3   | 8             | 52     |       |
|   |           | .769     | 285.2      |                |             |       |             |        |           |           |          | 16502      | .475           | 294.4          | 219.5 + 9.2   | 36            | 180    |       |
|   |           | 16493    | .484       | 288.9          | 271.3 + 6.6 | 71    | 367         |        |           |           |          | 16507      | .782           | 109.8          | 143.6 -16.8   | 20            | 105    | 129 c |
|   |           | 16505    | .448       | 57.0           | 221.5 +11.6 | 4     | 17          |        |           |           |          | 16508      | .857           | 106.4          | 135.4 -15.2   | 47            | 381    | 556 c |
|   |           | 16502    | .458       | 64.0           | 219.5 + 9.1 | 38    | 194         |        |           |           |          | 16510      | .972           | 100.4          | 117.2 -10.7   | 56            | 477    | 408 c |
|   |           |          | .903       | 86.2           |             |       | 197         |        |           |           |          |            | (-20.2)        | (193.6)(- 2.3) | (207)         | (1479) (2202) |        |       |
|   |           |          | .960       | 106.3          |             |       | 81          |        |           |           |          |            |                |                |               |               |        |       |
|   |           |          | (-21.3)    | (244.0)(- 2.7) | (113)       | (578) | (1458)      |        |           |           |          |            |                |                |               |               |        |       |

Group 16504. May 11 - 12. A small spot.

Group 16505. May 14 - 15. Small faint spots.

Group 16506. May 18 - 18. A pair of spots.

Group 16507. May 18 - 26. A stream of small spots, of which the leader is the most stable component and alone remains by May 23.

Group 16508. May 18 - 26. Return of Group 16474. A composite spot, followed by a few tiny companions. The group slowly disintegrates after May 18, leaving a single small spot on May 25.

Group 16509. May 18 - 21. A pair of small spots.

Group 16510. May 18 - 30. Return of Group 16475. A composite spot, which by May 22 has divided into two, to form a regular spot and companion. The former alone remains by May 28.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |                 | POSITION |        | AREA   |             |        | U.T.    | Group No. | MEASURES |                | POSITION |        | AREA   |             |        |
|---------|-----------|----------|-----------------|----------|--------|--------|-------------|--------|---------|-----------|----------|----------------|----------|--------|--------|-------------|--------|
|         |           | Dist.    | Pos. Angle      | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |
| 1950    |           |          |                 | o        | o      |        |             |        | 1950    |           |          |                | o        | o      |        |             |        |
| 138.455 | G         | .986     | 280.9           |          |        |        | 301         |        |         | 16509     | .807     | 283.1          |          |        |        |             | 163    |
|         |           | .940     | 294.3           |          |        |        | 165         |        |         | 16502     | .982     | 262.8          | 232.8    | - 7.4  | 0      | 60          | 247 c  |
|         |           | .782     | 292.5           |          |        |        | 301         |        |         | 16512     | .924     | 280.7          | 220.4    | + 9.1  | 23     | 156         | 203 c  |
|         |           | .901     | 286.5           | 241.2    | +13.8  | 13     | 59          | 108 c  |         | 1293a     | .220     | 194.3          | 157.0    | -14.1  | 14     | 95          |        |
|         |           | .791     | 261.7           | 230.6    | - 7.8  | 27     | 164         | 66 c   |         | 16507     | .392     | 352.7          | 156.8    | +20.9  | 1      | 6           |        |
|         |           | .677     | 286.1           | 219.6    | + 9.2  | 33     | 150         |        |         | 16508     | .284     | 154.0          | 146.4    | -16.6  | 14     | 52          |        |
|         |           | .403     | 121.7           | 158.0    | -14.1  | 22     | 128         |        |         | 16514     | .364     | 128.7          | 136.8    | -14.9  | 24     | 167         |        |
|         |           | .612     | 115.5           | 143.5    | -16.9  | 30     | 116         |        |         | 16510     | .441     | 43.1           | 135.5    | +16.9  | 0      | 4           |        |
|         |           | .693     | 109.3           | 136.2    | -14.7  | 52     | 290         | 80 f   |         |           | .620     | 104.4          | 116.3    | -10.4  | 59     | 389         |        |
|         |           | .886     | 100.7           | 116.6    | -10.4  | 71     | 480         | 541 f  |         |           | .935     | 80.1           | 85.4     | + 8.5  | 153    | 1115        | 493 c  |
|         |           | .858     | 111.5           |          |        |        | 188         |        |         |           | .765     | 106.9          |          |        |        | 74          |        |
|         |           | .958     | 110.7           |          |        |        | 98          |        |         |           | .839     | 105.9          |          |        |        | 166         |        |
| May 19  |           | (-19.9)  | (-178.6)(- 2.1) | (248)    | (1387) | (1848) |             |        |         |           | .890     | 92.0           |          |        |        | 136         |        |
|         |           |          |                 |          |        |        |             |        |         |           | .936     | 112.3          |          |        |        | 217         |        |
|         |           |          |                 |          |        |        |             |        |         |           | .954     | 101.4          |          |        |        | 131         |        |
|         |           |          |                 |          |        |        |             |        |         |           | .969     | 166.6          |          |        |        | 14          |        |
| 139.325 | C         | .978     | 293.8           |          |        |        | 181         |        |         | May 21    | (-19.3)  | (153.8)(- 1.9) | (288)    | (2044) | (2734) |             |        |
|         |           | .840     | 291.8           |          |        |        | 326         |        |         |           |          |                |          |        |        | 509         |        |
|         |           | .835     | 303.4           |          |        |        | 130         |        |         |           |          |                |          |        |        | 159         |        |
|         |           | .968     | 284.0           | 241.5    | +13.0  | 24     | 173         | 234 c  | 141.325 |           | .958     | 287.2          |          |        |        | 296         |        |
|         |           | .903     | 262.5           | 231.4    | - 7.7  | 7      | 46          | 124 c  | G       |           | .947     | 294.7          |          |        |        | 188         |        |
|         |           | .806     | 282.7           | 219.6    | + 9.0  | 26     | 144         | 181 c  |         |           | .908     | 281.2          |          |        |        | 187         |        |
|         |           | .265     | 146.2           | 158.4    | -14.7  | 24     | 113         |        |         |           | .892     | 309.4          |          |        |        |             |        |
|         |           | .437     | 125.8           | 145.5    | -16.6  | 11     | 53          |        |         |           | .875     | 297.8          |          |        |        |             |        |
|         |           | .532     | 115.4           | 137.4    | -14.9  | 45     | 239         |        |         | 16502     | .985     | 279.6          | 220.1    | + 9.1  | 20     | 147         | 126 c  |
|         |           | .779     | 102.0           | 116.5    | -10.5  | 82     | 424         | 292 f  |         | 1293b     | .967     | 262.0          | 215.9    | - 8.2  | 0      | 4           | 93 c   |
|         |           | .979     | 81.8            | 89.5     | + 7.6  | 43     | 286         | 244 c  |         |           | .357     | 231.8          | 157.5    | -14.4  | 9      | 49          |        |
|         |           | .891     | 86.8            |          |        |        | 84          |        |         | 16507     | .281     | 201.8          | 146.9    | -16.9  | 9      | 48          |        |
|         |           | .947     | 104.0           |          |        |        | 239         |        |         | 16515     | .379     | 350.8          | 144.4    | +20.1  | 1      | 5           |        |
| May 20  |           | .961     | 92.8            |          |        |        | 97          |        |         |           |          |                |          |        |        |             |        |
|         |           | (-19.6)  | (-167.1)(- 2.0) | (262)    | (1478) | (2132) |             |        |         | 16508     | .217     | 175.0          | 139.6    | -14.2  | 21     | 134         |        |
|         |           |          |                 |          |        |        |             |        |         | 16514     | .334     | 17.6           | 134.7    | +16.7  | 0      | 4           |        |
|         |           |          |                 |          |        |        |             |        |         | 16510     | .436     | 110.4          | 116.3    | -10.3  | 56     | 391         |        |
|         |           |          |                 |          |        |        |             |        |         | 16516     | .542     | 56.2           | 112.9    | +15.9  | 1      | 9           |        |
|         |           |          |                 |          |        |        |             |        |         | 16513     | .829     | 78.6           | 85.7     | + 8.3  | 120    | 1089        | 252 c  |
|         |           |          |                 |          |        |        |             |        |         |           | .849     | 73.7           |          |        |        | 97          |        |
| 140.330 | G         | .986     | 186.6           |          |        |        | 15          |        |         |           | .957     | 109.0          |          |        |        | 233         |        |
|         |           | .940     | 188.2           |          |        |        | 10          |        |         |           | .966     | 100.2          |          |        |        | 281         |        |
|         |           | .914     | 288.5           |          |        |        | 543         |        |         |           | .971     | 83.0           |          |        |        | 256         |        |
|         |           | .907     | 302.5           |          |        |        | 189         |        |         |           | (-19.0)  | (140.7)(- 1.8) | (237)    | (1880) | (2677) |             |        |
|         |           | .848     | 314.3           |          |        |        | 133         |        |         | May 22    |          |                |          |        |        |             |        |

Group 16511. May 19 - 20. A pair of small spots, growing as they pass round the west limb.

Group 16512. May 19 - 24. A stream of changing spots, appearing suddenly on May 19. One small spot remains by May 25.

Group 16513. May 20-June 1. At first a stream of normal type, of which both leader and follower are regular spots and the intermediate component composite. This middle component appears to move forward and to have amalgamated with the leader by May 27. From this date the following portion dies out, leaving the leader alone at the west limb.

Group 16514. May 21 - 29. A bi-polar group, growing rapidly from a tiny spot near the C.M. The follower, a stable regular spot, is the most stable component.

Group 16515. May 22 - 28. Intermittent. A small spot.

Group 16516. May 22 - 24. A small spot.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.                 | Group No. | MEASURES |            | POSITION |                | AREA  |             |        | U.T.           | Group No. | MEASURES |                | POSITION      |        | AREA   |             |        |       |
|----------------------|-----------|----------|------------|----------|----------------|-------|-------------|--------|----------------|-----------|----------|----------------|---------------|--------|--------|-------------|--------|-------|
|                      |           | Dist.    | Pos. Angle | Long.    | Lat.           | Umbræ | Whole Spots | Faculæ |                |           | Dist.    | Pos. Angle     | Long.         | Lat.   | Umbræ  | Whole Spots | Faculæ |       |
| 1950<br>142.346<br>C |           | .981     | 279.7      |          | o o            |       | 197         |        | 1950<br>May 25 | 1293c     | .926     | 107.0          | 33.7          | -16.2  | 0      | 5           | 230 c  |       |
|                      |           | .956     | 294.8      |          |                |       | 150         |        |                |           | (-18.0)  | (100.7)(- 1.4) | (410)         | (2407) | (1582) |             |        |       |
|                      | 16512     | .586     | 246.3      | 160.8    | -15.0          | 2     | 8           |        |                | 145.329   |          | .936           | 254.5         |        |        |             |        |       |
|                      | 16507     | .426     | 230.5      | 147.3    | -17.3          | 9     | 40          |        |                | C         | 16507    | .875           | 250.5         | 147.4  | -17.6  | 2           | 13     | 123 c |
|                      | 16508     | .294     | 219.9      | 138.4    | -14.6          | 14    | 97          |        |                |           | 16508    | .800           | 253.9         | 139.8  | -13.6  | 3           | 15     | 130 c |
|                      | 16514     | .335     | 344.3      | 132.6    | +17.0          | 30    | 119         |        |                |           | 16514    | .748           | 295.5         | 132.7  | +17.8  | 143         | 980    | 183 c |
|                      | 16510     | .241     | 129.8      | 116.4    | -10.5          | 64    | 344         |        |                |           | 16519    | .766           | 302.3         | 132.3  | +23.1  | 12          | 66     | 100 c |
|                      | 16516     | .381     | 35.7       | 113.9    | +16.3          | 7     | 30          |        |                |           | 16510    | .499           | 251.3         | 116.3  | -10.3  | 44          | 208    |       |
|                      | 16513     | .675     | 75.7       | 86.0     | + 8.3          | 204   | 1160        | 175 c  |                |           | 16513    | .170           | 2.7           | 87.2   | + 8.5  | 127         | 824    |       |
|                      | 16517     | .993     | 77.5       | 44.8     | +12.2          | 8     | 81          | 235 p  |                |           | 16517    | .693           | 71.3          | 45.8   | +11.8  | 11          | 44     | 108 f |
|                      |           | .861     | 99.1       |          |                |       | 141         |        |                |           | 16518    | .839           | 50.9          | 38.4   | +31.1  | 31          | 177    | 118 c |
|                      |           | .864     | 70.9       |          |                |       | 110         |        |                |           |          | .803           | 108.6         |        |        |             |        | 70    |
|                      |           | .898     | 80.8       |          |                |       | 113         |        |                |           |          | .901           | 69.3          |        |        |             |        | 89    |
|                      |           | .937     | 106.9      |          |                |       | 141         |        |                |           |          | .909           | 108.5         |        |        |             |        | 74    |
|                      |           | .939     | 115.0      |          |                |       | 192         |        |                |           |          | .939           | 76.7          |        |        |             |        | 89    |
|                      |           | .965     | 85.5       |          |                |       | 209         |        |                |           |          |                |               |        |        |             |        |       |
| May 23               |           |          |            | (-18.7)  | (127.2)(- 1.7) | (338) | (1879)      | (1766) | May 26         |           |          | (-17.7)        | (87.7)(- 1.3) | (373)  | (2327) | (1277)      |        |       |
| 143.329<br>C         |           | .872     | 234.6      |          |                |       | 168         |        | 146.393<br>G   |           | .936     | 254.5          |               |        |        |             |        | 273   |
|                      | 16512     | .741     | 251.0      | 160.5    | -15.0          | 1     | 7           |        |                | 16515     | .825     | 242.1          |               |        |        |             |        | 181   |
|                      | 16507     | .595     | 242.4      | 147.6    | -17.3          | 8     | 26          |        |                | 1293d     | .959     | 291.9          | 145.2         | +20.5  | 0      | 9           | 91 c   |       |
|                      | 16515     | .604     | 307.1      | 144.9    | +19.9          | 0     | 14          |        |                | 16514     | .867     | 250.1          | 132.3         | -17.8  | 5      | 14          | 174 c  |       |
|                      | 16508     | .488     | 243.0      | 140.7    | -14.2          | 13    | 54          |        |                | 16519     | .870     | 291.1          | 131.8         | +17.6  | 139    | 854         | 354 c  |       |
|                      | 16514     | .441     | 317.1      | 132.4    | +17.3          | 124   | 796         |        |                | 16510     | .882     | 297.4          | 131.8         | +23.3  | 32     | 160         | 144 c  |       |
|                      | 16510     | .163     | 193.3      | 116.4    | -10.7          | 54    | 391         |        |                | 16513     | .692     | 256.1          | 116.5         | -10.4  | 43     | 209         |        |       |
|                      | 16516     | .305     | 359.4      | 114.4    | +16.1          | 0     | 5           |        |                | 16517     | .305     | 303.6          | 88.4          | + 8.5  | 154    | 835         |        |       |
|                      | 16513     | .503     | 69.8       | 85.8     | + 8.6          | 150   | 1046        |        |                | 16518     | .509     | 63.5           | 46.0          | +12.0  | 9      | 32          |        |       |
|                      | 16517     | .934     | 76.8       | 46.2     | +11.7          | 10    | 73          | 690 f  |                |           | .733     | 43.8           | 37.5          | +30.9  | 33     | 136         | 71 c   |       |
|                      | 16518     | .977     | 57.4       | 40.0     | +31.3          | 0     | 16          | 352 c  |                |           | .792     | 64.5           |               |        |        |             | 103    |       |
|                      |           | .803     | 102.5      |          |                |       | 258         |        |                |           | .841     | 75.7           |               |        |        |             | 95     |       |
|                      |           | .831     | 80.4       |          |                |       | 168         |        |                |           | .950     | 49.5           |               |        |        |             | 163    |       |
|                      |           | .853     | 116.8      |          |                |       | 337         |        |                |           | .967     | 83.5           |               |        |        |             | 133    |       |
| May 24               |           |          |            | (-18.4)  | (114.2)(- 1.6) | (360) | (2428)      | (2420) | May 27         |           |          | (-17.3)        | (73.6)(- 1.2) | (415)  | (2249) | (1782)      |        |       |
| 144.345<br>C         |           | .942     | 239.2      |          |                |       | 131         |        | 147.405<br>G   |           | .965     | 253.2          |               |        |        |             |        | 474   |
|                      |           | .900     | 314.8      |          |                |       | 152         |        |                |           | .913     | 311.3          |               |        |        |             | 166    |       |
|                      |           | .848     | 253.8      |          |                |       | 209         |        |                |           | .911     | 248.0          |               |        |        |             | 247    |       |
|                      | 16507     | .756     | 247.8      | 147.7    | -17.5          | 5     | 18          | 84 c   |                | 16515     | .997     | 289.4          | 144.7         | +19.2  | 0      | 43          | 88 f   |       |
|                      | 16508     | .659     | 250.0      | 140.2    | -14.1          | 7     | 53          |        |                | 16514     | .955     | 288.8          | 131.4         | +17.5  | 145    | 687         | 526 c  |       |
|                      | 16514     | .600     | 302.6      | 132.6    | +17.6          | 156   | 891         |        |                | 16519     | .957     | 295.0          | 131.0         | +23.5  | 43     | 220         | 380 c  |       |
|                      | 16519     | .635     | 313.4      | 131.1    | +24.6          | 6     | 31          |        |                | 16510     | .484     | 257.8          | 117.1         | -10.8  | 28     | 164         | 155 c  |       |
|                      | 16510     | .310     | 239.3      | 116.4    | -10.4          | 48    | 259         |        |                | 16513     | .497     | 288.4          | 88.5          | + 8.0  | 159    | 875         |        |       |
|                      | 16513     | .294     | 53.6       | 86.9     | + 8.7          | 136   | 879         |        |                | 16517     | .333     | 46.1           | 46.0          | +12.2  | 7      | 26          |        |       |
|                      | 16517     | .833     | 74.8       | 45.7     | +11.8          | 10    | 58          | 426 f  |                |           | 16518    | .637           | 33.8          | 35.9   | +30.8  | 22          | 99     |       |
|                      |           |          |            |          |                |       |             |        |                |           | 16520    | .844           | 81.6          | 3.2    | + 6.5  | 0           | 8      | 222 f |
|                      |           |          |            |          |                |       |             |        |                |           | .931     | 46.4           |               |        |        |             | 402    |       |
|                      |           |          |            |          |                |       |             |        |                |           | .944     | 69.4           |               |        |        |             | 412    |       |
|                      | 16518     | .919     | 55.0       | 39.4     | +31.1          | 42    | 213         | 350 c  | May 28         |           |          | (-17.0)        | (60.2)(- 1.1) | (404)  | (2122) | (3072)      |        |       |

Group 16517. May 23 - 30. A small spot, with a tiny companion on May 28 and 29.

Group 16518. May 24-June 2. A regular spot, with a small preceding companion on May 26 and 27.

Group 16519. May 25 - 28. Two or three small spots which are growing as they pass out of sight.

Group 16520. May 28-June 7. A stream, developing from a tiny spot on May 28. The leader becomes the largest and most stable component.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U. T.   | Group No. | MEASURES |               | POSITION |        | AREA   |             |        | U. T.   | Group No. | MEASURES |            | POSITION       |                | AREA  |             |        |        |
|---------|-----------|----------|---------------|----------|--------|--------|-------------|--------|---------|-----------|----------|------------|----------------|----------------|-------|-------------|--------|--------|
|         |           | Dist.    | Pos. Angle    | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle | Long.          | Lat.           | Umbræ | Whole Spots | Faculæ |        |
| 1950    |           |          |               | o        | o      |        |             |        | 1950    |           |          |            | o              | o              |       |             |        |        |
| 148.420 | C         | .974     | 248.6         |          |        |        | 122         |        | 151.335 | C         | .830     | 250.6      |                |                |       | 128         |        |        |
|         |           | .905     | 265.8         |          |        |        | 78          |        |         |           | .767     | 235.8      |                |                |       | 101         |        |        |
|         |           | .886     | 249.0         |          |        |        | 142         |        |         |           | 16513    | .994       | 279.0          | 91.6 + 8.9     | 18    | 127         | 806 f  |        |
|         |           | .828     | 275.2         |          |        |        | 89          |        |         |           | 16518    | .640       | 324.8          | 33.6 +30.9     | 3     | 14          |        |        |
|         | 16514     | .989     | 289.6         | 127.1    | +19.1  | 36     | 233         | 90 c   |         | 16523     | .376     | 323.4      | 21.7 +16.9     | 2              | 17    |             |        |        |
|         | 16510     | .944     | 258.6         | 117.1    | -11.1  | 24     | 142         | 255 c  |         | 16524     | .275     | 357.4      | 8.9 +15.3      | 9              | 56    |             |        |        |
|         | 16513     | .710     | 281.5         | 91.2     | + 7.4  | 137    | 746         | 166 p  |         | 16520     | .118     | 34.4       | 4.4 + 5.0      | 40             | 295   |             |        |        |
|         | 16521     | .187     | 199.6         | 50.4     | -11.1  | 13     | 42          |        |         | 16522     | .419     | 41.0       | 351.5 +17.8    | 2              | 17    |             |        |        |
|         | 16517     | .238     | 2.2           | 46.3     | +12.7  | 4      | 12          |        |         | 16525     | .911     | 79.6       | 303.2 + 9.2    | 0              | 11    | 129 c       |        |        |
|         | 16518     | .551     | 18.6          | 35.1     | +30.3  | 16     | 117         |        |         |           | .909     | 69.7       |                |                |       | 409         |        |        |
|         | 16520     | .692     | 81.3          | 3.6      | + 5.2  | 3      | 25          | 178 f  | June 1  |           | (-15.6)  |            | (8.2)(- 0.6)   |                | (74)  | (537)       | (1573) |        |
|         |           | .794     | 38.0          |          |        |        | 127         |        |         |           |          |            |                |                |       |             |        |        |
|         |           | .872     | 45.8          |          |        |        | 101         |        |         |           |          |            |                |                |       |             |        |        |
|         |           | .880     | 66.7          |          |        |        | 369         |        | 152.607 | G         | .936     | 257.1      |                |                |       | 321         |        |        |
|         |           | .942     | 115.8         |          |        |        | 196         |        |         |           | .930     | 276.7      |                |                |       | 371         |        |        |
|         |           | .944     | 36.2          |          |        |        | 249         |        |         |           | .912     | 244.6      |                |                |       | 388         |        |        |
| May 29  |           | (-16.6)  | (46.8)(- 1.0) | (233)    | (1317) | (2162) |             |        |         |           | .793     | 293.2      |                |                |       | 160         |        |        |
|         |           |          |               |          |        |        |             |        |         | 16526     | .863     | 281.9      | 50.2 +10.0     | 7              | 43    | 202 nf      |        |        |
|         |           |          |               |          |        |        |             |        |         | 16518     | .773     | 312.5      | 32.9 +31.0     | 0              | 7     | 115 c       |        |        |
|         | 149.340   | C        | .965          | 286.1    |        |        | 209         |        |         |           | 16523    | .576       | 300.7          | 22.4 +16.6     | 7     | 49          |        |        |
|         | 16510     | .994     | 259.2         | 118.1    | -10.8  | 18     | 145         | 418 f  |         | 16524     | .410     | 310.3      | 10.2 +14.8     | 5              | 27    |             |        |        |
|         | 16513     | .840     | 279.6         | 91.1     | + 7.6  | 167    | 837         | 377 c  |         | 16520     | .241     | 293.8      | 4.1 + 5.1      | 43             | 483   |             |        |        |
|         | 16521     | .334     | 237.5         | 51.2     | -11.1  | 10     | 40          |        |         | 16525     | .755     | 77.1       | 303.4 + 9.3    | 7              | 38    | 118 c       |        |        |
|         | 16517     | .292     | 323.5         | 44.8     | +12.8  | 2      | 12          |        |         | 16527     | .975     | 84.1       | 274.6 + 5.6    | 15             | 126   | 410 c       |        |        |
|         | 16518     | .524     | 0.7           | 34.2     | +30.7  | 13     | 88          |        |         |           | .804     | 66.1       |                |                |       | 250         |        |        |
|         | 16520     | .553     | 79.0          | 1.7      | + 5.3  | 8      | 57          |        |         |           | .921     | 75.3       |                |                |       | 189         |        |        |
|         |           | .955     | 79.3          |          |        |        | 129         |        |         |           |          | .933       | 93.4           |                |       |             | 345    |        |
| May 30  |           | (-16.3)  | (34.6)(- 0.8) | (218)    | (1179) | (1133) |             |        | June 2  |           |          | .949       | 64.4           |                |       |             | 270    |        |
|         |           |          |               |          |        |        |             |        |         |           | (-15.1)  |            | (351.4)(- 0.5) |                | (84)  | (773)       | (3139) |        |
|         |           |          |               |          |        |        |             |        |         |           |          |            |                |                |       |             |        |        |
| 150.333 | G         | .955     | 265.0         |          |        |        | 171         |        | 153.321 | G         | .956     | 249.5      |                |                |       | 134         |        |        |
|         |           | .917     | 256.9         |          |        |        | 128         |        |         |           | .906     | 239.2      |                |                |       | 174         |        |        |
|         |           | .897     | 245.3         |          |        |        | 128         |        |         |           | .863     | 289.8      |                |                |       | 325         |        |        |
|         |           | .880     | 321.6         |          |        |        | 107         |        |         |           | .848     | 306.9      |                |                |       | 269         |        |        |
|         | 16513     | .946     | 278.1         | 91.9     | + 7.2  | 126    | 755         | 658 n  |         |           | .832     | 316.1      |                |                |       | 83          |        |        |
|         | 16521     | .506     | 249.9         | 50.3     | -10.6  | 3      | 9           |        |         | 16526     | .933     | 280.7      | 50.2 + 9.8     | 25             | 119   | 349 c       |        |        |
|         | 16518     | .547     | 340.7         | 33.5     | +30.3  | 8      | 43          |        |         | 16523     | .691     | 294.6      | 22.6 +16.4     | 5              | 26    |             |        |        |
|         | 16520     | .336     | 72.0          | 2.9      | + 5.3  | 47     | 218         |        |         | 16524     | .547     | 297.9      | 11.7 +14.4     | 5              | 14    |             |        |        |
|         | 16522     | .584     | 56.7          | 350.7    | +18.0  | 2      | 15          |        |         | 16520     | .394     | 284.4      | 4.3 + 5.3      | 80             | 474   |             |        |        |
|         |           | .869     | 50.2          |          |        |        | 103         |        |         | 16525     | .643     | 74.8       | 303.1 + 9.4    | 10             | 45    |             |        |        |
|         |           | .872     | 75.3          |          |        |        | 174         |        |         | 16527     | .925     | 84.0       | 274.6 + 5.4    | 18             | 78    | 335 c       |        |        |
|         |           | .880     | 117.4         |          |        |        | 83          |        |         |           | .868     | 94.3       |                |                |       | 378         |        |        |
|         |           | .894     | 101.4         |          |        |        | 127         |        |         |           | .880     | 63.4       |                |                |       | 100         |        |        |
|         |           | .960     | 77.3          |          |        |        | 162         |        |         |           | .963     | 71.2       |                |                |       | 62          |        |        |
|         |           | .961     | 68.7          |          |        |        | 163         |        |         |           | .965     | 79.9       |                |                |       | 267         |        |        |
| May 31  |           | (-15.9)  | (21.5)(- 0.7) | (186)    | (1040) | (2004) |             |        | June 3  |           |          | (-14.8)    |                | (341.9)(- 0.4) |       | (143)       | (756)  | (2476) |
|         |           |          |               |          |        |        |             |        |         |           |          |            |                |                |       |             |        |        |

Group 16521. May 29 - 31. A pair of small spots on May 29 and 30; a single spot on the next day.

Group 16522. May 31-June 1. A pair of tiny spots.

Group 16523. June 1 - 3. One or two small spots.

Group 16524. June 1 - 4. A pair of small spots, of which only one remains by June 3.

Group 16525. June 1 - 11. Two or three small changing spots, not seen from June 6 to 9.

Group 16526. June 2 - 4. A small spot.

Group 16527. June 2 - 11. Return of Group 16493: third appearance. A few small variable spots.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |                |          |        |        |             |        |         |           |                |            |          |      |                   |             |        |
|---|-----------|----------|----------------|----------|--------|--------|-------------|--------|---------|-----------|----------------|------------|----------|------|-------------------|-------------|--------|
| U.T.  | Group No. | MEASURES |                | POSITION |        | AREA   |             |        | U.T.    | Group No. | MEASURES       |            | POSITION |      | AREA              |             |        |
|   |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.          | Pos. Angle | Long.    | Lat. | Umbræ             | Whole Spots | Faculæ |
| 1950  | 154.360 G | .947     | 240.1          | o        | o      |        | 106         |        | 1950    | 157.350 C | .924           | 314.8      | o        | o    |                   | 144         |        |
|   |           | .922     | 305.8          |          |        | 307    |             |        | .899    |           | 291.6          |            |          |      | 113               |             |        |
|   |           | .890     | 249.5          |          |        | 124    |             |        | .984    |           | 275.4          | 8.0        | + 5.3    | 39   | 248               | 285 c       |        |
|   |           | .856     | 289.1          |          |        | 242    |             |        | .256    |           | 76.5           | 274.2      | + 3.6    | 6    | 30                |             |        |
|   |           | .992     | 279.6          | 50.6     | + 9.5  | 8      | 80          | 386 nf | .668    |           | 68.5           | 248.9      | + 14.2   | 3    | 13                |             |        |
|   |           | .724     | 290.8          | 12.4     | + 14.7 | 1      | 5           |        | .874    |           | 74.6           |            |          |      | 501               |             |        |
|   |           | .610     | 278.6          | 5.3      | + 5.0  | 87     | 472         |        | .880    |           | 100.4          |            |          |      | 128               |             |        |
|   |           | 1294a    | .464           | 47.8     | 307.1  | + 17.9 | 1           | 8      | .969    |           | 79.0           |            |          |      | 223               |             |        |
|   |           | .450     | 68.0           | 303.3    | + 9.5  | 8      | 24          |        | (-13.2) |           | (288.6)(+ 0.1) |            |          |      | (48) (291) (1394) |             |        |
|   |           | .813     | 83.4           | 274.2    | + 5.2  | 8      | 27          | 141 c  |         |           |                |            |          |      |                   |             |        |
|   |           | .777     | 58.9           |          |        | 126    |             |        |         |           |                |            |          |      | 179               |             |        |
|   |           | .828     | 95.1           |          |        | 142    |             |        |         |           |                |            |          |      | 175               |             |        |
|   |           | .882     | 79.2           |          |        | 662    |             |        |         |           |                |            |          |      | 126               |             |        |
| June 4  |           | .920     | 70.0           |          |        | 231    |             |        |         |           |                |            |          |      |                   |             |        |
|   | 155.336 G | .989     | 76.4           |          |        | 151    |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | (-14.4)  | (328.2)(- 0.2) | (113)    | (616)  | (2618) |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .967     | 304.8          |          |        |        | 288         |        |         |           |                |            |          |      |                   |             |        |
|   |           | .948     | 250.4          |          |        | 160    |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .935     | 289.2          |          |        | 303    |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .851     | 286.0          |          |        | 142    |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .834     | 323.4          |          |        | 165    |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .786     | 276.6          | 6.7      | + 5.1  | 93     | 549         | 220 c  |         |           |                |            |          |      |                   |             |        |
|   |           | 16520    | .267           | 48.8     | 303.6  | + 10.0 | 9           | 53     |         |           |                |            |          |      |                   |             |        |
|   |           | 16525    | .664           | 82.8     | 274.1  | + 4.7  | 5           | 29     |         |           |                |            |          |      |                   |             |        |
|   |           | .806     | 80.1           |          |        | 125    |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .816     | 69.0           |          |        | 187    |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .941     | 75.1           |          |        | 368    |             |        |         |           |                |            |          |      |                   |             |        |
| June 5  |           | .951     | 110.1          |          |        | 91     |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .966     | 97.7           |          |        | 87     |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | (-14.0)  | (315.3)(- 0.1) | (107)    | (631)  | (2136) |             |        |         |           |                |            |          |      |                   |             |        |
|   | 156.376 C | 159.336  | C              | .927     | 276.6  |        |             |        |         |           |                |            |          |      | 206               |             |        |
|   |           | .899     | 291.2          |          |        |        |             |        |         |           |                |            |          |      | 88                |             |        |
|   |           | .760     | 256.8          |          |        | 310.8  | - 9.7       |        | 17      |           | 62             | 60 c       |          |      |                   |             |        |
|   |           | .759     | 292.9          |          |        | 309.2  | + 17.4      |        | 19      |           | 89             | 101 c      |          |      |                   |             |        |
|   |           | .250     | 280.1          |          |        | 276.5  | + 2.9       |        | 4       |           | 16             |            |          |      |                   |             |        |
|   |           | .934     | 109.4          |          |        | 194.8  | - 17.9      |        | 135     |           | 929            | { 543 c    |          |      |                   |             |        |
|   |           | .994     | 110.0          |          |        | 179.4  | - 19.8      |        | 40      |           | 206            |            |          |      |                   |             |        |
|   |           | .768     | 75.9           |          |        |        |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .854     | 67.3           |          |        |        |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .856     | 84.7           |          |        |        |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .894     | 75.5           |          |        |        |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .944     | 63.8           |          |        |        |             |        |         |           |                |            |          |      |                   |             |        |
| June 6  |           | (-13.6)  | (301.5) (0.0)  | (57)     | (511)  | (1666) |             |        |         |           |                |            |          |      |                   |             |        |
|   |           | .924     | (262.3)(+ 0.4) |          |        |        |             |        |         |           |                |            |          |      |                   |             |        |

Group 16528. June 6 - 8. A small spot.

Group 16529. June 8 - 11. A few variable spots.

Group 16530. June 8 - 11. A few small spots, of which only one remains by June 11.

Group 16531. June 8 - 20. A big spot with double umbra which becomes elongated and splits into two by June 14. It has, however, recombined by June 17 to form a composite spot.

Group 16532. June 9 - 21. A composite spot, which slowly disintegrates and dies out.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.      | Group No. | MEASURES |            | POSITION |                | AREA  |             |        | U.T.    | Group No. | MEASURES |                | POSITION |       | AREA  |                     |        |       |
|-----------|-----------|----------|------------|----------|----------------|-------|-------------|--------|---------|-----------|----------|----------------|----------|-------|-------|---------------------|--------|-------|
|           |           | Dist.    | Pos. Angle | Long.    | Lat.           | Umbræ | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle     | Long.    | Lat.  | Umbræ | Whole Spots         | Faculæ |       |
| 1950      |           |          |            | °        | °              |       |             |        | 1950    | 16536     | .996     | 105.4          | 138.0    | -15.2 | 11    | 48                  | 166 p  |       |
| 160.327 G |           | .973     | 276.5      |          |                |       | 343         |        |         |           | .895     | 108.1          |          |       |       | 115                 |        |       |
|           |           | .958     | 288.6      |          |                |       | 119         |        |         |           | .967     | 72.3           |          |       |       | 178                 |        |       |
|           |           | .935     | 252.0      |          |                |       | 208         |        |         |           | (-11.2)  | (222.2)(+ 0.7) |          |       |       | (227) (1275) (1850) |        |       |
|           |           | .932     | 241.0      |          |                |       | 204         |        |         |           |          |                |          |       |       |                     |        |       |
|           |           | .782     | 293.6      |          |                |       | 423         |        |         |           |          |                |          |       |       |                     |        |       |
|           | 16529     | .895     | 289.9      | 311.2    | +17.9          | 23    | 144         | 329 c  | June 12 | 163.333 C | .939     | 263.0          |          |       |       | 177                 |        |       |
|           | 16530     | .884     | 259.0      | 310.6    | -9.4           | 20    | 110         | 186 c  |         |           | .903     | 272.6          |          |       |       | 256                 |        |       |
|           | 16525     | .831     | 281.8      | 304.7    | +10.1          | 2     | 19          | 328 c  |         |           | .901     | 282.0          |          |       |       | 318                 |        |       |
|           | 16527     | .481     | 276.0      | 277.7    | + 3.3          | 8     | 52          |        |         | 16535     | .950     | 290.6          | 280.1    | +19.8 | 6     | 35                  | 161 c  |       |
|           | 1294c     | .391     | 66.4       | 228.0    | + 9.4          | 1     | 18          |        |         | 16534     | .601     | 290.3          | 244.6    | +12.7 | 11    | 83                  |        |       |
|           | 16531     | .840     | 112.1      | 194.5    | -18.1          | 142   | 982         | 402 c  |         |           | 16531    | .403           | 143.4    | 194.8 | -18.6 | 183                 | 944    |       |
|           | 16532     | .962     | 111.0      | 176.6    | -20.0          | 45    | 398         | 496 c  |         |           | 16532    | .629           | 124.0    | 175.9 | -19.8 | 24                  | 232    |       |
|           |           | .915     | 65.8       |          |                |       | 325         |        |         |           | 16536    | .948           | 109.0    | 139.4 | -17.7 | 31                  | 168    | 415 c |
|           |           | .916     | 52.3       |          |                |       | 283         |        |         |           | 16537    | .971           | 72.3     | 134.0 | +17.3 | 0                   | 18     | 621 p |
| June 10   |           |          |            | (-12.0)  | (249.2)(+ 0.5) | (241) | (1723)      | (3646) |         |           | .883     | 67.0           |          |       |       | 106                 |        |       |
|           |           |          |            |          |                |       |             |        | June 13 |           | (-10.8)  | (209.4)(+ 0.8) |          |       |       | (255) (1480) (2054) |        |       |
| 161.387 G |           | .952     | 293.6      |          |                |       | 129         |        |         |           | .957     | 276.5          |          |       |       | 456                 |        |       |
|           |           | .867     | 292.0      |          |                |       | 138         |        |         |           | .941     | 285.3          |          |       |       | 164                 |        |       |
|           |           | .785     | 265.0      |          |                |       | 129         |        |         |           | 16535    | .996           | 289.2    | 280.4 | +19.2 | 48                  | 271    | 211 c |
|           | 16530     | .983     | 260.2      | 314.1    | - 9.5          | 0     | 13          | 137 c  | C       |           | 16534    | .746           | 286.8    | 242.8 | +13.1 | 8                   | 44     | 144 c |
|           | 16529     | .977     | 288.2      | 312.2    | +17.9          | 21    | 110         | 265 f  |         |           | 16538    | .172           | 304.1    | 204.0 | + 6.5 | 2                   | 10     |       |
|           | 16525     | .953     | 280.4      | 307.2    | +10.1          | 4     | 53          | 170 c  |         |           | 16531    | .326           | 176.0    | 194.4 | -17.9 | 161                 | 961    |       |
|           | 16527     | .677     | 275.2      | 277.5    | + 4.0          | 1     | 10          |        |         |           | 16532    | .483           | 138.2    | 175.8 | -20.1 | 18                  | 187    |       |
|           | 16533     | .630     | 292.0      | 272.1    | +14.1          | 1     | 8           |        |         |           | 16536    | .849           | 111.3    | 140.0 | -17.4 | 27                  | 189    | 228 c |
|           | 16534     | .265     | 330.2      | 243.0    | +13.8          | 3     | 12          |        |         |           | 16537    | .944           | 72.1     | 125.9 | +17.2 | 21                  | 125    | 692 n |
|           | 16531     | .695     | 117.4      | 194.9    | -18.1          | 175   | 967         | 54 f   |         |           | .962     | 115.9          |          |       |       | 180                 |        |       |
|           | 16532     | .879     | 113.2      | 176.2    | -19.9          | 29    | 395         | 225 c  |         |           | .978     | 104.8          |          |       |       | 183                 |        |       |
| June 11   |           |          |            | (-11.6)  | (235.2)(+ 0.6) | (234) | (1568)      | (1442) | June 14 |           | (-10.3)  | (195.8)(+ 1.0) |          |       |       | (285) (1787) (2258) |        |       |
| 162.364 G |           | .974     | 280.0      |          |                |       | 150         |        |         | 165.334 C | .975     | 288.3          |          |       |       | 172                 |        |       |
|           |           | .964     | 289.0      |          |                |       | 233         |        |         |           | .801     | 278.3          |          |       |       | 46                  |        |       |
|           |           | .923     | 264.7      |          |                |       | 119         |        |         |           | .769     | 289.5          |          |       |       | 139                 |        |       |
|           |           | .901     | 297.4      |          |                |       | 171         |        |         |           | 16534    | .890           | 283.8    | 245.1 | +12.8 | 8                   | 51     | 284 c |
|           |           | .894     | 287.4      |          |                |       | 77          |        |         |           | 16538    | .391           | 283.3    | 205.3 | + 6.2 | 1                   | 4      |       |
|           |           | .859     | 269.0      |          |                |       | 156         |        |         |           | 16531    | .381           | 210.1    | 194.4 | -18.1 | 171                 | 906    |       |
|           |           | .812     | 275.8      |          |                |       | 156         |        |         |           | 16532    | .374           | 162.9    | 176.2 | -19.8 | 15                  | 117    |       |
|           |           | .798     | 285.8      |          |                |       | 95          |        |         |           | 16536    | .715           | 116.3    | 140.8 | -17.6 | 45                  | 194    | 174 c |
|           | 16535     | .845     | 292.4      | 277.8    | +19.1          | 2     | 13          | 52 c   |         |           | 16537    | .861           | 70.5     | 124.9 | +17.3 | 13                  | 110    | 615 n |
|           | 16533     | .825     | 285.2      | 276.7    | +12.9          | 2     | 8           |        |         |           | .913     | 118.8          |          |       |       | 175                 |        |       |
|           | 16534     | .417     | 300.6      | 243.7    | +12.8          | 15    | 44          |        |         |           | .939     | 82.5           |          |       |       | 81                  |        |       |
|           | 16531     | .551     | 125.5      | 194.2    | -18.0          | 152   | 923         |        |         |           | .942     | 105.1          |          |       |       | 295                 |        |       |
|           | 16532     | .770     | 116.8      | 175.5    | -19.8          | 45    | 239         | 182 c  | June 15 |           | (-9.9)   | (182.9)(+ 1.1) |          |       |       | (253) (1382) (1981) |        |       |

Group 16533. June 11 - 12. A tiny spot.

Group 16534. June 11 - 16. A group of small variable spots.

Group 16535. June 12 - 14. A small spot, growing as it passes round the limb.

Group 16536. June 12 - 22. A group of changing spots, of which only a pair remains by June 19; these die out before reaching the limb.

Group 16537. June 13 - 23. Return of Group 16514. A small regular spot slowly declining, preceded by a distant companion until June 19.

Group 16538. June 14 - 15. A tiny spot.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |            | POSITION |               | AREA  |             |        | U.T.    | Group No. | MEASURES |               | POSITION |               | AREA   |             |        |     |
|---------|-----------|----------|------------|----------|---------------|-------|-------------|--------|---------|-----------|----------|---------------|----------|---------------|--------|-------------|--------|-----|
|         |           | Dist.    | Pos. Angle | Long.    | Lat.          | Umbræ | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle    | Long.    | Lat.          | Umbræ  | Whole Spots | Faculæ |     |
| 1950    |           |          |            | o        | o             |       | 99          |        | 1950    |           |          | o             | o        |               |        |             |        |     |
| 166.639 | G         | .917     | 260.4      |          |               |       | 288         |        | June 18 |           | .960     | 82.4          | (-8.6)   | (142.6)(+1.4) | (253)  | (1454)      | (1299) |     |
|         |           | .901     | 285.2      |          |               |       | 73          |        |         |           |          |               |          |               |        |             |        |     |
|         |           | .779     | 284.2      |          |               |       |             |        |         |           |          |               |          |               |        |             |        |     |
|         |           | .984     | 282.3      | 245.1    | +12.3         | 0     | 25          | 263 c  | 169.564 | C         | .969     | 278.7         |          |               |        |             |        |     |
|         |           | .623     | 229.6      | 196.5    | -22.7         | 4     | 15          |        |         |           | .936     | 287.9         |          |               |        |             |        |     |
|         |           | .563     | 234.6      | 194.4    | -17.9         | 188   | 970         |        |         |           | .938     | 250.1         | 194.7    | -18.0         | 130    | 775         | { 412  |     |
|         |           | .387     | 206.6      | 176.2    | -19.0         | 4     | 25          |        |         |           | .921     | 244.7         | 191.0    | -22.5         | 3      | 11          |        |     |
|         |           | .520     | 129.6      | 140.9    | -18.2         | 31    | 136         |        |         |           | .779     | 245.7         | 174.9    | -17.6         | 2      | 10          | 82 c   |     |
|         |           | .695     | 66.2       | 124.2    | +17.1         | 18    | 89          |        |         |           | .424     | 218.9         | 143.1    | -17.6         | 15     | 75          |        |     |
|         |           | .953     | 81.2       | 93.6     | +8.7          | 67    | 375         | 299 c  |         |           | .274     | 15.7          | 122.5    | +16.8         | 9      | 38          |        |     |
|         |           | .796     | 111.0      |          |               |       | 189         |        |         |           | .565     | 76.3          | 93.3     | +9.0          | 50     | 343         |        |     |
|         |           | .916     | 93.9       |          |               |       | 57          |        |         |           | .865     | 82.5          |          |               |        |             |        |     |
|         |           | .937     | 70.1       |          |               |       | 113         |        |         |           | .898     | 108.3         | (-8.1)   | (126.9)(+1.6) | (209)  | (1252)      | (869)  |     |
| June 16 |           |          |            | (-9.4)   | (165.7)(+1.2) | (312) | (1635)      | (1381) |         |           |          |               |          |               |        |             |        |     |
|         |           |          |            |          |               |       |             |        |         |           |          |               |          |               |        |             |        |     |
| 167.346 | G         | .961     | 280.6      |          |               |       | 285         |        | 170.538 |           | .951     | 292.4         |          |               |        |             |        | 166 |
|         |           | .958     | 288.0      |          |               |       | 316         |        |         |           | .910     | 236.2         |          |               |        |             |        | 115 |
|         |           | .854     | 282.8      |          |               |       | 197         |        |         |           |          |               |          |               |        |             | 603 c  |     |
|         |           | .675     | 240.8      | 194.5    | -18.1         | 153   | 960         |        |         |           | .988     | 251.5         | 193.8    | -17.9         | 117    | 791         | 362 c  |     |
|         |           | .694     | 234.6      | 194.0    | -22.6         | 11    | 51          |        |         |           | .891     | 248.6         | 174.6    | -18.1         | 0      | 5           |        |     |
|         |           | .482     | 227.4      | 178.1    | -17.8         | 3     | 34          |        |         |           | .569     | 234.3         | 142.9    | -17.9         | 6      | 22          |        |     |
|         |           | .6536    | 141.8      | 140.7    | -17.8         | 19    | 135         |        |         |           | .297     | 336.2         | 121.2    | +17.3         | 7      | 24          |        |     |
|         |           | .582     | 61.0       | 124.2    | +17.4         | 17    | 91          |        |         |           | .380     | 69.4          | 93.0     | +9.2          | 62     | 356         |        |     |
|         |           | .894     | 80.8       | 93.3     | +8.8          | 59    | 434         | 264 c  |         |           | .469     | 64.9          | 88.3     | +12.9         | 3      | 13          |        |     |
|         |           | .916     | 68.0       |          |               |       | 155         |        |         |           | .910     | 79.2          | 48.9     | +10.5         | 0      | 6           | 141 c  |     |
|         |           | .951     | 77.8       |          |               |       | 331         |        |         |           | .893     | 117.5         |          |               |        |             | 140    |     |
| June 17 |           |          |            | (-9.0)   | (156.3)(+1.3) | (262) | (1705)      | (1548) |         |           |          |               |          |               |        |             | 216    |     |
|         |           |          |            |          |               |       |             |        |         |           |          |               |          |               |        |             | 120    |     |
|         |           |          |            |          |               |       |             |        |         |           |          |               |          |               |        |             |        |     |
|         |           |          |            |          |               |       |             |        |         |           |          |               |          |               |        |             |        |     |
| 168.381 | G         | .966     | 282.4      |          |               |       | 198         |        | 171.474 | 16532     | .964     | 250.2         | 174.5    | -18.5         | 0      | 13          | 716 c  |     |
|         |           | .917     | 291.2      |          |               |       | 171         |        |         | 16536     | .713     | 243.2         | 143.4    | -17.3         | 4      | 13          | 89 p   |     |
|         |           | .876     | 279.5      |          |               |       | 154         |        |         | 16537     | .413     | 310.5         | 120.8    | +17.2         | 4      | 12          |        |     |
|         |           | .842     | 242.6      | 196.1    | -21.9         | 2     | 23 {        | 182 c  |         |           | .202     | 49.1          | 92.8     | +9.4          | 48     | 271         |        |     |
|         |           | .817     | 246.6      | 194.5    | -18.1         | 152   | 845         |        |         | 16541     | .296     | 47.8          | 88.7     | +13.2         | 9      | 54          |        |     |
|         |           | .625     | 239.8      | 176.9    | -17.1         | 0     | 4           |        |         | 16542     | .785     | 78.4          | 50.5     | +10.2         | 19     | 69          | 122 c  |     |
|         |           | .328     | 176.0      | 141.2    | -17.6         | 17    | 91          |        |         | 16543     | .970     | 74.0          | 26.1     | +16.0         | 48     | 230         | 424 c  |     |
|         |           | .421     | 49.1       | 123.2    | +17.2         | 11    | 64          |        |         |           | .867     | 70.8          |          |               |        |             | 322    |     |
|         |           | .765     | 79.4       | 93.2     | +9.0          | 71    | 427         | 155 f  |         |           | .939     | 108.2         |          |               |        |             | 216    |     |
|         |           | .882     | 70.2       |          |               |       |             | 121    |         |           | .941     | 59.3          |          |               |        |             | 201    |     |
|         |           | .887     | 81.0       |          |               |       | 197         |        | June 21 |           | (-7.2)   | (101.7)(+1.8) | (132)    | (662)         | (2090) |             |        |     |
|         |           |          |            |          |               |       |             |        |         |           |          |               |          |               |        |             |        |     |

Group 16539. June 16 - 19. A single small spot on June 16 and 19; a pair on the other two days.

Group 16540. June 16 - 28. Return of Group 16513. A regular spot, with occasional companions. The umbra is divided from June 18 to 22.

Group 16541. June 20 - 25. A few small variable spots.

Group 16542. June 20-July 1. A stream, developing from a tiny spot. The leader becomes regular, and the follower a cluster of small spots which die out rapidly after June 28.

Group 16543. June 21 - 28. A pair of diminishing spots; only the leader remains by June 27.

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| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |            |               |       |        |             |         |         |           |          |            |               |       |        |             |         |  |
|---|-----------|----------|------------|---------------|-------|--------|-------------|---------|---------|-----------|----------|------------|---------------|-------|--------|-------------|---------|--|
| U.T.  | Group No. | MEASURES |            | POSITION      |       | AREA   |             |         | U.T.    | Group No. | MEASURES |            | POSITION      |       | AREA   |             |         |  |
|   |           | Dist.    | Pos. Angle | Long.         | Lat.  | Umbrae | Whole Spots | Faculae |         |           | Dist.    | Pos. Angle | Long.         | Lat.  | Umbrae | Whole Spots | Faculae |  |
| 1950  |           |          |            | o             | o     |        |             |         | 1950    |           |          |            | o             | o     |        |             |         |  |
| 172.339   | G         | .954     | 255.0      |               |       |        | 131         |         | 16548   | .934      | 255.9    | 131.8      | -12.4         | 6     | 33     | 142         | 141 c   |  |
|   |           | .936     | 240.5      |               |       |        | 161         |         | 16540   | .488      | 285.8    | 92.3       | + 9.4         | 42    | 257    |             |         |  |
|   |           | .824     | 291.9      |               |       |        | 162         |         | 16541   | .427      | 297.0    | 86.9       | +13.1         | 0     | 12     |             |         |  |
|   |           | 16536    | .819       | 248.7         | 142.6 | -16.1  | 2           | 8       | 297 c   | 16542     | .223     | 56.3       | 53.2          | + 9.1 | 77     | 402         |         |  |
|   |           | 16537    | .552       | 299.4         | 120.3 | +17.3  | 4           | 8       |         | 16545     | .566     | 118.0      | 33.2          | -13.5 | 1      | 7           |         |  |
|   |           | 16540    | .138       | 343.1         | 92.5  | + 9.4  | 60          | 310     |         | 16543     | .637     | 68.6       | 26.3          | +15.0 | 20     | 119         |         |  |
|   |           | 16541    | .207       | 14.9          | 87.1  | +13.4  | 6           | 41      |         | 16546     | .698     | 85.2       | 19.9          | + 4.8 | 1      | 11          |         |  |
|   |           | 16544    | .200       | 48.5          | 81.5  | + 9.4  | 4           | 22      |         | 16550     | .760     | 63.4       | 17.4          | +21.3 | 2      | 7           |         |  |
|   |           | 16542    | .639       | 76.9          | 51.2  | + 9.8  | 25          | 142     |         | 16547     | .751     | 75.6       | 16.1          | +12.1 | 18     | 76          | 144 c   |  |
|   |           | 16545    | .858       | 107.6         | 33.0  | -14.0  | 5           | 14      | 46 c    | 16549     | .887     | 84.4       | 1.7           | + 5.9 | 2      | 10          | 258 n   |  |
|   |           | 16543    | .898       | 73.8          | 27.0  | +15.4  | 27          | 122     | 164 c   |           | .784     | 45.0       |               |       |        | 221         |         |  |
|   |           | 16546    | .945       | 85.5          | 19.4  | + 4.9  | 3           | 24      | 167 c   |           | .808     | 82.2       |               |       |        | 183         |         |  |
|   |           | 16547    | .967       | 77.5          | 15.1  | +12.6  | 4           | 23      | 96 c    |           | .882     | 107.3      |               |       |        | 121         |         |  |
|   |           |          | .897       | 7.7           |       |        |             | 6       |         |           | .941     | 81.0       |               |       |        | 369         |         |  |
| June 22   |           |          | .925       | 56.5          |       |        |             | 104     |         |           |          |            |               |       |        |             |         |  |
|   |           |          | (-6.9)     | (90.2)(+ 1.9) | (140) | (714)  | (1334)      |         | June 24 |           |          | (-6.0)     | (64.0)(+ 2.1) | (169) | (934)  | (3678)      |         |  |
| 173.466   | G         | .968     | 293.2      |               |       |        | 135         |         | 175.340 |           |          |            |               |       |        |             | 154     |  |
|   |           | .945     | 252.8      |               |       |        | 347         |         | C       |           |          |            |               |       |        | 76          |         |  |
|   |           | .901     | 244.6      |               |       |        | 171         |         |         |           |          |            |               |       |        | 131         |         |  |
|   |           | .886     | 291.8      |               |       |        | 320         |         |         |           |          |            |               |       |        | 213         |         |  |
|   |           | .775     | 299.5      |               |       |        | 145         |         |         |           |          |            |               |       |        | 117         |         |  |
|   |           | 16548    | .855       | 254.2         | 132.5 | -12.4  | 17          | 42      | 89 c    | 16540     | .671     | 282.0      | 92.1          | + 9.6 | 50     | 278         |         |  |
|   |           | 16537    | .726       | 292.5         | 119.8 | +17.5  | 1           | 9       |         | 16541     | .617     | 288.7      | 87.2          | +13.1 | 1      | 11          |         |  |
|   |           | 16540    | .320       | 294.4         | 92.4  | + 9.5  | 45          | 262     |         | 16544     | .561     | 288.5      | 83.3          | +12.1 | 1      | 13          |         |  |
|   |           | 16541    | .273       | 316.6         | 86.4  | +13.4  | 3           | 13      |         | 16542     | .137     | 336.3      | 53.7          | + 9.4 | 119    | 630         |         |  |
|   |           | 16544    | .171       | 327.4         | 80.8  | +10.2  | 1           | 9       |         | 16545     | .397     | 133.3      | 33.3          | -13.7 | 4      | 32          |         |  |
|   |           | 16542    | .413       | 70.6          | 52.1  | + 9.7  | 50          | 266     |         | 16543     | .455     | 59.2       | 26.7          | +15.4 | 20     | 83          |         |  |
|   |           | 16545    | .688       | 110.8         | 34.2  | -12.6  | 1           | 6       |         | 16550     | .602     | 56.7       | 18.0          | +21.1 | 6      | 14          |         |  |
|   |           | 16543    | .768       | 71.8          | 26.4  | +15.1  | 25          | 153     | 151 c   | 16547     | .591     | 72.1       | 15.5          | +12.2 | 14     | 67          |         |  |
|   |           | 16546    | .826       | 85.7          | 19.8  | + 4.7  | 2           | 12      | 176 c   | 16549     | .755     | 83.9       | 1.7           | + 6.0 | 3      | 10          | 100 f   |  |
|   |           | 16547    | .856       | 77.3          | 17.0  | +11.9  | 13          | 51      | 80 c    |           | .959     | 78.7       |               |       |        | 136         |         |  |
|   |           | 16549    | .953       | 83.2          | 3.1   | + 7.1  | 3           | 15      | 347 c   | June 25   |          | (-5.5)     | (50.5)(+ 2.2) | (218) | (1138) | (927)       |         |  |
|   |           |          | .836       | 50.1          |       |        |             | 157     |         |           |          |            |               |       |        |             |         |  |
| June 23   |           |          | .942       | 103.6         |       |        |             | 101     |         |           |          |            |               |       |        | 102         |         |  |
|   |           |          | (-6.4)     | (75.3)(+ 2.0) | (161) | (838)  | (2219)      |         | 176.361 |           |          |            |               |       |        | 77          |         |  |
| 174.321   | G         | .955     | 250.5      |               |       |        | 535         |         |         |           |          |            |               |       |        | 106         |         |  |
|   |           | .949     | 291.4      |               |       |        | 542         |         |         |           |          |            |               |       |        | 134         |         |  |
|   |           | .900     | 282.0      |               |       |        | 119         |         |         |           |          |            |               |       |        | 71          |         |  |
|   |           | .896     | 239.7      |               |       |        | 283         |         |         |           |          |            |               |       |        | 144 c       |         |  |
|   |           | .877     | 305.4      |               |       |        | 308         |         |         |           |          |            |               |       |        | 193 c       |         |  |
|   |           | .860     | 292.8      |               |       |        | 312         |         |         |           |          |            |               |       |        |             |         |  |

Group 16544. June 22 - 25. A few faint spots, not seen on June 24.

Group 16545. June 22-July 2. A pair of small spots, except between June 26 and 28, when there is a nondescript stream.

Group 16548. June 22 - 24. A small spot.

Group 16547. June 22 - 27. A single small spot on June 22, 23 and 27; a pair on the other days.

Group 16548. June 23 - 24. A pair of small spots.

Group 16549. June 23 - 29. Return of Group 16520. A small spot until June 25. Nothing is then seen until June 29, when a few faint markings appear.

Group 16550. June 24 - 25. A tiny spot.

Group 16551. June 26 - 27. A tiny spot.

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| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |            |               |               |       |             |        |         |           |          |                |          |                |       |             |                   |                    |       |       |
|---|-----------|----------|------------|---------------|---------------|-------|-------------|--------|---------|-----------|----------|----------------|----------|----------------|-------|-------------|-------------------|--------------------|-------|-------|
| U.T.  | Group No. | MEASURES |            | POSITION      |               | AREA  |             |        | U.T.    | Group No. | MEASURES |                | POSITION |                | AREA  |             |                   |                    |       |       |
|   |           | Dist.    | Pos. Angle | Long.         | Lat.          | Umbræ | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle     | Long.    | Lat.           | Umbræ | Whole Spots | Faculæ            |                    |       |       |
| 1950  |           |          |            | o             | o             |       |             |        | 1950    |           |          |                | o        | o              |       |             |                   |                    |       |       |
|   | 16545     | .278     | 168.1      | 33.6          | -13.4         | 18    | 111         |        |         | 16552     | .392     | 214.5          | 9.2      | -16.1          | 7     | 48          |                   |                    |       |       |
|   | 16543     | .283     | 36.3       | 27.0          | +15.5         | 9     | 39          |        |         | 16549     | .098     | 294.2          | 1.0      | + 5.0          | 2     | 21          |                   |                    |       |       |
|   | 16547     | .398     | 64.0       | 15.6          | +12.2         | 12    | 27          |        |         | 1295a     | .414     | 99.4           | 331.9    | - 1.4          | 0     | 3           |                   |                    |       |       |
|   | 1294e     | .855     | 74.8       | 338.9         | +14.2         | 0     | 9           | 142 c  |         | 16553     | .977     | 69.8           | 280.1    | +19.1          | 21    | 154         | 385 f             |                    |       |       |
|   |           | .916     | 85.2       |               |               |       |             | 143    |         |           | .832     | 67.6           |          |                |       |             | 229               |                    |       |       |
|   |           | .924     | 45.2       |               |               |       |             | 159    |         |           | .940     | 91.6           |          |                |       |             | 335               |                    |       |       |
|   |           | .974     | 105.2      |               |               |       |             | 243    |         |           | .968     | 77.2           |          |                |       |             | 227               |                    |       |       |
|   |           | .980     | 76.5       |               |               |       |             | 192    |         |           | (-3.6)   | (355.9)(+ 2.7) |          |                |       |             | (99) (757) (1655) |                    |       |       |
| June 26   |           |          |            | (-5.0)        | (37.0)(+ 2.4) | (175) | (1077)      | (1706) | June 29 |           |          |                |          |                |       |             |                   |                    |       |       |
|   |           |          |            |               |               |       |             |        |         | 180.335   |          |                |          |                |       |             |                   |                    |       |       |
|   |           | .886     | 254.0      |               |               |       |             | 136    |         |           | 16542    | .947           | 278.4    | 55.6           | + 8.9 | 38          | 354               | 292 c              |       |       |
| 177.330   | G         | .875     | 283.0      |               |               |       |             | 352    |         |           | 16545    | .813           | 252.2    | 36.7           | -12.7 | 6           | 40                | 165 c              |       |       |
|   |           | .857     | 273.3      |               |               |       |             | 66     |         |           | 16552    | .529           | 232.0    | 10.0           | -16.4 | 36          | 128               |                    |       |       |
|   |           | .949     | 284.2      | 95.5          | +14.2         | 3     | 14          | 199 c  |         |           | 1295b    | .323           | 116.3    | 327.6          | - 5.5 | 1           | 7                 |                    |       |       |
|   |           | 16551    | 932        | 279.3         | 92.7          | + 9.6 | 34          | 245    | 206 s   |           |          | 16553          | .915     | 68.8           | 279.0 | +20.5       | 16                | 129                | 301 f |       |
|   |           | 16540    | .512       | 284.2         | 54.2          | + 9.4 | 91          | 579    |         |           |          | 16554          | .940     | 118.3          | 278.4 | -25.3       | 8                 | 48                 | 134 c |       |
|   |           | 16542    | .332       | 211.2         | 34.3          | -13.9 | 19          | 79     |         |           |          |                | .932     | 87.8           |       |             |                   | 242                |       |       |
|   |           | 16543    | .225       | 344.3         | 27.7          | +15.0 | 5           | 9      |         |           |          |                | .933     | 78.0           |       |             |                   | 184                |       |       |
|   |           | 16547    | .181       | 25.8          | 19.5          | +11.8 | 3           | 6      |         |           |          |                | .977     | 66.4           |       |             |                   | 129                |       |       |
|   |           | .774     | 73.7       |               |               |       |             | 46     | June 30 |           |          |                | (-3.2)   | (344.4)(+ 2.8) |       |             |                   | (105) (706) (1614) |       |       |
|   |           | .795     | 81.9       |               |               |       |             | 80     |         |           |          |                |          |                |       |             |                   |                    |       |       |
|   |           | .894     | 111.9      |               |               |       |             | 77     |         |           |          |                |          |                |       |             |                   |                    |       |       |
|   |           | .912     | 78.8       |               |               |       |             | 182    | 181.328 |           |          |                | .965     | 287.6          |       |             |                   | 239                |       |       |
|   |           | .915     | 42.7       |               |               |       |             | 165    | G       |           |          |                | .836     | 290.1          |       |             |                   | 273                |       |       |
|   |           | .930     | 104.8      |               |               |       |             | 288    |         |           |          |                | .809     | 310.7          |       |             |                   | 196                |       |       |
|   |           | .947     | 73.8       |               |               |       |             | 196    |         |           |          |                | .785     | 275.5          |       |             |                   | 277                |       |       |
|   |           | .963     | 68.8       |               |               |       |             | 161    |         |           |          |                | 16542    | .997           | 278.4 | 56.7        | + 8.6             | 43                 | 299   | 444 f |
| June 27   |           |          | (-4.6)     | (24.1)(+ 2.5) | (155)         | (932) | (2154)      |        |         |           |          |                | 16545    | .919           | 254.5 | 36.3        | -13.0             | 7                  | 27    | 292 c |
|   |           |          |            |               |               |       |             |        |         |           |          |                | 16552    | .718           | 243.2 | 13.0        | -16.7             | 25                 | 155   |       |
|   |           |          |            |               |               |       |             |        |         |           |          |                | 16555    | .651           | 247.8 | 9.1         | -11.9             | 10                 | 53    |       |
|   |           |          |            |               |               |       |             |        |         |           |          |                | 16554    | .847           | 122.9 | 279.4       | -25.5             | 19                 | 92    | 126 c |
|   |           |          |            |               |               |       |             |        |         |           |          |                | 16553    | .814           | 66.6  | 278.5       | +20.6             | 38                 | 177   | 234 f |
| 178.394   | C         | .966     | 256.3      |               |               |       |             | 148    |         |           |          |                |          |                |       |             |                   | 139                |       |       |
|   |           | .958     | 284.6      |               |               |       |             | 162    |         |           |          |                |          |                |       |             |                   | 174                |       |       |
|   |           | .850     | 280.3      |               |               |       |             | 63     |         |           |          |                |          |                |       |             |                   | 171                |       |       |
|   |           | 16540    | .990       | 279.4         | 92.1          | + 9.7 | 38          | 199    | 160 f   |           |          |                |          |                |       |             |                   | 298                |       |       |
|   |           | 16542    | .702       | 281.1         | 54.3          | + 9.7 | 80          | 549    |         |           |          |                |          |                |       |             |                   | 236                |       |       |
|   |           | 16545    | .505       | 237.7         | 36.0          | -13.2 | 18          | 74     |         |           |          |                |          |                |       |             |                   | 233                |       |       |
|   |           | 16543    | .367       | 305.8         | 28.0          | +14.8 | 5           | 12     |         |           |          |                |          |                |       |             |                   | 87                 |       |       |
|   |           |          | .797       | 112.0         |               |       |             | 92     | 182.297 |           |          |                |          |                |       |             |                   | 91                 |       |       |
|   |           |          | .829       | 74.8          |               |       |             | 139    | G       |           |          |                |          |                |       |             |                   | 236                |       |       |
|   |           |          | .847       | 36.2          |               |       |             | 104    |         |           |          |                |          |                |       |             |                   | 237 c              |       |       |
|   |           |          | .852       | 104.4         |               |       |             | 81     |         |           |          |                |          |                |       |             |                   | 124 c              |       |       |
|   |           |          | .933       | 69.4          |               |       |             | 184    |         |           |          |                |          |                |       |             |                   | 57 c               |       |       |
|   |           |          | .971       | 93.8          |               |       |             | 127    |         |           |          |                |          |                |       |             |                   | 103                |       |       |
| June 28   |           |          | (-4.1)     | (10.1)(+ 2.6) | (141)         | (834) | (1260)      |        |         |           |          |                |          |                |       |             |                   | 124 c              |       |       |
|   |           |          |            |               |               |       |             |        |         |           |          |                |          |                |       |             |                   | 204                |       |       |
| 179.461   | G         | .941     | 275.6      |               |               |       |             |        |         |           |          |                |          |                |       |             |                   | 55 c               |       |       |
|   | 16542     | .854     | 279.4      | 54.3          | + 9.4         | 62    | 472         | 294 c  |         |           |          |                |          |                |       |             |                   | 100                |       |       |
|   | 16545     | .693     | 248.2      | 37.0          | -12.8         | 6     | 52          |        |         |           |          |                |          |                |       |             |                   | 204                |       |       |
|   | 16543     | .565     | 292.7      | 28.4          | +14.8         | 1     | 7           |        |         |           |          |                |          |                |       |             |                   | 1324               |       |       |
|   |           |          |            |               |               |       |             |        | July 2  |           |          |                |          |                |       |             |                   |                    |       |       |

Group 16552. June 29-July 3. A stream of small variable spots.

Group 16553. June 29-July 11. Return of Group 16535. A regular spot, slowly decreasing in area after July 4.

Group 16554. June 30-July 3. A pair of spots; only one remains on July 3.

Group 16555. July 1 - 4. A stream developing near the west limb, subsequent growth being lost to view.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |                | POSITION |       | AREA  |             |         | U.T.    | Group No. | MEASURES       |                | POSITION |       | AREA   |             |                     |
|---------|-----------|----------|----------------|----------|-------|-------|-------------|---------|---------|-----------|----------------|----------------|----------|-------|--------|-------------|---------------------|
|         |           | Dist.    | Pos. Angle     | Long.    | Lat.  | Umbræ | Whole Spots | Faculæ  |         |           | Dist.          | Pos. Angle     | Long.    | Lat.  | Umbræ  | Whole Spots | Faculæ              |
| 1950    |           |          |                | o        | o     |       |             |         | 1950    |           |                |                | o        | o     |        |             |                     |
| 183.576 |           | .979     | 289.6          |          |       |       | 106         |         | 16553   | .365      | 327.1          | 277.2          | +21.1    | 28    | 142    |             |                     |
| Mt. W   |           | .968     | 277.2          |          |       |       | 286         |         | 16556   | .242      | 329.3          | 272.3          | +15.4    | 63    | 351    |             |                     |
|         |           | .949     | 308.2          |          |       |       | 91          |         | 16558   | .959      | 110.5          | 193.9          | -18.5    | 50    | 252    | 310 c       |                     |
|         |           | .938     | 285.1          |          |       |       | 104         |         |         | .843      | 80.8           |                |          |       |        | 103         |                     |
|         |           | .922     | 275.7          |          |       |       | 243         |         |         | .933      | 70.9           |                |          |       |        | 107         |                     |
|         |           | .817     | 278.2          |          |       |       | 188         |         |         | (-0.5)    | (265.0)(+ 3.5) |                |          | (162) | (810)  | (1257)      |                     |
|         | 16552     | .970     | 251.4          | 15.4     | -17.1 | 19    | 67          | { 372 c | July 6  |           |                |                |          |       |        |             |                     |
|         | 16555     | .938     | 255.2          | 9.6      | -12.7 | 69    | 291         |         |         |           |                |                |          |       |        |             |                     |
|         | 16554     | .565     | 149.4          | 282.9    | -26.0 | 4     | 9           |         |         | 187.621   |                |                |          |       |        |             | 152                 |
|         | 16553     | .490     | 50.6           | 277.7    | +21.0 | 25    | 148         |         |         | G         |                |                |          |       |        |             | 144                 |
|         | 16556     | .558     | 63.2           | 270.2    | +17.2 | 2     | 5           |         |         |           |                |                |          |       |        |             | 170                 |
|         |           | .824     | 72.6           |          |       |       | 39          |         | 16560   | .971      | 277.5          | 324.1          | + 8.1    | 92    | 394    | 239 c       |                     |
|         |           | .917     | 80.2           |          |       |       | 126         |         | 16559   | .914      | 256.7          | 312.5          | -10.5    | 0     | 11     | 183 c       |                     |
|         |           | .941     | 72.4           |          |       |       | 149         |         | 16557   | .881      | 290.3          | 308.9          | +19.5    | 52    | 245    | 185 c       |                     |
| July 3  |           | (-1.8)   | (301.5)(+ 3.2) |          |       | (119) | (520)       | (1704)  |         |           |                |                |          |       |        |             |                     |
|         |           |          |                |          |       |       |             |         | 16553   | .552      | 304.6          | 277.0          | +21.3    | 17    | 111    |             |                     |
|         |           |          |                |          |       |       |             |         | 16556   | .446      | 297.1          | 272.1          | +15.0    | 74    | 585    |             |                     |
|         |           |          |                |          |       |       |             |         | 16558   | .855      | 114.5          | 192.9          | -18.7    | 27    | 193    | 277 sf      |                     |
| 184.654 |           | .933     | 280.0          |          |       |       | 190         |         |         | .946      | 112.2          |                |          |       |        |             | 324                 |
| G       | 16555     | .977     | 256.5          | 3.6      | -12.4 | 31    | 186         | 148 c   | July 7  |           | (+0.1)         | (247.9)(+ 3.6) |          | (262) | (1539) | (1674)      |                     |
|         | 16553     | .344     | 26.9           | 277.6    | +21.0 | 24    | 152         |         |         |           |                |                |          |       |        |             |                     |
|         | 16556     | .336     | 48.8           | 272.0    | +15.9 | 24    | 100         |         |         |           |                |                |          |       |        |             |                     |
|         |           | .801     | 73.5           |          |       |       | 287         |         |         |           |                |                |          |       |        |             |                     |
|         |           | .925     | 79.8           |          |       |       | 195         |         |         |           |                |                |          |       |        |             |                     |
| July 4  |           | (-1.3)   | (287.2)(+ 3.3) |          |       | (79)  | (438)       | (820)   | 188.325 |           |                |                |          |       |        |             |                     |
|         |           |          |                |          |       |       |             |         | G       |           |                |                |          |       |        |             |                     |
|         |           |          |                |          |       |       |             |         |         | .957      | 283.9          |                |          |       |        |             | 156                 |
|         |           |          |                |          |       |       |             |         |         | .945      | 318.8          |                |          |       |        |             | 349                 |
|         |           |          |                |          |       |       |             |         |         | .852      | 297.0          |                |          |       |        |             | 164                 |
|         |           |          |                |          |       |       |             |         |         | .848      | 288.7          |                |          |       |        |             | 98                  |
| 185.878 |           | .917     | 316.0          |          |       |       | 108         |         | 16560   | .993      | 276.6          | 321.9          | + 7.0    | 20    | 85     | 155 f       |                     |
| Mt. W   |           | .880     | 278.4          |          |       |       | 270         |         | 16559   | .970      | 257.8          | 315.2          | -10.8    | 0     | 14     | 184 c       |                     |
|         |           | .844     | 321.5          |          |       |       | 81          |         | 16557   | .940      | 289.6          | 308.4          | +19.6    | 28    | 356    | 274 c       |                     |
|         |           | .829     | 245.3          |          |       |       | 142         |         | 16553   | .657      | 299.0          | 276.6          | +21.5    | 15    | 113    |             |                     |
|         |           | .751     | 285.1          |          |       |       | 130         |         | 16556   | .574      | 290.9          | 272.2          | +14.9    | 90    | 636    |             |                     |
|         | 16557     | .633     | 295.9          | 307.8    | +18.7 | 0     | 2           |         | 16558   | .774      | 117.4          | 192.4          | -18.2    | 33    | 201    | 189 c       |                     |
|         | 16553     | .324     | 340.9          | 277.5    | +21.1 | 26    | 127         |         |         | .910      | 110.8          |                |          |       |        |             | 220                 |
|         | 16556     | .219     | 353.8          | 272.8    | +15.9 | 63    | 277         |         |         | .923      | 117.1          |                |          |       |        |             | 328                 |
|         | 16558     | .985     | 109.2          | 193.0    | -18.2 | 34    | 155         | 400 c   |         | .927      | 49.9           |                |          |       |        |             | 183                 |
|         |           | .903     | 79.9           |          |       |       | 133         |         |         | (+0.4)    | (238.6)(+ 3.7) |                |          |       |        |             |                     |
| July 5  |           | (-0.7)   | (271.0)(+ 3.4) |          |       | (123) | (561)       | (1264)  | July 8  |           |                |                |          |       |        |             | (186) (1405) (2300) |
|         |           |          |                |          |       |       |             |         |         |           |                |                |          |       |        |             |                     |
| 186.333 |           | .962     | 243.1          |          |       |       | 81          |         | 189.344 | .851      | 233.2          |                |          |       |        |             | 191                 |
| C       |           | .959     | 311.5          |          |       |       | 78          |         | 16557   | .986      | 289.6          | 305.9          | +19.9    | 12    | 79     | 255 sf      |                     |
|         |           | .912     | 276.0          |          |       |       | 136         |         | 16553   | .796      | 294.0          | 276.1          | +21.2    | 7     | 102    | 100 f       |                     |
|         |           | .908     | 319.1          |          |       |       | 105         |         | 16556   | .735      | 286.4          | 271.7          | +14.5    | 104   | 565    | 321 c       |                     |
|         |           | .854     | 248.1          |          |       |       | 95          |         | 16561   | .233      | 285.7          | 238.1          | + 7.3    | 6     | 34     |             |                     |
|         |           | .804     | 284.5          |          |       |       | 113         |         | 16558   | .631      | 124.9          | 192.3          | -17.9    | 27    | 182    |             |                     |
|         | 16559     | .734     | 252.7          | 310.2    | -10.2 | 1     | 7           | 52 c    |         |           | .837           | 120.5          |          |       |        |             | 325                 |
|         | 16557     | .706     | 294.3          | 307.8    | +19.3 | 20    | 58          | 77 c    | July 9  |           | .976           | 106.9          |          |       |        |             | 803                 |
|         |           |          |                |          |       |       |             |         |         | (+0.9)    | (225.1)(+ 3.8) |                |          |       |        |             | (156) (962) (1995)  |

Group 16556. July 3 - 12. A stream, growing vigorously from a tiny spot when first seen. The leader is the least stable component and dies out before reaching the west limb. The follower, the largest component, is composite.

Group 16557. July 5 - 9. A stream, appearing past the C.M., and growing as it passes out of sight.

Group 16558. July 5 - 17. Return of Group 16531. A regular spot, with a double umbra until July 13.

Group 16559. July 6 - 8. A tiny spot.

Group 16560. July 7 - 8. A pair of spots, appearing suddenly at the west limb.

Group 16561. July 9 - 14. Small changing spots, appearing past the C.M.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |            | POSITION |               | AREA  |             |        | U.T. | Group No. | MEASURES |            | POSITION      |               | AREA  |             |        |        |        |  |
|---------|-----------|----------|------------|----------|---------------|-------|-------------|--------|------|-----------|----------|------------|---------------|---------------|-------|-------------|--------|--------|--------|--|
|         |           | Dist.    | Pos. Angle | Long.    | Lat.          | Umbræ | Whole Spots | Faculæ |      |           | Dist.    | Pos. Angle | Long.         | Lat.          | Umbræ | Whole Spots | Faculæ |        |        |  |
| 1950    |           |          |            | o        | o             |       |             |        | 1950 |           |          |            | o             | o             |       |             |        |        |        |  |
| 190.331 | G         | .959     | 270.8      |          |               |       | 101         |        |      | 1950      |          | .960       | 58.0          |               |       |             | 245    |        |        |  |
|         |           | .949     | 260.7      |          |               |       | 91          |        |      |           |          | (+2.2)     | (185.3)(+4.1) |               |       | (167)       | (991)  | (1919) |        |  |
|         |           | .941     | 238.3      |          |               |       | 169         |        |      |           |          |            |               |               |       |             |        |        |        |  |
|         |           | .882     | 275.8      |          |               |       | 122         |        |      |           |          |            |               |               |       |             |        |        |        |  |
|         |           | .861     | 249.2      |          |               |       | 102         |        |      |           |          |            |               |               |       |             |        |        |        |  |
|         |           | .803     | 297.1      |          |               |       | 230         |        |      | 193.342   | G        | .881       | 287.7         |               |       |             | 158    |        |        |  |
|         |           | .901     | 291.8      | 275.7    | +21.3         | 24    | 119         | 252 f  |      | 16561     | .913     | 277.5      | 238.2         | +8.6          | 28    | 139         | 325 c  |        |        |  |
|         |           | .858     | 285.5      | 270.8    | +15.2         | 119   | 686         | 485 c  |      | 16558     | .493     | 221.7      | 192.2         | -17.6         | 28    | 175         |        |        |        |  |
|         |           | .446     | 278.1      | 238.4    | +7.1          | 17    | 94          |        |      | 16562     | .639     | 62.9       | 135.0         | +20.2         | 64    | 394         | 133 f  |        |        |  |
|         |           | .490     | 138.1      | 192.1    | -17.6         | 46    | 204         |        |      | 16564     | .631     | 67.9       | 134.6         | +17.0         | 1     | 9           |        |        |        |  |
|         |           | .964     | 70.2       | 137.5    | +20.1         | 88    | 709         | 633 c  |      | 16563     | .713     | 112.7      | 130.0         | -12.8         | 5     | 30          |        |        |        |  |
|         |           | .792     | 128.9      |          |               |       | 114         |        |      | 16565     | .992     | 79.3       | 88.8          | +11.2         | 0     | 19          | 317 p  |        |        |  |
|         |           | .856     | 70.0       |          |               |       | 133         |        |      |           | .852     | 126.9      |               |               |       | 164         |        |        |        |  |
|         |           | .925     | 109.1      |          |               |       | 360         |        |      |           | .861     | 63.5       |               |               |       | 339         |        |        |        |  |
| July 10 |           |          |            | (+1.3)   | (212.1)(+3.9) | (294) | (1812)      | (2792) |      |           |          |            |               |               |       | 129         |        |        |        |  |
|         |           |          |            |          |               |       |             |        |      |           |          |            |               |               |       | (126)       | (766)  | (1565) |        |  |
| 191.333 | G         | .975     | 240.3      |          |               |       | 102         |        |      | 194.417   |          | .966       | 285.6         |               |       |             | 131    |        |        |  |
|         |           | .967     | 275.9      |          |               |       | 156         |        |      |           |          | .905       | 277.6         |               |       |             | 107    |        |        |  |
|         |           | .949     | 252.7      |          |               |       | 72          |        |      |           |          | 16561      | .982          | 279.3         | 237.4 | +9.9        | 13     | 47     | 204 f  |  |
|         |           | .943     | 337.2      |          |               |       | 13          |        |      |           |          | 16566      | .890          | 258.9         | 219.6 | -7.9        | 0      | 5      | 153 c  |  |
|         |           | .919     | 294.3      |          |               |       | 262         |        |      |           |          | 16558      | .647          | 236.1         | 192.2 | -17.6       | 29     | 147    |        |  |
|         |           | .861     | 283.5      |          |               |       | 159         |        |      |           |          | 1295c      | .552          | 339.0         | 171.9 | +35.1       | 4      | 26     |        |  |
|         |           | .973     | 291.0      | 275.7    | +21.3         | 4     | 38          | 213 c  |      |           |          | 16562      | .470          | 53.1          | 134.5 | +20.2       | 38     | 306    |        |  |
|         |           | .629     | 284.8      | 271.0    | +15.3         | 62    | 406         | 543 c  |      |           |          | 16564      | .447          | 59.5          | 134.4 | +17.0       | 3      | 8      |        |  |
|         |           | .629     | 277.0      | 237.7    | +7.5          | 16    | 132         |        |      |           |          | 16563      | .549          | 120.7         | 129.2 | -12.4       | 18     | 56     |        |  |
|         |           | .383     | 163.5      | 192.3    | -17.0         | 35    | 188         |        |      |           |          | 16567      | .923          | 82.1          | 90.5  | +8.9        | 3      | 15     | 496 c  |  |
|         |           | .904     | 68.9       | 134.6    | +20.7         | 88    | 589         | 743 c  |      |           |          |            | .903          | 122.5         |       |             |        | 93     |        |  |
|         |           | .954     | 105.5      | 128.0    | -13.5         | 0     | 11          | 62 c   |      |           |          |            | .925          | 72.0          |       |             |        | 151    |        |  |
|         |           | .800     | 116.9      |          |               |       | 105         |        |      |           |          |            |               |               |       |             |        |        |        |  |
|         |           | .836     | 127.1      |          |               |       | 126         |        |      |           |          |            |               |               |       |             |        |        |        |  |
|         |           | .900     | 111.1      |          |               |       | 368         |        |      |           |          |            |               |               |       |             |        |        |        |  |
|         |           | .936     | 120.3      |          |               |       | 146         |        |      |           |          |            |               |               |       |             |        |        |        |  |
| July 11 |           |          |            | (+1.7)   | (198.8)(+4.0) | (205) | (1364)      | (3070) |      | 195.341   | G        | .912       | 278.0         |               |       |             | 154    |        |        |  |
|         |           |          |            |          |               |       |             |        |      |           |          | 16566      | .969          | 260.2         | 219.4 | -6.4        | 0      | 18     | 166 c  |  |
|         |           |          |            |          |               |       |             |        |      |           |          | 16558      | .777          | 242.8         | 192.1 | -17.7       | 29     | 202    | 187 c  |  |
| 192.354 | G         | .971     | 294.0      |          |               |       | 141         |        |      |           |          | 16564      | .279          | 39.6          | 135.1 | +16.7       | 2      | 16     |        |  |
|         |           | .931     | 284.8      |          |               |       | 171         |        |      |           |          | 16562      | .339          | 33.4          | 134.3 | +20.7       | 39     | 200    |        |  |
|         |           | .992     | 285.6      | 268.7    | +16.0         | 34    | 187         | 245 c  |      |           |          | 16563      | .387          | 137.1         | 130.2 | -12.1       | 10     | 60     |        |  |
|         |           | .789     | 277.1      | 237.4    | +8.1          | 32    | 151         | 175 c  |      |           |          | 16567      | .821          | 82.2          | 90.6  | +8.9        | 2      | 6      | 185 c  |  |
|         |           | .386     | 197.6      | 192.3    | -17.4         | 26    | 165         |        |      |           |          | 16565      | .831          | 78.7          | 89.7  | +11.8       | 0      | 6      | 238 c  |  |
|         |           | .786     | 67.0       | 134.9    | +20.5         | 75    | 488         | 631 c  |      |           |          | 16568      | .917          | 79.2          | 79.2  | +11.7       | 2      | 6      | 120 c  |  |
|         |           | .828     | 113.3      |          |               |       | 185         |        |      |           |          | 16569      | .999          | 82.2          | 58.0  | +8.0        | 0      | 94     | 101 p  |  |
|         |           | .912     | 121.0      |          |               |       | 126         |        |      |           |          |            | (+3.6)        | (145.8)(+4.4) |       |             | (84)   | (608)  | (1151) |  |

Group 16562. July 10 - 21. A broken group, slowly declining as it crosses the disk.

Group 16563. July 11 - 20. A stream of small variable spots, not seen on July 12.

Group 16564. July 13 - 15. A pair of tiny spots, appearing immediately south of Group 16562.

Group 16565. July 13 - 15. Return of Group 16540: third appearance. A small spot, seen only on July 13 and 15.

Group 16566. July 14 - 15. Three tiny spots on July 14; a single spot on July 15.

Group 16567. July 14 - 15. With Group 16565, a return of Group 16540: third appearance. A small spot.

Group 16568. July 15 - 26. A stream, quickly developing from a tiny spot when first seen. The leader, a large regular spot, is the most stable component.

Group 16569. July 15 - 27. Return of Group 16542. A fairly stable regular spot.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |   |          |                |          |        |        |             |        |              |   |   |            |               |       |        |             |        |       |
|---|---|----------|----------------|----------|--------|--------|-------------|--------|--------------|---|---|------------|---------------|-------|--------|-------------|--------|-------|
| U.T.  | Group No.                                 | MEASURES |                | POSITION |        | AREA   |             |        | U.T.         | Group No.   | MEASURES  |            | POSITION      |       | AREA   |             |        |       |
|   |   | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |              |   | Dist.   | Pos. Angle | Long.         | Lat.  | Umbræ  | Whole Spots | Faculæ |       |
| 1950  |   |          |                |          |        |        |             |        | 1950         |   |   |            |               |       |        |             |        |       |
| 196.380<br>G  | 16558<br>16562<br>16563<br>16568<br>16569 | .967     | 278.4          | o o      |        |        | 156         |        | 199.589<br>G | 16562<br>16563<br>16568<br>16569<br>1295d<br>16570<br>16571 | .984  | 241.4      | o o           |       |        | 126         |        |       |
|   |   | .927     | 285.8          |          |        |        | 153         |        |              |   |   | .904       | 247.2         |       |        | 174         |        |       |
|   |   | .866     | 293.6          |          |        |        | 80          |        |              |   |   | .884       | 288.4         |       |        | 110         |        |       |
|   |   | .784     | 236.7          |          |        |        | 277         |        |              |   |   | .855       | 237.0         |       |        | 110         |        |       |
|   |   | .895     | 247.8          | 192.1    | -17.5  | 31     | 154         | 433 c  |              |   |   | .726       | 293.3         | 134.6 | +20.1  | 20          | 81     | 126 p |
|   |   | .279     | 345.8          | 136.2    | +20.1  | 13     | 111         |        |              |   |   | .701       | 245.8         | 130.5 | -13.0  | 0           | 13     |       |
|   |   | .286     | 174.0          | 130.3    | -11.9  | 13     | 67          |        |              |   |   | .180       | 47.2          | 81.9  | +11.7  | 105         | 583    |       |
|   |   | .791     | 78.1           | 79.9     | +12.1  | 4      | 17          | 122 c  |              |   |   | .528       | 81.9          | 57.9  | + 8.3  | 67          | 320    |       |
|   |   | .964     | 82.8           | 57.2     | + 8.1  | 68     | 355         | 228 c  |              |   |   | .557       | 68.7          | 57.1  | +15.7  | 1           | 10     |       |
|   |   | .893     | 75.6           |          |        |        | 128         |        |              |   |   | .958       | 104.6         | 18.1. | -12.5  | 103         | 609    | 732 c |
|   |   | .973     | 75.8           |          |        |        | 222         |        |              |   |   | .985       | 86.0          | 9.5   | + 4.8  | 25          | 189    | 212 p |
|   |   | (+4.0)   | (132.0)(+ 4.5) | (129)    | (704)  | (1799) |             |        |              |   |   | .864       | 84.8          |       |        |             | 137    |       |
|   |   |          |                |          |        |        |             |        |              |   |   | .902       | 65.6          |       |        |             | 198    |       |
|   |   |          |                |          |        |        |             |        |              |   |   | .910       | 114.5         |       |        |             | 124    |       |
|   |   |          |                |          |        |        |             |        |              |   |   | .922       | 71.9          |       |        |             | 118    |       |
|   |   |          |                |          |        |        |             |        |              |   |   | .936       | 79.7          |       |        |             | 146    |       |
| July 16   | 197.327<br>G                              | .933     | 293.8          |          |        |        | 269         |        | July 19      | 200.362<br>C  | 16562<br>16563<br>16568<br>16569<br>16570<br>16571          | (+5.4)     | (89.6)(+ 4.8) | (321) | (1805) | (2313)      |        |       |
|   |   | .926     | 246.2          |          |        |        | 272         |        |              |   |   | .954       | 248.6         |       |        |             | 164    |       |
|   |   | .921     | 194.1          |          |        |        | 6           |        |              |   |   | .933       | 241.7         |       |        |             | 92     |       |
|   |   | .877     | 240.8          |          |        |        | 262         |        |              |   |   | .933       | 295.8         |       |        |             | 92     |       |
|   |   | .861     | 202.3          |          |        |        | 5           |        |              |   |   | .915       | 287.0         |       |        |             | 116    |       |
|   |   | .825     | 309.2          |          |        |        | 112         |        |              |   |   | .895       | 250.7         |       |        |             | 99     |       |
|   |   | .813     | 231.4          |          |        |        | 157         |        |              |   |   | .846       | 240.4         |       |        |             | 73     |       |
|   |   | .965     | 250.3          | 191.7    | -17.6  | 13     | 117         | 213 c  |              |   |   | .789       | 300.2         |       |        |             | 63     |       |
|   |   | .381     | 315.4          | 136.0    | +20.1  | 14     | 98          |        |              |   |   | .825       | 290.4         | 134.2 | +19.5  | 10          | 49     | 278 c |
|   |   | .339     | 213.8          | 130.6    | -11.8  | 9      | 123         |        |              |   |   | .768       | 248.6         | 126.3 | -12.9  | 0           | 7      | 90 p  |
|   |   | .629     | 76.1           | 81.0     | +12.3  | 54     | 363         |        |              |   |   | .133       | 337.6         | 82.3  | +11.8  | 96          | 724    |       |
|   |   | .882     | 83.0           | 57.5     | + 8.3  | 58     | 320         | 215 c  |              |   |   | .367       | 79.1          | 58.0  | + 8.5  | 51          | 335    |       |
|   |   | .792     | 76.4           |          |        |        | 142         |        |              |   |   | .889       | 106.1         | 18.7  | -11.9  | 90          | 609    | 466 c |
|   |   | .955     | 69.6           |          |        |        | 231         |        |              |   |   | .943       | 86.4          | 8.7   | + 5.0  | 27          | 212    | 208 c |
|   |   | (+4.4)   | (119.5)(+ 4.6) | (148)    | (1021) | (1884) |             |        |              |   |   | .988       | 102.8         | 359.7 | -11.8  | 13          | 132    | 108 c |
| July 17   | 198.360<br>G                              | .970     | 293.7          |          |        |        | 303         |        | July 20      | 201.493<br>G  | 16562<br>16563<br>16568<br>16569<br>16570<br>16571<br>16572 | (+5.8)     | (79.3)(+ 4.8) | (287) | (2068) | (2283)      |        |       |
|   |   | .955     | 244.5          |          |        |        | 193         |        |              |   |   | .865       | 71.6          |       |        |             | 115    |       |
|   |   | .950     | 252.9          |          |        |        | 145         |        |              |   |   | .905       | 116.6         |       |        |             | 116    |       |
|   |   | .919     | 236.0          |          |        |        | 160         |        |              |   |   | .959       | 56.1          |       |        |             | 97     |       |
|   |   | .918     | 305.3          |          |        |        | 159         |        |              |   |   | (+5.8)     | (79.3)(+ 4.8) | (287) | (2068) | (2283)      |        |       |
|   |   | .548     | 300.5          | 135.9    | +20.2  | 14     | 82          |        |              |   |   | .975       | 251.0         |       |        |             | 128    |       |
|   |   | .503     | 236.2          | 131.0    | -11.9  | 13     | 70          |        |              |   |   | .933       | 243.9         |       |        |             | 126    |       |
|   |   | .418     | 71.7           | 82.0     | +11.8  | 96     | 553         |        |              |   |   | .920       | 254.8         |       |        |             | 209    |       |
|   |   | .745     | 82.9           | 57.6     | + 8.4  | 61     | 326         | 93 f   |              |   |   | .867       | 234.6         |       |        |             | 80     |       |
|   |   | .863     | 69.9           |          |        |        | 192         |        |              |   |   | .797       | 302.8         |       |        |             | 85     |       |
|   |   | .924     | 96.3           |          |        |        | 164         |        |              |   |   | .939       | 288.2         | 134.6 | +18.8  | 3           | 33     | 552 c |
|   |   | .963     | 63.9           |          |        |        | 106         |        |              |   |   | .320       | 293.9         | 81.7  | +12.1  | 115         | 787    |       |
|   |   | .974     | 72.9           |          |        |        | 150         |        |              |   |   | .135       | 63.0          | 57.4  | + 8.4  | 42          | 331    |       |
|   |   | .977     | 85.0           |          |        |        | 292         |        |              |   |   | .212       | 48.0          | 55.1  | +12.9  | 3           | 13     |       |
|   |   | (+4.9)   | (105.8)(+ 4.7) | (184)    | (1031) | (1957) |             |        |              |   |   |            |               |       |        |             |        |       |

Group 16570. July 19 - 31. A stable regular spot, followed by a few small companions until July 25.

Group 16571. July 19 - 29. A small regular spot, with a few variable companions. On July 26 it begins to disintegrate and soon dies out.

Group 16572. July 20 - 31. A small persistent spot.

Group 16573. July 21 - 27. A small variable group, appearing immediately north of Group 16569.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |               | POSITION      |       | AREA  |             |        | U.T.    | Group No. | MEASURES |                | POSITION |                | AREA  |             |                      |       |
|---------|-----------|----------|---------------|---------------|-------|-------|-------------|--------|---------|-----------|----------|----------------|----------|----------------|-------|-------------|----------------------|-------|
|         |           | Dist.    | Pos. Angle    | Long.         | Lat.  | Umbræ | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle     | Long.    | Lat.           | Umbræ | Whole Spots | Faculæ               |       |
| 1950    | 16570     | .756     | 110.2         | 18.2          | -11.7 | 126   | 628         | 356 f  | 1950    |           | .902     | 114.2          | o        | o              |       |             | 159                  |       |
|         | 16571     | .827     | 87.2          | 8.6           | + 5.0 | 39    | 209         | 150 n  |         |           | .932     | 73.5           |          |                |       |             | 267                  |       |
|         | 16572     | .919     | 105.4         | 359.7         | -12.1 | 18    | 96          | 167 c  |         |           | .946     | 83.2           |          |                |       |             | 122                  |       |
|         |           | .798     | 119.0         |               |       |       |             | 149    |         |           | (+7.5)   | (26.1)(+ 5.2)  |          |                |       |             | (326) (1782) (1463)  |       |
|         |           | .911     | 78.1          |               |       |       |             | 96     |         |           |          |                |          |                |       |             |                      |       |
| July 21 |           |          | (+6.2)        | (64.4)(+ 4.9) |       | (346) | (2097)      | (2098) | July 24 | 205.642   | .912     | 288.2          |          |                |       |             | 182                  |       |
| 202.387 | G         | .975     | 254.7         |               |       |       |             | 152    |         |           | .955     | 281.0          | 82.7     | +12.1          | 115   | 535         | 845 c                |       |
|         |           | .956     | 238.0         |               |       |       |             | 97     |         |           | .770     | 281.1          | 59.8     | +11.9          | 5     | 20          | 90 c                 |       |
|         |           | .935     | 294.4         |               |       |       |             | 512    |         |           | .751     | 275.8          | 58.2     | + 7.8          | 46    | 212         | 134 c                |       |
|         | 16568     | .510     | 285.8         | 82.5          | +12.3 | 125   | 758         |        |         |           | .323     | 208.0          | 18.4     | -11.3          | 103   | 574         |                      |       |
|         | 16569     | .111     | 301.6         | 58.0          | + 8.3 | 44    | 188         |        |         |           | .013     | 141.8          | 9.0      | + 4.7          | 18    | 72          |                      |       |
|         | 16573     | .135     | 327.7         | 56.7          | +11.5 | 9     | 93          |        |         |           | .344     | 151.6          | 359.9    | -12.3          | 5     | 25          |                      |       |
|         | 16574     | .331     | 93.2          | 33.3          | + 3.7 | 4     | 12          |        |         |           | .440     | 136.6          | 351.5    | -13.5          | 0     | 5           |                      |       |
|         | 16570     | .618     | 116.0         | 18.1          | -11.5 | 124   | 672         |        |         |           | .488     | 141.3          | 350.9    | -17.3          | 4     | 29          |                      |       |
|         | 16571     | .685     | 87.7          | 9.3           | + 5.2 | 44    | 233         |        |         |           | .860     | 106.0          | 312.4    | -10.8          | 44    | 210         | 469 c                |       |
|         | 16572     | .819     | 109.0         | 0.2           | -12.4 | 12    | 86          | 158 f  |         |           | .797     | 72.2           |          |                |       |             | 434                  |       |
|         |           | .852     | 79.3          |               |       |       |             | 207    |         |           | .952     | 71.2           |          |                |       |             | 242                  |       |
|         |           | .963     | 80.0          |               |       |       |             | 190    |         |           | (+8.0)   | (9.5)(+ 5.3)   |          |                |       |             | (340) (1682) (2396)  |       |
| July 22 |           | (+6.6)   | (52.5)(+ 5.0) |               |       | (362) | (2042)      | (1316) | July 25 | 206.377   | 16568    | .991           | 281.8    | 82.8           | +12.4 | 108         | 523                  | 536 f |
| 203.418 | G         | .978     | 295.5         |               |       |       |             | 108    |         |           | 16569    | .852           | 276.3    | 58.4           | + 8.2 | 42          | 201                  | 265 c |
|         |           | .880     | 279.0         |               |       |       |             | 191    |         |           | 16573    | .833           | 279.9    | 56.4           | +11.2 | 6           | 35                   | 406 n |
|         |           | .852     | 288.1         |               |       |       |             | 142    |         |           | 16570    | .421           | 228.9    | 18.6           | -10.9 | 122         | 563                  |       |
|         | 16568     | .694     | 282.3         | 82.6          | +12.2 | 108   | 657         |        |         |           | 16571    | .162           | 267.9    | 9.1            | + 5.0 | 15          | 112                  |       |
|         | 16569     | .333     | 279.9         | 58.2          | + 8.1 | 58    | 259         |        |         |           | 16572    | .303           | 179.7    | 359.7          | -12.1 | 5           | 19                   |       |
|         | 16573     | .339     | 291.7         | 57.6          | +12.0 | 22    | 128         |        |         |           | 16576    | .415           | 158.2    | 350.6          | -17.2 | 18          | 82                   |       |
|         | 16574     | .076     | 98.5          | 34.6          | + 4.5 | 4     | 23          |        |         |           | 16575    | .763           | 109.1    | 312.8          | -10.8 | 64          | 337                  | 235 c |
|         | 16570     | .449     | 128.7         | 18.0          | -11.4 | 138   | 677         |        |         |           | 16577    | .967           | 111.8    | 287.8          | -19.4 | 4           | 23                   | 106 c |
|         | 16571     | .492     | 87.1          | 9.4           | + 5.9 | 31    | 177         |        |         |           | .925     | 92.7           |          |                |       |             | 255                  |       |
|         | 16572     | .674     | 115.1         | 0.3           | -12.6 | 10    | 73          |        |         |           | .970     | 77.7           |          |                |       |             | 347                  |       |
|         |           | .811     | 113.9         |               |       |       |             | 117    |         |           | (+8.3)   | (359.8)(+ 5.4) |          |                |       |             | (384) (1895) (2150). |       |
|         |           | .920     | 81.5          |               |       |       |             | 261    |         |           |          |                |          |                |       |             | 225                  |       |
|         |           | .958     | 109.9         |               |       |       |             | 138    |         |           |          |                |          |                |       |             | 115                  |       |
| July 23 |           | (+7.1)   | (38.9)(+ 5.1) |               |       | (371) | (1994)      | (957)  | July 26 | 207.335   | G        | .902           | 288.9    |                |       |             |                      |       |
| 204.388 | G         | .919     | 288.6         |               |       |       |             | 110    |         |           | .869     | 252.5          |          |                |       |             |                      |       |
|         | 16568     | .832     | 281.0         | 82.5          | +12.1 | 95    | 551         | 451 c  |         |           | 16569    | .946           | 276.6    | 58.4           | + 8.0 | 49          | 220                  | 189 c |
|         | 16569     | .534     | 276.9         | 58.3          | + 8.1 | 51    | 244         |        |         |           | 16573    | .935           | 279.9    | 56.7           | +11.2 | 0           | 10                   | 177 c |
|         | 16573     | .528     | 284.3         | 57.5          | +11.9 | 8     | 55          |        |         |           | 16570    | .580           | 242.4    | 18.5           | -11.0 | 136         | 561                  |       |
|         | 16574     | .167     | 262.7         | 35.6          | + 3.9 | 3     | 8           |        |         |           | 16571    | .379           | 269.3    | 9.4            | + 4.7 | 14          | 82                   |       |
|         | 16570     | .319     | 155.2         | 18.3          | -11.6 | 116   | 663         |        |         |           | 16572    | .369           | 214.6    | 359.4          | -12.3 | 3           | 8                    |       |
|         | 16571     | .288     | 89.3          | 9.4           | + 5.2 | 31    | 172         |        |         |           | 16576    | .392           | 188.5    | 350.6          | -17.3 | 17          | 85                   |       |
|         | 16572     | .519     | 124.6         | 0.3           | -12.4 | 13    | 44          |        |         |           | 1296a    | .025           | 35.1     | 346.3          | + 6.5 | 4           | 24                   |       |
|         | 16575     | .962     | 103.2         | 313.7         | -11.1 | 9     | 45          | 210 c  |         |           | 16575    | .657           | 114.3    | 309.6          | -11.4 | 80          | 470                  |       |
|         |           | .820     | 80.5          |               |       |       |             | 144    |         |           | 16577    | .895           | 114.9    | 287.9          | -19.4 | 6           | 18                   | 159 c |
|         |           |          |               |               |       |       |             |        |         |           | .913     | 79.8           |          |                |       |             | 306                  |       |
|         |           |          |               |               |       |       |             |        |         |           | .976     | 70.1           | (+8.7)   | (347.1)(+ 5.4) |       |             |                      | 259   |
|         |           |          |               |               |       |       |             |        |         |           |          |                |          |                |       |             | (309) (1478) (1430)  |       |

Group 16574. July 22 - 24. A small spot.

Group 16575. July 24-Aug. 3. A stream of small spots, undergoing minor changes before dying out.

Group 16576. July 25 - 29. A few small variable spots.

Group 16577. July 26 - 29. A small spot.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |                | POSITION |        | AREA   |             |        | U.T.    | Group No. | MEASURES |                | POSITION |        | AREA   |             |        |
|---------|-----------|----------|----------------|----------|--------|--------|-------------|--------|---------|-----------|----------|----------------|----------|--------|--------|-------------|--------|
|         |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |
| 1950    |           |          |                | o        | o      |        |             |        | 1950    |           |          |                | o        | o      |        |             |        |
| 208.594 | G         | .970     | 252.7          |          |        |        | 210         |        | 211.330 | C         | .972     | 273.9          |          |        |        | 163         |        |
|         |           | .958     | 291.9          |          |        |        | 138         |        |         |           | .923     | 279.7          |          |        |        | 346         |        |
|         |           | .865     | 292.1          |          |        |        | 148         |        |         |           | .860     | 246.8          |          |        |        | 162         |        |
|         | 16578     | .832     | 274.6          | 26.8     | + 6.8  | 14     | 87          | 263 f  |         |           | .797     | 286.3          |          |        |        | 92          |        |
|         | 16570     | .775     | 251.1          | 18.5     | -10.8  | 96     | 449         | 668 c  | 16570   |           | .996     | 258.8          | 17.6     | -10.5  | 48     | 223         | 289 s  |
|         | 16571     | .632     | 270.4          | 9.6      | + 4.5  | 4      | 15          |        | 16572   |           | .928     | 253.4          | 359.9    | -13.1  | 0      | 12          | 88 c   |
|         | 16572     | .559     | 237.3          | 359.1    | -12.7  | 1      | 7           |        | 16575   |           | .384     | 217.5          | 308.0    | -12.1  | 23     | 198         |        |
|         | 16576     | .502     | 219.5          | 349.9    | -17.5  | 10     | 59          |        | 16579   |           | .712     | 84.8           | 248.7    | + 7.7  | 33     | 179         | 102 f  |
|         | 16575     | .472     | 128.5          | 308.3    | -11.9  | 65     | 346         |        | 16581   |           | .863     | 103.8          | 236.4    | - 8.8  | 124    | 864         | 454 c  |
|         | 16577     | .752     | 121.7          | 287.9    | -19.2  | 2      | 9           | 89 c   |         |           | .832     | 73.6           |          |        |        | 101         |        |
|         | 1296b     | .903     | 70.4           | 265.7    | +20.1  | 0      | 2           |        |         |           | .896     | 84.6           |          |        |        | 138         |        |
|         | 16579     | .989     | 83.1           | 248.6    | + 7.7  | 39     | 197         | 103 c  | July 31 |           | (+10.4)  | (294.2)(+ 5.7) | (228)    | (1476) | (1935) |             |        |
|         |           | .795     | 75.7           |          |        |        | 207         |        |         |           |          |                |          |        |        |             |        |
|         |           | .903     | 67.7           |          |        |        | 503         |        |         |           |          |                |          |        |        | 191         |        |
|         |           | .922     | 79.9           |          |        |        | 324         |        | 212.345 | G         | .964     | 280.2          |          |        |        | 299         |        |
| July 28 |           | (+9.3)   | (330.4)(+ 5.5) | (231)    | (1171) | (2653) |             |        |         |           | .959     | 250.6          |          |        |        | 126         |        |
|         |           |          |                |          |        |        |             |        |         |           | .914     | 286.6          |          |        |        | 121         |        |
|         | 209.322   | .898     | 302.4          |          |        |        | 118         |        | 16575   | .537      | 235.6    | 307.7          | -12.5    | 31     | 145    |             |        |
|         | G         | .869     | 240.1          |          |        |        | 92          |        | 16579   | .528      | 84.6     | 248.9          | + 7.8    | 28     | 158    |             |        |
|         | 16578     | .909     | 274.3          | 26.3     | + 6.3  | 21     | 118         | 275 c  | 16581   | .726      | 108.6    | 236.8          | - 9.2    | 118    | 769    | 272 c       |        |
|         | 16570     | .867     | 254.0          | 18.6     | -10.8  | 106    | 536         | 569 s  | 16582   | .735      | 82.4     | 233.4          | + 9.5    | 8      | 34     | 53 f        |        |
|         | 16571     | .756     | 271.2          | 9.9      | + 4.6  | 4      | 17          | 73 c   | 16583   | .813      | 104.5    | 228.3          | - 8.2    | 12     | 37     | 147 f       |        |
|         | 16572     | .684     | 244.4          | 359.9    | -12.8  | 3      | 11          |        | 16584   | .992      | 107.6    | 200.4          | -16.6    | 0      | 27     | 355 c       |        |
|         | 16576     | .606     | 230.2          | 350.0    | -17.9  | 3      | 22          |        |         | .924      | 65.4     |                |          |        | 133    |             |        |
|         | 16575     | .362     | 145.6          | 308.8    | -11.8  | 64     | 321         |        |         | .941      | 76.8     |                |          |        | 134    |             |        |
|         | 16577     | .652     | 128.3          | 288.2    | -19.1  | 0      | 5           |        |         | .959      | 169.6    |                |          |        | 9      |             |        |
|         | 16580     | .826     | 101.1          | 266.4    | - 5.9  | 6      | 30          | 51 c   | Aug. 1  |           | (+10.8)  | (280.8)(+ 5.8) | (197)    | (1170) | (1840) |             |        |
|         | 1296c     | .839     | 81.6           | 263.6    | +10.1  | 2      | 11          | 115 n  |         |           |          |                |          |        |        |             |        |
|         | 16579     | .953     | 83.8           | 248.2    | + 7.6  | 52     | 222         | 407 c  |         |           |          |                |          |        |        |             |        |
|         | 16581     | .993     | 97.9           | 238.7    | - 7.1  | 37     | 114         | 75 c   | 213.362 |           | .975     | 285.2          |          |        |        | 126         |        |
|         |           | .810     | 71.2           |          |        |        | 167         |        |         |           | .942     | 299.2          |          |        |        | 101         |        |
| July 29 |           | .887     | 62.4           |          |        |        | 123         |        |         |           | .933     | 278.4          |          |        |        | 267         |        |
|         |           | (+9.6)   | (320.8)(+ 5.6) | (298)    | (1407) | (2065) |             |        |         |           | .903     | 246.8          |          |        |        | 106         |        |
|         | 210.585   | .943     | 248.9          |          |        |        | 247         |        | 16575   | .682      | 244.8    | 306.4          | -12.3    | 13     | 73     | 176 c       |        |
|         | C         | .885     | 275.9          |          |        |        | 190         |        | 16580   | .249      | 176.4    | 266.5          | - 8.4    | 1      | 7      |             |        |
|         | 16570     | .969     | 257.6          | 18.1     | -10.5  | 62     | 422         | 259 c  | 16579   | .315      | 84.4     | 249.1          | + 7.4    | 33     | 160    |             |        |
|         | 16572     | .838     | 250.6          | 358.0    | -12.8  | 2      | 12          | 77 c   | 16581   | .563      | 116.4    | 236.8          | - 9.4    | 135    | 753    |             |        |
|         | 16575     | .308     | 194.5          | 308.6    | -11.5  | 39     | 220         |        | 16582   | .562      | 81.8     | 233.2          | + 9.4    | 11     | 49     |             |        |
|         | 16579     | .822     | 84.5           | 248.7    | + 7.8  | 37     | 165         | 138 f  | 16583   | .652      | 110.2    | 229.4          | - 8.3    | 6      | 32     |             |        |
|         | 16581     | .936     | 101.6          | 236.3    | - 8.7  | 117    | 682         | 225 c  | 16584   | .947      | 112.1    | 199.7          | -18.7    | 24     | 189    | 311 c       |        |
| July 30 |           | .898     | 75.3           |          |        |        | 76          |        |         |           | .922     | 75.9           |          |        |        | 175         |        |
|         |           | (+10.1)  | (304.1)(+ 5.7) | (257)    | (1501) | (1212) |             |        |         |           | .950     | 67.3           |          |        |        | 163         |        |
|         |           |          |                |          |        |        |             |        | Aug. 2  |           | .987     | 112.0          |          |        |        | 312         |        |
|         |           |          |                |          |        |        |             |        |         |           | (+11.2)  | (267.4)(+ 5.9) | (223)    | (1263) | (1737) |             |        |

Group 16578. July 28 - 29. A cluster of small spots.

Group 16579. July 28 - Aug. 9. A regular spot, with some small close companions from August 7.

Group 16580. July 29 - Aug. 2. A pair of small spots, seen only on July 29 and August 2.

Group 16581. July 29-Aug. 10. A group which is at first bi-polar; on August 3 other spots appear in front of the leader and between the main components to form a stream. As the whole diminishes, the follower becomes a small well-defined regular spot.

Group 16582. Aug. 1 - 3. A few small spots.

Group 16583. Aug. 1 - 4. Two or three small spots, closely following Group 16581.

Group 16584. Aug. 1 - 13. A regular spot, followed by a few small changing spots until August 8.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |                | POSITION |        | AREA   |             |        | U.T.    | Group No. | MEASURES |            | POSITION      |                | AREA  |             |        |        |
|---------|-----------|----------|----------------|----------|--------|--------|-------------|--------|---------|-----------|----------|------------|---------------|----------------|-------|-------------|--------|--------|
|         |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle | Long.         | Lat.           | Umbræ | Whole Spots | Faculæ |        |
| 1950    |           |          |                | o        | o      |        |             |        | 1950    |           |          |            | o             | o              |       |             |        |        |
| 214.329 | G         | .970     | 279.1          |          |        |        | 139         |        |         | Aug. 6    |          | .962       | 71.3          |                |       |             | 342    |        |
|         |           | .960     | 250.0          |          |        |        | 141         |        |         |           |          | (+12.7)    | (214)9(+ 6.2) |                |       | (212)       | (1449) | (1169) |
|         |           | .902     | 257.6          |          |        |        | 106         |        |         |           |          |            |               |                |       |             |        |        |
|         |           | .888     | 285.4          |          |        |        | 272         |        |         |           |          |            |               |                |       |             |        |        |
|         | 16575     | .814     | 249.5          | 305.8    | -12.8  | 8      | 36          | 202 c  | 218.382 | G         | .982     | 284.1      |               |                |       |             | 179    |        |
|         | 16579     | .097     | 75.4           | 249.2    | + 7.4  | 33     | 174         |        |         |           | .963     | 271.0      |               |                |       |             | 146    |        |
|         | 16581     | .379     | 131.4          | 238.0    | - 8.7  | 107    | 1104        |        |         |           | .946     | 255.2      |               |                |       |             | 157    |        |
|         | 16582     | .382     | 79.1           | 232.3    | + 9.7  | 4      | 13          |        |         |           | .910     | 301.3      |               |                |       |             | 109    |        |
|         | 16583     | .507     | 118.4          | 227.9    | - 8.6  | 4      | 17          |        |         |           | .900     | 278.9      |               |                |       |             | 156    |        |
|         | 16584     | .838     | 115.4          | 202.3    | -17.5  | 47     | 243         | 185 c  |         |           | .893     | 291.7      |               |                |       |             | 328    |        |
|         |           | .936     | 61.8           |          |        |        | 112         |        |         |           | 16579    | .746       | 274.9         | 249.4          | + 7.8 | 33          | 202    | 36 f   |
|         |           | .946     | 113.6          |          |        |        | 348         |        |         |           | 16581    | .624       | 247.5         | 236.5          | - 8.7 | 89          | 751    |        |
| Aug. 3  |           | (+11.6)  | (254.6)(+ 6.0) | (203)    | (1587) | (1505) |             |        |         |           | 16584    | .394       | 188.3         | 204.4          | -16.7 | 29          | 194    |        |
|         |           |          |                |          |        |        |             |        |         |           | 16586    | .469       | 152.4         | 187.8          | -18.5 | 1           | 9      |        |
|         |           |          |                |          |        |        |             |        |         |           | 16585    | .915       | 104.3         | 136.9          | -10.4 | 11          | 113    | 267 f  |
|         |           |          |                |          |        |        |             |        |         |           | .834     | 117.9      |               |                |       |             | 185    |        |
| 215.326 | G         | .932     | 254.0          |          |        |        | 405         |        |         |           | .865     | 73.5       |               |                |       |             | 181    |        |
|         |           | .855     | 286.2          |          |        |        | 165         |        |         |           | .922     | 67.9       |               |                |       |             | 220    |        |
|         | 16579     | .139     | 280.2          | 249.3    | + 7.4  | 36     | 162         |        | Aug. 7  |           | .964     | 114.5      | (+13.1)       | (201.0)(+ 6.2) | (163) | (1269)      | (2134) | 170    |
|         | 16581     | .275     | 161.4          | 236.3    | - 9.7  | 178    | 1126        |        |         |           |          |            |               |                |       |             | 267    |        |
|         | 16583     | .350     | 135.0          | 227.0    | - 8.5  | 3      | 11          |        |         |           |          |            |               |                |       |             | 163    |        |
|         | 16584     | .713     | 121.7          | 202.1    | -17.3  | 41     | 273         | 89 f   |         |           |          |            |               |                |       |             | 123    |        |
|         |           | .850     | 118.1          |          |        |        | 215         |        |         |           | 16579    | .876       | 275.3         | 249.3          | + 7.7 | 31          | 214    | 237 f  |
|         |           | .940     | 116.9          |          |        |        | 232         |        |         |           | 16581    | .779       | 253.0         | 236.7          | - 9.0 | 122         | 544    | 475 c  |
| Aug. 4  |           | (+12.0)  | (241.4)(+ 6.0) | (258)    | (1572) | (1106) |             |        |         |           | 16584    | .473       | 215.0         | 204.3          | -16.7 | 31          | 179    |        |
|         |           |          |                |          |        |        |             |        |         |           | 16586    | .422       | 181.9         | 188.7          | -18.5 | 4           | 9      |        |
|         |           |          |                |          |        |        |             |        |         |           | 16585    | .808       | 107.5         | 136.6          | -10.1 | 21          | 104    | 305 f  |
| 216.328 | C         | .974     | 255.9          |          |        |        | 217         |        |         |           | .762     | 66.4       |               |                |       |             | 125    |        |
|         | 16579     | .361     | 275.5          | 249.3    | + 7.7  | 28     | 176         |        |         |           | .889     | 65.8       |               |                |       |             | 259    |        |
|         | 16581     | .293     | 207.3          | 235.9    | - 9.0  | 118    | 934         |        |         |           | .917     | 118.1      |               |                |       |             | 170    |        |
|         | 16584     | .562     | 133.1          | 202.8    | -17.0  | 37     | 261         |        |         |           | .964     | 70.1       | (+13.5)       | (187.9)(+ 6.3) | (209) | (1050)      | (2190) | 191    |
| Aug. 5  |           | .857     | 120.1          |          |        |        | 192         |        | Aug. 8  |           |          |            |               |                |       |             |        |        |
|         |           | (+12.3)  | (228.1)(+ 6.1) | (183)    | (1371) | (409)  |             |        |         |           | .884     | 281.8      |               |                |       |             | 141    |        |
|         |           |          |                |          |        |        |             |        |         |           | .792     | 250.1      |               |                |       |             | 136    |        |
| 217.328 | C         | .938     | 278.5          |          |        |        | 127         |        |         |           | 16579    | .961       | 275.9         | 249.4          | + 7.4 | 16          | 209    | 163 c  |
|         |           | .922     | 285.5          |          |        |        | 128         |        |         |           | 16581    | .894       | 256.9         | 236.6          | - 8.7 | 43          | 457    | 327 c  |
|         |           | .801     | 292.3          |          |        |        | 158         |        |         |           | 16584    | .599       | 231.1         | 204.1          | -16.5 | 36          | 187    |        |
|         | 16579     | .565     | 274.5          | 249.4    | + 7.7  | 29     | 170         |        |         |           | 16586    | .460       | 207.8         | 188.1          | -17.8 | 5           | 32     |        |
|         | 16581     | .442     | 235.9          | 236.5    | - 8.5  | 106    | 901         |        |         |           | 16587    | .632       | 69.9          | 136.8          | +17.5 | 1           | 8      |        |
|         | 16584     | .441     | 153.7          | 203.2    | -17.1  | 47     | 244         |        |         |           | 16585    | .671       | 113.0         | 136.4          | -10.3 | 18          | 100    |        |
|         | 16585     | .984     | 102.0          | 136.9    | -10.5  | 30     | 134         | 136 c  |         |           | .882     | 62.9       | (+13.9)       | (175.1)(+ 6.3) | (119) | (993)       | (941)  | 174    |
|         |           | .868     | 126.3          |          |        |        | 123         |        |         |           |          |            |               |                |       |             |        |        |
|         |           | .920     | 112.7          |          |        |        | 155         |        | Aug. 9  |           |          |            |               |                |       |             |        |        |

Group 16585. Aug. 6 - 14. A slowly-diminishing regular spot.

Group 16586. Aug. 7 - 13. A few small variable spots.

Group 16587. Aug. 9 - 17. A small stream, which goes through its life-history on the disk. On August 12 and 13 the leader is a small regular spot.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |                |          |        |        |             |        |         |           |                |               |          |       |        |             |        |
|---|-----------|----------|----------------|----------|--------|--------|-------------|--------|---------|-----------|----------------|---------------|----------|-------|--------|-------------|--------|
| U.T.  | Group No. | MEASURES |                | POSITION |        | AREA   |             |        | U.T.    | Group No. | MEASURES       |               | POSITION |       | AREA   |             |        |
|   |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.          | Pos. Angle    | Long.    | Lat.  | Umbræ  | Whole Spots | Faculæ |
| 1950  |           |          |                | o        | o      |        |             |        | 1950    |           |                |               | o        | o     |        |             |        |
| 221.648   | G         | .960     | 278.7          |          |        |        | 121         |        | 16589   | .978      | 247.3          | 195.2         | -20.5    | 27    | 158    | 205 c       |        |
|   |           | .947     | 270.5          |          |        |        | 142         |        | 16586   | .941      | 248.5          | 187.5         | -17.6    | 3     | 34     | 134 n       |        |
|   |           | .943     | 287.4          |          |        |        | 102         |        | 16587   | .402      | 294.4          | 143.2         | +15.6    | 23    | 190    |             |        |
|   | 16581     | .983     | 259.7          | 235.8    | -8.9   | 54     | 357         | 957 f  | 16585   | .374      | 223.3          | 136.0         | -9.3     | 5     | 32     |             |        |
|   | 16584     | .777     | 242.5          | 203.6    | -16.6  | 42     | 177         | 92 c   | 16588   | .629      | 75.6           | 82.2          | +14.2    | 29    | 463    |             |        |
|   | 16586     | .610     | 231.9          | 187.7    | -16.5  | 1      | 4           |        | 16590   | .898      | 83.7           | 56.7          | +8.6     | 26    | 155    | 147 c       |        |
|   | 16587     | .336     | 59.9           | 140.3    | +15.8  | 22     | 93          |        |         | .875      | 70.6           |               |          |       |        | 152         |        |
|   | 16585     | .456     | 127.4          | 136.3    | -10.1  | 18     | 105         |        |         | (+15.3)   | (121.0)(+ 6.6) |               |          |       |        |             |        |
|   | 16588     | .966     | 77.3           | 82.0     | +13.9  | 27     | 186         | 770 c  |         |           |                |               |          |       |        |             |        |
|   |           | .803     | 54.5           |          |        |        | 66          |        |         |           |                |               |          |       |        |             |        |
|   |           | .856     | 79.1           |          |        |        | 143         |        | 225.319 | .909      | 237.2          |               |          |       |        | 177         |        |
|   |           | .925     | 59.1           |          |        |        | 134         |        | G       | .994      | 248.6          | 189.8         | -20.3    | 40    | 233    | 338 n       |        |
| Aug. 10   |           | (+14.3)  | (157.8)(+ 6.4) | (164)    | (922)  | (2527) |             |        | 16587   | .573      | 287.6          | 143.7         | +15.4    | 17    | 121    |             |        |
|   |           |          |                |          |        |        |             |        | 16585   | .517      | 238.8          | 135.8         | -9.6     | 1     | 5      |             |        |
|   |           |          |                |          |        |        |             |        | 16588   | .466      | 71.6           | 82.3          | +14.4    | 55    | 368    |             |        |
|   | 222.322   | .968     | 257.6          |          |        |        | 247         |        | 16590   | .790      | 84.6           | 56.9          | +8.3     | 26    | 154    | 74 s        |        |
|   | G         | .871     | 276.8          |          |        |        | 138         |        |         |           |                |               |          |       |        | 331         |        |
|   | 16584     | .858     | 246.2          | 203.7    | -16.5  | 38     | 198         | 190 sf |         |           |                |               |          |       |        | 179         |        |
|   | 16586     | .708     | 238.4          | 187.8    | -16.7  | 1      | 11          |        |         |           |                |               |          |       |        |             |        |
|   | 16587     | .202     | 39.4           | 141.3    | +15.4  | 32     | 246         |        |         |           |                |               |          |       |        |             |        |
|   | 16585     | .347     | 142.9          | 136.7    | -9.7   | 13     | 91          |        |         |           |                |               |          |       |        |             |        |
|   | 16588     | .918     | 77.2           | 81.7     | +14.3  | 26     | 158         | 413 c  |         | 226.325   | .942           | 234.4         |          |       |        | 129         |        |
|   |           | .860     | 56.0           |          |        |        | 155         |        | C       | .855      | 241.5          |               |          |       | 84     |             |        |
|   |           | .915     | 47.4           |          |        |        | 169         |        | 16587   | .725      | 284.7          | 142.4         | +15.2    | 10    | 37     | 85 c        |        |
| Aug. 11   |           | (+14.6)  | (148.9)(+ 6.5) | (110)    | (704)  | (1312) |             |        | 16588   | .257      | 57.8           | 83.1          | +14.4    | 89    | 545    |             |        |
|   |           |          |                |          |        |        |             |        | 16589   | .630      | 85.2           | 56.8          | +8.2     | 28    | 161    |             |        |
|   |           |          |                |          |        |        |             |        | 16590   | .956      | 109.0          | 26.2          | -15.9    | 3     | 22     | 174 c       |        |
|   | 223.330   | .948     | 182.3          |          |        |        | 11          |        | 16591   | .979      | 102.1          | 19.5          | -10.4    | 74    | 403    | 289 c       |        |
|   | G         | .924     | 335.3          |          |        |        | 12          |        | 16592   | .862      | 86.6           |               |          |       |        | 173         |        |
|   | 16584     | .834     | 233.4          |          |        |        | 155         |        |         |           | (+16.0)        | (96.0)(+ 6.7) |          |       |        |             |        |
|   |           | .947     | 249.9          | 203.5    | -16.6  | 32     | 166         | 222 sf |         |           |                |               |          |       |        |             |        |
|   | 16589     | .905     | 243.2          | 195.2    | -20.9  | 6      | 19          | 65 c   |         |           |                |               |          |       |        |             |        |
|   | 16586     | .834     | 243.4          | 187.0    | -17.9  | 4      | 19          | 103 n  | 227.325 | .934      | 246.5          |               |          |       |        | 142         |        |
|   | 16587     | .194     | 324.6          | 142.3    | +15.5  | 43     | 240         |        | G       | .932      | 287.1          |               |          |       |        | 124         |        |
|   | 16585     | .280     | 182.5          | 136.3    | -9.7   | 12     | 69          |        |         | .903      | 238.6          |               |          |       |        | 66          |        |
|   | 16588     | .802     | 76.9           | 82.1     | +14.4  | 38     | 348         | 423 c  |         |           | .826           | 251.3         |          |       |        |             |        |
|   | 16590     | .978     | 82.5           | 57.1     | + 8.7  | 33     | 150         | 239 c  |         |           | .818           | 291.9         |          |       |        |             |        |
|   |           | .832     | 88.8           |          |        |        | 144         |        | 16587   | .864      | 283.3          | 143.0         | +14.8    | 5     | 23     | 297 c       |        |
|   |           | .960     | 71.9           |          |        |        | 181         |        | 16588   | .132      | 358.4          | 83.0          | +14.2    | 74    | 547    |             |        |
| Aug. 12   |           | (+14.9)  | (135.6)(+ 6.5) | (168)    | (1011) | (1555) |             |        | 16589   | .148      | 60.3           | 75.3          | +10.8    | 1     | 9      |             |        |
|   |           |          |                |          |        |        |             |        | 16590   | .437      | 84.9           | 56.8          | +8.2     | 27    | 142    |             |        |
|   |           |          |                |          |        |        |             |        | 16591   | .871      | 112.3          | 26.2          | -15.7    | 7     | 25     | 149 sf      |        |
|   | 224.433   | .943     | 237.1          |          |        |        | 203         |        | 16592   | .916      | 104.8          | 18.7          | -10.7    | 99    | 484    | 504 c       |        |
|   | G         | .939     | 286.5          |          |        |        | 131         |        | 16594   | .928      | 77.2           | 14.0          | +14.4    | 12    | 28     | 160 c       |        |
|   |           | .910     | 296.1          |          |        |        | 217         |        |         |           |                |               |          |       |        | 108         |        |
|   |           | .837     | 229.5          |          |        |        | 125         |        |         |           |                |               |          |       |        | 189         |        |
|   | 16584     | .997     | 252.9          | 204.2    | -16.4  | 0      | 43          |        | Aug. 16 |           | (+16.3)        | (82.8)(+ 6.7) |          | (225) | (1258) | (2027)      |        |

Group 16588. Aug. 10 - 21. Return of Group 16588. A cluster of spots which coalesces to form a composite spot for a few days. After August 17 the whole rapidly disintegrates, and disappears before reaching the limb.  
 Group 16589. Aug. 12 - 14. A group forming near the west limb and growing as it passes out of sight.  
 Group 16590. Aug. 12 - 24. Return of Group 16589: third appearance. A slowly-diminishing regular spot.  
 Group 16591. Aug. 15 - 20. One or two small spots.  
 Group 16592. Aug. 15 - 26. Return of Group 16570. A stable regular spot, with occasional companions.  
 Group 16593. Aug. 16 - 21. A few small changing spots, immediately following Group 16588.  
 Group 16594. Aug. 16 - 27. A stream, whose follower is the largest and most stable component until August 22, after which it quickly breaks up.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |            | POSITION      |       | AREA   |             |        | U.T.    | Group No. | MEASURES |            | POSITION      |       | AREA   |             |        |        |
|---------|-----------|----------|------------|---------------|-------|--------|-------------|--------|---------|-----------|----------|------------|---------------|-------|--------|-------------|--------|--------|
|         |           | Dist.    | Pos. Angle | Long.         | Lat.  | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle | Long.         | Lat.  | Umbræ  | Whole Spots | Faculæ |        |
| 1950    |           |          |            | o             | o     |        |             |        | 1950    |           |          |            | o             | o     |        |             |        |        |
| 228.383 | G         | .934     | 256.7      |               |       |        | 94          |        | 231.430 | C         | .967     | 296.9      |               |       |        | 106         |        |        |
|         |           | .928     | 291.1      |               |       |        | 182         |        |         |           | .941     | 278.9      |               |       |        | 128         |        |        |
|         |           | .892     | 248.8      |               |       |        | 163         |        |         |           | .859     | 305.7      |               |       |        | 107         |        |        |
|         |           | 16587    | .959       | 284.3         | 143.2 | +15.6  | 3           | 16     | 184 c   |           | 16588    | .815       | 282.7         | 83.4  | +14.3  | 3           | 19     | 149 nf |
|         |           |          | .271       | 299.9         | 82.8  | +14.4  | 57          | 388    |         |           | 16593    | .747       | 278.7         | 77.1  | +11.1  | 3           | 14     | 89 c   |
|         |           |          | .132       | 300.1         | 75.4  | +10.5  | 13          | 60     |         |           | 16590    | .464       | 274.3         | 56.2  | + 8.1  | 12          | 36     |        |
|         |           |          | .210       | 82.3          | 56.7  | + 8.3  | 30          | 114    |         |           | 16591    | .378       | 173.9         | 26.1  | -15.1  | 1           | 4      |        |
|         |           |          | .753       | 117.7         | 25.2  | -15.5  | 8           | 45     |         |           | 16592    | .337       | 149.5         | 18.5  | -10.0  | 101         | 434    |        |
|         |           |          | .800       | 108.8         | 18.6  | -10.6  | 103         | 476    | 210 c   |           | 16594    | .328       | 65.6          | 10.6  | +14.4  | 67          | 402    |        |
|         |           |          | .819       | 77.3          | 13.5  | +14.2  | 23          | 222    | 147 c   |           | 16595    | .877       | 114.7         | 331.9 | -17.8  | 30          | 203    | 188 c  |
|         |           |          | .863       | 123.9         |       |        |             | 56     |         |           | 16596    | .919       | 52.7          | 322.7 | +36.9  | 25          | 120    | 192 f  |
|         |           |          | .875       | 116.5         |       |        |             | 152    |         |           | 16598    | .937       | 111.3         | 322.7 | -17.2  | 6           | 18     | 328 c  |
|         |           |          | .945       | 82.5          |       |        |             | 189    |         |           | 16597    | .935       | 103.7         | 321.3 | -10.2  | 21          | 64     | 297 f  |
|         |           |          | .950       | 109.3         |       |        |             | 288    |         |           |          | .933       | 73.1          |       |        |             | 227    |        |
| Aug.17  |           |          | (+16.7)    | (68.8)(+ 6.8) | (237) | (1321) | (1665)      |        |         | Aug.20    |          | (+17.7)    | (28.5)(+ 6.9) | (269) | (1314) | (1811)      |        |        |
| 229.325 | G         | .988     | 258.9      |               |       |        | 145         |        | 232.337 | 16588     | .923     | 284.2      | 84.6          | +15.7 | 0      | 3           | 392 c  |        |
|         |           | .979     | 288.6      |               |       |        | 355         |        | G       | 16593     | .879     | 279.0      | 78.5          | +11.2 | 0      | 5           | 193 c  |        |
|         |           | .964     | 250.8      |               |       |        | 191         |        |         | 16590     | .632     | 274.7      | 55.9          | + 8.3 | 7      | 50          |        |        |
|         |           | .884     | 295.2      |               |       |        | 132         |        |         | 16592     | .295     | 186.1      | 18.3          | -10.1 | 65     | 408         |        |        |
|         |           | 16588    | .454       | 288.5         | 82.6  | +14.4  | 40          | 259    |         |           | 16594    | .169       | 35.9          | 10.7  | +14.7  | 62          | 394    |        |
|         |           |          | .339       | 284.1         | 75.8  | +11.1  | 12          | 47     |         |           | 16595    | .772       | 120.0         | 332.1 | -17.8  | 21          | 192    | 178 f  |
|         |           |          | .027       | 346.5         | 56.7  | + 8.3  | 16          | 86     |         |           | 16598    | .849       | 114.8         | 323.1 | -16.8  | 2           | 8      | 166 c  |
|         |           |          | .625       | 127.6         | 25.3  | -16.5  | 3           | 13     |         |           | 16596    | .848       | 50.8          | 321.9 | +36.5  | 20          | 105    | 171 f  |
|         |           |          | .658       | 114.4         | 18.9  | -10.4  | 72          | 426    |         |           | 16597    | .843       | 106.5         | 321.6 | - 9.9  | 6           | 72     | 65 n   |
|         |           |          | .699       | 76.8          | 11.9  | +14.1  | 49          | 272    |         |           | 16599    | .985       | 92.9          | 297.0 | - 1.6  | 0           | 6      | 107 c  |
|         |           |          | .829       | 80.8          |       |        |             | 122    |         |           |          | .840       | 76.0          |       |        |             | 95     |        |
|         |           |          | .864       | 113.0         |       |        |             | 316    |         |           |          | .897       | 68.0          |       |        |             | 102    |        |
|         |           |          | .953       | 81.0          |       |        |             | 279    |         |           |          | .920       | 106.8         |       |        |             | 258    |        |
| Aug.18  |           |          | (+17.0)    | (56.3)(+ 6.8) | (192) | (1103) | (1540)      |        |         | Aug.21    |          | (+18.0)    | (16.5)(+ 6.9) | (183) | (1243) | (1727)      |        |        |
| 230.333 | G         | 16588    | .934       | 294.3         |       |        |             | 204    |         | 233.440   |          | .964       | 281.9         |       |        |             | 507    |        |
|         |           | .643     | 284.4      | 82.8          | +14.4 | 21     | 142         |        |         | G         | 16590    | .807       | 275.3         | 56.0  | + 8.4  | 12          | 39     | 88 c   |
|         |           | .549     | 280.0      | 76.3          | +11.1 | 10     | 47          |        |         |           | 16592    | .401       | 224.5         | 18.4  | - 9.8  | 79          | 419    |        |
|         |           | .233     | 276.9      | 56.5          | + 8.2 | 13     | 80          |        |         |           | 16600    | .393       | 212.7         | 14.4  | -12.4  | 1           | 9      |        |
|         |           | .452     | 143.2      | 26.8          | -14.6 | 1      | 6           |        |         |           | 16594    | .193       | 312.2         | 10.3  | +14.4  | 71          | 366    |        |
|         |           | .493     | 125.3      | 19.0          | -10.3 | 73     | 457         |        |         |           | 16595    | .633       | 129.7         | 331.3 | -17.8  | 35          | 200    |        |
|         |           | .533     | 73.9       | 11.2          | +14.2 | 52     | 403         |        |         |           | 16598    | .734       | 124.5         | 322.2 | -19.1  | 1           | 7      |        |
|         |           | .961     | 110.6      | 332.5         | -17.6 | 28     | 165         | 504 f  |         |           | 16597    | .691       | 112.1         | 321.6 | - 9.7  | 14          | 66     | 88 f   |
|         |           | .975     | 53.5       | 324.2         | +37.0 | 15     | 66          | 219 sf |         |           | 16596    | .751       | 46.3          | 319.6 | +36.4  | 8           | 67     | 93 f   |
|         |           | .993     | 101.3      | 321.5         | -10.3 | 8      | 45          | 149 c  |         |           | 16599    | .908       | 95.3          | 297.4 | - 1.8  | 11          | 33     | 156 c  |
|         |           | .820     | 111.5      |               |       |        |             | 119    |         |           |          | .842       | 111.5         |       |        |             | 189    |        |
|         |           | .904     | 81.9       |               |       |        |             | 145    |         |           |          | .973       | 75.0          |       |        |             | 121    |        |
|         |           | .980     | 72.7       |               |       |        |             | 224    |         |           |          | (+18.3)    | (1.9)(+ 7.0)  | (232) | (1206) | (1242)      |        |        |
| Aug.19  |           |          | (+17.3)    | (43.0)(+ 6.8) | (221) | (1411) | (1564)      |        |         | Aug.22    |          |            |               |       |        |             |        |        |

Group 16595. Aug. 19 - 30. A small regular spot, with a double umbra between August 22 and 27.

Group 16596. Aug. 19 - 25. A small spot, which soon breaks up and dies out.

Group 16597. Aug. 19 - 30. A small, slowly-diminishing regular spot.

Group 16598. Aug. 20 - 22. A small spot.

Group 16599. Aug. 21 - 25. A single spot on August 21 and 25; a pair on the other days.

Group 16600. Aug. 22 - 27. One or two small spots which develop into a stream. The leader, a small regular spot, nearly touches Group 16592; the follower becomes composite by August 25.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |                |          |        |       |             |              |         |           |          |                |          |                |                |             |        |        |
|---|-----------|----------|----------------|----------|--------|-------|-------------|--------------|---------|-----------|----------|----------------|----------|----------------|----------------|-------------|--------|--------|
| U.T.  | Group No. | MEASURES |                | POSITION |        | AREA  |             |              | U.T.    | Group No. | MEASURES |                | POSITION |                | AREA           |             |        |        |
|   |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ | Whole Spots | Faculæ       |         |           | Dist.    | Pos. Angle     | Long.    | Lat.           | Umbræ          | Whole Spots | Faculæ |        |
| 1950  |           |          |                |          |        |       |             |              |         |           |          |                |          |                |                |             |        |        |
| 234.301   | G         | .921     | 290.6          | o        | o      |       |             |              | 1950    |           | .978     | 100.2          | o        | o              |                |             |        |        |
|   | 16590     | .904     | 276.0          | 55.7     | + 8.5  | 2     | 19          | 145<br>170 s |         | Aug.25    | (+19.2)  | (323.4)(+ 7.0) | (222)    | (1287)         | (2081)         | 428         |        |        |
|   | 16592     | .539     | 238.8          | 18.4     | -10.0  | 78    | 395         |              |         |           |          |                |          |                |                |             |        |        |
|   | 16600     | .521     | 230.8          | 15.0     | -12.8  | 18    | 61          |              |         |           |          |                |          |                |                |             |        |        |
|   | 16594     | .357     | 292.4          | 10.4     | +14.4  | 55    | 237         |              | 237.351 | G         | .955     | 263.1          |          |                |                |             |        |        |
|   | 16601     | .450     | 217.8          | 7.0      | -14.1  | 7     | 26          |              |         |           | .935     | 245.7          |          |                |                |             |        |        |
|   | 16595     | .525     | 142.6          | 331.1    | -17.9  | 44    | 227         |              |         |           | .806     | 242.5          |          |                |                |             |        |        |
|   | 16597     | .544     | 119.5          | 322.0    | - 9.4  | 11    | 37          |              |         |           | 16592    | .941           | 256.7    | 18.4           | - 9.9          | 60          | 364    |        |
|   | 16596     | .654     | 40.7           | 319.1    | +35.6  | 11    | 47          |              |         |           | 16600    | .923           | 253.3    | 14.9           | -12.4          | 64          | 528    |        |
|   | 16599     | .802     | 97.8           | 298.1    | - 2.0  | 14    | 40          | 218 c<br>229 |         |           | 16594    | .893           | 283.3    | 14.2           | +15.0          | 8           | 45     |        |
| Aug.23  |           | .938     | 71.2           |          |        |       |             |              |         |           | 16601    | .863           | 249.1    | 6.3            | -14.0          | 2           | 9      |        |
|   |           | (+18.6)  | (350.6)(+ 7.0) | (240)    | (1089) | (762) |             |              |         |           | 16595    | .536           | 216.6    | 329.9          | -18.7          | 30          | 163    |        |
|   |           |          |                |          |        |       |             |              |         |           | 16597    | .337           | 217.1    | 322.1          | - 8.6          | 6           | 31     |        |
|   |           |          |                |          |        |       |             |              |         |           | 16602    | .834           | 100.7    | 255.2          | - 4.8          | 21          | 108    |        |
| 235.323   | G         | .896     | 274.3          |          |        |       |             | 102          |         |           | .827     | 57.7           |          |                |                |             |        |        |
|   | 16590     | .840     | 284.0          |          |        |       |             | 95           |         |           | .874     | 81.5           |          |                |                |             |        |        |
|   | 16592     | .795     | 245.3          |          |        |       |             | 93           |         |           | .915     | 37.1           |          |                |                |             |        |        |
|   | 16600     | .980     | 277.5          | 56.2     | + 8.7  | 5     | 22          | 124 c        |         |           | .926     | 103.7          |          |                |                |             |        |        |
|   | 16594     | .704     | 248.1          | 18.5     | -10.0  | 72    | 321         |              |         |           | .945     | 65.7           | (+19.5)  | (310.3)(+ 7.1) | (191)          | (1248)      | (2229) |        |
|   | 16601     | .672     | 242.1          | 14.5     | -12.7  | 51    | 324         |              |         |           |          |                |          |                |                |             |        |        |
|   | 16595     | .590     | 285.3          | 13.0     | +14.7  | 23    | 131         |              |         |           |          |                |          |                |                |             |        |        |
|   | 16597     | .597     | 233.1          | 6.6      | -14.9  | 10    | 34          |              |         |           |          |                |          |                |                |             |        |        |
|   | 16599     | .441     | 166.1          | 330.7    | -18.2  | 35    | 195         |              |         |           |          |                |          |                |                |             |        |        |
|   |           | .380     | 136.5          | 321.8    | - 9.1  | 9     | 36          |              | 238.667 | G         | .945     | 298.4          |          |                |                |             |        |        |
|   |           | .549     | 28.5           | 318.4    | +35.4  | 8     | 38          |              |         |           | .945     | 248.4          |          |                |                |             |        |        |
| Aug.24  |           | .676     | 101.3          | 295.7    | - 2.3  | 9     | 47          |              |         |           | .889     | 245.8          |          |                |                |             |        |        |
|   |           | .899     | 69.8           |          |        |       |             | 284          |         |           | 16600    | .990           | 256.3    | 12.7           | -12.4          | 26          | 144    |        |
|   |           | .950     | 44.0           |          |        |       |             | 126          |         |           | 16594    | .967           | 283.6    | 9.1            | +14.9          | 0           | 35     |        |
|   |           | .956     | 62.3           |          |        |       |             | 134          |         |           | 16595    | .710           | 233.5    | 330.0          | -19.3          | 18          | 133    |        |
|   |           | (+18.9)  | (337.1)(+ 7.0) | (222)    | (1148) | (958) |             |              |         |           | 16597    | .555           | 242.6    | 322.7          | - 8.6          | 5           | 18     |        |
|   |           |          |                |          |        |       |             |              |         |           | 16602    | .628           | 107.3    | 256.0          | - 5.1          | 13          | 62     |        |
|   |           |          |                |          |        |       |             |              |         |           | 16603    | .912           | 110.2    | 230.7          | -15.1          | 9           | 42     |        |
| 236.356   | G         | .955     | 275.6          |          |        |       |             | 106          |         |           | .791     | 110.6          |          |                |                |             |        |        |
|   | 16592     | .916     | 251.9          |          |        |       |             | 224          |         |           | .798     | 101.6          |          |                |                |             |        |        |
|   | 16600     | .855     | 241.5          |          |        |       |             | 149          |         |           | .901     | 105.7          |          |                |                |             |        |        |
|   | 16594     | .845     | 253.3          | 18.5     | -10.0  | 76    | 352         | 101 c        |         |           | .922     | 63.0           | (+19.8)  | (292.9)(+ 7.1) | (71)           | (434)       | (1465) |        |
|   | 16601     | .810     | 248.8          | 13.9     | -12.6  | 63    | 509         | 138 c        |         |           |          |                |          |                |                |             |        |        |
|   | 16595     | .764     | 283.8          | 13.4     | +15.0  | 18    | 84          | 159 c        |         |           |          |                |          |                |                |             |        |        |
|   | 16597     | .741     | 241.7          | 5.8      | -15.4  | 5     | 27          |              |         |           |          |                |          |                |                |             |        |        |
|   | 16599     | .446     | 194.6          | 330.2    | -18.5  | 31    | 207         |              | 239.601 | G         | .962     | 248.9          |          |                |                |             |        |        |
|   | 16602     | .279     | 174.7          | 321.9    | - 9.1  | 6     | 26          |              |         |           | .927     | 277.7          |          |                |                |             |        |        |
|   |           | .479     | 10.9           | 317.1    | +34.9  | 3     | 16          |              |         |           | 16595    | .828           | 239.9    | 330.0          | -19.9          | 16          | 111    |        |
|   |           | .396     | 112.6          | 302.0    | - 2.2  | 0     | 4           |              |         |           | 16597    | .710           | 250.3    | 322.9          | - 8.6          | 8           | 23     |        |
|   |           | .941     | 97.8           | 254.3    | - 4.9  | 20    | 62          | 136 c        |         |           | 16602    | .447           | 115.9    | 256.8          | - 4.7          | 13          | 69     |        |
|   |           | .869     | 68.6           |          |        |       |             | 171          |         |           | 16604    | .988           | 76.9     | 198.3          | +14.0          | 6           | 57     |        |
|   |           | .886     | 104.4          |          |        |       |             | 54           |         |           |          | .828           | 107.2    |                |                |             |        |        |
|   |           | .922     | 58.7           |          |        |       |             | 146          |         |           |          | .972           | 108.5    | (+20.1)        | (280.5)(+ 7.1) | (43)        | (260)  | (1142) |
|   |           | .954     | 81.0           |          |        |       |             | 269          | Aug.28  |           |          |                |          |                |                |             |        |        |

Group 16601. Aug. 23 - 26. Two or three small spots, of which only one remains by August 26.

Group 16602. Aug.25-Sept.2. A small spot, with a companion until August 29.

Group 16603. Aug.27-Sept.5. Intermittent. One or two small spots.

Group 16604. Aug.28-Sept.9. A stream, led by a regular spot which alone remains by September 5.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |            |                |       |       |             |        |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|---|-----------|----------|------------|----------------|-------|-------|-------------|--------|------|--|----------|----------------|----------|----------------|-------|-------------|--------|-------|--------|--|--|--|--|--|--|
| U.T.  | Group No. | MEASURES |            | POSITION       |       | AREA  |             |        | U.T. | Group No.  | MEASURES |                | POSITION |                | AREA  |             |        |       |        |  |  |  |  |  |  |
|   |           | Dist.    | Pos. Angle | Long.          | Lat.  | Umbræ | Whole Spots | Faculæ |      |  | Dist.    | Pos. Angle     | Long.    | Lat.           | Umbræ | Whole Spots | Faculæ |       |        |  |  |  |  |  |  |
| 1950  | 240.482 G | .958     | 279.9      | o              | o     |       | 150         |        | 1950 | 16602<br>1297b<br>16604<br>16606<br>Sept.1<br>244.345 G<br>16607<br>16602<br>16604<br>16606<br>16608<br>Sept.2<br>245.457 C<br>16607<br>16605<br>16604<br>16606<br>16608<br>Sept.3<br>246.416 G<br>16607<br>16603<br>16604<br>16606<br>16608<br>Sept.4 | .483     | 247.7          | 257.5    | - 4.1          | 6     | 15          |        |       |        |  |  |  |  |  |  |
|   |           | .881     | 285.3      |                |       |       | 84          |        |      |  | .125     | 343.6          | 233.1    | +14.0          | 1     | 9           |        |       |        |  |  |  |  |  |  |
|   |           | .783     | 287.5      |                |       |       | 118         |        |      |  | .509     | 73.3           | 200.9    | +14.6          | 30    | 239         |        |       |        |  |  |  |  |  |  |
|   |           | .779     | 312.3      |                |       |       | 104         |        |      |  | .667     | 134.1          | 200.2    | -21.4          | 5     | 14          |        |       |        |  |  |  |  |  |  |
|   |           | .917     | 244.4      | 330.4          | -20.1 | 11    | 91          | 198 c  |      |  | .798     | 121.9          |          |                |       |             | 161    |       |        |  |  |  |  |  |  |
|   |           | .834     | 254.5      | 323.1          | - 8.7 | 4     | 13          | 61 f   |      |  | .863     | 130.9          |          |                |       |             | 122    |       |        |  |  |  |  |  |  |
|   |           | .293     | 133.6      | 256.7          | - 4.7 | 12    | 61          |        |      |  | .966     | 75.5           |          |                |       |             | 129    |       |        |  |  |  |  |  |  |
|   |           | .420     | 129.1      | 249.7          | - 8.6 | 3     | 10          |        |      |  | (+21.1)  | (231.0)(+ 7.2) |          |                |       |             | (61)   | (385) | (1056) |  |  |  |  |  |  |
|   |           | .672     | 122.9      | 233.2          | -15.6 | 0     | 6           |        |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|   |           | .938     | 112.1      | 203.1          | -17.9 | 0     | 13          | 121 c  |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|   |           | .961     | 115.7      | 199.8          | -22.2 | 4     | 19          | 123 c  |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|   |           | .929     | 77.1       | 199.5          | +14.5 | 49    | 296         | 268 c  |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|   |           | .881     | 68.1       |                |       |       | 96          |        |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
| Aug.29  |           |          | (+20.3)    | (268.9)(+ 7.1) |       | (83)  | (509)       | (1323) |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
| 241.582   | G         | .886     | 290.1      |                |       |       | 244         |        |      |  | .776     | 280.5          | 269.1    | +12.7          | 27    | 153         | 200 c  |       |        |  |  |  |  |  |  |
|   |           | .876     | 308.6      |                |       |       | 200         |        |      |  | .664     | 255.9          | 257.9    | - 3.8          | 1     | 7           |        |       |        |  |  |  |  |  |  |
|   |           | .849     | 249.2      |                |       |       | 129         |        |      |  | .289     | 64.5           | 202.4    | +14.1          | 25    | 153         |        |       |        |  |  |  |  |  |  |
|   |           | .763     | 260.8      |                |       |       | 35          |        |      |  | .554     | 148.9          | 200.1    | -21.3          | 4     | 11          |        |       |        |  |  |  |  |  |  |
|   |           | .983     | 248.2      | 330.2          | -19.8 | 13    | 56          | 264 sf |      |  | .899     | 110.5          | 157.5    | -14.9          | 0     | 2           | 116 c  |       |        |  |  |  |  |  |  |
|   |           | .943     | 258.0      | 323.1          | - 8.7 | 0     | 10          | 166 f  |      |  | .920     | 126.7          |          |                |       |             | 144    |       |        |  |  |  |  |  |  |
|   |           | .248     | 293.1      | 267.9          | +12.5 | 4     | 14          |        |      |  | .933     | 72.5           | (+21.3)  | (217.9)(+ 7.2) | (57)  | (326)       | (1087) |       |        |  |  |  |  |  |  |
|   |           | .208     | 192.4      | 257.0          | - 4.5 | 8     | 51          |        |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|   |           | .293     | 161.2      | 248.9          | - 8.9 | 0     | 3           |        |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|   |           | .814     | 76.6       | 199.5          | +15.1 | 48    | 338         | 166 c  |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|   |           | .878     | 120.0      | 199.5          | -22.0 | 2     | 15          | 163 f  |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|   |           | .841     | 115.0      |                |       |       | 115         |        |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|   |           | .936     | 67.2       |                |       |       | 127         |        |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|   |           | .951     | 113.8      |                |       |       | 182         |        |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
| Aug.30  |           |          | (+20.6)    | (254.4)(+ 7.2) |       | (75)  | (487)       | (1791) |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
| 242.373   | C         | .978     | 259.6      |                |       |       | 155         |        |      |  | .872     | 290.8          |          |                |       |             | 156    |       |        |  |  |  |  |  |  |
|   |           | .939     | 287.6      |                |       |       | 190         |        |      |  | .914     | 280.6          | 269.9    | +12.5          | 30    | 212         | 188 c  |       |        |  |  |  |  |  |  |
|   |           | .929     | 307.4      |                |       |       | 147         |        |      |  | .771     | 251.1          | 250.7    | - 9.6          | 0     | 9           | 169 c  |       |        |  |  |  |  |  |  |
|   |           | .919     | 252.6      |                |       |       | 194         |        |      |  | .133     | 5.6            | 202.4    | +14.8          | 27    | 140         |        |       |        |  |  |  |  |  |  |
|   |           | .828     | 262.5      |                |       |       | 176         |        |      |  | .476     | 174.0          | 200.2    | -21.0          | 0     | 4           |        |       |        |  |  |  |  |  |  |
|   |           | .431     | 283.6      | 269.2          | +12.3 | 4     | 38          |        |      |  | .752     | 116.0          | 159.2    | -14.1          | 2     | 8           | 122 f  |       |        |  |  |  |  |  |  |
|   |           | .303     | 229.8      | 257.3          | - 4.2 | 4     | 28          |        |      |  | .893     | 70.2           |          |                |       |             | 266    |       |        |  |  |  |  |  |  |
|   |           | .689     | 76.0       | 200.3          | +14.8 | 34    | 241         | 59 f   |      |  | .937     | 122.0          |          |                |       |             | 140    |       |        |  |  |  |  |  |  |
|   |           | .790     | 125.2      | 200.0          | -21.9 | 3     | 15          | 91 f   |      |  | .942     | 106.2          | (+21.6)  | (203.2)(+ 7.2) | (59)  | (373)       | (1219) |       |        |  |  |  |  |  |  |
|   |           | .896     | 118.3      |                |       |       | 136         |        |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
|   |           | .951     | 127.4      |                |       |       | 123         |        |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
| Aug.31  |           |          | (+20.8)    | (243.9)(+ 7.2) |       | (45)  | (322)       | (1271) |      |  |          |                |          |                |       |             |        |       |        |  |  |  |  |  |  |
| 243.347   | G         | .979     | 308.5      |                |       |       | 247         |        |      |  | .994     | 282.5          | 275.5    | +13.1          | 22    | 132         | 394 f  |       |        |  |  |  |  |  |  |
|   |           | .966     | 255.7      |                |       |       | 152         |        |      |  | .751     | 239.0          | 232.8    | -17.5          | 8     | 21          | 80 c   |       |        |  |  |  |  |  |  |
|   |           | .930     | 265.9      |                |       |       | 139         |        |      |  | .237     | 305.2          | 202.0    | +14.9          | 24    | 128         |        |       |        |  |  |  |  |  |  |
|   |           | .875     | 258.7      |                |       |       | 106         |        |      |  | .477     | 202.6          | 201.6    | -19.0          | 1     | 9           |        |       |        |  |  |  |  |  |  |
|   |           | 16607    | .612       | 281.5          | 268.8 | +12.7 | 19          | 108    |      |  | .599     | 124.8          | 160.2    | -13.7          | 1     | 6           |        |       |        |  |  |  |  |  |  |
|   |           |          |            |                |       |       |             |        |      |  | (+21.8)  | (190.5)(+ 7.2) |          |                |       |             |        |       |        |  |  |  |  |  |  |

Group 16605. Aug.29-Sept.3. A tiny spot seen only on August 29, 30 and September 3.

Group 16606. Aug.29-Sept.4. A small spot, except on September 4 when there is a pair.

Group 16607. Aug.30-Sept.4. A small stream, developing from a pair of tiny spots first seen on August 30.

Group 16608. Sept. 2 - 4. A tiny spot.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.      | Group No.               | MEASURES |                | POSITION |       | AREA  |             |        | U.T.     | Group No.               | MEASURES |                | POSITION |                | AREA  |             |        |       |       |
|-----------|-------------------------|----------|----------------|----------|-------|-------|-------------|--------|----------|-------------------------|----------|----------------|----------|----------------|-------|-------------|--------|-------|-------|
|           |                         | Dist.    | Pos. Angle     | Long.    | Lat.  | Umbræ | Whole Spots | Faculæ |          |                         | Dist.    | Pos. Angle     | Long.    | Lat.           | Umbræ | Whole Spots | Faculæ |       |       |
| 1950      |                         |          |                | o        | o     |       |             |        | 1950     |                         |          |                | o        | o              |       |             |        |       |       |
| 247.464 G | 16603<br>16604<br>16609 | .954     | 263.3          |          |       |       | 112         |        | Sept. 8  | 16604<br>16610          | .804     | 297.8          |          |                |       | 152         |        |       |       |
|           |                         | .948     | 245.7          |          |       |       | 122         |        |          |                         | .930     | 282.4          | 207.0    | +14.2          | 7     | 85          | 252 c  |       |       |
|           |                         | .948     | 254.6          |          |       |       | 246         |        |          |                         | .832     | 98.1           | 82.4     | - 2.6          | 15    | 90          | 128 c  |       |       |
|           |                         | .935     | 299.9          |          |       |       | 158         |        |          |                         | .832     | 78.6           |          |                |       | 183         |        |       |       |
|           |                         | .915     | 316.5          |          |       |       | 112         |        |          |                         | .914     | 71.6           |          |                |       | 138         |        |       |       |
|           |                         | .867     | 255.5          |          |       |       | 148         |        |          |                         | .930     | 52.8           |          |                |       | 167         |        |       |       |
|           |                         | .861     | 283.5          |          |       |       | 122         |        |          |                         | .943     | 64.2           |          |                |       | 151         |        |       |       |
|           |                         | .882     | 246.1          | 234.0    | -17.1 | 2     | 13          | 133 c  |          |                         | .957     | 84.6           |          |                |       | 231         |        |       |       |
|           |                         | .496     | 285.9          | 206.0    | +14.1 | 17    | 103         |        |          |                         | (+22.8)  | (137.7)(+ 7.2) |          |                | (22)  | (175)       | (1997) |       |       |
|           |                         | .932     | 78.5           | 107.2    | +13.3 | 3     | 10          | 155 c  |          |                         |          |                |          |                |       |             |        |       |       |
| Sept. 5   | 1297c                   | .862     | 70.5           |          |       |       | 222         |        | C        | 251.313                 | .972     | 249.9          |          |                |       | 230         |        |       |       |
|           |                         | .934     | 60.6           |          |       |       | 141         |        |          |                         | .933     | 241.2          |          |                |       | 195         |        |       |       |
|           |                         | (+22.1)  | (176.7)(+ 7.2) |          |       | (22)  | (126)       | (1671) |          |                         | .916     | 287.0          |          |                |       | 229         |        |       |       |
|           |                         |          |                |          |       |       |             |        |          |                         | 16604    | 282.9          | 206.4    | +14.0          | 19    | 133         | 185 c  |       |       |
|           |                         |          |                |          |       |       |             |        |          |                         | 1297d    | 312.7          | 137.1    | +17.0          | 3     | 18          |        |       |       |
| 248.329 G | 16604<br>16609<br>16610 | .958     | 301.1          |          |       |       | 157         |        | Sept. 9  | 16610                   | .701     | 102.0          | 82.6     | - 3.1          | 17    | 101         | 103 c  |       |       |
|           |                         | .946     | 283.4          |          |       |       | 155         |        |          |                         | .928     | 70.6           |          |                |       | 218         |        |       |       |
|           |                         | .931     | 275.1          |          |       |       | 123         |        |          |                         | .932     | 83.1           |          |                |       | 238         |        |       |       |
|           |                         | .930     | 261.1          |          |       |       | 77          |        |          |                         | (+22.9)  | (125.8)(+ 7.2) |          |                | (39)  | (252)       | (1398) |       |       |
|           |                         | .956     | 257.1          | 236.2    | -10.1 | 0     | 8           | 296 s  |          |                         |          |                |          |                |       |             |        |       |       |
|           |                         | .655     | 283.1          | 206.1    | +14.0 | 15    | 108         |        |          |                         | 252.581  |                | .971     | 287.8          |       |             | 209    |       |       |
|           |                         | .834     | 78.3           | 108.2    | +13.7 | 2     | 6           | 88 f   |          |                         | G        |                | .926     | 234.7          |       |             | 223    |       |       |
|           |                         | .993     | 93.5           | 82.7     | - 2.6 | 20    | 73          | 117 c  |          |                         | 16610    |                | .454     | 112.0          | 84.3  | - 3.2       | 22     | 103   |       |
|           |                         | .879     | 60.7           |          |       |       | 119         |        |          |                         |          |                | .802     | 68.1           |       |             | 225    |       |       |
|           |                         | .929     | 88.1           |          |       |       | 364         |        |          |                         |          |                | .900     | 88.1           |       |             | 194    |       |       |
| Sept. 6   | 16610                   | .932     | 163.0          |          |       |       | 12          |        | Sept. 10 |                         |          |                | (+23.2)  | (109.1)(+ 7.2) |       |             | (22)   | (103) | (851) |
|           |                         | .970     | 78.9           |          |       |       | 230         |        |          |                         |          |                |          |                |       |             |        |       |       |
|           |                         | .970     | 165.6          |          |       |       | 10          |        |          |                         |          |                |          |                |       |             |        |       |       |
|           |                         | (+22.3)  | (165.2)(+ 7.2) |          |       | (37)  | (195)       | (1748) |          |                         |          |                |          |                |       |             |        |       |       |
|           |                         |          |                |          |       |       |             |        |          |                         | 253.669  |                | .828     | 285.8          |       |             | 161    |       |       |
| 249.442 G | 16604<br>16610          | .986     | 260.5          |          |       |       | 99          |        | G        | 16611<br>16610<br>16612 | .678     | 294.0          | 136.2    | +21.4          | 3     | 17          |        |       |       |
|           |                         | .866     | 248.3          |          |       |       | 202         |        |          |                         | .265     | 134.7          | 83.9     | - 3.6          | 30    | 147         |        |       |       |
|           |                         | .823     | 234.9          |          |       |       | 220         |        |          |                         | .982     | 101.4          | 17.3     | - 9.7          | 60    | 241         | 376 s  |       |       |
|           |                         | .824     | 282.1          | 206.4    | +14.0 | 18    | 106         | 124 c  |          |                         | .892     | 65.4           |          |                |       | 62          |        |       |       |
|           |                         | .938     | 95.5           | 81.6     | - 2.6 | 21    | 99          | 402 c  |          |                         | .951     | 76.7           |          |                |       | 325         |        |       |       |
|           |                         | .886     | 79.9           |          |       |       | 268         |        |          |                         | (+23.4)  | (94.7)(+ 7.2)  |          |                | (93)  | (405)       | (924)  |       |       |
|           |                         | .935     | 69.6           |          |       |       | 79          |        |          |                         |          |                |          |                |       |             |        |       |       |
|           |                         | .955     | 55.0           |          |       |       | 189         |        |          |                         |          |                |          |                |       |             |        |       |       |
|           |                         | .963     | 29.9           |          |       |       | 124         |        |          |                         | 254.325  |                | .880     | 285.0          |       |             | 177    |       |       |
|           |                         | .963     | 77.9           |          |       |       | 249         |        |          |                         | 16611    |                | .783     | 291.4          | 137.3 | +21.2       | 6      | 22    | 89 c  |
| Sept. 7   |                         | (+22.5)  | (150.5)(+ 7.2) |          |       | (39)  | (205)       | (1956) | Sept. 11 | 16610<br>16612          | 16610    |                | .196     | 168.6          | 83.9  | - 3.8       | 24     | 127   |       |
|           |                         |          |                |          |       |       |             | 16612  |          |                         | .942     | 103.2          | 17.8     | - 9.8          | 44    | 230         | 442 c  |       |       |
|           |                         |          |                |          |       |       |             |        |          |                         | .804     | 62.4           |          |                |       | 152         |        |       |       |
|           |                         |          |                |          |       |       |             |        |          |                         | .842     | 110.4          |          |                |       | 104         |        |       |       |
|           |                         |          |                |          |       |       |             |        |          |                         | .908     | 76.2           |          |                |       | 267         |        |       |       |
| 250.417 G |                         | .942     | 250.8          |          |       |       | 182         |        | Sept. 12 |                         | (+23.6)  | (86.1)(+ 7.2)  |          |                | (74)  | (379)       | (1231) |       |       |
|           |                         | .899     | 230.1          |          |       |       | 205         |        |          |                         |          |                |          |                |       |             |        |       |       |
|           |                         | .842     | 285.8          |          |       |       | 208         |        |          |                         |          |                |          |                |       |             |        |       |       |

Group 16609. Sept. 5 - 6. A tiny spot.

Group 16610. Sept. 6 - 18. A string of small spots until September 12; on the next day considerable changes have taken place and from then onwards the group begins to die out.

Group 16611. Sept. 11 - 14. A bi-polar group appearing near the west limb. There is a sudden increase in area on September 13.

Group 16612. Sept. 11 - 23. Return of Group 16592: third appearance. A small regular spot with occasional companions.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |               |            |          |       |       |             |        |              |           |                |            |               |       |                     |             |        |       |
|---|-----------|---------------|------------|----------|-------|-------|-------------|--------|--------------|-----------|----------------|------------|---------------|-------|---------------------|-------------|--------|-------|
| U.T.  | Group No. | MEASURES      |            | POSITION |       | AREA  |             |        | U.T.         | Group No. | MEASURES       |            | POSITION      |       | AREA                |             |        |       |
|   |           | Dist.         | Pos. Angle | Long.    | Lat.  | Umbræ | Whole Spots | Faculæ |              |           | Dist.          | Pos. Angle | Long.         | Lat.  | Umbræ               | Whole Spots | Faculæ |       |
| 1950  |           |               |            | o        | o     |       |             |        | 1950         |           |                |            | o             | o     |                     |             |        |       |
| 255.368<br>G  | .969      | 286.2         |            |          |       |       | 271         |        | Sept. 16     | .927      | 116.9          |            |               |       | 149                 |             |        |       |
|   | .949      | 260.0         |            |          |       |       | 214         |        |              | .957      | 65.6           |            |               |       | 95                  |             |        |       |
|   | .876      | 246.8         |            |          |       |       | 105         |        |              | (+24.3)   | (33.3)(+ 7.2)  |            |               |       | (179) (1015) (1255) |             |        |       |
|   | 16611     | .900          | 289.1      | 137.1    | +20.3 | 78    | 355         | 225 c  |              | 259.374   | 16610          | .919       | 263.0         | 85.2  | - 3.5               | 16          | 97     | 341 c |
|   | 16610     | .280          | 227.7      | 84.2     | - 3.8 | 35    | 212         |        |              | G         | 16615          | .838       | 281.2         | 78.9  | +13.3               | 10          | 105    | 138 c |
|   | 16612     | .846          | 106.4      | 17.1     | - 9.7 | 40    | 181         | 188 c  |              | 16612     | .292           | 173.4      | 17.5          | - 9.6 | 15                  | 93          |        |       |
|   | 16613     | .932          | 78.2       | 2.7      | +13.6 | 22    | 73          | 141 c  |              | 16613     | .273           | 64.4       | 4.8           | +13.8 | 44                  | 341         |        |       |
|   | .819      | 78.4          |            |          |       |       | 295         |        |              | 16614     | .419           | 143.1      | 4.5           | -12.5 | 1                   | 4           |        |       |
|   | .837      | 114.6         |            |          |       |       | 185         |        |              | 16616     | .800           | 73.2       | 326.1         | +17.8 | 32                  | 238         | 168 f  |       |
|   | .886      | 68.8          |            |          |       |       | 230         |        |              | .830      | 105.7          |            |               |       | 121                 |             |        |       |
| Sept. 13  | .950      | 110.3         |            |          |       |       | 286         |        |              | .848      | 120.5          |            |               |       | 106                 |             |        |       |
|   | (+23.8)   | (72.3)(+ 7.2) |            |          |       | (175) | (821)       | (2140) |              | .905      | 65.8           |            |               |       | 131                 |             |        |       |
| 256.636<br>G  | .805      | 280.4         |            |          |       |       | 190         |        | Sept. 17     | .943      | 106.8          |            |               |       | 167                 |             |        |       |
|   | 16611     | .982          | 289.6      | 136.3    | +20.5 | 59    | 369         | 153 c  |              | .953      | 74.3           | (+24.4)    | (19.4)(+ 7.2) | (118) | (878)               | (1283)      | 111    |       |
|   | 16610     | .532          | 250.8      | 85.7     | - 3.8 | 33    | 191         |        |              | .966      | 330.8          |            |               |       | 13                  |             |        |       |
|   | 16612     | .674          | 113.2      | 16.8     | - 9.8 | 45    | 197         |        |              | .898      | 292.4          |            |               |       | 89                  |             |        |       |
|   | 16613     | .781          | 78.7       | 3.9      | +13.3 | 42    | 304         | 145 c  |              | 16610     | .985           | 266.6      | 86.3          | - 2.1 | 0                   | 14          | 289 s  |       |
|   | 16614     | .857          | 109.5      | 359.9    | -12.6 | 4     | 26          | 83 c   |              | 16615     | .937           | 280.8      | 77.2          | +12.6 | 23                  | 66          | 189 c  |       |
|   | .821      | 117.8         |            |          |       |       | 177         |        |              | 16617     | .405           | 210.4      | 19.0          | -13.4 | 9                   | 28          |        |       |
| Sept. 14  | (+24.0)   | (55.6)(+ 7.2) |            |          |       | (183) | (1087)      | (748)  | 260.323<br>G | 16612     | .335           | 210.4      | 16.8          | - 9.7 | 18                  | 78          |        |       |
|   | 16611     |               |            |          |       |       |             |        |              | 16613     | .115           | 17.4       | 4.9           | +13.4 | 52                  | 328         |        |       |
| 257.491<br>G  | .928      | 293.1         |            |          |       |       | 136         |        | Sept. 18     | 16614     | .343           | 173.6      | 4.7           | -12.8 | 1                   | 7           |        |       |
|   | .888      | 283.1         |            |          |       |       | 269         |        |              | 16616     | .654           | 71.2       | 326.6         | +17.6 | 48                  | 246         |        |       |
|   | .855      | 300.9         |            |          |       |       | 98          |        |              | .803      | 67.8           |            |               |       | 46                  |             |        |       |
|   | 16610     | .684          | 256.9      | 86.0     | - 3.6 | 41    | 198         |        |              | .854      | 111.4          |            |               |       | 53                  |             |        |       |
|   | 16615     | .552          | 280.2      | 77.9     | +11.7 | 1     | 7           |        |              | .916      | 98.9           |            |               |       | 111                 |             |        |       |
|   | 16612     | .535          | 121.5      | 16.8     | - 9.8 | 25    | 158         |        |              | .923      | 64.1           |            |               |       | 88                  |             |        |       |
|   | 16613     | .645          | 77.9       | 4.1      | +13.3 | 95    | 431         |        |              | .938      | 75.2           |            |               |       | 64                  |             |        |       |
|   | 16614     | .707          | 115.3      | 3.6      | -12.1 | 0     | 5           | 79 f   |              | (+24.6)   | (6.9)(+ 7.1)   | (151)      | (767)         | (942) |                     |             |        |       |
|   | 16616     | .973          | 73.9       | 326.5    | +17.2 | 43    | 251         | 326 c  |              | .908      | 296.0          |            |               |       |                     |             |        |       |
|   | .866      | 118.5         |            |          |       |       | 123         |        |              | .916      | 268.4          | 55.9       | + 1.4         | 5     | 33                  | 124 c       |        |       |
| Sept. 15  | .870      | 75.0          |            |          |       |       | 125         |        |              | 16617     | .573           | 236.2      | 18.9          | -12.4 | 11                  | 99          |        |       |
|   | (+24.1)   | (44.3)(+ 7.2) |            |          |       | (205) | (1050)      | (1156) |              | 16612     | .533           | 238.1      | 17.0          | -10.0 | 9                   | 86          |        |       |
| 258.323<br>G  | .953      | 283.9         |            |          |       |       | 184         |        | 261.614<br>G | 16619     | .429           | 287.0      | 14.7          | +13.7 | 0                   | 5           |        |       |
|   | 16610     | .807          | 260.5      | 86.0     | - 3.3 | 23    | 205         | 334 c  |              | 16614     | .424           | 219.2      | 5.6           | -12.3 | 3                   | 27          |        |       |
|   | 16615     | .701          | 280.9      | 78.0     | +12.8 | 8     | 66          |        |              | 16613     | .278           | 295.0      | 4.8           | +13.6 | 41                  | 234         |        |       |
|   | 16612     | .397          | 135.9      | 17.1     | - 9.6 | 25    | 118         |        |              | 16616     | .427           | 63.2       | 326.3         | +17.6 | 48                  | 277         |        |       |
|   | 16613     | .485          | 74.9       | 4.6      | +13.6 | 85    | 385         |        |              | .956      | 76.6           |            |               |       |                     |             |        |       |
|   | 16614     | .573          | 123.5      | 4.2      | -12.1 | 1     | 4           |        |              | (+24.8)   | (349.8)(+ 7.1) | (117)      | (761)         | (532) | 302                 |             |        |       |
|   | 1297e     | .894          | 67.4       | 329.5    | +23.4 | 2     | 8           | 91 c   |              | .908      | 296.0          |            |               |       |                     |             |        |       |
|   | 16616     | .914          | 73.9       | 326.5    | +17.6 | 35    | 229         | 241 c  |              | .916      | 268.4          |            |               |       |                     |             |        |       |

Group 16613. Sept. 13 - 24. A wide pair of nearly regular spots, each with a few small variable companions until September 19.

Group 16614. Sept. 14 - 23. One or two small spots.

Group 16615. Sept. 15 - 18. A few small spots.

Group 16616. Sept. 15 - 27. A stable regular spot.

Group 16617. Sept. 18 - 21. A few variable spots, appearing very closely sp Group 16612.

Group 16618. Sept. 19 - 20. A group appearing quite near the west limb.

Group 16619. Sept. 19 - 20. A faint spot.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.     | Group No. | MEASURES |            | POSITION |         | AREA  |             |         | U.T.     | Group No. | MEASURES |            | POSITION |         | AREA    |             |        |        |
|----------|-----------|----------|------------|----------|---------|-------|-------------|---------|----------|-----------|----------|------------|----------|---------|---------|-------------|--------|--------|
|          |           | Dist.    | Pos. Angle | Long.    | Lat.    | Umbræ | Whole Spots | Faculæ  |          |           | Dist.    | Pos. Angle | Long.    | Lat.    | Umbræ   | Whole Spots | Faculæ |        |
| 1950     |           |          |            | o        | o       |       |             |         | 1950     |           |          |            | o        | o       |         |             |        |        |
| 262.332  | G         | .936     | 294.3      |          |         |       | 126         |         | 265.366  |           | .959     | 280.8      |          |         |         | 118         |        |        |
|          |           | .924     | 277.1      |          |         |       | 130         |         |          |           | .927     | 242.5      |          |         |         | 74          |        |        |
|          | 16618     | .971     | 269.9      | 56.4     | + 1.6   | 42    | 214         | 305 c   |          | 16612     | .980     | 258.0      | 16.9     | -10.2   | 10      | 39          | 171 c  |        |
|          | 16617     | .695     | 245.0      | 20.3     | -11.6   | 12    | 51          | 85 p    |          | 16614     | .961     | 255.7      | 12.0     | -11.6   | 0       | 7           | 315 sf |        |
|          | 16619     | .603     | 282.3      | 17.4     | +13.1   | 1     | 4           |         |          | 16613     | .905     | 282.9      | 5.8      | +14.6   | 16      | 73          | 160 c  |        |
|          | 16612     | .648     | 245.2      | 16.9     | -10.1   | 12    | 70          |         |          | 16616     | .459     | 295.6      | 325.9    | +17.7   | 50      | 263         |        |        |
|          | 16614     | .534     | 233.3      | 6.3      | -12.1   | 7     | 25          |         |          | 16620     | .790     | 77.1       | 247.8    | +14.5   | 13      | 86          | 93 c   |        |
|          | 16613     | .426     | 287.5      | 5.0      | +13.8   | 38    | 195         |         |          |           | .801     | 113.8      |          |         |         | 75          |        |        |
|          | 16616     | .301     | 51.9       | 326.1    | +17.5   | 62    | 288         |         |          |           | .885     | 71.1       |          |         |         | 133         |        |        |
|          |           | .815     | 65.0       |          |         |       | 232         |         |          |           | .889     | 111.3      |          |         |         | 109         |        |        |
|          |           | .931     | 77.7       |          |         |       | 273         |         |          |           | .892     | 54.7       |          |         |         | 75          |        |        |
|          |           | .949     | 66.1       |          |         |       | 159         |         |          |           | .919     | 79.7       |          |         |         | 100         |        |        |
| Sept. 20 |           |          | (+24.9)    | (340.4)  | (+ 7.1) | (174) | (847)       | (1310)  |          | Sept. 23  |          |            | (+25.3)  | (300.3) | (+ 7.0) | (89)        | (468)  | (1758) |
| 263.326  | G         | .916     | 250.6      |          |         |       | 305         |         |          |           | .976     | 283.0      | 4.7      | +14.2   | 12      | 64          | 355 c  |        |
|          |           | .906     | 259.0      |          |         |       | 118         |         |          |           | .651     | 288.8      | 326.3    | +17.5   | 55      | 257         |        |        |
|          |           | .834     | 241.9      |          |         |       | 162         |         | 266.438  | 16613     | .610     | 75.6       | 248.8    | +14.3   | 21      | 128         |        |        |
|          |           | .828     | 282.4      |          |         |       | 360         |         |          | 16616     | (+25.4)  | (286.2)    | (+ 7.0)  | (88)    | (449)   | (355)       |        |        |
|          | 16617     | .834     | 251.2      | 20.6     | -11.4   | 6     | 55          | { 151 c |          | 16620     |          |            |          |         |         |             |        |        |
|          | 16612     | .795     | 251.6      | 17.0     | -10.0   | 11    | 53          |         |          |           |          |            |          |         |         |             |        |        |
|          | 16614     | .731     | 246.9      | 10.4     | -11.5   | 3     | 12          |         |          |           |          |            |          |         |         |             |        |        |
|          | 16613     | .616     | 284.0      | 5.1      | +14.2   | 31    | 184         |         |          |           |          |            |          |         |         |             |        |        |
|          | 16616     | .185     | 4.6        | 326.3    | +17.6   | 61    | 280         |         | 267.418  |           |          |            |          |         |         |             |        |        |
|          | 16620     | .973     | 76.8       | 249.5    | +14.4   | 0     | 23          | 406 c   |          |           |          |            |          |         |         |             |        |        |
|          |           | .812     | 76.1       |          |         |       | 382         |         |          | 16616     | .934     | 284.5      |          |         |         | 77          |        |        |
|          |           | .919     | 65.7       |          |         |       | 270         |         |          | 16621     | .795     | 287.1      | 325.9    | +17.7   | 35      | 265         | 84 c   |        |
|          |           | .923     | 82.7       |          |         |       | 188         |         |          | 16620     | .633     | 286.6      | 312.1    | +15.8   | 4       | 36          |        |        |
|          |           | .966     | 104.6      |          |         |       | 192         |         |          |           | .422     | 70.8       | 249.0    | +14.2   | 26      | 134         |        |        |
| Sept. 21 |           |          | (+25.0)    | (327.2)  | (+ 7.1) | (112) | (607)       | (2534)  |          |           |          |            |          |         |         |             | 104    |        |
| 264.442  | G         | .955     | 254.7      |          |         |       | 523         |         | Sept. 25 |           |          | (+25.5)    | (273.2)  | (+ 6.9) | (65)    | (435)       | (755)  |        |
|          |           | .919     | 281.0      |          |         |       | 255         |         |          |           |          |            |          |         |         |             |        |        |
|          |           | .911     | 246.3      |          |         |       | 350         |         |          |           |          |            |          |         |         |             |        |        |
|          |           | .808     | 241.8      |          |         |       | 85          |         |          |           |          |            |          |         |         |             |        |        |
|          | 16612     | .918     | 255.6      | 16.9     | -10.2   | 18    | 72          | 238 c   | 268.354  |           | .952     | 244.3      |          |         |         |             | 361    |        |
|          | 16614     | .841     | 249.8      | 6.3      | -12.8   | 4     | 16          | 102 c   |          |           | .915     | 255.4      |          |         |         |             | 165    |        |
|          | 16613     | .798     | 282.8      | 5.7      | +14.4   | 22    | 123         | 132 c   |          |           | .829     | 245.0      |          |         |         |             | 190    |        |
|          | 16616     | .295     | 309.8      | 326.2    | +17.6   | 54    | 255         |         |          | 16616     | .903     | 286.6      | 326.1    | +17.9   | 52      | 266         | 212 f  |        |
|          | 16620     | .887     | 77.6       | 248.0    | +14.4   | 17    | 97          | 627 c   |          | 16621     | .790     | 285.7      | 313.2    | +16.6   | 14      | 94          | 168 c  |        |
|          |           | .800     | 81.8       |          |         |       | 112         |         |          | 16620     | .235     | 56.0       | 249.4    | +14.3   | 22      | 134         |        |        |
|          |           | .820     | 61.8       |          |         |       | 137         |         |          | 16622     | .421     | 149.1      | 248.0    | -14.4   | 0       | 1           |        |        |
|          |           | .916     | 109.4      |          |         |       | 248         |         |          |           | .797     | 76.3       |          |         |         |             | 138    |        |
|          |           | .950     | 56.9       |          |         |       | 196         |         |          |           | .910     | 73.6       |          |         |         |             | 133    |        |
|          |           | .964     | 100.8      |          |         |       | 270         |         |          |           | .936     | 116.8      |          |         |         |             | 204    |        |
| Sept. 22 |           |          | (+25.2)    | (312.5)  | (+ 7.0) | (115) | (563)       | (3275)  | Sept. 26 |           |          | (+25.6)    | (260.9)  | (+ 6.9) | (88)    | (495)       | (1571) |        |

Group 16620. Sept. 21-Oct. 1. A string of small variable spots, of which the leader is the most stable component.

Group 16621. Sept. 25 - 28. A few small variable spots.

Group 16622. Sept. 26 - 27. A tiny spot.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |                | POSITION |       | AREA   |             |        | U.T.    | Group No. | MEASURES |                | POSITION |       | AREA  |                    |              |      |
|---------|-----------|----------|----------------|----------|-------|--------|-------------|--------|---------|-----------|----------|----------------|----------|-------|-------|--------------------|--------------|------|
|         |           | Dist.    | Pos. Angle     | Long.    | Lat.  | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle     | Long.    | Lat.  | Umbræ | Whole Spots        | Faculæ       |      |
| 1950    |           |          |                | o        | o     |        |             |        | 1950    |           |          |                | o        | o     |       |                    |              |      |
| 269.545 | 16616     | .983     | 287.2          | 325.8    | +18.1 | 19     | 221         | 132 c  | 274.538 |           | .947     | 252.0          |          |       |       | 189                |              |      |
| G       | 16621     | .906     | 285.7          | 310.8    | +17.1 | 5      | 26          | 184 c  |         |           | .932     | 281.8          |          |       |       | 515                |              |      |
|         | 1298a     | .844     | 261.5          | 301.7    | -3.4  | 2      | 7           | 121 s  |         |           | .882     | 259.6          |          |       |       | 93                 |              |      |
|         | 16620     | .157     | 331.1          | 249.7    | +14.8 | 25     | 136         |        |         |           | .844     | 287.4          |          |       |       | 83                 |              |      |
|         | 16622     | .357     | 189.0          | 248.5    | -13.7 | 1      | 7           |        |         |           | .517     | 113.7          | 151.0    | -6.1  | 38    | 168                |              |      |
|         | 16623     | .836     | 121.1          | 195.2    | -21.2 | 0      | 2           | 231 c  |         |           | .6625    | .730           | 64.3     | 133.8 | +23.1 | 41                 | 184          | 85 s |
| Sept.27 |           | (+25.7)  | (245.2)(+ 6.9) | (52)     | (399) | (668)  |             |        |         |           | .856     | 79.5           | 120.0    | +12.4 | 12    | 64                 | 205 nf       |      |
|         |           |          |                |          |       |        |             |        |         |           | .912     | 105.3          |          |       |       | 81                 |              |      |
|         |           |          |                |          |       |        |             |        |         |           | .933     | 158.1          |          |       |       | 10                 |              |      |
|         |           |          |                |          |       |        |             |        |         |           | .939     | 153.9          |          |       |       | 16                 |              |      |
| 270.310 | 16621     | .909     | 261.2          |          |       |        | 90          |        | Oct.2   |           | (+26.1)  | (179.3)(+ 6.6) |          |       |       | (91)               | (416) (1277) |      |
| C       | 16620     | .955     | 285.2          | 308.8    | +16.5 | 0      | 14          | 188 c  |         |           |          |                |          |       |       |                    |              |      |
|         | 16623     | .276     | 302.8          | 249.0    | +15.2 | 16     | 82          |        |         |           |          |                |          |       |       |                    |              |      |
| Sept.28 |           | .746     | 125.6          | 194.9    | -20.5 | 8      | 31          | 134 c  |         |           |          |                |          |       |       | 320                |              |      |
|         |           | (+25.8)  | (235.1)(+ 6.8) | (24)     | (127) | (412)  |             |        |         |           |          |                |          |       |       | 217                |              |      |
|         |           |          |                |          |       |        |             |        |         |           |          |                |          |       |       | 119                |              |      |
| 271.311 | 16620     | .979     | 263.8          |          |       |        | 156         |        |         |           |          |                |          |       |       |                    |              |      |
| C       | 16623     | .457     | 289.1          | 248.3    | +14.7 | 10     | 59          |        |         |           |          |                |          |       |       | 32                 | 228          |      |
|         | 16624     | .627     | 136.3          | 194.4    | -20.9 | 11     | 41          |        |         |           |          |                |          |       |       | 41                 | 203          |      |
|         | 16625     | .966     | 97.1           | 147.9    | -5.0  | 12     | 60          | 168 c  |         |           |          |                |          |       |       | 8                  | 50           |      |
| Sept.29 |           | .995     | 68.1           | 135.8    | +22.3 | 34     | 168         | 254 p  |         |           |          |                |          |       |       | 98 nf              |              |      |
|         |           | .904     | 72.5           |          |       |        | 164         |        |         |           |          |                |          |       |       | 180                |              |      |
|         |           | (+25.9)  | (221.9)(+ 6.8) | (67)     | (328) | (742)  |             |        |         |           |          |                |          |       |       | 157                |              |      |
|         |           |          |                |          |       |        |             |        |         |           |          |                |          |       |       | (81) (481) (1091)  |              |      |
| 272.316 | 16620     | .973     | 256.0          |          |       |        | 115         |        | 276.557 |           |          |                |          |       |       |                    | 201          |      |
| C       | 16623     | .958     | 288.0          |          |       |        | 74          |        |         |           |          |                |          |       |       | 232                |              |      |
|         | 16624     | .902     | 281.0          |          |       |        | 112         |        |         |           |          |                |          |       |       |                    |              |      |
|         | 16625     | .644     | 284.2          | 248.5    | +14.2 | 7      | 24          |        |         |           |          |                |          |       |       | 48                 | 262          |      |
| Sept.30 |           | .482     | 157.9          | 197.5    | -19.9 | 1      | 5           |        |         |           |          |                |          |       |       | 46                 | 182          |      |
|         |           | .873     | 100.0          | 149.1    | -5.3  | 20     | 106         | 173 c  |         |           |          |                |          |       |       | 5                  | 34           |      |
|         |           | .953     | 68.0           | 135.2    | +23.0 | 36     | 200         | 220 c  |         |           |          |                |          |       |       | 10                 | 43           |      |
|         |           | .814     | 72.4           |          |       |        | 120         |        |         |           |          |                |          |       |       | 225 c              |              |      |
|         |           | (+26.0)  | (208.6)(+ 6.7) | (64)     | (335) | (814)  |             |        | Oct.4   |           | (+26.2)  | (152.6)(+ 6.5) |          |       |       | (109) (521) (920)  |              |      |
|         |           |          |                |          |       |        |             |        |         |           |          |                |          |       |       |                    |              |      |
| 273.383 | 16620     | .947     | 284.7          |          |       |        | 225         |        |         |           |          |                |          |       |       |                    | 115          |      |
| G       | 16623     | .896     | 296.7          |          |       |        | 138         |        | 277.320 |           |          |                |          |       |       |                    | 238          |      |
|         | 16624     | .853     | 247.7          |          |       |        | 160         |        |         |           |          |                |          |       |       |                    | 103          |      |
|         | 16625     | .828     | 282.7          | 250.7    | +14.2 | 0      | 10          | 334 c  |         |           |          |                |          |       |       |                    | 180          |      |
|         | 16626     | .471     | 179.7          | 194.3    | -21.3 | 5      | 33          |        |         |           |          |                |          |       |       |                    |              |      |
|         |           | .724     | 104.5          | 149.9    | -5.6  | 26     | 115         | 172 c  |         |           |          |                |          |       |       | 42                 | 207          |      |
|         |           | .870     | 67.2           | 134.1    | +23.1 | 40     | 166         | 439 c  |         |           |          |                |          |       |       | 39                 | 174          |      |
|         |           | .962     | 78.8           | 119.6    | +12.5 | 7      | 45          | 207 c  |         |           |          |                |          |       |       | 5                  | 17           |      |
|         |           | .917     | 56.3           |          |       |        | 125         |        |         |           |          |                |          |       |       | 22                 | 80           |      |
|         |           | .961     | 162.2          |          |       |        | 16          |        |         |           |          |                |          |       |       | 0                  | 11           |      |
|         |           | .983     | 100.9          |          |       |        | 298         |        |         |           |          |                |          |       |       | 177                |              |      |
| Oct.1   |           | .986     | 151.8          |          |       |        | 26          |        |         |           |          |                |          |       |       |                    | 303          |      |
|         |           | (+26.1)  | (194.5)(+ 6.7) | (78)     | (369) | (2140) |             |        | Oct.5   |           | (+26.3)  | (142.6)(+ 6.5) |          |       |       | (108) (489) (1593) |              |      |
|         |           |          |                |          |       |        |             |        |         |           |          |                |          |       |       |                    |              |      |

Group 16624. Sept.29-Oct.10. A stream of small spots, of which the leader becomes regular and is the longest-lived.

Group 16625. Sept.29-Oct.12. Return of Group 16611. A stable regular spot.

Group 16626. Oct. 1 - 5. A small spot.

Group 16627. Oct. 4 - 13. Return of Group 16615. A variable stream.

Group 16628. Oct. 5 - 8. Return of Group 16618. A tiny spot on each day.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.    | Group No. | MEASURES |                | POSITION |        | AREA   |             |        | U.T.    | Group No. | MEASURES |               | POSITION      |       | AREA  |                     |                    |       |       |
|---------|-----------|----------|----------------|----------|--------|--------|-------------|--------|---------|-----------|----------|---------------|---------------|-------|-------|---------------------|--------------------|-------|-------|
|         |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle    | Long.         | Lat.  | Umbræ | Whole Spots         | Faculæ             |       |       |
| 1950    | 278.343 G | .949     | 247.1          | o        | o      |        | 385         |        | 1950    | Oct. 9    | .880     | 77.5          | o             | o     |       | 190                 |                    |       |       |
|         |           | .946     | 284.5          |          |        |        | 204         |        |         |           | .989     | 83.2          |               |       |       | 177                 |                    |       |       |
|         |           | .911     | 235.2          |          |        |        | 294         |        |         |           | (+26.4)  | (90.0)(+ 6.3) |               |       |       | (151) (1016) (1525) |                    |       |       |
|         |           | .851     | 288.3          |          |        |        | 191         |        |         |           |          |               |               |       |       |                     |                    |       |       |
|         |           | .454     | 243.3          | 153.1    | - 5.9  | 29     | 155         |        |         |           | 16624    | .969          | 261.8         | 151.3 | - 6.3 | 9                   | 63                 | 210 c |       |
|         |           | .299     | 349.3          | 132.6    | +23.4  | 31     | 160         |        | 282.302 | C         | .856     | 288.5         | 135.7         | +19.0 | 8     | 33                  | 95 c               |       |       |
|         |           | .764     | 79.9           | 79.1     | +11.8  | 12     | 55          | 112 c  |         |           | 16625    | .823          | 294.3         | 131.4 | +23.5 | 28                  | 174                | 128 n |       |
|         |           | .914     | 91.3           | 63.3     | + 1.4  | 0      | 5           | 383 c  |         |           | 16629    | .231          | 258.0         | 89.8  | + 3.3 | 38                  | 198                |       |       |
|         |           | .885     | 113.5          |          |        |        | 167         |        |         |           | 16627    | .110          | 347.3         | 78.2  | +12.3 | 6                   | 31                 |       |       |
|         |           | .918     | 61.1           |          |        |        | 195         |        |         |           | 16630    | .758          | 100.8         | 28.7  | - 4.0 | 3                   | 30                 | 134 f |       |
|         |           | .931     | 167.7          |          |        |        | 12          |        |         |           | 16631    | .878          | 108.0         | 18.2  | -12.5 | 45                  | 384                | 414 c |       |
|         |           | .956     | 81.0           |          |        |        | 393         |        |         |           | 16632    | .913          | 103.6         | 12.8  | - 9.7 | 2                   | 18                 |       |       |
| Oct. 6  |           | (+26.3)  | (129.1)(+ 6.4) | (72)     | (375)  | (2336) |             |        |         |           |          | .787          | 115.5         |       |       |                     | 104                |       |       |
|         |           |          |                |          |        |        |             |        |         |           |          | .861          | 79.4          |       |       |                     | 126                |       |       |
|         |           |          |                |          |        |        |             |        |         |           |          | .938          | 85.0          |       |       |                     | 147                |       |       |
| 279.301 | C         | 16624    | .626           | 252.3    | 153.1  | - 5.8  | 15          | 153    |         | Oct. 10   |          | (+26.4)       | (76.8)(+ 6.2) |       |       |                     | (139) (931) (1358) |       |       |
|         |           | 16625    | .393           | 320.2    | 132.3  | +23.7  | 36          | 153    |         |           |          | .947          | 286.2         |       |       |                     | 171                |       |       |
|         |           | 16627    | .605           | 78.9     | 79.2   | +11.8  | 3           | 29     |         |           |          | .856          | 255.3         |       |       |                     | 224                |       |       |
|         |           | 16628    | .806           | 91.2     | 62.8   | + 2.8  | 0           | 3      | 111 c   | 283.427   | G        | .818          | 280.4         |       |       |                     | 105                |       |       |
|         |           |          | .886           | 80.0     |        |        |             |        | 92      |           |          | 16625         | .933          | 292.6 | 131.4 | +23.3               | 37                 | 167   | 119 c |
| Oct. 7  |           | (+26.3)  | (116.4)(+ 6.4) | (54)     | (338)  | (203)  |             |        |         |           |          | .476          | 265.8         | 90.3  | + 3.4 | 33                  | 158                |       |       |
|         |           |          |                |          |        |        |             |        |         | 16629     | .289     | 288.7         | 78.1          | +11.2 | 10    | 60                  |                    |       |       |
|         |           |          |                |          |        |        |             |        |         | 1298c     | .539     | 76.0          | 29.7          | +12.7 | 1     | 5                   |                    |       |       |
| 280.449 | G         | 16624    | .923           | 283.0    |        |        |             | 129    |         |           | 16630    | .589          | 105.9         | 26.8  | - 4.4 | 1                   | 6                  |       |       |
|         |           | 16625    | .808           | 257.8    | 153.6  | - 5.8  | 13          | 105    | 241 c   |           | G        | .739          | 113.5         | 18.2  | -12.7 | 77                  | 339                | 135 c |       |
|         |           | 16625    | .567           | 303.8    | 132.2  | +23.8  | 35          | 195    |         |           |          | .788          | 106.8         | 12.4  | - 9.2 | 0                   | 4                  | 264 c |       |
|         |           | 16629    | .202           | 103.8    | 90.0   | + 3.4  | 27          | 173    |         |           |          | .829          | 70.3          | 6.2   | +19.7 | 6                   | 21                 | 80 c  |       |
|         |           | 16627    | .399           | 74.2     | 78.3   | +12.1  | 16          | 82     |         |           |          | .817          | 84.4          |       |       |                     | 181                |       |       |
|         |           | 16628    | .612           | 96.4     | 64.0   | + 1.1  | 0           | 4      |         |           |          | .879          | 76.4          |       |       |                     | 115                |       |       |
|         |           | 16630    | .972           | 96.6     | 25.8   | - 4.9  | 23          | 88     | 315 c   |           |          | .905          | 113.8         |       |       |                     | 566                |       |       |
|         |           | 16631    | .994           | 103.8    | 19.4   | -12.9  | 61          | 388    | 320 p   |           |          | .939          | 83.6          |       |       |                     | 207                |       |       |
|         |           |          | .936           | 77.5     |        |        |             |        | 157     |           |          | .945          | 69.0          |       |       |                     | 302                |       |       |
| Oct. 8  |           |          | .947           | 85.6     |        |        |             |        | 206     |           |          | (+26.4)       | (62.0)(+ 6.1) |       |       |                     |                    |       |       |
|         |           | (+26.4)  | (101.3)(+ 6.3) | (175)    | (1035) | (1368) |             |        |         |           |          |               |               |       |       | (165) (760) (2469)  |                    |       |       |
| 281.301 | C         | 16624    | .898           | 259.9    | 152.6  | - 6.1  | 13          | 78     | 332 c   | 284.341   | G        | .929          | 255.6         |       |       |                     | 180                |       |       |
|         |           | 16625    | .690           | 298.3    | 131.4  | +23.8  | 32          | 159    |         |           |          | .985          | 292.8         | 131.5 | +23.5 | 38                  | 199                | 243 n |       |
|         |           | 16629    | .049           | 167.2    | 89.4   | + 3.6  | 39          | 248    |         |           |          | .868          | 280.0         | 110.5 | +11.7 | 9                   | 40                 | 120 c |       |
|         |           | 16627    | .219           | 62.3     | 78.6   | +12.0  | 7           | 27     |         |           |          | .648          | 268.4         | 90.2  | + 3.6 | 31                  | 170                |       |       |
|         |           | 16630    | .904           | 97.5     | 26.3   | - 4.0  | 15          | 106    | 152 c   |           |          | .475          | 283.3         | 77.9  | +11.5 | 4                   | 22                 |       |       |
|         |           | 16631    | .960           | 105.0    | 18.5   | -12.5  | 45          | 398    | 524 c   |           |          | .497          | 112.9         | 22.6  | - 5.8 | 1                   | 5                  |       |       |
|         |           |          | .867           | 86.1     |        |        |             |        | 150     |           |          | .605          | 119.6         | 17.5  | -12.3 | 58                  | 352                |       |       |

Group 16629. Oct. 8 - 15. A regular spot, followed by a few companions appearing suddenly near the central meridian. By October 13 the diminishing regular spot alone remains.

Group 16630. Oct. 8 - 14. A group of small dying spots.

Group 16631. Oct. 8 - 19. At first, a composite spot with a few small companions. On October 15 it breaks up into numerous small spots which die out before reaching the limb.

Group 16632. Oct. 10 - 11. A pair of tiny spots.

Group 16633. Oct. 11 - 14. A pair of small spots on October 11 and 12, a single small spot on the other day.

Group 16634. Oct. 12 - 13. Two or three small spots on October 12; a single small spot on October 13.

Group 16635. Oct. 12 - 20. One or two small spots, which within a few days develop into an elongated composite spot, which on October 18 splits into two.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.            | Group No. | MEASURES |            | POSITION      |               | AREA  |             |        | U.T.            | Group No. | MEASURES |            | POSITION       |       | AREA   |             |        |       |
|-----------------|-----------|----------|------------|---------------|---------------|-------|-------------|--------|-----------------|-----------|----------|------------|----------------|-------|--------|-------------|--------|-------|
|                 |           | Dist.    | Pos. Angle | Long.         | Lat.          | Umbræ | Whole Spots | Faculæ |                 |           | Dist.    | Pos. Angle | Long.          | Lat.  | Umbræ  | Whole Spots | Faculæ |       |
| 1950<br>Oct. 12 | 16633     | .698     | 68.4       | 6.7           | +19.3         | 11    | 28          |        | 1950<br>Oct. 15 |           | .915     | 335.3      | o              | o     |        |             | 11     |       |
|                 | 16636     | .983     | 74.1       | 329.3         | +16.7         | 24    | 82          | 101 c  |                 |           | .820     | 268.0      |                |       |        |             | 251    |       |
|                 |           | .834     | 114.9      |               |               |       |             | 90     |                 | 16629     | .987     | 271.7      | 90.5           | + 2.6 | 27     | 176         | 85 c   |       |
|                 |           | .916     | 122.4      |               |               |       |             | 109    |                 | 16638     | .510     | 262.1      | 40.1           | + 1.0 | 6      | 39          |        |       |
|                 |           | .939     | 111.6      | (+26.4)       | (49.9)(+ 6.0) | (177) | (909)       | (1033) |                 | 16631     | .341     | 203.3      | 16.2           | -12.4 | 38     | 239         |        |       |
|                 |           |          |            |               |               |       |             | 81     |                 | 16635     | .372     | 186.5      | 12.4           | -15.8 | 38     | 231         |        |       |
|                 |           |          |            |               |               |       |             |        |                 | 16636     | .667     | 71.2       | 328.8          | +16.8 | 12     | 70          |        |       |
|                 |           |          |            |               |               |       |             |        |                 |           | .908     | 97.2       |                |       |        |             | 314    |       |
|                 |           |          |            |               |               |       |             |        |                 |           |          | (+26.3)    | (9.9)(+ 5.8)   | (121) | (755)  | (1546)      |        |       |
|                 |           |          |            |               |               |       |             |        |                 |           |          |            |                |       |        |             |        |       |
| 285.378<br>G    |           | .971     | 254.2      |               |               |       |             | 115    | 288.634<br>G    |           | .925     | 270.9      |                |       |        |             | 202    |       |
|                 |           | .894     | 262.7      |               |               |       |             | 160    |                 |           | .877     | 282.3      |                |       |        |             | 137    |       |
|                 |           | .832     | 255.9      |               |               |       |             | 140    |                 |           | 16638    | .761       | 264.7          | 42.4  | - 0.3  | 3           | 17     |       |
|                 |           | .765     | 281.3      |               |               |       |             | 154    |                 |           | 16631    | .547       | 236.2          | 20.9  | -12.7  | 37          | 203    |       |
|                 | 16634     | .970     | 280.2      | 112.9         | +11.4         | 0     | 8           | 138 n  |                 |           | 16635    | .489       | 222.0          | 13.1  | -15.8  | 101         | 656    |       |
|                 | 16629     | .816     | 269.6      | 90.9          | + 3.2         | 25    | 126         | 130 nf |                 |           | 16636    | .432       | 64.9           | 329.4 | +15.8  | 11          | 35     |       |
|                 | 16627     | .664     | 282.0      | 77.8          | +12.4         | 1     | 7           |        |                 |           | 16639    | .912       | 100.2          | 288.8 | - 6.8  | 26          | 90     | 168 c |
|                 | 16630     | .234     | 132.3      | 26.4          | - 3.1         | 1     | 26          |        |                 |           | 1299a    | .909       | 72.8           | 287.6 | +18.0  | 2           | 11     | 276 f |
|                 | 16631     | .447     | 134.0      | 17.2          | -12.4         | 55    | 320         |        |                 |           | .779     | 100.1      |                |       |        |             | 228    |       |
|                 | 16635     | .543     | 133.4      | 12.1          | -16.4         | 1     | 4           |        |                 |           | .868     | 63.4       |                |       |        |             | 133    |       |
| Oct. 13         | 16633     | .511     | 62.4       | 7.8           | +19.0         | 4     | 16          |        | Oct. 16         |           |          | (+26.2)    | (353.3)(+ 5.7) | (180) | (1012) | (1144)      |        |       |
|                 | 1298d     | .537     | 87.1       | 3.8           | + 6.6         | 1     | 4           |        |                 |           |          |            |                |       |        |             |        |       |
|                 | 16637     | .647     | 90.6       | 355.9         | + 4.2         | 0     | 3           |        |                 |           |          |            |                |       |        |             |        |       |
|                 | 16636     | .918     | 74.6       | 329.2         | +16.5         | 11    | 50          | 284 f  |                 |           |          |            |                |       |        |             |        |       |
|                 |           | .923     | 109.8      |               |               |       |             | 343    |                 |           |          |            |                |       |        |             |        |       |
|                 |           |          | (+26.4)    | (36.3)(+ 6.0) | (99)          | (564) | (1464)      |        |                 |           |          |            |                |       |        |             |        |       |
|                 |           |          |            |               |               |       |             |        |                 |           |          |            |                |       |        |             |        |       |
|                 |           |          |            |               |               |       |             |        |                 |           |          |            |                |       |        |             |        |       |
|                 |           |          |            |               |               |       |             |        |                 |           |          |            |                |       |        |             |        |       |
|                 |           |          |            |               |               |       |             |        |                 |           |          |            |                |       |        |             |        |       |
| 286.329<br>G    |           | .913     | 288.5      |               |               |       |             | 161    | 289.310<br>C    |           | .964     | 271.3      |                |       |        |             | 118    |       |
|                 |           | .904     | 260.1      |               |               |       |             | 219    |                 |           | .826     | 267.7      |                |       |        |             | 94     |       |
|                 |           | .892     | 277.7      |               |               |       |             | 244    |                 |           | .781     | 278.9      |                |       |        |             | 94     |       |
|                 |           | .882     | 335.9      |               |               |       |             | 12     |                 |           | 16631    | .650       | 242.2          | 20.4  | -13.0  | 56          | 170    |       |
|                 |           | .879     | 339.7      |               |               |       |             | 9      |                 |           | 16635    | .598       | 232.5          | 13.9  | -16.3  | 103         | 665    |       |
|                 |           | .815     | 283.1      |               |               |       |             | 353    |                 |           | 16636    | .300       | 53.9           | 329.9 | +15.7  | 12          | 25     |       |
|                 | 16629     | .922     | 270.6      | 90.9          | + 2.8         | 31    | 119         | 109 c  |                 |           | 16639    | .830       | 102.1          | 289.8 | - 6.7  | 19          | 78     | 78 c  |
|                 | 16630     | .196     | 221.0      | 31.1          | - 2.6         | 1     | 5           |        |                 |           | .870     | 69.0       |                |       |        |             | 173    |       |
|                 | 16631     | .330     | 159.0      | 16.8          | -12.0         | 42    | 284         |        |                 |           |          | (+26.2)    | (344.4)(+ 5.7) | (190) | (938)  | (557)       |        |       |
|                 | 16635     | .425     | 149.9      | 11.0          | -15.7         | 17    | 55          |        |                 |           |          |            |                |       |        |             | 166    |       |
| Oct. 14         | 16633     | .345     | 52.0       | 7.2           | +17.9         | 1     | 5           |        | 290.357<br>G    |           | .932     | 271.3      |                |       |        |             | 310    |       |
|                 | 16637     | .437     | 94.4       | 357.9         | + 3.4         | 1     | 6           |        |                 |           | .921     | 251.0      |                |       |        |             | 171    |       |
|                 | 16636     | .815     | 74.5       | 329.1         | +16.0         | 11    | 55          | 85 n   |                 |           | .909     | 279.2      |                |       |        |             | 207    |       |
|                 |           | .914     | 72.7       |               |               |       |             | 149    |                 |           | .863     | 260.6      |                |       |        |             | 227    |       |
|                 |           | .931     | 63.9       |               |               |       |             | 90     |                 |           | .847     | 289.2      |                |       |        |             | 227    |       |
|                 |           | .959     | 94.8       |               |               |       |             | 270    |                 |           | 16631    | .800       | 248.8          | 20.4  | -13.2  | 22          | 129    | 223 c |
|                 |           |          | (+26.3)    | (23.7)(+ 5.9) | (104)         | (529) | (1701)      |        |                 |           | 16635    | .759       | 242.6          | 15.0  | -16.4  | 97          | 601    | 169 c |
|                 |           |          |            |               |               |       |             |        |                 |           | 16636    | .172       | 2.6            | 330.1 | +15.4  | 4           | 15     |       |
|                 |           |          |            |               |               |       |             |        |                 |           | 16639    | .681       | 106.4          | 289.6 | - 6.8  | 28          | 157    |       |
|                 |           |          |            |               |               |       |             |        |                 |           | .770     | 68.8       |                |       |        |             | 147    |       |
| 287.374<br>G    |           | .977     | 278.1      |               |               |       |             | 306    | Oct. 18         |           | .927     | 98.9       |                |       |        |             | 103    |       |
|                 |           | .957     | 265.5      |               |               |       |             | 133    |                 |           | .945     | 70.6       |                |       |        |             | 184    |       |
|                 |           | .929     | 281.9      |               |               |       |             | 446    |                 |           |          | (+26.2)    | (330.6)(+ 5.6) | (151) | (902)  | (1907)      |        |       |

Group 16636. Oct. 12 - 18. Return of Group 16616. A small spot, with a faint companion on October 15.

Group 16637. Oct. 13 - 14. A pair of tiny spots on October 13; a single spot on October 14.

Group 16638. Oct. 15 - 16. A pair of spots on October 15; a single spot on October 16.

Group 16639. Oct. 18 - 27. A stream of small changing spots which almost die out by October 21. On the next day there is an increase in activity and a bi-polar group is formed.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |                |          |       |       |             |                         |           |           |                |                |                |                  |                            |             |        |
|---|-----------|----------|----------------|----------|-------|-------|-------------|-------------------------|-----------|-----------|----------------|----------------|----------------|------------------|----------------------------|-------------|--------|
| U.T.  | Group No. | MEASURES |                | POSITION |       | AREA  |             |                         | U.T.      | Group No. | MEASURES       |                | POSITION       |                  | AREA                       |             |        |
|   |           | Dist.    | Pos. Angle     | Long.    | Lat.  | Umbræ | Whole Spots | Faculæ                  |           |           | Dist.          | Pos. Angle     | Long.          | Lat.             | Umbræ                      | Whole Spots | Faculæ |
| 1950  |           |          |                |          |       |       |             |                         |           |           |                |                |                |                  |                            |             |        |
| Oct. 19   | 291.434 G | .950     | 259.9          | 19.8     | -13.2 | 2     | 11 }        | 457<br>7<br>673 c       | 1950      | 297.371 G | .943           | 264.6          | o              | o                | 246<br>142<br>166<br>233 c |             |        |
|   |           | .882     | 321.7          |          |       |       |             |                         |           |           | .938           | 254.8          |                |                  |                            |             |        |
|   |           | .913     | 252.9          |          |       |       |             |                         |           |           | .750           | 293.2          |                |                  |                            |             |        |
|   |           | .901     | 249.0          |          |       |       |             |                         |           |           | .823           | 259.6          | 292.3 - 5.5    | 63 371           | 200<br>(392) (987)         |             |        |
|   |           | .493     | 113.1          |          |       |       |             |                         |           |           | .527           | 38.4           |                |                  |                            |             |        |
|   |           | .900     | 73.3           |          |       |       |             |                         |           |           | .924           | 72.2           |                |                  |                            |             |        |
|   |           | .929     | 106.5          |          |       |       |             |                         |           |           | (+25.6)        | (238.1)(+ 5.0) |                |                  |                            |             |        |
|   |           | (+26.1)  | (316.4)(+ 5.5) |          |       |       |             |                         |           |           | (65)           | (392)          |                |                  |                            |             |        |
| Oct. 20   | 292.429 G | .862     | 241.8          | 17.5     | -15.7 | 59    | 441         | 141<br>193<br>900 c     | 298.384 G | 16639     | .848           | 291.9          | 292.6 - 5.3    | 23 273           | 125<br>588 c               |             |        |
|   |           | .860     | 276.1          |          |       |       |             |                         |           |           | .424           | 16.8           |                |                  |                            |             |        |
|   |           | .973     | 252.4          |          |       |       |             |                         |           |           | .968           | 102.8          |                |                  |                            |             |        |
|   |           | .320     | 129.8          |          |       |       |             |                         |           |           | .982           | 93.7           |                |                  |                            |             |        |
|   |           | .755     | 69.7           |          |       |       |             |                         |           |           | .890           | 98.3           |                |                  |                            |             |        |
|   |           | .869     | 114.0          |          |       |       |             |                         |           |           | .943           | 71.8           | (+25.4)        | (224.7)(+ 4.9)   | (64) (490) (1133)          |             |        |
|   |           | .877     | 72.2           |          |       |       |             |                         |           |           | (+26.0)        | (303.3)(+ 5.4) |                |                  |                            |             |        |
|   |           | (+26.0)  | (303.3)(+ 5.4) |          |       |       |             |                         |           |           | (71)           | (522)          |                |                  |                            |             |        |
|   |           | (+26.0)  | (289.9)(+ 5.4) |          |       |       |             |                         |           |           | (1741)         |                |                |                  |                            |             |        |
|   |           | (+26.0)  | (289.9)(+ 5.4) |          |       |       |             |                         |           |           | (+25.4)        | (211.8)(+ 4.8) |                |                  |                            |             |        |
| Oct. 21   | 293.440 C | .967     | 251.2          | 292.0    | - 6.9 | 3     | 23          | 290<br>184              | 299.364 G | 16639     | .921           | 291.1          | 290.2 - 4.8    | 18 127           | 309<br>363 c               |             |        |
|   |           | .939     | 279.8          |          |       |       |             |                         |           |           | .982           | 264.2          |                |                  |                            |             |        |
|   |           | .217     | 189.8          |          |       |       |             |                         |           |           | .410           | 350.3          |                |                  |                            |             |        |
|   |           | (+26.0)  | (289.9)(+ 5.4) |          |       |       |             |                         |           |           | .872           | 106.3          |                |                  |                            |             |        |
|   |           | (+26.0)  | (289.9)(+ 5.4) |          |       |       |             |                         |           |           | .915           | 95.0           |                |                  |                            |             |        |
|   |           | (+26.0)  | (289.9)(+ 5.4) |          |       |       |             |                         |           |           | .894           | 70.7           | (+25.3)        | (211.8)(+ 4.8)   | (63) (364) (1693)          |             |        |
|   |           | (+26.0)  | (289.9)(+ 5.4) |          |       |       |             |                         |           |           | (+25.3)        | (211.8)(+ 4.8) |                |                  |                            |             |        |
|   |           | (+26.0)  | (289.9)(+ 5.4) |          |       |       |             |                         |           |           | (+25.3)        | (211.8)(+ 4.8) |                |                  |                            |             |        |
|   |           | (+26.0)  | (289.9)(+ 5.4) |          |       |       |             |                         |           |           | (+25.3)        | (211.8)(+ 4.8) |                |                  |                            |             |        |
|   |           | (+26.0)  | (289.9)(+ 5.4) |          |       |       |             |                         |           |           | (+25.3)        | (211.8)(+ 4.8) |                |                  |                            |             |        |
| Oct. 22   | 294.288 C | .297     | 227.3          | 291.3    | - 6.4 | 6     | 44          | 300.370 G               | 16641     | .730      | 110.9          | 154.5 - 11.7   | 17 93          | 138 c            |                            |             |        |
|   |           | (+25.9)  | (278.7)(+ 5.3) |          |       |       |             |                         |           | .803      | 96.6           |                |                |                  |                            |             |        |
|   |           | (+25.9)  | (278.7)(+ 5.3) |          |       |       |             |                         |           | .951      | 68.0           |                |                |                  |                            |             |        |
|   |           | (+25.9)  | (278.7)(+ 5.3) |          |       |       |             |                         |           | .991      | 76.8           |                |                |                  |                            |             |        |
|   |           | (+25.9)  | (278.7)(+ 5.3) |          |       |       |             |                         |           | .795      | 68.8           | (+25.2)        | (198.5)(+ 4.7) | (82) (376) (676) |                            |             |        |
|   |           | (+25.9)  | (278.7)(+ 5.3) |          |       |       |             |                         |           | (+25.2)   | (198.5)(+ 4.7) |                |                |                  |                            |             |        |
|   |           | (+25.9)  | (278.7)(+ 5.3) |          |       |       |             |                         |           | (+25.2)   | (198.5)(+ 4.7) |                |                |                  |                            |             |        |
|   |           | (+25.9)  | (278.7)(+ 5.3) |          |       |       |             |                         |           | (+25.2)   | (198.5)(+ 4.7) |                |                |                  |                            |             |        |
|   |           | (+25.9)  | (278.7)(+ 5.3) |          |       |       |             |                         |           | (+25.2)   | (198.5)(+ 4.7) |                |                |                  |                            |             |        |
| Oct. 23   | 295.608 G | .939     | 251.5          | 291.9    | - 6.2 | 21    | 184         | 158<br>281<br>159       | 301.452 G | 16643     | .899           | 247.5          | 155.7 - 11.2   | 29 191           | 175<br>94                  |             |        |
|   |           | .883     | 287.8          |          |       |       |             |                         |           |           | .887           | 258.5          |                |                  |                            |             |        |
|   |           | .785     | 265.0          |          |       |       |             |                         |           |           | .653           | 310.1          |                |                  |                            |             |        |
|   |           | .541     | 250.0          |          |       |       |             |                         |           |           | .410           | 306.1          |                |                  |                            |             |        |
|   |           | (+25.8)  | (261.3)(+ 5.2) |          |       |       |             |                         |           |           | .541           | 119.3          |                |                  |                            |             |        |
|   |           | (+25.8)  | (261.3)(+ 5.2) |          |       |       |             |                         |           |           | .633           | 99.1           | (+25.1)        | (184.3)(+ 4.6)   | (140) (831) (1261)         |             |        |
|   |           | (+25.8)  | (261.3)(+ 5.2) |          |       |       |             |                         |           |           | .832           | 99.1           |                |                  |                            |             |        |
|   |           | (+25.8)  | (261.3)(+ 5.2) |          |       |       |             |                         |           |           | .853           | 66.7           |                |                  |                            |             |        |
|   |           | (+25.8)  | (261.3)(+ 5.2) |          |       |       |             |                         |           |           | .938           | 77.0           |                |                  |                            |             |        |
|   |           | (+25.8)  | (261.3)(+ 5.2) |          |       |       |             |                         |           |           | (+25.1)        | (184.3)(+ 4.6) |                |                  |                            |             |        |
| Oct. 24   | 296.389 G | .954     | 287.0          | 292.7    | - 5.9 | 51    | 235         | 144<br>75<br>112<br>249 | 301.452 G | 16645     | .821           | 287.4          | 239.0 + 16.9   | 25 127           | 211 c                      |             |        |
|   |           | .901     | 270.3          |          |       |       |             |                         |           |           | .1299c         | .410           |                |                  |                            |             |        |
|   |           | .899     | 244.3</        |          |       |       |             |                         |           |           |                |                |                |                  |                            |             |        |

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|---|-----------|----------|----------------|----------|----------------|--------|-------------|--------|--------------|-----------|----------|----------------|----------|-------|--------|-------------|--------|
| U.T.  | Group No. | MEASURES |                | POSITION |                | AREA   |             |        | U.T.         | Group No. | MEASURES |                | POSITION |       | AREA   |             |        |
|   |           | Dist.    | Pos. Angle     | Long.    | Lat.           | Umbrae | Whole Spots | Faculæ |              |           | Dist.    | Pos. Angle     | Long.    | Lat.  | Umbrae | Whole Spots | Faculæ |
| 1950  |           |          |                | o        | o              |        |             |        | 1950         |           |          |                | o        | o     |        |             |        |
| 302.391<br>G  | 16645     | .949     | 249.2          |          |                |        |             |        | Nov.3        |           | .964     | 91.8           |          |       |        | 387         |        |
|   | 1299d     | .928     | 286.3          | 240.1    | +16.8          | 12     | 77          | 124 c  |              |           | .982     | 102.4          |          |       |        | 342         |        |
|   | 16640     | .846     | 254.1          | 227.7    | -10.9          | 0      | 10          | 82 c   |              |           | (+24.2)  | (117.8)(+ 4.1) | (86)     | (445) | (729)  |             |        |
|   | 16641     | .774     | 304.7          | 218.5    | +29.2          | 8      | 42          | 61 c   |              |           |          |                |          |       |        |             |        |
|   | 16642     | .372     | 135.5          | 156.6    | -11.0          | 28     | 162         |        |              |           |          |                |          |       |        | 70          |        |
|   | 16646     | .448     | 103.9          | 146.2    | - 2.1          | 13     | 55          |        |              |           |          |                |          |       |        |             |        |
|   | 16643     | .670     | 101.7          | 130.9    | - 4.4          | 10     | 46          |        |              |           |          |                |          |       |        | 108 c       |        |
|   | 16644     | .734     | 64.1           | 126.7    | +21.8          | 1      | 9           |        |              |           |          |                |          |       |        | 182         |        |
|   |           | .833     | 76.8           | 115.6    | +13.5          | 44     | 294         | 203 c  |              |           |          |                |          |       |        | 91          |        |
|   |           | (+24.9)  | (171.9)(+ 4.5) | (116)    | (695)          | (608)  |             |        |              |           |          |                |          |       |        |             |        |
| Oct.30  |           |          |                |          |                |        |             |        | 307.291<br>C |           | .852     | 262.5          |          |       |        |             |        |
|   | 16641     | .953     | 87.5           |          |                |        |             |        |              |           | .797     | 254.2          | 158.2    | -10.0 | 11     | 110         |        |
|   | 16646     | .964     | 77.9           |          |                |        |             |        |              |           | .478     | 252.9          | 134.5    | - 4.5 | 16     | 182         |        |
|   | 16643     | .984     | 104.7          |          |                |        |             |        |              |           | .226     | 309.5          | 117.5    | +12.2 | 18     |             |        |
|   | 16644     | .880     | 95.2           |          |                |        |             |        |              |           | .953     | 87.5           | 35.0     | + 3.6 | 7      | 52          | 207 c  |
|   |           | .963     | 94.3           |          |                |        |             |        |              |           | .964     | 77.9           | 32.5     | +12.7 | 0      | 24          | 163 c  |
|   |           | (+24.1)  | (107.3)(+ 4.0) | (88)     | (728)          | (1103) |             |        |              |           | .984     | 104.7          | 29.2     | -13.7 | 36     | 269         | 314 p  |
|   |           |          |                |          |                |        |             |        |              |           | .880     | 95.2           |          |       |        | 144         |        |
|   |           |          |                |          |                |        |             |        |              |           | .963     | 94.3           |          |       |        | 97          |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
| 303.294<br>C  | 16645     | .936     | 255.2          |          |                |        |             |        | Nov.4        |           |          |                |          |       |        |             |        |
|   | 16640     | .969     | 284.8          | 236.0    | +15.4          | 0      | 22          | 283 c  |              |           |          |                |          |       |        |             |        |
|   | 16641     | .871     | 300.9          | 218.4    | +28.9          | 0      | 21          | 154 c  |              |           |          |                |          |       |        |             |        |
|   | 16642     | .270     | 170.0          | 157.3    | -11.0          | 34     | 176         |        |              |           |          |                |          |       |        |             |        |
|   | 16644     | .260     | 116.8          | 146.6    | - 2.4          | 3      | 28          |        |              |           |          |                |          |       |        |             |        |
|   | 16646     | .482     | 106.6          | 132.5    | - 4.0          | 8      | 64          |        |              |           |          |                |          |       |        |             |        |
|   | 16644     | .691     | 75.4           | 116.8    | +13.2          | 18     | 247         | 222 f  |              |           |          |                |          |       |        |             |        |
|   |           | .912     | 94.4           | (+24.8)  | (160.0)(+ 4.4) | (63)   | (558)       | (1189) |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
| 304.292<br>C  | 16641     | .317     | 220.0          | 158.7    | - 9.8          | 25     | 138         |        | 308.386<br>G |           |          |                |          |       |        |             |        |
|   | 16642     | .112     | 180.4          | 146.8    | - 2.1          | 3      | 17          |        |              |           |          |                |          |       |        |             |        |
|   | 16646     | .291     | 120.8          | 132.3    | - 4.4          | 13     | 97          |        |              |           |          |                |          |       |        |             |        |
|   | 16644     | .509     | 71.1           | 117.3    | +13.2          | 28     | 233         |        |              |           |          |                |          |       |        |             |        |
|   |           | .921     | 77.6           | (+24.6)  | (146.8)(+ 4.3) | (69)   | (485)       | (269)  |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
| Nov.1   | 16641     | .317     | 298.4          |          |                |        |             |        | Nov.5        |           |          |                |          |       |        |             |        |
|   | 16641     | .481     | 240.6          | 158.4    | - 9.8          | 26     | 132         | 134    |              |           |          |                |          |       |        |             |        |
|   | 1299e     | .240     | 230.2          | 143.9    | - 4.7          | 2      | 10          |        |              |           |          |                |          |       |        |             |        |
|   | 16646     | .153     | 170.6          | 131.9    | - 4.5          | 33     | 225         |        |              |           |          |                |          |       |        |             |        |
|   | 16644     | .309     | 60.8           | 117.3    | +12.7          | 40     | 182         |        |              |           |          |                |          |       |        |             |        |
|   |           | .813     | 72.8           |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           | .905     | 87.4           | (+24.4)  | (133.3)(+ 4.2) | (101)  | (549)       | (493)  |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
| 305.317<br>C  | 16641     | .981     | 298.4          |          |                |        |             |        | 309.320<br>C |           |          |                |          |       |        |             |        |
|   | 16641     | .481     | 240.6          | 158.4    | - 9.8          | 26     | 132         | 134    |              |           |          |                |          |       |        |             |        |
|   | 1299e     | .240     | 230.2          | 143.9    | - 4.7          | 2      | 10          |        |              |           |          |                |          |       |        |             |        |
|   | 16646     | .153     | 170.6          | 131.9    | - 4.5          | 33     | 225         |        |              |           |          |                |          |       |        |             |        |
|   | 16644     | .309     | 60.8           | 117.3    | +12.7          | 40     | 182         |        |              |           |          |                |          |       |        |             |        |
| Nov.2   |           | .813     | 72.8           |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           | .905     | 87.4           | (+24.4)  | (133.3)(+ 4.2) | (101)  | (549)       | (493)  |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |
| 306.493<br>G  | 16641     | .685     | 251.2          | 158.8    | - 9.6          | 27     | 114         |        | Nov.6        |           |          |                |          |       |        |             |        |
|   | 16646     | .288     | 239.8          | 132.2    | - 4.4          | 35     | 207         |        |              |           |          |                |          |       |        |             |        |
|   | 16644     | .146     | 1.2            | 117.6    | +12.5          | 24     | 124         |        |              |           |          |                |          |       |        |             |        |
|   |           |          |                |          |                |        |             |        |              |           |          |                |          |       |        |             |        |

Group 16647. Nov. 4 - 9. A few small changing spots, dying out on the central meridian.  
 Group 16648. Nov. 4 - 5. A small spot.  
 Group 16649. Nov. 4 - 16. A stable regular spot, with some close variable companions until November 11.  
 Group 16650. Nov. 5 - 12. A bi-polar group, with a rapid increase in area, appearing suddenly near the C.M. The leader is a stable regular spot, and the follower composite.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |              |            |          |        |       |             |        |           |           |          |               |          |       |        |             |         |
|---|-----------|--------------|------------|----------|--------|-------|-------------|--------|-----------|-----------|----------|---------------|----------|-------|--------|-------------|---------|
| U.T.  | Group No. | MEASURES     |            | POSITION |        | AREA  |             |        | U.T.      | Group No. | MEASURES |               | POSITION |       | AREA   |             |         |
|   |           | Dist.        | Pos. Angle | Long.    | Lat.   | Umbræ | Whole Spots | Faculæ |           |           | Dist.    | Pos. Angle    | Long.    | Lat.  | Umbræ  | Whole Spots | Faculæ  |
| 1950  |           |              |            | o        | o      |       |             |        | 1950      |           |          |               | o        | o     |        |             |         |
| 310.431 G   | .963      | 289.6        |            |          |        |       | 81          |        | 314.416 G | .950      | 282.7    | 85.1          | +13.1    | 136   | 834    | 465 c       |         |
|   | .916      | 295.4        |            |          |        |       | 122         |        |           | .520      | 240.3    | 40.7          | -12.0    | 1     | 10     |             |         |
|   | 16646     | .951         | 265.2      | 137.4    | -3.4   | 25    | 123         | 397 c  |           | 16649     | .392     | 221.4         | 28.7     | -13.9 | 29     | 146         |         |
|   | 16644     | .798         | 282.4      | 118.5    | +12.1  | 3     | 18          | 211 c  |           | 16651     | .809     | 73.3          | 320.1    | +15.3 | 68     | 418         | 290 c   |
|   | 16650     | .364         | 296.1      | 85.4     | +12.7  | 119   | 667         |        |           | 16652     | .954     | 97.9          | 301.5    | -6.5  | 18     | 69          | 496 f   |
|   | 16647     | .487         | 90.2       | 36.8     | +3.2   | 7     | 32          |        |           | .872      | 92.7     |               |          |       |        | 144         |         |
|   | 16649     | .645         | 115.6      | 29.4     | -13.2  | 51    | 283         |        |           |           | (+22.5)  | (13.3)        | (+3.2)   | (252) | (1477) | (1395)      |         |
|   | .850      | 111.8        |            |          |        |       | 352         |        |           |           |          |               |          |       |        |             |         |
|   | .957      | 114.2        |            |          |        |       | 131         |        |           |           |          |               |          |       |        |             |         |
|   | (+23.4)   | (65.9)(+3.7) | (205)      | (1123)   | (1294) |       |             |        |           |           |          |               |          |       |        |             |         |
| Nov. 7  |           |              |            |          |        |       |             |        | 315.440 G | .921      | 265.9    |               |          |       |        | 112         |         |
|   |           |              |            |          |        |       |             |        |           | 16650     | .990     | 283.4         | 81.8     | +13.7 | 24     | 278         | 357 c   |
|   |           |              |            |          |        |       |             |        |           | 16649     | .560     | 238.6         | 29.2     | -14.2 | 37     | 154         |         |
|   |           |              |            |          |        |       |             |        |           | 16651     | .643     | 69.7          | 321.2    | +15.3 | 58     | 471         |         |
|   |           |              |            |          |        |       |             |        |           | 16653     | .860     | 104.7         | 302.1    | -10.9 | 2      | 9           | { 325 f |
|   |           |              |            |          |        |       |             |        |           | 16652     | .855     | 99.1          | 301.9    | -6.1  | 11     | 57          |         |
|   |           |              |            |          |        |       |             |        |           | .969      | 71.5     |               |          |       |        | 175         |         |
|   |           |              |            |          |        |       |             |        |           |           | (+22.3)  | (359.8)(+3.1) | (132)    | (969) | (969)  |             |         |
|   |           |              |            |          |        |       |             |        |           |           |          |               |          |       |        |             |         |
|   |           |              |            |          |        |       |             |        |           |           |          |               |          |       |        |             |         |
| 311.293 C   | .936      | 294.3        |            |          |        |       | 119         |        | Nov. 12   | .836      | 271.6    |               |          |       |        | 119         |         |
|   | .994      | 266.5        | 137.8      | -3.1     | 9      | 48    | 188 f       |        |           | .814      | 252.0    |               |          |       |        | 282         |         |
|   | 16646     | .881         | 284.6      | 116.0    | +14.5  | 0     | 4           | 287 c  |           | 16649     | .721     | 247.1         | 29.0     | -14.1 | 32     | 164         | 41 p    |
|   | 16644     | .533         | 288.1      | 85.6     | +12.6  | 103   | 720         |        |           | 16651     | .472     | 62.2          | 320.5    | +15.4 | 91     | 556         |         |
|   | 16650     | .312         | 91.5       | 36.4     | +3.0   | 3     | 18          |        |           | 16653     | .705     | 108.2         | 303.2    | -10.5 | 1      | 8           | { 135 f |
|   | 16647     | .500         | 124.3      | 29.5     | -13.1  | 56    | 253         |        |           | 16652     | .704     | 101.9         | 302.3    | -6.1  | 6      | 38          |         |
|   | .760      | 127.5        |            |          |        |       | 245         |        |           | .809      | 94.4     |               |          |       |        | 186         |         |
|   | .890      | 117.3        |            |          |        |       | 231         |        |           | .867      | 73.6     |               |          |       |        | 99          |         |
|   | (+23.3)   | (54.5)(+3.6) | (171)      | (1043)   | (1070) |       |             |        |           | .905      | 66.6     |               |          |       |        | 177         |         |
|   |           |              |            |          |        |       |             |        |           |           | (+22.0)  | (346.0)(+3.0) | (130)    | (766) | (1039) |             |         |
| Nov. 8  |           |              |            |          |        |       |             |        | 316.492 G |           |          |               |          |       |        |             |         |
|   |           |              |            |          |        |       |             |        |           | 16649     | .721     | 247.1         | 29.0     | -14.1 | 32     | 164         | 41 p    |
|   |           |              |            |          |        |       |             |        |           | 16651     | .472     | 62.2          | 320.5    | +15.4 | 91     | 556         |         |
|   |           |              |            |          |        |       |             |        |           | 16653     | .705     | 108.2         | 303.2    | -10.5 | 1      | 8           | { 135 f |
|   |           |              |            |          |        |       |             |        |           | 16652     | .704     | 101.9         | 302.3    | -6.1  | 6      | 38          |         |
|   |           |              |            |          |        |       |             |        |           | .809      | 94.4     |               |          |       |        | 186         |         |
|   |           |              |            |          |        |       |             |        |           | .867      | 73.6     |               |          |       |        | 99          |         |
|   |           |              |            |          |        |       |             |        |           | .905      | 66.6     |               |          |       |        | 177         |         |
|   |           |              |            |          |        |       |             |        |           |           | (+22.0)  | (346.0)(+3.0) | (130)    | (766) | (1039) |             |         |
|   |           |              |            |          |        |       |             |        |           |           |          |               |          |       |        |             |         |
| 312.293 C   | .956      | 282.8        |            |          |        |       | 356         |        | Nov. 13   |           |          |               |          |       |        |             |         |
|   | .918      | 291.6        |            |          |        |       | 172         |        |           | 16649     | .721     | 247.1         | 29.0     | -14.1 | 32     | 164         | 41 p    |
|   | .805      | 259.6        |            |          |        |       | 143         |        |           | 16651     | .472     | 62.2          | 320.5    | +15.4 | 91     | 556         |         |
|   | 16650     | .698         | 284.8      | 84.9     | +12.8  | 102   | 783         |        |           | 16653     | .705     | 108.2         | 303.2    | -10.5 | 1      | 8           | { 135 f |
|   | 16647     | .064         | 105.2      | 37.8     | +2.5   | 0     | 3           |        |           | 16652     | .704     | 101.9         | 302.3    | -6.1  | 6      | 38          |         |
|   | 16649     | .350         | 144.2      | 29.2     | -13.0  | 43    | 255         |        |           | .809      | 94.4     |               |          |       |        | 186         |         |
|   | 16651     | .978         | 74.0       | 325.0    | +14.8  | 19    | 129         | 233 c  |           | .867      | 73.6     |               |          |       |        | 99          |         |
|   | .924      | 70.6         |            |          |        |       | 110         |        |           | .905      | 66.6     |               |          |       |        | 177         |         |
|   | .936      | 79.3         |            |          |        |       | 148         |        |           |           | (+22.0)  | (346.0)(+3.0) | (130)    | (766) | (1039) |             |         |
|   | (+23.0)   | (41.3)(+3.5) | (164)      | (1170)   | (1162) |       |             |        |           |           |          |               |          |       |        |             |         |
| Nov. 9  |           |              |            |          |        |       |             |        | 317.462 G | .943      | 270.8    |               |          |       |        | 178         |         |
|   |           |              |            |          |        |       |             |        |           | .917      | 255.8    |               |          |       |        | 489         |         |
|   |           |              |            |          |        |       |             |        |           | .896      | 265.6    |               |          |       |        | 147         |         |
|   |           |              |            |          |        |       |             |        |           | 16649     | .850     | 251.3         | 29.1     | -14.1 | 17     | 144         | 236 s   |
|   |           |              |            |          |        |       |             |        |           | 16654     | .260     | 352.6         | 335.2    | +17.8 | 4      | 17          |         |
|   |           |              |            |          |        |       |             |        |           | 16651     | .302     | 44.9          | 320.5    | +15.1 | 112    | 652         |         |
|   |           |              |            |          |        |       |             |        |           | 16652     | .532     | 106.7         | 302.5    | -6.3  | 4      | 18          |         |
|   |           |              |            |          |        |       |             |        |           | 16655     | .734     | 72.3          | 287.1    | +14.8 | 0      | 3           | 85 f    |
|   |           |              |            |          |        |       |             |        |           | .806      | 62.8     |               |          |       |        | 100         |         |
|   |           |              |            |          |        |       |             |        |           |           | (+21.8)  | (333.2)(+2.9) | (137)    | (834) | (1235) |             |         |
| Nov. 10   |           |              |            |          |        |       |             |        | Nov. 14   |           |          |               |          |       |        |             |         |
|   |           |              |            |          |        |       |             |        |           |           |          |               |          |       |        |             |         |
|   |           |              |            |          |        |       |             |        |           |           |          |               |          |       |        |             |         |
|   |           |              |            |          |        |       |             |        |           |           |          |               |          |       |        |             |         |
|   |           |              |            |          |        |       |             |        |           |           |          |               |          |       |        |             |         |
|   |           |              |            |          |        |       |             |        |           |           |          |               |          |       |        |             |         |

Group 16651. Nov. 9 - 21. A long stream of normal type. The leader and follower are fairly stable regular spots. The intermediate spots grow into a composite structure by November 15 and after November 17 begin to die out.

Group 16652. Nov. 11 - 17. Return of Group 16639. A small spot.

Group 16653. Nov. 12 - 13. A tiny spot.

Group 16654. Nov. 14 - 18. A small spot, not seen on November 16.

Group 16655. Nov. 14 - 22. A small group of faint variable spots, not seen on November 21.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.   | Group No. | MEASURES |                | POSITION |        | AREA   |             |        | U.T.    | Group No. | MEASURES |                | POSITION |                | AREA  |             |        |
|--------|-----------|----------|----------------|----------|--------|--------|-------------|--------|---------|-----------|----------|----------------|----------|----------------|-------|-------------|--------|
|        |           | Dist.    | Pos. Angle     | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle     | Long.    | Lat.           | Umbræ | Whole Spots | Faculæ |
| 1950   | 318.379 G |          |                | o        | o      |        |             |        | 1950    | Nov.19    | .418     | 308.9          | 287.1    | +17.3          | 6     | 79          |        |
|        |           | .976     | 257.5          |          |        |        | 344         |        | 16655   |           | .910     | 65.6           | 203.2    | +23.1          | 2     | 26          | 79 c   |
|        |           | .963     | 264.8          |          |        |        | 240         |        | 1300a   |           | .940     | 117.2          | (+20.3)  | (267.3)(+ 2.3) | (79)  | (634)       | 78     |
|        |           | .952     | 246.6          |          |        |        | 142         |        |         |           |          |                |          |                |       |             |        |
|        |           | .909     | 240.7          |          |        |        | 156         |        |         |           |          |                |          |                |       |             |        |
|        |           | .907     | 283.8          |          |        |        | 194         |        |         |           |          |                |          |                |       |             |        |
|        |           | .846     | 251.1          |          |        |        | 366         |        |         |           |          |                |          |                |       |             |        |
|        |           | .795     | 241.2          |          |        |        | 98          |        | 323.426 | 16651     | .913     | 285.8          | 320.0    | +15.3          | 58    | 439         | 552 c  |
|        |           | .940     | 254.1          | 29.5     | -13.9  | 29     | 123         | 200 c  | G       | 16655     | .584     | 297.6          | 287.3    | +17.5          | 1     | 22          |        |
|        |           | .367     | 315.7          | 336.6    | +17.8  | 2      | 14          |        | Nov.20  |           | .916     | 67.6           | (+20.0)  | (254.6)(+ 2.2) | (59)  | (461)       | 175    |
| Nov.15 | 319.291 C | .225     | 8.4            | 319.2    | +15.6  | 130    | 775         |        |         |           |          |                |          |                |       |             |        |
|        |           | .225     | 116.6          | 303.0    | - 6.2  | 4      | 13          |        |         |           |          |                |          |                |       |             |        |
|        |           | .347     | 126.2          | 302.5    | -10.6  | 0      | 4           |        |         |           |          |                |          |                |       |             |        |
|        |           | .590     | 66.0           | 287.1    | +16.2  | 2      | 17          |        |         |           |          |                |          |                |       |             |        |
|        |           | .832     | 73.4           |          |        |        | 177         |        | 324.162 | K         | .845     | 258.7          |          |                |       |             | 224    |
|        |           | (+21.5)  | (321.1)(+ 2.8) | (167)    | (946)  | (1917) |             |        | 16651   |           | .828     | 286.7          |          |                |       |             | 117    |
|        |           |          |                |          |        |        |             |        | Nov.21  |           | .951     | 285.6          | 316.5    | +15.4          | 26    | 243         | 588 c  |
|        |           |          |                |          |        |        |             |        |         |           | (+19.8)  | (244.9)(+ 2.1) |          |                | (26)  | (243)       | (929)  |
|        |           | .971     | 283.3          |          |        |        | 86          |        | 325.383 |           | .961     | 289.7          |          |                |       |             | 97     |
|        |           | .937     | 255.9          |          |        |        | 327         |        | G       |           | .940     | 262.2          |          |                |       |             | 206    |
| Nov.16 | 320.475 G | .889     | 246.1          |          |        |        | 296         |        | 16655   |           | .879     | 289.4          | 289.2    | +17.9          | 0     | 16          | 178 c  |
|        |           | .988     | 254.9          | 29.0     | -14.5  | 19     | 180         | 145 f  | 16657   |           | .986     | 71.1           | 148.6    | +19.0          | 32    | 96          | 84 c   |
|        |           | .285     | 321.9          | 319.6    | +15.5  | 144    | 848         |        |         |           | .938     | 102.3          | (+19.4)  | (228.8)(+ 1.9) | (32)  | (112)       | 142    |
|        |           | .190     | 147.5          | 303.2    | - 6.5  | 0      | 6           |        |         |           |          |                |          |                |       |             |        |
|        |           | .434     | 56.1           | 287.1    | +16.4. | 8      | 52          |        |         |           |          |                |          |                |       |             |        |
|        |           | .935     | 73.8           |          |        |        | 293         |        | Nov.22  |           |          |                |          |                |       |             |        |
|        |           | (+21.3)  | (309.1)(+ 2.7) | (171)    | (1086) | (1147) |             |        |         |           |          |                |          |                |       |             |        |
|        |           |          |                |          |        |        |             |        | 326.544 | C         | .967     | 287.8          |          |                |       |             | 203    |
|        |           |          |                |          |        |        |             |        | 16657   |           | .930     | 295.4          |          |                |       |             | 100    |
|        |           | .973     | 252.5          |          |        |        | 209         |        |         |           | .906     | 69.8           | 149.7    | +19.0          | 20    | 138         | 240 c  |
| Nov.17 | 321.385 G | .938     | 243.3          |          |        |        | 140         |        |         |           | .855     | 108.2          |          |                |       |             | 101    |
|        |           | .865     | 251.8          |          |        |        | 86          |        | Nov.23  |           | .950     | 97.6           | (+19.0)  | (213.5)(+ 1.8) | (20)  | (138)       | 166    |
|        |           | .698     | 293.7          | 335.6    | +18.1  | 3      | 14          |        |         |           |          |                |          |                |       |             |        |
|        |           | .477     | 298.9          | 319.1    | +15.5  | 132    | 804         |        |         |           |          |                |          |                |       |             |        |
|        |           | .270     | 220.5          | 303.7    | - 9.3  | 0      | 5           |        |         |           |          |                |          |                |       |             |        |
|        |           | .231     | 227.1          | 303.3    | - 6.5  | 0      | 4           |        |         | 327.366   | G        | 16657          | .965     | 292.9          |       |             | 103    |
|        |           | .275     | 24.3           | 286.7    | +16.9  | 16     | 107         |        |         |           | .825     | 68.0           | 148.8    | +19.0          | 32    | 132         | 188 c  |
|        |           | .831     | 70.5           |          |        |        | 155         |        |         |           | .885     | 98.5           |          |                |       |             | 259    |
|        |           | (+20.9)  | (293.5)(+ 2.5) | (151)    | (934)  | (590)  |             |        | Nov.24  |           | .964     | 78.5           | (+18.7)  | (202.6)(+ 1.7) | (32)  | (132)       | 183    |
|        |           |          |                |          |        |        |             |        |         |           |          |                |          |                |       |             |        |
| Nov.18 | 322.459 G | .958     | 251.3          |          |        |        | 206         |        |         |           |          |                |          |                |       |             |        |
|        |           | .934     | 297.7          |          |        |        | 226         |        |         |           |          |                |          |                |       |             |        |
|        |           | .829     | 290.8          | 336.0    | +18.4  | 4      | 29          | 89 c   | 328.430 | 16657     | .687     | 63.0           | 148.3    | +19.3          | 20    | 83          | 83 c   |
|        |           | .640     | 290.9          | 319.6    | +15.0  | 78     | 553         | 166 p  | 16658   |           | .977     | 106.8          | 112.1    | -16.0          | 9     | 30          | 94 c   |
|        |           | .272     | 337.2          | 287.8    | +16.8  | 10     | 55          |        |         |           | .762     | 101.7          |          |                |       |             | 151    |
|        |           | (+20.6)  | (281.5)(+ 2.4) | (92)     | (637)  | (687)  |             |        |         |           | .859     | 81.4           |          |                |       |             | 95     |
|        |           |          |                |          |        |        |             |        |         |           | .937     | 76.8           |          |                |       |             | 169    |
| Nov.25 | 16651     | .938     | 289.6          |          |        |        | 140         |        |         |           | .949     | 95.6           |          |                |       |             | 102    |
|        | 16651     | .806     | 287.3          | 320.0    | +15.2  | 71     | 529         | 403 c  |         |           | .951     | 65.8           | (+18.4)  | (188.6)(+ 1.6) | (29)  | (113)       | 174    |
|        |           |          |                |          |        |        |             |        |         |           |          |                |          |                |       | (868)       |        |

Group 16658. Nov. 15 - 17. A tiny spot, not seen on November 16.

Group 16657. Nov.22-Dec.3. A stream of small spots, led by a regular spot which alone remains by November 29.

Group 16658. Nov.25-Dec.6. A long changing stream, developing from a tiny spot when first seen at the east limb. By December 3 only the leader and follower remain.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.         | Group No. | MEASURES |               | POSITION |        | AREA   |             |         | U.T.   | Group No. | MEASURES |               | POSITION      |       | AREA   |             |         |     |
|--------------|-----------|----------|---------------|----------|--------|--------|-------------|---------|--------|-----------|----------|---------------|---------------|-------|--------|-------------|---------|-----|
|              |           | Dist.    | Pos. Angle    | Long.    | Lat.   | Umbrae | Whole Spots | Faculae |        |           | Dist.    | Pos. Angle    | Long.         | Lat.  | Umbrae | Whole Spots | Faculae |     |
| 1950         |           |          |               | o        | o      |        |             |         | 1950   |           |          |               | o             | o     |        |             |         |     |
| 329.483<br>G | 16657     | .910     | 289.4         |          |        |        |             |         | Nov.30 |           | .938     | 82.9          |               |       |        |             | 203     |     |
|              | 16659     | .535     | 54.2          | 147.4    | +19.4  | 22     | 118         | 64      |        |           | .971     | 104.1         |               |       |        |             | 269     |     |
|              | 16659     | .792     | 98.4          | 122.9    | -5.7   | 3      | 16          | 44 c    |        |           | (+16.5)  | (121.7)(+0.9) |               |       |        |             | (575)   |     |
|              | 16658     | .893     | 108.8         | 113.3    | -16.0  | 6      | 27          | 158 c   |        |           |          |               |               |       |        |             |         |     |
|              |           | .921     | 65.8          |          |        |        |             | 56      |        |           |          |               |               |       |        |             |         |     |
|              |           | (+18.0)  | (174.7)(+1.4) | (31)     | (161)  | (322)  |             |         |        | 334.358   | 16657    | .676          | 299.0         | 149.3 | +19.7  | 7           | 17      |     |
| 330.371<br>G | 16657     | .400     | 38.1          | 147.9    | +19.5  | 13     | 119         |         | Dec.1  |           | 16662    | .392          | 250.6         | 132.3 | -6.7   | 20          | 98      |     |
|              | 16659     | .645     | 100.7         | 123.6    | -5.9   | 15     | 136         |         |        |           | 16659    | .238          | 241.2         | 122.5 | -5.7   | 23          | 97      |     |
|              | 16658     | .771     | 112.0         | 115.2    | -15.9  | 13     | 75          | 174 c   |        |           | 16660    | .310          | 202.6         | 117.6 | -15.8  | 51          | 163     |     |
|              | 16660     | .927     | 115.8         | 98.0     | -23.2  | 3      | 15          | 164 c   |        |           | 16661    | .433          | 161.0         | 101.7 | -23.3  | 39          | 152     |     |
|              | 16661     | .983     | 77.8          | 83.8     | +12.2  | 48     | 404         | 313 c   |        |           | 16663    | .462          | 64.2          | 85.4  | +12.2  | 55          | 292     |     |
|              |           | .784     | 77.3          |          |        |        |             | 141     |        |           |          | .990          | 104.8         | 29.3  | -14.5  | 27          | 93      |     |
|              |           | .785     | 92.5          |          |        |        |             | 132     |        |           |          | .920          | 105.4         |       |        |             | 252     |     |
|              |           | .834     | 64.2          |          |        |        |             | 198     |        |           |          | .928          | 92.0          |       |        |             | 69      |     |
|              |           | (+17.7)  | (163.0)(+1.3) | (92)     | (749)  | (1122) |             |         |        |           |          | (+16.2)       | (110.5)(+0.8) |       |        |             | (453)   |     |
|              |           |          |               |          |        |        |             |         |        |           |          |               |               |       |        |             |         |     |
| 331.290<br>C | 16657     | .314     | 3.6           | 149.7    | +19.4  | 13     | 58          |         | Dec.2  |           | 16657    | .910          | 251.7         |       |        |             | 87      |     |
|              | 16659     | .472     | 104.7         | 123.7    | -5.8   | 37     | 183         |         |        |           | 16662    | .814          | 293.9         | 149.3 | +19.6  | 3           | 16      |     |
|              | 16658     | .617     | 117.9         | 116.5    | -15.7  | 44     | 225         |         |        |           | 16659    | .585          | 259.0         | 132.4 | -5.8   | 52          | 494     |     |
|              | 16660     | .829     | 118.7         | 99.1     | -22.6  | 30     | 82          | 111 c   |        |           | 16660    | .416          | 254.1         | 120.9 | -5.9   | 10          | 60      |     |
|              | 16661     | .911     | 76.8          | 85.8     | +12.5  | 46     | 290         | 291 c   |        |           | 16661    | .437          | 230.6         | 117.7 | -15.4  | 29          | 161     |     |
|              |           | .932     | 70.2          |          |        |        |             | 215     |        |           |          | .409          | 187.2         | 100.5 | -23.1  | 16          | 97      |     |
|              |           | (+17.4)  | (150.9)(+1.2) | (170)    | (838)  | (617)  |             |         |        |           |          | .292          | 45.6          | 85.0  | +12.4  | 45          | 295     |     |
| 332.466<br>G |           |          |               |          |        |        |             |         |        |           |          | .937          | 106.1         | 28.9  | -14.8  | 8           | 83      |     |
|              | 16657     | .397     | 323.1         | 150.0    | +19.5  | 15     | 41          |         |        |           |          | .819          | 94.9          |       |        |             | 363 c   |     |
|              | 16659     | .228     | 120.3         | 124.0    | -5.5   | 25     | 166         |         |        |           |          | .838          | 109.0         |       |        |             | 73      |     |
|              | 16658     | .413     | 133.4         | 117.3    | -15.4  | 51     | 446         |         |        |           |          | .937          | 115.8         |       |        |             | 182     |     |
|              | 16660     | .642     | 127.9         | 102.4    | -22.2  | 57     | 334         |         |        |           |          | (+15.8)       | (97.3)(+0.7)  |       |        |             | 89      |     |
|              | 16661     | .774     | 74.5          | 85.8     | +12.6  | 55     | 355         | 137 c   |        |           |          | .925          | 257.4         |       |        |             | 183     |     |
| Nov.29       |           | .819     | 65.7          |          |        |        |             | 190     | Dec.3  |           |          | .834          | 254.2         |       |        |             | 78      |     |
|              |           | (+16.9)  | (135.4)(+1.1) | (203)    | (1342) | (327)  |             |         |        |           |          | 16657         | .926          | 291.0 | 149.3  | +19.6       | 3       | 20  |
|              |           |          |               |          |        |        |             |         |        |           |          | 16662         | .772          | 262.7 | 132.9  | -5.2        | 70      | 482 |
|              |           |          |               |          |        |        |             |         |        |           |          | 16659         | .634          | 259.8 | 121.6  | -6.0        | 5       | 23  |
|              |           |          |               |          |        |        |             |         |        |           |          | 16658         | .642          | 244.8 | 120.8  | -15.3       | 41      | 118 |
| 333.505<br>G | 16657     | .545     | 306.6         | 149.3    | +19.7  | 4      | 34          |         |        |           |          | 16660         | .484          | 214.0 | 99.9   | -23.0       | 16      | 63  |
|              | 16662     | .207     | 237.1         | 131.7    | -5.6   | 4      | 34          |         |        |           |          | 16661         | .209          | 350.4 | 84.9   | +12.4       | 31      | 250 |
|              | 16659     | .114     | 189.1         | 122.7    | -5.6   | 18     | 128         |         |        |           |          | 16663         | .832          | 108.5 | 28.4   | -14.9       | 15      | 104 |
|              | 16658     | .292     | 162.3         | 116.4    | -15.2  | 43     | 243         |         |        |           |          | 16664         | .995          | 102.4 | 359.2  | -12.3       | 34      | 268 |
|              | 16660     | .513     | 141.7         | 101.6    | -22.8  | 38     | 223         |         |        |           |          | .915          | 105.2         |       |        |             | 220 c   |     |
|              | 16661     | .618     | 70.5          | 85.2     | +12.6  | 38     | 313         |         |        |           |          | (+15.4)       | (82.9)(+0.6)  |       |        |             | 294     |     |
|              |           | .814     | 75.5          |          |        |        |             |         |        |           |          |               |               |       |        |             |         |     |

Group 16659. Nov.28-Dec.3. A few small variable spots which go through their whole life-history on the disk.

Group 16660. Nov.27-Dec.6. A pair of widely-separated spots, with a few companions on November 29. The group dies out before reaching the limb.

Group 16661. Nov.27-Dec.9. Return of Group 16650. A regular spot, whose umbra divides into two as the whole declines.

Group 16662. Nov.30-Dec.5. Return of Group 16649. A stream, appearing suddenly in front of Group 16659 and growing rapidly. The group is diminishing as it passes round the limb, the leader having died out by December 5. On December 2 there is a composite spot to the south of the group-centre.

Group 16663. Dec. 1 - 10. A small, slowly-declining spot.

Group 16664. Dec. 3 - 15. A stable regular spot, with a following companion until December 10.

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.      | Group No. | MEASURES |               | POSITION |        | AREA   |             |         | U.T.      | Group No. | MEASURES |               | POSITION |               | AREA   |             |         |     |
|-----------|-----------|----------|---------------|----------|--------|--------|-------------|---------|-----------|-----------|----------|---------------|----------|---------------|--------|-------------|---------|-----|
|           |           | Dist.    | Pos. Angle    | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ  |           |           | Dist.    | Pos. Angle    | Long.    | Lat.          | Umbræ  | Whole Spots | Faculæ  |     |
| 1950      |           |          |               | o        | o      |        |             |         | 1950      |           |          |               | o        | o             |        |             |         |     |
| 337.441 G |           | .964     | 291.5         |          |        |        | 200         |         | 340.548 C |           | .963     | 249.2         |          |               |        | 154         |         |     |
|           |           | .813     | 284.6         |          |        |        | 221         |         |           |           | .934     | 242.2         |          |               |        | 174         |         |     |
|           |           | .787     | 261.3         |          |        |        | 114         |         |           |           | .837     | 295.3         |          |               |        | 191         |         |     |
|           | 16662     | .895     | 263.9         | 132.9    | -5.3   | 84     | 479         | 470 c   |           | 16661     | .840     | 285.4         | 84.9     | +12.9         | 23     | 116         | 153 c   |     |
|           | 16658     | .789     | 249.8         | 119.8    | -15.5  | 33     | 110         | 189 c   |           | 16663     | .268     | 175.5         | 27.7     | -15.4         | 9      | 45          |         |     |
|           | 16660     | .623     | 231.6         | 101.5    | -22.4  | 4      | 22          |         |           | 16666     | .244     | 153.5         | 22.5     | -12.5         | 3      | 17          |         |     |
|           | 16661     | .332     | 308.9         | 85.1     | +12.4  | 38     | 199         |         |           | 16664     | .515     | 113.7         | 0.2      | -11.9         | 38     | 230         |         |     |
|           | 16663     | .698     | 112.6         | 28.1     | -15.2  | 14     | 96          |         |           | 16667     | .591     | 54.2          | 358.3    | +20.1         | 23     | 96          |         |     |
|           | 16664     | .946     | 103.1         | 359.5    | -12.2  | 59     | 274         | { 461 c |           | 16665     | .617     | 115.8         | 353.8    | -15.5         | 21     | 193         |         |     |
|           | 16665     | .979     | 106.1         | 352.4    | -15.7  | 0      | 26          |         |           | 16668     | .948     | 76.1          | 318.2    | +13.1         | 32     | 211         | { 399 c |     |
|           |           | .755     | 104.0         |          |        |        | 124         |         |           | 16669     | .976     | 75.3          | 312.2    | +14.3         | 53     | 586         |         |     |
|           |           | .851     | 107.2         |          |        |        | 289         |         |           |           | .816     | 75.3          |          |               |        | 136         |         |     |
|           |           | .928     | 161.1         |          |        |        | 12          |         |           |           | .898     | 68.3          |          |               |        | 226         |         |     |
|           |           | .930     | 115.3         |          |        |        | 220         |         |           |           | .982     | 102.1         |          |               |        | 135         |         |     |
| Dec. 4    |           | (+15.0)  | (69.8)(+ 0.4) | (232)    | (1206) | (2300) |             |         | Dec. 7    |           | (+13.7)  | (28.9)        | (0.0)    | (202)         | (1494) | (1568)      |         |     |
| 338.402 G |           | .912     | 289.6         |          |        |        | 159         |         | 341.290 C |           | .923     | 293.8         |          |               |        | 188         |         |     |
|           |           | .883     | 280.4         |          |        |        | 116         |         |           | 16661     | .917     | 283.6         | 84.7     | +12.4         | 21     | 100         | 212 c   |     |
|           | 16662     | .955     | 264.4         | 129.6    | -5.2   | 22     | 163         | 331 c   |           | 16663     | .303     | 207.5         | 27.4     | -15.7         | 9      | 36          |         |     |
|           | 16658     | .894     | 252.4         | 119.2    | -15.5  | 18     | 109         | 153 c   |           | 16666     | .239     | 197.0         | 23.2     | -13.3         | 3      | 16          |         |     |
|           | 16660     | .774     | 241.0         | 103.8    | -21.8  | 2      | 10          | 111 c   |           | 16664     | .376     | 123.4         | 0.5      | -12.0         | 47     | 216         |         |     |
|           | 16661     | .505     | 294.6         | 85.1     | +12.4  | 28     | 216         |         |           | 16667     | .488     | 44.4          | 357.9    | +20.2         | 36     | 190         |         |     |
|           | 16663     | .542     | 119.8         | 28.1     | -15.3  | 9      | 80          |         |           | 16665     | .505     | 122.2         | 352.9    | -15.7         | 19     | 132         |         |     |
|           | 16664     | .852     | 104.4         | 359.9    | -12.0  | 66     | 335         |         |           | 16668     | .881     | 75.4          | 318.4    | +12.8         | 22     | 192         | { 642 c |     |
|           | 16665     | .915     | 106.8         | 352.2    | -15.2  | 2      | 27          | 132 c   |           | 16669     | .930     | 74.5          | 311.7    | +14.3         | 66     | 430         |         |     |
|           |           | .783     | 112.7         |          |        |        | 139         |         |           |           | .803     | 68.0          |          |               |        | 243         |         |     |
|           |           | .853     | 103.8         |          |        |        | 124         |         |           |           | .948     | 101.4         | (+13.4)  | (19.1)(- 0.1) | (223)  | (1312)      | (1431)  | 146 |
|           |           | .931     | 114.6         |          |        |        | 103         |         |           |           |          |               |          |               |        |             |         |     |
| Dec. 5    |           | (+14.6)  | (57.2)(+ 0.3) | (147)    | (940)  | (1368) |             |         | Dec. 8    |           | (+13.4)  | (19.1)(- 0.1) | (223)    | (1312)        | (1431) |             |         |     |
| 339.372 G |           | .979     | 263.5         |          |        |        | 238         |         | 342.285 C |           | .964     | 292.3         |          |               |        | 96          |         |     |
|           |           | .953     | 282.3         |          |        |        | 143         |         |           | 16661     | .982     | 282.4         | 84.5     | +12.1         | 16     | 85          | 221 c   |     |
|           |           | .921     | 291.0         |          |        |        | 154         |         |           | 16663     | .436     | 232.9         | 27.0     | -15.4         | 10     | 40          |         |     |
|           | 16658     | .971     | 254.0         | 119.6    | -15.4  | 10     | 63          | 524 f   |           | 16666     | .365     | 234.3         | 23.6     | -12.4         | 4      | 24          |         |     |
|           | 16660     | .885     | 244.9         | 103.9    | -21.9  | 0      | 2           | 555 c   |           | 16664     | .214     | 159.5         | 1.6      | -11.7         | 33     | 196         |         |     |
|           | 16661     | .676     | 288.5         | 85.3     | +12.5  | 21     | 142         |         |           | 16667     | .367     | 18.0          | 359.1    | +20.2         | 50     | 401         |         |     |
|           | 16663     | .386     | 134.6         | 27.9     | -15.5  | 10     | 65          |         |           | 16665     | .333     | 143.4         | 354.2    | -15.6         | 4      | 23          |         |     |
|           | 16664     | .723     | 107.5         | 359.7    | -12.4  | 44     | 234         | 99 f    |           | 16668     | .750     | 71.8          | 319.1    | +13.4         | 36     | 258         | { 527 c |     |
|           | 16665     | .805     | 109.5         | 352.7    | -15.4  | 22     | 148         | 222 c   |           | 16669     | .831     | 71.7          | 311.4    | +15.0         | 41     | 391         |         |     |
|           | 1300b     | .985     | 71.6          | 325.0    | +18.2  | 0      | 20          | 681 c   |           |           | .843     | 106.6         |          |               |        | 134         |         |     |
|           |           | .909     | 71.8          |          |        |        | 183         |         |           |           | .958     | 67.0          |          |               |        | 144         |         |     |
|           |           | .947     | 61.0          |          |        |        | 220         |         |           |           | (+13.0)  | (6.0)(- 0.2)  | (194)    | (1418)        | (1122) |             |         |     |
| Dec. 6    |           | (+14.2)  | (44.4)(+ 0.2) | (107)    | (674)  | (3019) |             |         | Dec. 9    |           | (+13.0)  | (6.0)(- 0.2)  | (194)    | (1418)        | (1122) |             |         |     |

Group 16665. Dec. 4 - 11. A variable stream, with a brief maximum on December 7.

Group 16666. Dec. 7 - 10. Two or three small spots.

Group 16667. Dec. 7 - 15. A stream of normal type, of which the leader is the most stable component.

Group 16668. Dec. 7 - 17. Return of Group 16651. At first a regular spot, with a component to the immediate north.

From December 9 this companion develops into a spreading cluster and by December 12 the whole group begins to break up rapidly, leaving a small spot alone by December 16.

Group 16669. Dec. 7 - 19. A composite spot, which soon breaks up and spreads out to form a stream. The only definite component is a small regular spot at the rear, which alone remains on December 16.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

| POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|---|-----------|----------|---------------|----------|--------|--------|-------------|--------|---------|-----------|----------|------------|---------------|---------------|---------------|---------------|------------|-----------|-----------|
| U.T.  | Group No. | MEASURES |               | POSITION |        | AREA   |             |        | U.T.    | Group No. | MEASURES |            | POSITION      |               | AREA          |               |            |           |           |
|   |           | Dist.    | Pos. Angle    | Long.    | Lat.   | Umbræ  | Whole Spots | Faculæ |         |           | Dist.    | Pos. Angle | Long.         | Lat.          | Umbræ         | Whole Spots   | Faculæ     |           |           |
| 1950  |           |          |               | o        | o      |        |             |        | 1950    |           |          |            | o             | o             |               |               |            |           |           |
| 343.321   |           | .795     | 247.5         |          |        |        |             |        |         | 16664     | .796     | 255.8      | 2.8           | -11.7         | 35            | 192           | 313 c      |           |           |
| C   | 16670     | .675     | 288.6         | 33.1     | +12.2  | 22     | 84          | 240    | Dec. 13 | 16667     | .780     | 296.8      | 358.7         | +20.1         | 50            | 463           | 208 c      |           |           |
|   | 16663     | .612     | 244.3         | 27.2     | -15.5  | 3      | 11          |        |         | 16668     | .298     | 324.5      | 321.2         | +13.3         | 23            | 217           |            |           |           |
|   | 16666     | .551     | 247.4         | 23.7     | -12.4  | 0      | 6           |        |         | 16669     | .273     | 358.1      | 311.5         | +15.1         | 35            | 342           |            |           |           |
|   | 16664     | .257     | 218.0         | 1.7      | -11.9  | 25     | 173         |        |         | 16673     | .906     | 107.1      | 247.1         | -15.7         | 2             | 13            | 151 c      |           |           |
|   | 16667     | .369     | 342.1         | 359.3    | +20.2  | 53     | 337         |        |         |           | .886     | 75.1       | (+11.1)       | (311.0)(-0.7) | (149)         | (1250)        | (2566) 325 |           |           |
|   | 16665     | .255     | 182.3         | 353.0    | -15.0  | 1      | 4           |        |         |           |          |            |               |               |               |               |            |           |           |
|   | 16668     | .588     | 66.5          | 318.9    | +13.3  | 45     | 210         |        |         |           |          |            |               |               |               |               |            |           |           |
|   | 16669     | .707     | 68.1          | 309.8    | +15.0  | 52     | 346         |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           | .881     | 66.9          |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           | (+12.5)  | (352.4)(-0.3) | (201)    | (1171) | (482)  |             |        |         | 347.292   | C        | .944       | 249.6         |               |               |               | 188        |           |           |
| Dec. 10   |           |          |               |          |        |        |             |        |         |           |          | .800       | 252.6         |               |               |               | 139        |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          | 16664      | .895          | 257.2         | 2.8           | -11.8         | 23         | 170       | 192 c     |
|   |           |          |               |          |        |        |             |        |         |           |          | 16667      | .881          | 293.1         | 359.2         | +19.8         | 41         | 340       | 223 c     |
|   |           |          |               |          |        |        |             |        |         |           |          | 16668      | .446          | 304.0         | 322.3         | +13.7         | 14         | 79        |           |
|   |           |          |               |          |        |        |             |        |         |           |          | 16669      | .331          | 328.0         | 310.4         | +15.4         | 21         | 167       |           |
|   |           |          |               |          |        |        |             |        |         |           |          | 16674      | .772          | 72.9          | 251.1         | +12.5         | 0          | 24        | 105 c     |
|   |           |          |               |          |        |        |             |        |         |           |          | .838       | 110.6         | (+10.8)       | (300.0)(-0.8) | (99)          | (780)      | (971) 124 |           |
|   |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
| 344.420   |           | .912     | 252.1         |          |        |        |             |        |         |           |          | 16664      | .918          | 253.4         |               |               |            | 288       |           |
|   |           | .775     | 247.3         |          |        |        |             |        |         |           |          | 16667      | .975          | 258.7         | 3.3           | -11.2         | 33         | 144       | 379 c     |
|   |           | 16670    | .826          | 285.3    | 32.3   | +12.2  | 10          | 75     | Dec. 14 |           |          | 16668      | .964          | 290.9         | 359.3         | +19.8         | 12         | 110       | 435 c     |
|   |           | 16664    | .451          | 244.6    | 2.4    | -11.6  | 31          | 194    |         |           |          | 16669      | .653          | 293.9         | 324.3         | +14.5         | 14         | 57        |           |
|   |           | 16667    | .485          | 316.4    | 358.7  | +20.0  | 60          | 404    |         |           |          | 16675      | .370          | 184.2         | 288.1         | -22.5         | 3          | 14        |           |
|   |           | 16665    | .360          | 227.9    | 353.8  | -14.4  | 1           | 8      |         |           |          | 16672      | .203          | 7.9           | 284.8         | +10.5         | 1          | 7         |           |
|   |           | 16668    | .394          | 53.5     | 319.0  | +13.0  | 34          | 283    |         |           |          | 16674      | .628          | 67.7          | 250.0         | +12.9         | 0          | 8         |           |
|   |           | 16669    | .528          | 58.7     | 310.1  | +15.4  | 43          | 284    |         |           |          | (+10.3)    | (286.4)(-1.0) | (76)          | (456)         | (1102)        |            |           |           |
|   |           | 16671    | .819          | 70.2     | 284.9  | +15.8  | 0           | 6      |         |           |          |            |               |               |               |               |            |           |           |
|   |           | .903     | 61.9          |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
| Dec. 11   |           | (+12.1)  | (337.9)(-0.5) | (179)    | (1254) | (1024) |             |        |         |           |          | 16664      | .979          | 255.4         |               |               |            |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          | 16667      | .964          | 290.9         | 359.3         | +19.8         | 12         | 110       |           |
|   |           |          |               |          |        |        |             |        |         |           |          | 16668      | .653          | 293.9         | 324.3         | +14.5         | 14         | 57        |           |
|   |           |          |               |          |        |        |             |        |         |           |          | 16669      | .472          | 309.2         | 308.7         | +16.4         | 13         | 116       |           |
|   |           |          |               |          |        |        |             |        |         |           |          | 16675      | .370          | 184.2         | 288.1         | -22.5         | 3          | 14        |           |
|   |           |          |               |          |        |        |             |        |         |           |          | 16672      | .203          | 7.9           | 284.8         | +10.5         | 1          | 7         |           |
|   |           |          |               |          |        |        |             |        |         |           |          | 16674      | .628          | 67.7          | 250.0         | +12.9         | 0          | 8         |           |
|   |           |          |               |          |        |        |             |        |         |           |          | (+10.3)    | (286.4)(-1.0) | (76)          | (456)         | (1102)        |            |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
| 345.453   |           | .979     | 255.4         |          |        |        |             |        |         |           |          | 16664      | .895          | 292.0         |               |               |            | 157       |           |
|   |           | .929     | 250.6         |          |        |        |             |        |         |           |          | 16667      | .880          | 284.2         |               |               |            | 102       |           |
|   |           | .910     | 243.4         |          |        |        |             |        |         |           |          | 16668      | .777          | 297.4         |               |               |            | 154       |           |
|   |           | .826     | 250.6         |          |        |        |             |        |         |           |          | 16672      | .823          | 288.9         | 324.9         | +14.8         | 8          | 40        | 108 f     |
|   |           | 16670    | .919          | 284.0    | 30.1   | +12.6  | 17          | 96     | Dec. 15 |           |          | 16669      | .644          | 298.2         | 307.7         | +16.7         | 11         | 64        |           |
|   |           | 16664    | .641          | 252.0    | 2.7    | -11.8  | 32          | 168    |         |           |          | 16675      | .467          | 220.2         | 290.4         | -21.8         | 2          | 10        |           |
|   |           | 16667    | .641          | 303.4    | 358.9  | +20.1  | 48          | 321    |         |           |          | .901       | 66.8          |               | (+9.8)        | (271.5)(-1.1) | (21)       | (114)     | (694) 173 |
|   |           | 16668    | .254          | 18.4     | 319.6  | +13.3  | 35          | 185    |         |           |          |            |               |               |               |               |            |           |           |
|   |           | 16669    | .351          | 39.2     | 311.1  | +15.1  | 45          | 224    |         |           |          |            |               |               |               |               |            |           |           |
|   |           | 16671    | .655          | 66.4     | 286.1  | +14.7  | 1           | 10     |         |           |          |            |               |               |               |               |            |           |           |
|   |           | 16672    | .680          | 74.1     | 282.8  | +10.3  | 0           | 3      |         |           |          |            |               |               |               |               |            |           |           |
|   |           | 16673    | .978          | 106.1    | 246.9  | -15.8  | 9           | 52     |         |           |          |            |               |               |               |               |            |           |           |
|   |           | .967     | 77.2          |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           | (+11.6)  | (324.3)(-0.6) | (187)    | (1059) | (1622) |             |        |         |           |          |            |               |               |               |               |            |           |           |
| Dec. 12   |           |          |               |          |        |        |             |        |         |           |          | Dec. 16    |               |               |               |               |            |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           |          |               |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
| 346.463   |           | .973     | 249.6         |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           | .952     | 242.9         |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           | .949     | 256.2         |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           | .880     | 252.0         |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           | .820     | 241.3         |          |        |        |             |        |         |           |          |            |               |               |               |               |            |           |           |
|   |           | 16670    | .973          | 283.6    | 26.8   | +13.1  | 4           | 23     | Dec. 17 |           |          |            |               |               |               |               |            |           |           |

Group 16670. Dec. 10 - 13. A few variable spots, appearing near the west limb.  
 Group 16671. Dec. 11 - 12. One or two tiny spots.  
 Group 16672. Dec. 12 - 15. A tiny spot, seen only on December 12 and 15.  
 Group 16673. Dec. 12 - 13. A small spot.  
 Group 16674. Dec. 14 - 15. A pair of small spots on December 14; a single spot on December 15.  
 Group 16675. Dec. 15 -

## POSITIONS AND AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR

| U.T.                   | Group No.      | MEASURES                                     |  | POSITION                                 |      | AREA            |                                  |                                   | U.T.                  | Group No.  | MEASURES  |   | POSITION  |   | AREA    |             |        |  |  |
|------------------------|----------------|--|--|--|------|-----------------|----------------------------------|-----------------------------------|-----------------------|--|---|---|---|---|---------|-------------|--------|--|--|
|                        |                | Dist.  | Pos. Angle   | Long.                                    | Lat. | Umbræ           | Whole Spots                      | Faculæ                            |                       |  | Dist.   | Pos. Angle  | Long.   | Lat.  | Umbræ   | Whole Spots | Faculæ |  |  |
| 1950                   |                |  |  | o  | o    |                 |                                  |                                   | 1950                  |  |   |   | o   | o   |         |             |        |  |  |
| 351.304<br>C<br>Dec.18 | 16669          | .953<br>.888                                 | 283.9<br>290.0<br>(+8.9)                                   | 307.8<br>(+17.0)<br>(247.2)(-1.3)        |      | 6<br>(6)        | 21<br>(21)                       | 140 c<br>(396)                    | 359.364<br>C<br>16677 | 16676<br>16677   | .373<br>.436<br>.919<br>.935  | 52.5<br>99.9<br>63.1<br>81.1<br>(+5.1)  | 123.5<br>115.5<br>- 6.4<br>(141.0)(-2.3)  | +10.9<br>- 6.4<br>343<br>291<br>(65) (432) (634)    | 60<br>5 | 403<br>29   |        |  |  |
| 352.297<br>C<br>Dec.19 | 16669          | .930<br>.849<br>.965                         | 295.0<br>244.7<br>288.2<br>(+8.5)                          | 307.4<br>(+17.1)<br>(234.1)(-1.5)        |      |                 | 197<br>88<br>492 c<br>(777)      |                                   | Dec.26                | 360.302<br>C<br>16676<br>16677                               | .248<br>.223<br>.852<br>.969  | 18.7<br>107.1<br>79.7<br>101.9<br>(+4.7)                                      | 124.0<br>116.3<br>- 6.2<br>(128.6)(-2.5)  | +11.1<br>- 6.2<br>89<br>3<br>16<br>(92) (512) (445) |         |             |        |  |  |
| 353.290<br>C<br>Dec.20 | 1301a          | .950<br>.934<br>.853<br>.903<br>.963<br>.963 | 294.2<br>247.1<br>297.2<br>285.0<br>95.4<br>63.9<br>(+8.0) | 284.2<br>(+12.8)<br>(221.0)(-1.6)        |      | 2<br>(0)        | 7<br>(15)                        | 177 s<br>306<br>115<br>(944)      | 361.596<br>G<br>16676 | .865<br>.324<br>.864<br>.917<br>.952<br>.961                 | 251.3<br>317.0<br>102.0<br>87.0<br>75.8<br>105.8<br>(+4.0)                  | 124.6<br>124.6<br>+11.1<br>124.6<br>+11.1<br>124.6<br>+10.8                   | 54<br>54<br>424<br>215<br>122<br>262<br>191<br>(54) (424) (919)                         |   |         |             |        |  |  |
| 354.331<br>C<br>Dec.21 |                | .863<br>.897<br>.946                         | 95.8<br>61.9<br>96.3<br>(+7.5)                             | (207.3)(-1.7)                            |      |                 | 204<br>69<br>190<br>(463)        |                                   | Dec.28                | 362.118<br>K<br>16676  | .408<br>.913  | 304.6<br>74.6<br>(+3.8)   | 124.6<br>124.6<br>+10.8<br>(104.7)(-2.7)  | 23<br>23<br>222<br>(23) (222) (146)                 |         |             |        |  |  |
| 355.297<br>C<br>Dec.22 |                | .816<br>.834<br>.863<br>.955                 | 291.1<br>57.5<br>95.2<br>108.9<br>(+7.1)                   | (194.6)(-1.8)                            |      | (0)             | (0)                              | 81<br>76<br>327<br>191<br>(675)   | 363.309<br>C<br>16676 | .883<br>.809<br>.618<br>.834<br>.874<br>.897<br>.900<br>.984 | 262.5<br>262.9<br>291.7<br>69.0<br>114.5<br>74.6<br>105.0<br>96.0<br>(+3.2) | 124.6<br>124.6<br>+10.9<br>124.6<br>+10.9<br>124.6<br>+10.9<br>124.6<br>+10.9 | 31<br>31<br>217<br>217<br>146<br>188<br>177<br>(31) (217) (1304)                        |   |         |             |        |  |  |
| 356.331<br>C<br>Dec.23 |                | .922<br>.757<br>.888<br>.952                 | 288.9<br>97.2<br>108.6<br>98.1<br>(+6.6)                   | (181.0)(-2.0)                            |      | (0)             | (0)                              | 133<br>119<br>316<br>167<br>(735) |                       | .958<br>.876<br>.773<br>.811<br>.825<br>.937<br>.962<br>.971 | 261.9<br>264.1<br>287.1<br>71.3<br>110.1<br>96.7<br>105.5<br>71.3<br>(+2.7) | (89.0)(-2.8)  | (31) (217) (1304)   |   |         |             |        |  |  |
| 357.454<br>G<br>Dec.24 | 16676<br>16677 | .710<br>.824<br>.938                         | 73.0<br>98.3<br>91.8<br>(+6.0)                             | 122.7<br>111.0<br>- 8.0<br>(166.2)(-2.1) |      | 19<br>8<br>(27) | 65<br>26<br>(91)                 | 166 c<br>124<br>290<br>(290)      | 364.290<br>C<br>16676 | .958<br>.876<br>.773<br>.811<br>.825<br>.937<br>.962<br>.971 | 261.9<br>264.1<br>287.1<br>71.3<br>110.1<br>96.7<br>105.5<br>71.3<br>(+2.7) | 124.8<br>124.8<br>+11.2<br>124.8<br>+11.2<br>124.8<br>+11.2<br>124.8<br>+11.2 | 19<br>19<br>148<br>148<br>229 c<br>231<br>150<br>176<br>131<br>129<br>(19) (148) (1593) |   |         |             |        |  |  |
| 358.454<br>G<br>Dec.25 | 16676<br>16677 | .530<br>.668<br>.964<br>.985                 | 65.0<br>99.1<br>71.0<br>83.5<br>(+5.6)                     | 123.8<br>111.4<br>- 7.7<br>(153.0)(-2.2) |      | 16<br>8<br>(24) | 139<br>38<br>359<br>243<br>(602) |                                   | Dec.31                |  |   |   |   |   |         |             |        |  |  |

Group 16676. Dec.24-1951 Jan.2. A stream, growing rapidly to a maximum on December 27 and then declining quickly. The follower is the largest component but is the first to die out.

Group 16677. Dec. 24 - 27. A pair of small variable spots.

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ROYAL GREENWICH OBSERVATORY

*General Catalogue  
of Groups of Sunspots*

For the year 1950

GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1950

GENERAL CATALOGUE OF GROUPS OF SUNSPOTS FOR THE YEAR 1950.

Groups of sunspots, lasting for two or more days, are numbered in the *first* column in continuation of the group-numbers given in 1949 and the previous years. Groups seen only once are not included in this catalogue but are given with a distinctive numeration in a following table on p. C 73.

The *second* column gives the corresponding Mount Wilson group number, as identified from the bi-monthly summaries of the Mount Wilson magnetic observations of sunspots published in *Publications of the Astronomical Society of the Pacific*.

The *third* column gives the U.T. of the central meridian passage of each group as deduced from its mean longitude (given in the *eleventh* column). For those groups which are in existence at the time of the central meridian passage of their longitude, the time is given to 0<sup>d</sup>.01, corresponding to 0°.13 of solar longitude. In other cases, in which groups disappear before or appear after the central meridian, the deduced time is given to 0<sup>d</sup>.1.

The *fourth* column gives the duration of each group in days. Intermittent groups, *i.e.*, groups which are not seen upon the photographs of every day between their first and last appearances, are indicated by a fraction, the numerator of which represents the number of days on which they are actually observed, the denominator being the number of days covering the extreme limits of observation.

The *sixth* and *eighth* columns, headed "Longitude from central meridian", give, for the days on which each group was first and last seen respectively, the heliographic longitude from the meridian passing through the centre of the Sun's disk at the time of observation, longitudes west of the centre being reckoned as positive.

The mean areas for umbræ and whole spots entered in the *ninth* and *tenth* columns are corrected for the effect of foreshortening and are expressed in millionths of the Sun's visible hemisphere.

The *eleventh* and *twelfth* columns give the mean heliographic position of the group in longitude and latitude respectively.

The *thirteenth* column gives reference to all groups contained in *Ledger I* and *Ledger II*; for a group in *Ledger I* both its recurrent series number and its order in the series are also given.

With reference to the identification both of recurrent and revival groups, it should be noted that longitudes are based on the ephemeris given in the *Nautical Almanac*, assuming a solar rotation period constant at all latitudes. After an interval of one rotation, recurring groups will, therefore, show in general - apart from any proper motion they may have of their own - apparent drifts in longitude varying in amount according to their respective latitudes. The following table, derived from the formula  $\xi = 14^\circ.37 - 2^\circ.60 \sin^2 \phi$ , gives the apparent drift in longitude appropriate to different latitudes after an interval of 27 days, a drift forwards corresponding to an increase in heliographic longitude.

| Latitude.....Drift<br>forwards. | Latitude.....Drift<br>backwards. |
|---------------------------------|----------------------------------|
| 0° .. .. 5°                     | 20° .. .. 3°                     |
| 5° .. .. 4.5                    | 25° .. .. 7.5                    |
| 10° .. .. 3                     | 30° .. .. 12.5                   |
| 15° .. .. 0.5                   | 35° .. .. 18                     |

## GENERAL CATALOGUE OF SUNSPOTS

| No. of Group |           | U.T. of Central Meridian Passage | Duration in Days | First Seen |                                 | Last Seen |                                 | Mean Area Corrected for Foreshortening |             | Mean Position of Group |          | Reference to Ledger |
|--------------|-----------|----------------------------------|------------------|------------|---------------------------------|-----------|---------------------------------|--|-------------|------------------------|----------|---------------------|
| G            | Mt. W     |                                  |                  | Date       | Longitude from Central Meridian | Date      | Longitude from Central Meridian | Umbræ                                  | Whole Spots | Longitude              | Latitude |                     |
|              |           | 1950                             |                  | 1950       | °                               | 1950      | °                               |  |             | °                      | °        |                     |
| 16363        | 10187     | Jan. 9.5                         | 5                | Jan. 3     | -82                             | Jan. 7    | -30                             | 9                                      | 50          | 92.2                   | -12.7    |                     |
| 64           | 88        | 2.8                              | 4                | 4          | +19                             | 7         | +61                             | 6                                      | 38          | 181.2                  | +11.2    |                     |
| 16365        | 10190     | 6.6                              | 2                | 5          | -14                             | 6         | -2                              | 1                                      | 11          | 130.6                  | +19.6    |                     |
| 66           | 91        | 9.72                             | 11               | 5          | -56                             | 15        | +74                             | 34                                     | 194         | 89.4                   | +12.8    | II                  |
| 67           | 89        | 10.46                            | 12               | 5          | -66                             | 16        | +81                             | 15                                     | 116         | 79.8                   | +8.7     | II                  |
| 68           | 92        | 13.1                             | 4                | 7          | -76                             | 10        | -36                             | 5                                      | 33          | 45.6                   | -3.8     |                     |
| 69           | 94        | 8.7                              | 5                | 10         | +20                             | 14        | +74                             | 71                                     | 408         | 103.5                  | +12.1    | I 1588 (1)          |
| 16370        | 10195 pt. | 13.8                             | 2                | 11         | -33                             | 12        | -19                             | 6                                      | 34          | 35.6                   | +7.8     |                     |
| 71           | ..        | 7.8                              | 2                | 12         | +60                             | 13        | +72                             | 2                                      | 14          | 114.8                  | +20.6    |                     |
| 72           | 95 pt.    | 13.73                            | 8                | 12         | -17                             | 19        | +74                             | 10                                     | 56          | 36.7                   | +6.3     | II                  |
| 73           | 96 }      | 17.06                            | 6/10             | 12         | -60                             | 21        | +60                             | 1                                      | 9           | 352.8                  | -12.8    | II                  |
| 74           | 10200     | 20.44                            | 13               | 14         | -81                             | 26        | +83                             | 46                                     | 267         | 308.3                  | -8.7     | I 1589 (1)          |
| 16375        | 10199     | 18.09                            | 9                | 15         | -40                             | 23        | +74                             | 33                                     | 175         | 339.3                  | +15.2    | I 1590 (1)          |
| 76           | 10201     | 21.1                             | 5                | 15         | -77                             | 19        | -22                             | 8                                      | 55          | 299.3                  | +6.9     |                     |
| 77           | 10197     | 15.5                             | 6                | 16         | +12                             | 21        | +79                             | 29                                     | 170         | 13.4                   | +14.2    | II                  |
| 78           | 10205     | 19.99                            | 10               | 16         | -52                             | 25        | +72                             | 75                                     | 446         | 314.2                  | +15.0    | II                  |
| 79           | 02        | 21.64                            | 8/11             | 16         | -67                             | 26        | +65                             | 4                                      | 18          | 292.5                  | +20.0    | I 1585 (3)          |
| 16380        | 10206     | 23.13                            | 12               | 17         | -77                             | 28        | +67                             | 35                                     | 219         | 273.0                  | +9.8     | I 1587 (2)          |
| 81           | ..        | 23.5                             | 5                | 19         | -57                             | 23        | -2                              | 2                                      | 11          | 268.7                  | +13.4    |                     |
| 82           | 08 pt.    | 24.80                            | 12               | 19         | -71                             | 30        | +70                             | 40                                     | 214         | 251.0                  | +9.0     | II                  |
| 83           | 08 pt.    | 25.33                            | 8                | 19         | -76                             | 26        | +16                             | 23                                     | 132         | 244.0                  | +12.2    | II                  |
| 84           | 09        | 21.39                            | 8                | 20         | -11                             | 27        | +82                             | 39                                     | 236         | 295.8                  | -12.8    | II                  |
| 16385        | 10210     | 24.44                            | 9                | 20         | -56                             | 28        | +56                             | 5                                      | 28          | 255.7                  | +3.8     | II                  |
| 86           | 11        | 27.17                            | 13               | 21         | -75                             | Feb. 2    | +80                             | 92                                     | 560         | 219.7                  | +20.0    | II                  |
| 87           | 12        | 27.81                            | 11               | 22         | -77                             | 1         | +65                             | 21                                     | 88          | 211.3                  | +8.8     | II                  |
| 88           | ..        | 29.2                             | 2                | 23         | -76                             | Jan. 24   | -63                             | 4                                      | 46          | 193.6                  | +16.1    |                     |
| 89           | 14        | 21.0                             | 4                | 24         | +42                             | 27        | +81                             | 40                                     | 233         | 301.2                  | +15.0    | I 1591 (1)          |
| 16390        | 10216     | 29.28                            | 9                | 24         | -66                             | Feb. 1    | +40                             | 23                                     | 128         | 192.0                  | +11.8    | II                  |
| 91           | 17 pt.    | 29.7                             | 5                | 24         | -68                             | Jan. 28   | -18                             | 5                                      | 34          | 187.0                  | +2.5     |                     |
| 92           | 17 pt.    | 29.6                             | 2                | 24         | -69                             | 25        | -57                             | 4                                      | 20          | 187.4                  | +5.0     |                     |
| 93           | 17 pt.    | 29.7                             | 2                | 24         | -69                             | 25        | -58                             | 2                                      | 12          | 186.8                  | +7.2     |                     |
| 94           | ..        | 27.9                             | 3                | 25         | -35                             | 27        | -4                              | 1                                      | 11          | 210.3                  | +20.2    |                     |
| 16395        | 10220     | 31.1                             | 5                | 25         | -77                             | 29        | -22                             | 1                                      | 13          | 167.4                  | -14.2    |                     |
| 96           | 18        | 26.3                             | 5                | 26         | +2                              | 30        | +56                             | 9                                      | 40          | 231.3                  | -12.8    |                     |
| 97           | 22        | Feb. 4.17                        | 7/8              | 29         | -76                             | Feb. 5    | +18                             | 4                                      | 17          | 114.4                  | -17.3    | II                  |
| 98           | 23        | 5.14                             | 11/12            | 30         | -75                             | 10        | +63                             | 4                                      | 25          | 101.6                  | +12.7    | I 1588 (2)          |
| 99           | 26        | 9.5                              | 4                | Feb. 3     | -80                             | 6         | -42                             | 8                                      | 39          | 44.4                   | +13.0    |                     |
| 16400        | ..        | 10.2                             | 3                | 4          | -76                             | 6         | -51                             | 3                                      | 17          | 34.6                   | +22.5    |                     |
| 01           | 10227     | 13.83                            | 12               | 8          | -72                             | 19        | +72                             | 28                                     | 171         | 347.2                  | +17.2    | I 1590 (2)          |
| 02           | 29        | 14.20                            | 11               | 10         | -53                             | 20        | +86                             | 92                                     | 644         | 342.3                  | -17.2    | I 1592 (1)          |
| 03           | 30        | 16.69                            | 13               | 10         | -84                             | 22        | +76                             | 28                                     | 152         | 309.6                  | -8.3     | I 1589 (2)          |
| 04           | 31        | 17.06                            | 13               | 11         | -76                             | 23        | +84                             | 55                                     | 295         | 304.7                  | +15.0    | I 1591 (2)          |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

| GENERAL CATALOGUE OF SUNSPOTS |           |                                  |                  |            |                                 |           |                                 |  |             |                        |          |                     |
|-------------------------------|-----------|----------------------------------|------------------|------------|---------------------------------|-----------|---------------------------------|--|-------------|------------------------|----------|---------------------|
| No. of Group                  |           | U.T. of Central Meridian Passage | Duration in Days | First Seen |                                 | Last Seen |                                 | Mean Area Corrected for Foreshortening |             | Mean Position of Group |          | Reference to Ledger |
| G                             | Mt. W     |                                  |                  | Date       | Longitude from Central Meridian | Date      | Longitude from Central Meridian | Umbræ                                  | Whole Spots | Longitude              | Latitude |                     |
| 16405                         | 10232     | 1950                             |                  | 1950       | o                               | 1950      | o                               |  |             | o                      | o        |                     |
| 06                            | 33 pt.    | Feb. 9.1                         | 3                | Feb. 13    | +58                             | Feb. 15   | +79                             | 11                                     | 76          | 49.5                   | +11.0    | I 1593 (1)          |
| 07                            | 34        | 19.27                            | 13               | 13         | -79                             | 25        | +83                             | 52                                     | 343         | 275.6                  | +11.6    | II                  |
| 08                            | 36        | 19.60                            | 13               | 13         | -83                             | 25        | +77                             | 23                                     | 129         | 271.2                  | + 1.5    | I 1594 (1)          |
| 09                            | 35        | 11.2                             | 4                | 14         | +45                             | 17        | +80                             | 55                                     | 405         | 22.0                   | -17.6    | II                  |
|                               |           | 19.88                            | 12               | 14         | -70                             | 25        | +71                             | 27                                     | 145         | 267.5                  | +22.8    |                     |
| 16410                         | 10233 pt. | 20.14                            | 13               | 14         | -74                             | 26        | +82                             | 280                                    | 1853        | 264.2                  | +10.1    | I 1593 (1)          |
| 11                            | 37        | 23.62                            | 11               | 18         | -69                             | 28        | +63                             | 13                                     | 76          | 218.3                  | +16.6    | II                  |
| 12                            | 39        | 18.6                             | 5                | 19         | + 8                             | 23        | +66                             | 4                                      | 18          | 285.0                  | + 2.9    |                     |
| 13                            | 40        | 25.13                            | 13               | 19         | -77                             | Mar. 3    | +81                             | 17                                     | 84          | 198.4                  | + 4.3    | II                  |
| 14                            | 42        | 24.57                            | 10               | 20         | -57                             | 1         | +67                             | 12                                     | 58          | 205.7                  | +13.2    | II                  |
| 16415                         | 10241     | 26.07                            | 12               | 20         | -78                             | 3         | +71                             | 53                                     | 279         | 186.0                  | + 8.8    | I 1595 (1)          |
| 16                            | 43        | 18.2                             | 4                | 21         | +43                             | Feb. 24   | +79                             | 38                                     | 177         | 290.0                  | +13.7    | I 1596 (1)          |
| 17                            | 44        | Mar. 3.8                         | 5                | 26         | -69                             | Mar. 2    | -22                             | 3                                      | 23          | 110.2                  | +20.3    |                     |
| 18                            | 45        | Feb. 26.4                        | 3                | 27         | +11                             | 1         | +40                             | 6                                      | 17          | 181.3                  | -10.2    |                     |
| 19                            | 47        | 26.7                             | 3/5              | 28         | +22                             | 4         | +75                             | 1                                      | 7           | 177.5                  | -15.6    |                     |
| 16420                         | 10248     | Mar. 1.79                        | 8                | 28         | -19                             | 7         | +77                             | 8                                      | 48          | 137.0                  | - 7.2    | II                  |
| 21                            | 49        | 6.29                             | 13               | 28         | -77                             | 12        | +77                             | 16                                     | 105         | 77.7                   | -21.0    | II                  |
| 22                            | 50        | 6.28                             | 13               | 28         | -82                             | 12        | +84                             | 62                                     | 332         | 77.9                   | - 4.1    | I 1597 (1)          |
| 23                            | ..        | 6.8                              | 2                | Mar. 1     | -71                             | 2         | -58                             | 0                                      | 6           | 71.2                   | -22.4    |                     |
| 24                            | 51        | 7.59                             | 11               | 1          | -83                             | 11        | +49                             | 21                                     | 118         | 60.6                   | + 4.3    | II                  |
| 16425                         | 10252     | 3.59                             | 7                | 3          | - 4                             | 9         | +76                             | 28                                     | 170         | 113.3                  | +26.4    | I 1598 (1)          |
| 26                            | 60        | 8.14                             | 6                | 3          | -65                             | 8         | + 3                             | 4                                      | 20          | 53.4                   | + 9.3    | II                  |
| 27                            | 53        | 6.29                             | 4                | 4          | -25                             | 7         | +14                             | 8                                      | 36          | 77.7                   | + 6.3    |                     |
| 28                            | 55        | 8.9                              | 3                | 4          | -59                             | 6         | -33                             | 3                                      | 20          | 43.6                   | +11.7    |                     |
| 29                            | 57 pt.    | 10.1                             | 4                | 4          | -75                             | 7         | -35                             | 4                                      | 13          | 28.1                   | -28.6    |                     |
| 16430                         | 10256     | 10.3                             | 4                | 4          | -78                             | 7         | -40                             | 13                                     | 77          | 24.3                   | -19.0    | I 1594 (2)          |
| 31                            | 57 pt.    | 9.9                              | 4                | 5          | -59                             | 8         | -20                             | 7                                      | 22          | 30.0                   | -25.3    |                     |
| 32                            | ..        | 11.1                             | 2                | 5          | -74                             | 6         | -63                             | 4                                      | 20          | 14.4                   | +16.0    |                     |
| 33                            | ..        | 10.7                             | 2                | 6          | -58                             | 7         | -44                             | 4                                      | 12          | 19.1                   | -15.8    |                     |
| 34                            | 61        | 12.03                            | 13               | 6          | -75                             | 18        | +81                             | 66                                     | 496         | 2.1                    | +21.3    | II                  |
| 16435                         | 10262 pt. | 13.02                            | 14               | 6          | -87                             | 19        | +83                             | 109                                    | 523         | 349.1                  | -15.5    | I 1599 (1)          |
| 36                            | 64        | 2.6                              | 2                | 7          | +64                             | 8         | +76                             | 25                                     | 124         | 126.9                  | + 9.2    |                     |
| 37                            | 65        | 7.93                             | 8                | 7          | - 6                             | 14        | +81                             | 52                                     | 380         | 56.2                   | +28.5    | I 1600 (1)          |
| 38                            | 63        | 12.60                            | 11               | 7          | -71                             | 17        | +71                             | 9                                      | 56          | 354.6                  | +11.5    | II                  |
| 39                            | 62 pt.    | 13.72                            | 13               | 7          | -82                             | 19        | +75                             | 68                                     | 409         | 339.8                  | -17.4    | I 1592 (2)          |
| 16440                         | 10266     | 7.0                              | 3                | 9          | +33                             | 11        | +58                             | 2                                      | 13          | 68.9                   | +21.3    |                     |
| 41                            | 67 {      | 15.92                            | 10/12            | 10         | -73                             | 21        | +75                             | 4                                      | 16          | 310.8                  | - 9.0    | I 1589 (3)          |
| 42                            | 68        | 16.88                            | 10               | 11         | -73                             | 20        | +50                             | 32                                     | 182         | 298.2                  | +13.0    | I 1596 (2)          |
| 43                            | 71        | 18.53                            | 13               | 12         | -82                             | 24        | +76                             | 73                                     | 437         | 276.5                  | +11.6    | I 1593 (2)          |
| 44                            | 73        | 10.2                             | 2                | 14         | +54                             | 15        | +70                             | 4                                      | 14          | 26.0                   | -24.7    |                     |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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| GENERAL CATALOGUE OF SUNSPOTS |         |                                  |                  |            |                                 |           |                                 |  |             |                        |          |                     |
|-------------------------------|---------|----------------------------------|------------------|------------|---------------------------------|-----------|---------------------------------|--|-------------|------------------------|----------|---------------------|
| No. of Group                  |         | U.T. of Central Meridian Passage | Duration in Days | First Seen |                                 | Last Seen |                                 | Mean Area Corrected for Foreshortening |             | Mean Position of Group |          | Reference to Ledger |
| G                             | Mt. W   |                                  |                  | Date       | Longitude from Central Meridian | Date      | Longitude from Central Meridian | Umbrae                                 | Whole Spots | Longitude              | Latitude |                     |
| 16445                         | 10272   | 1950                             | 12               | 1950       | °                               | 1950      | °                               |  |             | °                      | °        |                     |
| 46                            | 77      | Mar. 19.66                       | 12               | Mar. 14    | -69                             | Mar. 25   | +74                             | 23                                     | 156         | 261.6                  | +19.7    | II                  |
| 47                            | 78      | 17.6                             | 7                | 17         | 0                               | 23        | +73                             | 11                                     | 58          | 289.0                  | +11.8    | II                  |
| 48                            | ..      | 18.15                            | 6                | 17         | -9                              | 22        | +60                             | 2                                      | 12          | 281.4                  | +15.1    | II                  |
| 49                            | 79      | 23.6                             | 2                | 17         | -80                             | 18        | -70                             | 0                                      | 8           | 209.3                  | -7.3     |                     |
|                               |         | 25.09                            | 12               | 19         | -76                             | 30        | +73                             | 18                                     | 106         | 189.9                  | +9.4     | I 1595 (2)          |
| 16450                         | 10282   | 25.70                            | 9                | 20         | -68                             | 28        | +32                             | 11                                     | 55          | 181.9                  | -17.7    | II                  |
| 51                            | 84      | 20.3                             | 3                | 24         | +54                             | 26        | +82                             | 2                                      | 25          | 252.7                  | -8.0     |                     |
| 52                            | 86      | 27.61                            | 8                | 24         | -42                             | 31        | +46                             | 15                                     | 79          | 156.7                  | +22.1    | II                  |
| 53                            | 83      | 28.33                            | 5                | 24         | -54                             | 28        | +2                              | 5                                      | 28          | 147.2                  | -12.6    |                     |
| 54                            | 85      | 24.0                             | 5                | 25         | +17                             | 29        | +70                             | 44                                     | 291         | 204.2                  | -3.4     | I 1601 (1)          |
| 16455                         | 10289   | 29.49                            | 3/6              | 25         | -57                             | 30        | +16                             | 1                                      | 5           | 132.0                  | +10.0    |                     |
| 56                            | 87      | 31.75                            | 13               | 25         | -82                             | Apr. 6    | +71                             | 22                                     | 124         | 102.1                  | +26.9    | I 1598 (2)          |
| 57                            | 88      | Apr. 2.16                        | 13               | 27         | -76                             | 8         | +82                             | 45                                     | 233         | 83.5                   | -2.5     | I 1597 (2)          |
| 58                            | 90pt.   | 3.66                             | 11               | 29         | -71                             | 8         | +61                             | 17                                     | 74          | 63.7                   | +13.0    | II                  |
| 59                            | 90pt.   | 3.97                             | 12               | 29         | -75                             | 9         | +72                             | 19                                     | 87          | 59.7                   | +10.2    | II                  |
| 16460                         | 10292   | 4.27                             | 13               | 29         | -76                             | 10        | +78                             | 101                                    | 506         | 55.6                   | +27.0    | I 1600 (2)          |
| 61                            | 93      | 3.73                             | 11               | 29         | -77                             | 8         | +64                             | 15                                     | 85          | 62.8                   | -4.7     | II                  |
| 62                            | 90pt.   | 4.17                             | 11               | 30         | -66                             | 9         | +73                             | 20                                     | 142         | 57.0                   | +8.6     | II                  |
| 63                            | 94      | 3.45                             | 8                | Apr. 2     | -16                             | 9         | +81                             | 64                                     | 423         | 66.5                   | -20.9    | I 1602 (1)          |
| 64                            | 10296 { | 6.45                             | 9                | 3          | -45                             | 11        | +69                             | 20                                     | 106         | 26.9                   | +12.7    | I 1603 (1)          |
| 16465                         | 10297   | 8.9                              | 3                | 3          | -73                             | 5         | -46                             | 3                                      | 25          | 354.5                  | +6.5     |                     |
| 66                            | 98      | 9.75                             | 13               | 3          | -82                             | 15        | +73                             | 34                                     | 226         | 343.4                  | -16.5    | I 1599 (2)          |
| 67                            | 10303   | 13.55                            | 13               | 7          | -78                             | 19        | +75                             | 214                                    | 1527        | 293.1                  | +13.4    | II                  |
| 68                            | 05      | 15.96                            | 12               | 11         | -65                             | 22        | +83                             | 49                                     | 409         | 261.3                  | +6.8     | I 1604 (1)          |
| 69                            | 08      | 19.48                            | 13               | 13         | -81                             | 25        | +75                             | 85                                     | 508         | 214.8                  | +14.1    | II                  |
| 16470                         | 10309   | 20.1                             | 5/6              | 14         | -76                             | 19        | -9                              | 4                                      | 19          | 207.0                  | -2.3     | I 1601 (2)          |
| 71                            | ..      | 20.7                             | 2                | 15         | -71                             | 16        | -54                             | 2                                      | 18          | 199.4                  | +18.4    |                     |
| 72                            | 10      | 12.8                             | 3                | 16         | +48                             | 18        | +76                             | 3                                      | 26          | 303.1                  | +8.5     |                     |
| 73                            | 13      | 25.1                             | 3                | 19         | -76                             | 21        | -47                             | 0                                      | 10          | 141.2                  | +11.8    |                     |
| 74                            | 12      | 25.65                            | 13               | 19         | -84                             | May 1     | +76                             | 99                                     | 658         | 133.4                  | -16.9    | I 1605 (1)          |
| 16475                         | 10314   | 27.26                            | 13               | 21         | -80                             | 3         | +82                             | 174                                    | 1011        | 112.1                  | -12.0    | I 1606 (1)          |
| 76                            | 15      | 20.5                             | 4                | 23         | +40                             | Apr. 26   | +77                             | 6                                      | 35          | 201.2                  | +9.0     |                     |
| 77                            | 16      | 20.7                             | 2                | 23         | +38                             | 24        | +48                             | 0                                      | 7           | 199.2                  | -6.7     |                     |
| 78                            | 17      | 25.2                             | 2                | 23         | -23                             | 24        | -11                             | 1                                      | 9           | 139.7                  | +23.3    |                     |
| 79                            | 18      | 29.17                            | 12               | 23         | -76                             | May 4     | +68                             | 23                                     | 121         | 86.8                   | -1.9     | I 1597 (3)          |
| 16480                         | 10319   | 26.4                             | 2                | 24         | -28                             | Apr. 25   | -12                             | 3                                      | 15          | 123.8                  | -4.2     |                     |
| 81                            | ..      | 28.61                            | 2/7              | 24         | -57                             | 30        | +24                             | 0                                      | 3           | 94.2                   | -17.4    |                     |
| 82                            | 21      | 30.57                            | 13               | 24         | -78                             | May 6     | +73                             | 29                                     | 173         | 68.4                   | -21.2    | I 1602 (2)          |
| 83                            | 20      | 28.92                            | 7/8              | 25         | -48                             | 2         | +50                             | 3                                      | 12          | 90.1                   | -14.5    | II                  |
| 84                            | 22      | 29.85                            | 10               | 25         | -58                             | 4         | +62                             | 8                                      | 50          | 77.9                   | -10.0    | II                  |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

| GENERAL CATALOGUE OF SUNSPOTS |       |   |                          |                 |                                 |               |                                 |  |             |                        |          |                     |
|-------------------------------|-------|---|--------------------------|-----------------|---------------------------------|---------------|---------------------------------|--|-------------|------------------------|----------|---------------------|
| No. of Group                  |       | U.T. of Central Meridian Passage                          | Duration in Days         | First Seen      |                                 | Last Seen     |                                 | Mean Area Corrected for Foreshortening |             | Mean Position of Group |          | Reference to Ledger |
| G                             | Mt. W |   |                          | Date            | Longitude from Central Meridian | Date          | Longitude from Central Meridian | Umbrae                                 | Whole Spots | Longitude              | Latitude |                     |
| 16485                         | 10323 | 1950<br>May 2.07<br>86 24<br>87 25<br>88 26<br>89 27      | 9<br>12<br>12<br>7<br>9  | 1950<br>Apr. 26 | -75                             | 1950<br>May 4 | +29                             | 29                                     | 178         | 48.5                   | +25.8    | I 1600 (3)          |
|                               |       |   |                          | 28              | -69                             | 9             | +79                             | 99                                     | 615         | 30.6                   | +13.9    | I 1603 (2)          |
|                               |       |   |                          | 28              | -80                             | 9             | +65                             | 15                                     | 87          | 16.8                   | +12.5    | II                  |
|                               |       |   |                          | 30              | -12                             | 6             | +72                             | 11                                     | 50          | 61.8                   | -12.1    | II                  |
|                               |       |   |                          | May 1           | -70                             | 9             | +33                             | 27                                     | 174         | 345.6                  | +16.8    | II                  |
|                               |       |   |                          |                 |                                 |               |                                 |  |             |                        |          |                     |
| 16490                         | 10328 | Apr. 30.7<br>May 9.17                                     | 2<br>6                   | 3               | +36                             | 4             | +48                             | 6                                      | 26          | 67.1                   | +14.2    | II                  |
| 91                            | 29    | 11.0  | 5                        | 4               | -67                             | 9             | +3                              | 6                                      | 29          | 314.7                  | +7.7     |                     |
| 92                            | 30    | 12.42   | 13                       | 5               | -72                             | 9             | -22                             | 1                                      | 14          | 290.5                  | +7.8     |                     |
| 93                            | 32    | 2.0   | 2                        | 6               | -80                             | 18            | +79                             | 86                                     | 511         | 271.6                  | +6.1     | I 1604 (2)          |
| 94                            | 33    |   |                          | 7               | +72                             | 8             | +81                             | 11                                     | 30          | 49.6                   | +1.4     |                     |
| 16495                         | 10331 | 3.6<br>11.6   | 3<br>4                   | 7               | +52                             | 9             | +75                             | 53                                     | 217         | 27.7                   | -13.8    |                     |
| 96                            | ..    | 7.3   | 5                        | 7               | -57                             | 10            | -13                             | 1                                      | 9           | 282.6                  | +8.2     |                     |
| 97                            | 34    | 10.2  | 5                        | 8               | +13                             | 12            | +71                             | 13                                     | 60          | 339.2                  | -19.4    |                     |
| 98                            | 36    | 6.6   | 2                        | 8               | -24                             | 9             | -12                             | 1                                      | 7           | 301.2                  | +14.0    |                     |
| 99                            | 35    |   |                          | 9               | +35                             | 11            | +67                             | 2                                      | 10          | 348.2                  | -11.8    |                     |
| 16500                         | 10337 | 9.4<br>10.6<br>16.38                                      | 2<br>2<br>13             | 10              | +15                             | 11            | +30                             | 6                                      | 26          | 311.2                  | -12.2    |                     |
| 01                            | 39    | 6.6   | 2                        | 10              | +1                              | 11            | +14                             | 2                                      | 9           | 296.4                  | -3.5     |                     |
| 02                            | 38    | 10.3  | 13                       | 10              | -77                             | 22            | +79                             | 34                                     | 179         | 219.3                  | +9.3     | II                  |
| 03                            | 41    |   |                          | 11              | +66                             | 12            | +81                             | 20                                     | 115         | 348.3                  | +39.6    |                     |
| 04                            | 40    |   |                          | 12              | +29                             | 13            | +40                             | 2                                      | 18          | 299.2                  | +11.2    |                     |
| 16505                         | 10342 | 16.1<br>12.1<br>21.96<br>22.54<br>15.5                    | 2<br>3<br>11<br>11<br>4  | 14              | -22                             | 15            | -9                              | 3                                      | 16          | 223.0                  | +13.0    |                     |
| 06                            | 43    | 12.1  | 3                        | 16              | +59                             | 18            | +81                             | 8                                      | 47          | 276.0                  | -3.3     |                     |
| 07                            | 44    | 21.96   | 11                       | 16              | -75                             | 26            | +60                             | 15                                     | 65          | 145.6                  | -17.1    |                     |
| 08                            | 45    | 22.54   | 11                       | 16              | -83                             | 26            | +52                             | 27                                     | 168         | 137.8                  | -14.6    | I 1605 (2)          |
| 09                            | 46    |   |                          | 18              | +36                             | 21            | +79                             | 10                                     | 80          | 231.2                  | -7.8     |                     |
| 16510                         | 10347 | 24.15<br>14.7<br>20.96<br>26.31<br>22.91                  | 13<br>2<br>6<br>13<br>9  | 18              | -76                             | 30            | +84                             | 52                                     | 323         | 116.6                  | -10.5    | I 1606 (2)          |
| 11                            | 49    | 14.7  | 2                        | 19              | +63                             | 20            | +74                             | 18                                     | 116         | 241.4                  | +13.4    |                     |
| 12                            | 48    | 20.96   | 6                        | 19              | -21                             | 24            | +46                             | 12                                     | 67          | 158.7                  | -14.6    | II                  |
| 13                            | 50    | 26.31   | 13                       | 20              | -78                             | June 1        | +83                             | 148                                    | 924         | 88.0                   | +8.1     | I 1607 (1)          |
| 14                            | 51    | 22.91   | 9                        | 21              | -18                             | May 29        | +80                             | 92                                     | 542         | 133.0                  | +17.3    | I 1608 (1)          |
| 16515                         | 10354 | 22.0<br>24.36<br>55pt.<br>30.23<br>23.0                   | 4/7<br>3<br>8<br>10<br>4 | 22              | +4                              | 28            | +84                             | 0                                      | 9           | 144.8                  | +20.2    |                     |
| 16                            | 52    | 24.36   | 3                        | 22              | -28                             | 24            | 0                               | 3                                      | 15          | 113.7                  | +16.1    |                     |
| 17                            | 55pt. | 29.49   | 8                        | 23              | -82                             | 30            | +10                             | 8                                      | 37          | 45.8                   | +12.1    | II                  |
| 18                            | 56    | 30.23   | 10                       | 24              | -74                             | June 2        | +42                             | 17                                     | 91          | 36.0                   | +30.8    | II                  |
| 19                            | 57    |   |                          | 25              | +30                             | May 28        | +71                             | 23                                     | 119         | 131.6                  | +23.6    |                     |
| 16520                         | 10359 | June 1.60<br>May 29.1<br>June 2.6<br>May 31.3<br>June 1.1 | 11<br>3<br>2<br>3<br>4   | 28              | -57                             | June 7        | +79                             | 45                                     | 302         | 4.7                    | +5.3     | I 1609 (1)          |
| 21                            | 60    |   |                          | 29              | +4                              | May 31        | +29                             | 9                                      | 30          | 50.6                   | -10.9    |                     |
| 22                            | 61    |   |                          | 31              | -31                             | June 1        | -17                             | 2                                      | 16          | 351.1                  | +17.9    |                     |
| 23                            | 62    |   |                          | June 1          | +14                             | 3             | +41                             | 5                                      | 31          | 22.2                   | +16.6    |                     |
| 24                            | 63    |   |                          | 1               | +1                              | 4             | +44                             | 5                                      | 26          | 10.8                   | +14.8    |                     |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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| GENERAL CATALOGUE OF SUNSPOTS |                                 |   |                           |            |                                 |           |                                 |  |             |                        |          |                     |       |            |
|-------------------------------|---------------------------------|---|---------------------------|------------|---------------------------------|-----------|---------------------------------|--|-------------|------------------------|----------|---------------------|-------|------------|
| No. of Group                  |                                 | U.T. of Central Meridian Passage                  | Duration in Days          | First Seen |                                 | Last Seen |                                 | Mean Area Corrected for Foreshortening |             | Mean Position of Group |          | Reference to Ledger |       |            |
| G                             | Mt. W                           |   |                           | Date       | Longitude from Central Meridian | Date      | Longitude from Central Meridian | Umbrae                                 | Whole Spots | Longitude              | Latitude |                     |       |            |
| 16525                         | 10371 {<br>26<br>27<br>28<br>29 | June 6.18<br>May 29.2<br>June 8.36<br>10.4<br>7.2 | 7/11<br>3<br>10<br>3<br>4 | 1950       | 1950                            | June 1    | -65                             | 1950                                   | +72         | 4                      | 22       | 304.1               | + 9.7 | II         |
|                               |                                 |   |                           |            |                                 | 2         | +59                             |  | +82         | 16                     | 81       | 50.2                | + 9.9 |            |
|                               |                                 |   |                           |            |                                 | 2         | -77                             |  | +42         | 7                      | 40       | 275.2               | + 4.2 | I 1604 (3) |
|                               |                                 |   |                           |            |                                 | 6         | -53                             |  | -26         | 4                      | 14       | 248.8               | +14.0 |            |
|                               |                                 |   |                           |            |                                 | 8         | +34                             |  | +77         | 19                     | 107      | 310.5               | +17.8 |            |
| 16530                         | 10370<br>31<br>32<br>33<br>34   | 5.6<br>14.46<br>15.86<br>8.4<br>10.7              | 4<br>13<br>13<br>2<br>6   |            |                                 | 8         | +34                             | 11                                     | +79         | 10                     | 52       | 311.1               | - 9.8 | I 1610 (1) |
|                               |                                 |   |                           |            |                                 | 8         | -82                             | 20                                     | +80         | 155                    | 913      | 194.5               | -18.1 | II         |
|                               |                                 |   |                           |            |                                 | 9         | -83                             | 21                                     | +73         | 15                     | 138      | 176.0               | -19.0 |            |
|                               |                                 |   |                           |            |                                 | 11        | +37                             | 12                                     | +54         | 2                      | 8        | 274.4               | +13.5 |            |
|                               |                                 |   |                           |            |                                 | 11        | + 8                             | 16                                     | +79         | 8                      | 43       | 244.0               | +12.9 | II         |
| 16535                         | 10378<br>36<br>37<br>38<br>39   | 8.1<br>18.46<br>19.88<br>13.7<br>14.5             | 3<br>11<br>11<br>2<br>4   |            |                                 | 12        | +56                             | 14                                     | +85         | 4                      | 24       | 279.0               | +19.4 | I 1611 (1) |
|                               |                                 |   |                           |            |                                 | 12        | -84                             | 22                                     | +52         | 20                     | 103      | 141.5               | -17.5 | II         |
|                               |                                 |   |                           |            |                                 | 13        | -75                             | 23                                     | +44         | 10                     | 57       | 122.7               | +17.2 | I 1608 (2) |
|                               |                                 |   |                           |            |                                 | 14        | + 8                             | 15                                     | +22         | 2                      | 7        | 204.6               | + 6.4 |            |
|                               |                                 |   |                           |            |                                 | 16        | +31                             | 19                                     | +64         | 5                      | 25       | 194.4               | -22.4 |            |
| 16540                         | 10382<br>41<br>42<br>43<br>44   | 22.14<br>22.55<br>25.16<br>27.11<br>22.97         | 13<br>6<br>12<br>9<br>3/4 |            |                                 | 16        | -72                             | 28                                     | +82         | 52                     | 316      | 92.8                | + 9.2 | I 1607 (2) |
|                               |                                 |   |                           |            |                                 | 20        | -26                             | 25                                     | +37         | 4                      | 24       | 87.4                | +13.2 | II         |
|                               |                                 |   |                           |            |                                 | 20        | -65                             | July 1                                 | +86         | 60                     | 373      | 52.9                | + 9.6 | I 1612 (1) |
|                               |                                 |   |                           |            |                                 | 21        | -76                             | June 29                                | +32         | 18                     | 86       | 27.1                | +15.2 | II         |
|                               |                                 |   |                           |            |                                 | 22        | - 9                             | 25                                     | +33         | 2                      | 11       | 81.9                | +10.6 |            |
| 16545                         | 10388<br>46<br>47<br>48<br>49   | 26.53<br>27.7<br>27.9<br>19.2<br>29.01            | 11<br>3<br>6<br>2<br>4/7  |            |                                 | 22        | -57                             | July 2                                 | +76         | 8                      | 43       | 34.7                | -13.3 | II         |
|                               |                                 |   |                           |            |                                 | 22        | -71                             | June 24                                | -44         | 2                      | 16       | 19.7                | + 4.8 |            |
|                               |                                 |   |                           |            |                                 | 22        | -75                             | 27                                     | - 5         | 11                     | 42       | 16.5                | +12.1 |            |
|                               |                                 |   |                           |            |                                 | 23        | +57                             | 24                                     | +68         | 12                     | 38       | 132.2               | -12.4 |            |
|                               |                                 |   |                           |            |                                 | 23        | -72                             | 29                                     | + 5         | 1                      | 8        | 1.9                 | + 6.0 | I 1609 (2) |
| 16550                         | 10391<br>51<br>52<br>53<br>54   | 27.8<br>22.0<br>28.3<br>19.5<br>97                | 2<br>2<br>5<br>13<br>4    |            |                                 | 24        | -47                             | 25                                     | -32         | 4                      | 10       | 17.7                | +21.2 |            |
|                               |                                 |   |                           |            |                                 | 26        | +58                             | 27                                     | +71         | 2                      | 12       | 95.2                | +13.6 |            |
|                               |                                 |   |                           |            |                                 | 29        | +13                             | July 3                                 | +74         | 22                     | 108      | 11.6                | -16.6 |            |
|                               |                                 |   |                           |            |                                 | 29        | -76                             | 11                                     | +77         | 20                     | 127      | 277.4               | +20.9 | I 1611 (2) |
|                               |                                 |   |                           |            |                                 | 30        | -66                             | 3                                      | -19         | 13                     | 61       | 278.6               | -25.8 |            |
| 16555                         | 10398<br>56<br>57<br>58<br>59   | June 28.4<br>July 5.82<br>3.1<br>11.82<br>2.7     | 4<br>10<br>5<br>13<br>3   | July 1     | +38                             |           |                                 | 4                                      | +76         | 36                     | 154      | 9.6                 | -12.2 | II         |
|                               |                                 |   |                           | 3          | -31                             |           |                                 | 12                                     | +83         | 77                     | 476      | 271.7               | +15.2 |            |
|                               |                                 |   |                           | 5          | +37                             |           |                                 | 9                                      | +81         | 33                     | 220      | 308.4               | +19.5 |            |
|                               |                                 |   |                           | 5          | -78                             |           |                                 | 17                                     | +72         | 31                     | 182      | 192.4               | -17.8 | I 1610 (2) |
|                               |                                 |   |                           | 6          | +45                             |           |                                 | 8                                      | +77         | 0                      | 11       | 312.6               | -10.5 |            |
| 16560                         | 10401<br>61<br>62<br>63<br>64   | 1.9<br>8.4<br>16.14<br>16.56<br>16.2              | 2<br>6<br>12<br>9/10<br>3 |            |                                 | 7         | +76                             | 8                                      | +83         | 92                     | 394      | 324.1               | + 8.1 |            |
|                               |                                 |   |                           |            |                                 | 9         | +13                             | 14                                     | +79         | 20                     | 110      | 238.0               | + 7.7 | II         |
|                               |                                 |   |                           |            |                                 | 10        | -75                             | 21                                     | +70         | 39                     | 262      | 135.2               | +20.1 | II         |
|                               |                                 |   |                           |            |                                 | 11        | -71                             | 20                                     | +47         | 7                      | 44       | 129.6               | -12.5 | II         |
|                               |                                 |   |                           |            |                                 | 13        | -38                             | 15                                     | -11         | 2                      | 11       | 134.7               | +16.9 |            |

## GENERAL CATALOGUE OF SUNSPOTS

| No. of Group |          | U.T. of Central Meridian Passage | Duration in Days | First Seen |                                 | Last Seen |                                 | Mean Area Corrected for Foreshortening |             | Mean Position of Group |          | Reference to Ledger |
|--------------|----------|----------------------------------|------------------|------------|---------------------------------|-----------|---------------------------------|--|-------------|------------------------|----------|---------------------|
| G            | Mt. W    |                                  |                  | Date       | Longitude from Central Meridian | Date      | Longitude from Central Meridian | Umbræ                                  | Whole Spots | Longitude              | Latitude |                     |
| 16565        | ..       | 1950                             |                  | 1950       | °                               | 1950      | °                               |  |             | °                      | °        | I 1607 (3)          |
| 66           | 10410    | July 19.6                        | 2/3              | July 13    | -83                             | July 15   | -56                             | 0                                      | 6           | 89.7                   | +11.8    |                     |
| 67           | 9.8      | 9.8                              | 2                | 14         | +62                             | 15        | +74                             | 0                                      | 12          | 219.5                  | -7.2     |                     |
| 67           | 09       | 19.5                             | 2                | 14         | -68                             | 15        | -55                             | 2                                      | 10          | 90.6                   | +8.9     | I 1607 (3)          |
| 68           | 12       | 20.19                            | 12               | 15         | -67                             | 26        | +83                             | 83                                     | 503         | 81.7                   | +12.0    | I 1613 (1)          |
| 69           | 11       | 21.98                            | 13               | 15         | -88                             | 27        | +71                             | 53                                     | 276         | 57.9                   | +8.2     | I 1612 (2)          |
| 16570        | 10415    | 24.97                            | 13               | 19         | -72                             | 31        | +83                             | 110                                    | 580         | 18.3                   | -11.3    | I 1614 (1)          |
| 71           | 17       | 25.66                            | 11               | 19         | -80                             | 29        | +49                             | 23                                     | 130         | 9.2                    | +5.0     | II                  |
| 72           | 18       | 26.38                            | 12               | 20         | -80                             | 31        | +66                             | 7                                      | 44          | 359.7                  | -12.4    | II                  |
| 73           | 20       | 22.04                            | 7                | 21         | -9                              | 27        | +70                             | 8                                      | 51          | 57.1                   | +11.8    | II                  |
| 74           | 21       | 23.75                            | 3                | 22         | -19                             | 24        | +10                             | 4                                      | 14          | 34.5                   | +4.0     |                     |
| 16575        | 10423    | 30.19                            | 11               | 24         | -72                             | Aug. 3    | +51                             | 40                                     | 217         | 309.3                  | -11.7    | II                  |
| 76           | 24       | 27.08                            | 5                | 25         | -19                             | July 29   | +29                             | 10                                     | 55          | 350.4                  | -17.4    |                     |
| 77           | 27       | 31.8                             | 4                | 26         | -72                             | 29        | -33                             | 3                                      | 14          | 288.0                  | -19.3    |                     |
| 78           | 29       | 24.4                             | 2                | 28         | +56                             | 29        | +66                             | 18                                     | 102         | 26.6                   | +6.6     |                     |
| 79           | 32       | Aug. 3.74                        | 13               | 28         | -82                             | Aug. 9    | +74                             | 32                                     | 183         | 249.1                  | +7.6     | II                  |
| 16580        | 10433 {  | 2.4                              | 2/5              | 29         | -54                             | 2         | -1                              | 1                                      | 7           | 266.4                  | -7.2     |                     |
| 81           | 34       | 4.69                             | 13               | 29         | -82                             | 10        | +78                             | 109                                    | 770         | 236.6                  | -8.9     | II                  |
| 82           | 35       | 5.0                              | 3                | Aug. 1     | -47                             | 3         | -22                             | 8                                      | 32          | 233.0                  | +9.5     |                     |
| 83           | 36       | 5.3                              | 4                | 1          | -52                             | 4         | -14                             | 6                                      | 24          | 228.2                  | -8.4     |                     |
| 84           | 37       | 7.22                             | 13               | 1          | -80                             | 13        | +83                             | 37                                     | 210         | 203.1                  | -17.0    | II                  |
| 16585        | 10441    | 12.26                            | 9                | 6          | -78                             | 14        | +26                             | 14                                     | 84          | 136.4                  | -10.0    | II                  |
| 86           | 42       | 8.38                             | 7                | 7          | -13                             | 13        | +66                             | 3                                      | 17          | 187.8                  | -17.6    | II                  |
| 87           | 43       | 11.86                            | 9                | 9          | -38                             | 17        | +74                             | 17                                     | 108         | 141.8                  | +15.6    | II                  |
| 88           | 44       | 16.33                            | 12               | 10         | -76                             | 21        | +68                             | 38                                     | 286         | 82.7                   | +14.4    | I 1613 (2)          |
| 89           | 45       | 7.8                              | 3                | 12         | +60                             | 14        | +80                             | 16                                     | 88          | 195.2                  | -20.7    |                     |
| 16590        | 10446    | 18.31                            | 13               | 12         | -78                             | 24        | +79                             | 18                                     | 93          | 56.5                   | +8.4     | I 1612 (3)          |
| 91           | 49       | 20.6                             | 6                | 15         | -70                             | 20        | -2                              | 4                                      | 19          | 26.0                   | -15.6    | II                  |
| 92           | 47       | 21.18                            | 12               | 15         | -76                             | 26        | +68                             | 79                                     | 412         | 18.6                   | -10.2    | I 1614 (2)          |
| 93           | 48       | 16.81                            | 6                | 16         | -8                              | 21        | +62                             | 6                                      | 30          | 76.4                   | +11.0    | II                  |
| 94           | 50       | 21.67                            | 12               | 16         | -69                             | 27        | +76                             | 40                                     | 235         | 12.1                   | +14.5    | II                  |
| 16595        | 10451    | 24.79                            | 12               | 19         | -70                             | 30        | +76                             | 26                                     | 162         | 330.9                  | -18.6    | II                  |
| 96           | 52       | 25.6                             | 7                | 19         | -79                             | 25        | -6                              | 13                                     | 66          | 320.4                  | +36.1    | II                  |
| 97           | 53       | 25.45                            | 12               | 19         | -82                             | 30        | +69                             | 8                                      | 36          | 322.2                  | -9.1     | II                  |
| 98           | ..       | 25.4                             | 3                | 20         | -66                             | 22        | -40                             | 3                                      | 11          | 322.7                  | -17.7    |                     |
| 99           | 54       | 27.3                             | 5                | 21         | -80                             | 25        | -21                             | 7                                      | 26          | 298.0                  | -2.0     |                     |
| 16600        | 10455pt. | 21.5                             | 6                | 22         | +12                             | 27        | +80                             | 37                                     | 262         | 14.2                   | -12.6    | II                  |
| 01           | 55pt.    | 22.1                             | 4                | 23         | +16                             | 26        | +56                             | 6                                      | 24          | 6.4                    | -14.6    |                     |
| 02           | 56       | 30.42                            | 9                | 25         | -69                             | Sept. 2   | +40                             | 11                                     | 51          | 256.5                  | -4.5     | II                  |
| 03           | 57 {     | Sept. 1.22                       | 4/10             | 27         | -62                             | 5         | +57                             | 2                                      | 8           | 232.7                  | -16.3    |                     |
| 04           | 59       | 3.47                             | 13               | 28         | -82                             | 9         | +81                             | 27                                     | 176         | 203.0                  | +14.5    | II                  |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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## GENERAL CATALOGUE OF SUNSPOTS

| No. of Group |                                 | U.T. of Central Meridian Passage | Duration in Days | First Seen |                                 | Last Seen |                                 | Mean Area Corrected for Foreshortening |             | Mean Position of Group |          | Reference to Ledger |
|--------------|---------------------------------|----------------------------------|------------------|------------|---------------------------------|-----------|---------------------------------|--|-------------|------------------------|----------|---------------------|
| G            | Mt. W                           |                                  |                  | Date       | Longitude from Central Meridian | Date      | Longitude from Central Meridian | Umbrae                                 | Whole Spots | Longitude              | Latitude |                     |
| 16605        | ..                              | 1950                             |                  | 1950       | °                               | 1950      | °                               |  |             | °                      | °        |                     |
| 06           | 10460                           | Aug. 30.93                       | 3/6              | Aug. 29    | -19                             | Sept. 3   | +48                             | 0                                      | 4           | 249.8                  | + 9.0    | II                  |
| 07           | 61                              | Sept. 3.68                       | 7                | 29         | -69                             | 4         | +11                             | 3                                      | 12          | 200.2                  | -21.3    | II                  |
| 08           | 68                              | Aug. 29.5                        | 6                | 30         | +14                             | 4         | +85                             | 17                                     | 105         | 269.0                  | +12.5    | II                  |
| 09           | 72                              | Sept. 6.8                        | 3                | Sept. 2    | -60                             | 4         | -30                             | 1                                      | 5           | 159.0                  | -14.2    |                     |
|              |                                 | 10.7                             | 2                | 5          | -70                             | 6         | -57                             | 2                                      | 8           | 107.7                  | +13.5    |                     |
| 16610        | 10470                           | 12.46                            | 13               | 6          | -82                             | 18        | +79                             | 23                                     | 132         | 84.3                   | + 3.2    | II                  |
| 11           | 75                              | 8.5                              | 4                | 11         | +42                             | 14        | +81                             | 29                                     | 131         | 136.9                  | +21.0    | I 1615 (1)          |
| 12           | 76pt.                           | 17.55                            | 13               | 11         | -77                             | 23        | +77                             | 26                                     | 124         | 17.1                   | - 9.9    | I 1614 (3)          |
| 13           | 77                              | 18.49                            | 12               | 13         | -70                             | 24        | +78                             | 42                                     | 228         | 4.7                    | +13.8    | II                  |
| 14           | 79                              | 18.41                            | 10               | 14         | -56                             | 23        | +72                             | 2                                      | 13          | 5.8                    | -12.2    | II                  |
| 16615        | 10480                           | 12.9                             | 4                | 15         | +34                             | 18        | +70                             | 10                                     | 61          | 78.0                   | +12.6    | I 1616 (1)          |
| 16           | 81                              | 21.40                            | 13               | 15         | -78                             | 27        | +81                             | 48                                     | 260         | 326.2                  | +17.6    | I 1617 (1)          |
| 17           | 76pt.                           | 17.4                             | 4                | 18         | +12                             | 21        | +53                             | 10                                     | 58          | 19.7                   | -12.2    |                     |
| 18           | 83                              | 14.6                             | 2                | 19         | +66                             | 20        | +76                             | 24                                     | 124         | 56.2                   | + 1.5    | I 1618 (1)          |
| 19           | 82                              | 17.6                             | 2                | 19         | +25                             | 20        | +37                             | 0                                      | 4           | 16.0                   | +13.4    |                     |
| 16620        | 10484                           | 27.26                            | 11               | 21         | -78                             | Oct. 1    | +56                             | 14                                     | 83          | 249.0                  | +14.5    | II                  |
| 21           | 85                              | { 22.5                           | 4                | 25         | +39                             | Sept. 28  | +74                             | 6                                      | 42          | 311.2                  | +16.5    |                     |
| 22           | 86                              | 27.31                            | 2                | 26         | -13                             | 27        | + 3                             | 0                                      | 4           | 248.2                  | -14.0    |                     |
| 23           | 88                              | Oct. 1.3                         | 5                | 27         | -50                             | Oct. 1    | 0                               | 5                                      | 22          | 195.3                  | -20.8    |                     |
| 24           | 90                              | 4.66                             | 12               | 29         | -74                             | 10        | +74                             | 25                                     | 142         | 151.2                  | - 5.8    | II                  |
| 16625        | 10491                           | 6.06                             | 14               | 29         | -86                             | 12        | +82                             | 37                                     | 176         | 132.8                  | +23.4    | I 1615 (2)          |
| 26           | 92                              | 7.0                              | 5                | Oct. 1     | -75                             | 5         | -22                             | 7                                      | 42          | 120.3                  | +12.3    |                     |
| 27           | 93                              | 10.17                            | 10               | 4          | -73                             | 13        | +42                             | 9                                      | 44          | 78.6                   | +11.8    | I 1616 (2)          |
| 28           | ..                              | 11.3                             | 4                | 5          | -80                             | 8         | -37                             | 0                                      | 6           | 63.2                   | + 1.6    | I 1618 (2)          |
| 29           | 95                              | 9.25                             | 8                | 8          | -11                             | 15        | +81                             | 32                                     | 170         | 90.2                   | + 3.3    | II                  |
| 16630        | 10496                           | 14.09                            | 7                | 8          | -76                             | 14        | + 7                             | 6                                      | 38          | 26.8                   | - 4.1    | II                  |
| 31           | 97                              | 14.72                            | 12               | 8          | -82                             | 19        | +63                             | 43                                     | 257         | 18.6                   | -12.6    | II                  |
| 32           | 99                              | 15.2                             | 2                | 10         | -64                             | 11        | -50                             | 1                                      | 11          | 12.6                   | - 9.4    |                     |
| 33           | 10504                           | 15.6                             | 4                | 11         | -56                             | 14        | -16                             | 6                                      | 18          | 7.0                    | +19.0    |                     |
| 34           | 02                              | 7.7                              | 2                | 12         | +61                             | 13        | +77                             | 4                                      | 24          | 111.7                  | +11.6    |                     |
| 16635        | 10498                           | 15.10                            | 9                | 12         | -40                             | 20        | +74                             | 56                                     | 355         | 13.6                   | -15.7    | II                  |
| 36           | 10507                           | 18.4                             | 7                | 12         | -81                             | 18        | 0                               | 10                                     | 42          | 329.4                  | +16.0    | I 1617 (2)          |
| 37           | ..                              | 16.4                             | 2                | 13         | -40                             | 14        | -26                             | 0                                      | 4           | 356.9                  | + 3.8    |                     |
| 38           | 09                              | 13.0                             | 2                | 15         | +30                             | 16        | +49                             | 4                                      | 28          | 41.2                   | + 0.4    |                     |
| 39           | 12                              | 21.37                            | 12               | 16         | -64                             | 27        | +78                             | 24                                     | 147         | 290.8                  | - 6.2    | I 1619 (1)          |
| 16640        | 105 <sup>18</sup> <sub>24</sub> | 26.93                            | 6/7              | 25         | -22                             | 31        | +58                             | 5                                      | 30          | 217.5                  | +28.8    | II                  |
| 41           | 19                              | 31.55                            | 12               | 26         | -74                             | Nov. 6    | +78                             | 22                                     | 123         | 156.6                  | -10.6    | II                  |
| 42           | 20                              | Nov. 1.3                         | 7                | 26         | -78                             | 1         | 0                               | 13                                     | 70          | 146.2                  | - 2.3    | II                  |
| 43           | 21                              | 2.8                              | 3                | 28         | -72                             | Oct. 30   | -45                             | 3                                      | 15          | 126.5                  | +22.1    | I 1615 (3)          |
| 44           | 23                              | 3.55                             | 12               | 28         | -83                             | Nov. 8    | +62                             | 23                                     | 148         | 117.1                  | +12.8    | II                  |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

| GENERAL CATALOGUE OF SUNSPOTS |       |                                  |                  |                 |                                 |                    |                                 |  |             |                        |          |                     |
|-------------------------------|-------|----------------------------------|------------------|-----------------|---------------------------------|--------------------|---------------------------------|--|-------------|------------------------|----------|---------------------|
| No. of Group                  |       | U.T. of Central Meridian Passage | Duration in Days | First Seen      |                                 | Last Seen          |                                 | Mean Area Corrected for Foreshortening |             | Mean Position of Group |          | Reference to Ledger |
| G                             | Mt. W |                                  |                  | Date            | Longitude from Central Meridian | Date               | Longitude from Central Meridian | Umbræ                                  | Whole Spots | Longitude              | Latitude |                     |
| 16645                         | 10522 | 1950<br>Oct. 25.3                | 3                | 1950<br>Oct. 29 | ° +55                           | 1950-51<br>Oct. 31 | ° +76                           | 12                                     | 75          | 238.4                  | +16.4    |                     |
| 46                            | 26    | Nov. 2.32                        | 11               | 29              | -55                             | Nov. 8             | +83                             | 18                                     | 123         | 133.2                  | -4.2     | II                  |
| 47                            | 27    | 9.6                              | 6                | Nov. 4          | -72                             | 9                  | -4                              | 7                                      | 45          | 36.7                   | +3.0     | II                  |
| 48                            | 29    | 10.0                             | 2                | 4               | -75                             | 5                  | -60                             | 0                                      | 13          | 32.4                   | +12.6    |                     |
| 49                            | 28    | 10.22                            | 13               | 4               | -78                             | 16                 | +80                             | 36                                     | 208         | 29.1                   | -13.7    | I 1620 (1)          |
| 16650                         | 10530 | 5.97                             | 8                | 5               | -9                              | 12                 | +82                             | 96                                     | 644         | 85.1                   | +12.8    | I 1621 (1)          |
| 51                            | 31    | { 15.45                          | 13               | 9               | -76                             | 21                 | +72                             | 89                                     | 569         | 320.2                  | +15.3    | I 1622 (1)          |
| 52                            | 32    | 16.79                            | 7                | 11              | -72                             | 17                 | +10                             | 6                                      | 29          | 302.5                  | -6.3     | I 1619 (2)          |
| 53                            | 35    | 16.8                             | 2                | 12              | -58                             | 13                 | -43                             | 2                                      | 8           | 302.6                  | -10.7    |                     |
| 54                            | 36    | 14.3                             | 4/5              | 14              | +2                              | 18                 | +54                             | 3                                      | 15          | 335.8                  | +18.0    |                     |
| 16655                         | 10537 | 17.93                            | 8/9              | 14              | -46                             | 22                 | +60                             | 5                                      | 39          | 287.4                  | +16.7    | II                  |
| 56                            | ..    | 16.74                            | 2/3              | 15              | -19                             | 17                 | +10                             | 0                                      | 3           | 303.1                  | -10.0    |                     |
| 57                            | 39    | 28.43                            | 12               | 22              | -80                             | Dec. 3             | +66                             | 14                                     | 71          | 149.0                  | +19.4    | II                  |
| 58                            | 40    | 30.85                            | 12               | 25              | -76                             | 6                  | +75                             | 29                                     | 148         | 117.1                  | -15.6    | II                  |
| 59                            | 41    | 30.43                            | 8                | 26              | -52                             | 3                  | +39                             | 17                                     | 101         | 122.7                  | -5.8     | II                  |
| 16660                         | 10543 | Dec. 2.06                        | 10               | 27              | -65                             | 6                  | +60                             | 20                                     | 100         | 101.2                  | -22.6    | II                  |
| 61                            | 42    | 3.29                             | 13               | 27              | -79                             | 9                  | +78                             | 36                                     | 235         | 85.0                   | +12.4    | I 1621 (2)          |
| 62                            | 44    | Nov. 29.7                        | 6                | 30              | +10                             | 5                  | +72                             | 42                                     | 292         | 132.0                  | -5.6     | II                  |
| 63                            | 45    | Dec. 7.63                        | 10               | Dec. 1          | -81                             | 10                 | +35                             | 10                                     | 62          | 27.9                   | -15.3    | I 1620 (2)          |
| 64                            | 47    | 9.63                             | 13               | 3               | -84                             | 15                 | +77                             | 39                                     | 210         | 1.4                    | -11.8    | II                  |
| 16665                         | 10548 | 10.26                            | 8                | 4               | -77                             | 11                 | +16                             | 9                                      | 70          | 353.1                  | -15.3    | II                  |
| 66                            | ..    | 7.98                             | 4                | 7               | -6                              | 10                 | +31                             | 2                                      | 16          | 23.2                   | -12.6    |                     |
| 67                            | 50    | 9.83                             | 9                | 7               | -31                             | 15                 | +73                             | 41                                     | 296         | 358.8                  | +20.1    | II                  |
| 68                            | 49    | 12.71                            | 11               | 7               | -71                             | 17                 | +66                             | 24                                     | 160         | 321.0                  | +13.6    | I 1622 (2)          |
| 69                            | 51    | 13.55                            | 13               | 7               | -77                             | 19                 | +73                             | 30                                     | 233         | 309.8                  | +15.7    | II                  |
| 16670                         | 10552 | 7.4                              | 4                | 10              | +41                             | 13                 | +76                             | 13                                     | 70          | 30.6                   | +12.5    |                     |
| 71                            | 53    | 15.4                             | 2                | 11              | -53                             | 12                 | -38                             | 0                                      | 8           | 285.5                  | +15.2    |                     |
| 72                            | 54    | 15.5                             | 2/4              | 12              | -42                             | 15                 | -2                              | 0                                      | 2           | 283.8                  | +10.4    |                     |
| 73                            | ..    | 18.3                             | 2                | 12              | -77                             | 13                 | -64                             | 6                                      | 32          | 247.0                  | -15.8    |                     |
| 74                            | ..    | 18.0                             | 2                | 14              | -49                             | 15                 | -36                             | 0                                      | 16          | 250.6                  | +12.7    |                     |
| 16675                         | 10555 | 15.1                             | 3                | 15              | +2                              | 17                 | +32                             | 2                                      | 10          | 289.9                  | -21.9    |                     |
| 76                            | 58    | 27.63                            | 10               | 24              | -44                             | Jan. 2             | +77                             | 32                                     | 218         | 124.4                  | +11.0    | II                  |
| 77                            | 59    | 28.4                             | 4                | 24              | -55                             | Dec. 27            | -12                             | 6                                      | 27          | 113.6                  | -7.1     |                     |

## GENERAL CATALOGUE OF SUNSPOTS

## SUNSPOTS SEEN ON ONE DAY ONLY

The groups of sunspots tabulated below were seen on one day only and appear in the *Daily Results* with a distinctive numeration, comprising the number of the rotation during which each was observed and a letter given in order of appearance. These short-lived groups are usually composed of one or two very small spots. The deduced time of central meridian passage of each spot is given in the fourth column of the table.

| No. of Group     | Date        | Longi-tude from Central Meridian | U.T. of Central Meridian Passage | Area Corrected for Foreshortening |             | Position of Group |               | No. of Group     | Date         | Longi-tude from Central Meridian | U.T. of Central Meridian Passage | Area Corrected for Foreshortening |             | Position of Group |               |       |
|------------------|-------------|----------------------------------|----------------------------------|-----------------------------------|-------------|-------------------|---------------|------------------|--------------|----------------------------------|----------------------------------|-----------------------------------|-------------|-------------------|---------------|-------|
|                  |             |                                  |                                  | Umbræ                             | Whole Spots | Longi-tude        | Latit-<br>ude |                  |              |                                  |                                  | Umbræ                             | Whole Spots | Longi-tude        | Latit-<br>ude |       |
| <b>1288c</b>     | 1950 Jan. 1 | o<br>+22.2                       | 1949-50 Dec. 30.8                | o<br>0                            | 3           | 220.6             | +16.6         | <b>1294c</b>     | 1950 June 10 | o<br>-21.2                       | 1950 June 11.9                   | o<br>1                            | 18          | 228.0             | + 9.4         |       |
|                  | 2           | +63.3                            |                                  | 28.5                              | 0           | 7                 | 250.9         | +10.5            | d<br>26      | +46.8<br>-58.1                   | 22.8<br>30.0                     | 2                                 | 15          | 83.8              | -13.1         |       |
| <b>1289a</b>     | Jan. 24     | -36.2                            | Jan. 27.1                        | 0                                 | 8           | 220.2             | +27.5         | <b>1295a</b>     | June 29      | -24.0                            | July 1.3                         | 0                                 | 3           | 331.9             | - 1.4         |       |
| b                | 24          | -48.9                            | 28.1                             | 2                                 | 11          | 207.5             | - 8.2         |                  | b<br>30      | -16.8                            | 1.6                              | 1                                 | 7           | 327.6             | - 5.5         |       |
| c                | 27          | -33.1                            | 30.0                             | 0                                 | 5           | 182.3             | +23.1         |                  | c<br>July 14 | +13.9                            | 13.4                             | 4                                 | 26          | 171.9             | +35.1         |       |
| d                | 29          | +33.0                            | 27.0                             | 2                                 | 13          | 222.3             | + 9.1         |                  | d<br>19      | -32.5                            | 22.0                             | 1                                 | 10          | 57.1              | +15.7         |       |
| e                | 30          | +26.1                            | 28.3                             | 1                                 | 8           | 204.7             | +20.6         |                  | e<br>25      | -18.0                            | 27.0                             | 0                                 | 5           | 351.5             | -13.5         |       |
| f                | Feb. 4      | -14.6                            | Feb. 5.6                         | 1                                 | 5           | 95.8              | +15.1         |                  |              |                                  |                                  |                                   |             |                   |               |       |
| <b>1290a</b>     | Feb. 18     | -44.1                            | Feb. 21.7                        | 6                                 | 18          | 243.3             | - 7.5         |                  | <b>1296a</b> | July 27                          | - 0.8                            | July 27.4                         | 4           | 24                | 346.3         | + 6.5 |
| b                | 25          | - 9.9                            | 26.1                             | 1                                 | 5           | 185.1             | - 0.8         |                  | b<br>28      | -64.7                            | Aug. 2.5                         | 0                                 | 2           | 265.7             | +20.1         |       |
| c                | 27          | -17.5                            | 28.7                             | 1                                 | 11          | 151.3             | -14.1         |                  | c<br>29      | -57.2                            | 2.6                              | 2                                 | 11          | 263.6             | +10.1         |       |
| d                | Mar. 1      | + 7.6                            | 28.8                             | 2                                 | 11          | 149.7             | +19.3         |                  | <b>1297a</b> | Aug. 29                          | -65.8                            | Sept. 3.5                         | 0           | 13                | 203.1         | -17.9 |
| e                | 4           | -75.2                            | Mar. 10.1                        | 4                                 | 23          | 27.7              | -31.8         |                  | b<br>Sept. 1 | + 2.1                            | 1.2                              | 1                                 | 9           | 233.1             | +14.0         |       |
| f                | 7           | +33.0                            | 4.9                              | 4                                 | 13          | 96.3              | -12.7         |                  | c<br>6       | +71.0                            | 1.0                              | 0                                 | 8           | 236.2             | -10.1         |       |
| g                | 11          | +10.5                            | 10.5                             | 0                                 | 5           | 22.1              | -20.0         |                  | d<br>9       | +11.3                            | 8.5                              | 3                                 | 18          | 137.1             | +17.0         |       |
| <b>1291a</b>     | Mar. 14     | +66.8                            | Mar. 9.2                         | 3                                 | 18          | 38.8              | +11.9         |                  | e<br>16      | -63.8                            | 21.2                             | 2                                 | 8           | 329.5             | +23.4         |       |
| b                | 14          | -24.8                            | 16.2                             | 0                                 | 2           | 307.2             | -15.5         |                  |              |                                  |                                  |                                   |             |                   |               |       |
| c                | 15          | +44.8                            | 12.1                             | 4                                 | 19          | 1.3               | -18.1         |                  | <b>1298a</b> | Sept. 27                         | +56.5                            | Sept. 23.3                        | 2           | 7                 | 301.7         | - 3.4 |
| d                | 16          | -39.5                            | 19.4                             | 1                                 | 12          | 265.2             | + 9.3         |                  | b<br>Oct. 10 | +58.9                            | Oct. 5.8                         | 8                                 | 33          | 135.7             | +19.0         |       |
| e                | 20          | -29.9                            | 22.9                             | 1                                 | 4           | 218.6             | - 9.8         |                  | c<br>11      | -32.3                            | 13.9                             | 1                                 | 5           | 29.7              | +12.7         |       |
| f                | Apr. 3      | -22.6                            | Apr. 5.1                         | 1                                 | 11          | 44.4              | -21.1         |                  | d<br>13      | -32.5                            | 15.8                             | 1                                 | 4           | 3.8               | + 6.6         |       |
| g                | 7           | -61.0                            | 12.0                             | 2                                 | 10          | 313.8             | +13.9         |                  |              |                                  |                                  |                                   |             |                   |               |       |
| <b>1292a</b>     | Apr. 9      | +16.6                            | Apr. 8.2                         | 2                                 | 8           | 3.7               | - 7.1         |                  | <b>1299a</b> | Oct. 16                          | -65.7                            | Oct. 21.6                         | 2           | 11                | 287.6         | +18.0 |
| b                | 12          | +71.1                            | 7.0                              | 3                                 | 13          | 19.9              | -14.2         |                  | b<br>24      | + 2.5                            | 24.2                             | 1                                 | 5           | 253.5             | +15.4         |       |
| c                | May 3       | -73.6                            | May 8.9                          | 0                                 | 12          | 318.2             | - 8.5         |                  | c<br>29      | +20.3                            | 27.9                             | 3                                 | 26          | 204.6             | +18.2         |       |
| <b>1293a</b>     | May 21      | + 3.0                            | May 21.1                         | 1                                 | 6           | 156.8             | +20.9         |                  | d<br>30      | +55.8                            | 26.2                             | 0                                 | 10          | 227.7             | -10.9         |       |
| b                | 22          | +75.2                            | 16.6                             | 0                                 | 4           | 215.9             | - 8.2         |                  | e<br>Nov. 2  | +10.6                            | Nov. 1.5                         | 2                                 | 10          | 143.9             | - 4.7         |       |
| c                | 25          | -67.0                            | 30.4                             | 0                                 | 5           | 33.7              | -16.2         |                  | f<br>11      | +27.4                            | 9.3                              | 1                                 | 10          | 40.7              | -12.0         |       |
| d                | 27          | +58.7                            | 23.0                             | 5                                 | 14          | 132.3             | -17.8         |                  | <b>1300a</b> | Nov. 19                          | -64.1                            | Nov. 24.3                         | 2           | 26                | 203.2         | +23.1 |
| <b>1294a</b>     | June 4      | -21.1                            | June 6.0                         | 1                                 | 8           | 307.1             | +17.9         |                  | b<br>Dec. 6  | -79.4                            | Dec. 12.4                        | 0                                 | 20          | 325.0             | +18.2         |       |
| b                | 8           | +55.0                            | 4.2                              | 4                                 | 36          | 330.4             | + 8.7         |                  | <b>1301a</b> | Dec. 20                          | +63.2                            | Dec. 15.5                         | 2           | 7                 | 284.2         | +12.8 |
| Greenwich Number |             |                                  |                                  | Greenwich Number                  |             |                   |               | Greenwich Number |              |                                  |                                  | Greenwich Number                  |             |                   |               |       |
| <b>1288d</b>     |             |                                  |                                  | <b>1291b</b>                      |             |                   |               | <b>1293b</b>     |              |                                  |                                  | <b>1295c</b>                      |             |                   |               |       |
| 10186            |             |                                  |                                  | 10275                             |             |                   |               | 10353            |              |                                  |                                  | 10407                             |             |                   |               |       |
| <b>1289c</b>     |             |                                  |                                  | c<br>74                           |             |                   |               | c<br>58          |              |                                  |                                  | d<br>46                           |             |                   |               |       |
| 10219            |             |                                  |                                  | d<br>76                           |             |                   |               | <b>1294a</b>     |              |                                  |                                  | 10426                             |             |                   |               |       |
| e<br>24          |             |                                  |                                  | e<br>81                           |             |                   |               | c<br>75          |              |                                  |                                  | b<br>31                           |             |                   |               |       |
| <b>1290a</b>     |             |                                  |                                  | f<br>95                           |             |                   |               | d<br>90          |              |                                  |                                  | <b>1297b</b>                      |             |                   |               |       |
| 10238            |             |                                  |                                  | <b>1292a</b>                      |             |                   |               | 10366            |              |                                  |                                  | 10463                             |             |                   |               |       |
| c<br>46          |             |                                  |                                  | 10301                             |             |                   |               | <b>1295a</b>     |              |                                  |                                  | d<br>71                           |             |                   |               |       |
| f<br>59          |             |                                  |                                  | b<br>07                           |             |                   |               | 10394            |              |                                  |                                  | <b>1298b</b>                      |             |                   |               |       |
| g<br>69          |             |                                  |                                  | b<br>96                           |             |                   |               | b<br>96          |              |                                  |                                  | 10500                             |             |                   |               |       |
| <b>1294a</b>     |             |                                  |                                  | <b>1301a</b>                      |             |                   |               | 10557            |              |                                  |                                  | <b>1301a</b>                      |             |                   |               |       |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

## REVIVAL GROUPS OF SUNSPOTS

Groups of spots occupying the same heliographic position in consecutive disk passages (partial or complete) but with definite breaks in their history are termed 'Revivals'. Such groups have been abstracted from the preceding catalogue and are grouped in series in the following table. When a 'Recurrent' series i.e. *Ledger I* forms part of a 'Revival' series, a reference is given in the last column of the table. Groups that are given in detail in *Ledger II* are also indicated.

| No. | No. of Group | U.T. of Central Meridian Passage | Rotation | Duration in Days | First Seen |                                 | Last Seen |                                 | Area | Mean Position |          | Reference to Ledger |
|-----|--------------|----------------------------------|----------|------------------|------------|---------------------------------|-----------|---------------------------------|------|---------------|----------|---------------------|
|     |              |                                  |          |                  | Date       | Longitude from Central Meridian | Date      | Longitude from Central Meridian |      | Longitude     | Latitude |                     |
| 1   | 16380        | 1950                             |          |                  | 1950       | o                               | 1950      | o                               | 219  | o             | o        | I 1587 (2)          |
|     | 406          | Jan. 23.13                       | 1289     | 12               | Jan. 17    | -77                             | Jan. 28   | +67                             |      | 273           | +10      | { I 1593            |
|     | 443          | Feb. 19.27                       | 1290     | 13               | Feb. 13    | -79                             | Feb. 25   | +83                             |      | 276           | +12      |                     |
|     |              | Mar. 18.53                       | 1291     | 13               | Mar. 12    | -82                             | Mar. 24   | +76                             | 437  | 276           | +12      |                     |
| 2   | 16399        | Feb. 9.5                         | 1289     | 4                | Feb. 3     | -80                             | Feb. 6    | -42                             | 39   | 44            | +13      |                     |
|     | 428          | Mar. 8.9                         | 1290     | 3                | Mar. 4     | -59                             | Mar. 6    | -33                             |      | 44            | +12      |                     |
| 3   | 16405        | Feb. 9.1                         | 1290     | 3                | Feb. 13    | +58                             | Feb. 15   | +79                             | 76   | 50            | +11      | II                  |
|     | 426          | Mar. 8.14                        | 1290     | 6                | Mar. 3     | -65                             | Mar. 8    | +3                              |      | 53            | +9       |                     |
|     | 462          | Apr. 4.17                        | 1291     | 11               | Mar. 30    | -66                             | Apr. 9    | +73                             |      | 57            | +9       | II                  |
| 4   | 16409        | Feb. 19.88                       | 1290     | 12               | Feb. 14    | -70                             | Feb. 25   | +71                             | 145  | 268           | +23      | II                  |
|     | 445          | Mar. 19.66                       | 1291     | 12               | Mar. 14    | -69                             | Mar. 25   | +74                             |      | 262           | +20      |                     |
| 5   | 16419        | Feb. 26.7                        | 1290     | 3/5              | Feb. 28    | +22                             | Mar. 4    | +75                             | 7    | 177           | -16      | II                  |
|     | 450          | Mar. 25.70                       | 1291     | 9                | Mar. 20    | -68                             | Mar. 28   | +32                             |      | 182           | -18      |                     |
| 6   | 16423        | Mar. 6.8                         | 1290     | 2                | Mar. 1     | -71                             | Mar. 2    | -58                             | 6    | 71            | -22      | { I 1602            |
|     | 463          | Apr. 3.45                        | 1291     | 8                | Apr. 2     | -16                             | Apr. 9    | +81                             |      | 66            | -21      |                     |
|     | 482          | Apr. 30.57                       | 1292     | 13               | Apr. 24    | -78                             | May 6     | +73                             |      | 68            | -21      |                     |
| 7   | 16436        | Mar. 2.6                         | 1290     | 2                | Mar. 7     | +64                             | Mar. 8    | +76                             | 124  | 127           | +9       | II                  |
|     | 455          | Mar. 29.49                       | 1291     | 3/6              | Mar. 25    | -57                             | Mar. 30   | +16                             |      | 132           | +10      |                     |
| 8   | 16442        | Mar. 16.88                       | 1291     | 10               | Mar. 11    | -73                             | Mar. 20   | +50                             | 182  | 298           | +13      | I 1596 (2) }        |
|     | 446          | Mar. 17.6                        | 1291     | 7                | Mar. 17    | 0                               | Mar. 23   | +73                             |      | 289           | +12      |                     |
|     | 467          | Apr. 13.55                       | 1292     | 13               | Apr. 7     | -78                             | Apr. 19   | +75                             |      | 293           | +13      |                     |
|     | 498          | May 10.2                         | 1293     | 2                | May 8      | -24                             | May 9     | -12                             |      | 301           | +14      |                     |
|     | 504          | May 10.3                         | 1293     | 2                | May 12     | +29                             | May 13    | +40                             |      | 299           | +11      |                     |
|     | 525          | June 6.18                        | 1294     | 7/11             | June 1     | -65                             | June 11   | +72                             |      | 304           | +10      |                     |
|     |              |                                  |          |                  |            |                                 |           |                                 |      |               |          |                     |
| 9   | 16458        | Apr. 3.66                        | 1291     | 11               | Mar. 29    | -71                             | Apr. 8    | +61                             | 74   | 64            | +13      | II                  |
|     | 490          | Apr. 30.7                        | 1292     | 2                | May 3      | +36                             | May 4     | +48                             |      | 67            | +14      |                     |
| 10  | 16466        | Apr. 9.75                        | 1292     | 13               | Apr. 3     | -82                             | Apr. 15   | +73                             | 226  | 343           | -16      | I 1599 (2)          |
|     | 497          | May 7.3                          | 1293     | 5                | May 8      | +13                             | May 12    | +71                             |      | 339           | -19      |                     |

† Group 16405 does not appear until Rotation 1289 has ended.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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| REVIVAL GROUPS OF SUNSPOTS |  |  |  |  |   |  |  |  |  |  |  |
|----------------------------|--|--|--|--|---|--|--|--|--|--|--|
| No.                        | No. of Group   | U.T. of Central Meridian Passage   | Rotation   | Duration in Days                           | First Seen  |  | Last Seen  |  | Area   | Mean Position                                | Reference to Ledger                                  |
|                            |  |  |  |  | Date  | Longitude from Central Meridian                    | Date   | Longitude from Central Meridian                      |  |  |  |
| 11                         | 16478<br>519   | 1950<br>Apr. 25.2<br>May 23.0  | 1292<br>1293   | 2<br>4                                     | 1950<br>Apr. 23<br>May 25   | °<br>-23<br>+30                                    | 1950<br>Apr. 24<br>May 28  | °<br>-11<br>+71                                      | 9<br>119   | °<br>140<br>132                              | +23<br>+24   |
| 12                         | 16500<br>530<br>559<br>575                             | May 9.4<br>June 5.6<br>July 2.7<br>July 30.19  | 1293<br>1294<br>1295<br>1296                                 | 2<br>4<br>3<br>11                          | May 10<br>June 8<br>July 6<br>July 24   | +15<br>+34<br>+45<br>-72                           | May 11<br>June 11<br>July 8<br>Aug. 3  | +30<br>+79<br>+77<br>+51                             | 26<br>52<br>11<br>217                            | 311<br>311<br>313<br>309                     | -12<br>-10<br>-10<br>-12                             |
| 13                         | 16507<br>536   | May 21.96<br>June 18.46  | 1293<br>1294   | 11<br>11                                   | May 16<br>June 12   | -75<br>-84   | May 26<br>June 22  | +60<br>+52   | 65<br>103  | 146<br>142                                   | -17<br>-18   |
| 14                         | 16511<br>528   | May 14.7<br>June 10.4  | 1293<br>1294   | 2<br>3                                     | May 19<br>June 6  | +63<br>-53   | May 20<br>June 8   | +74<br>-26   | 116<br>14  | 241<br>249                                   | +13<br>+14   |
| 15                         | 16517<br>526<br>542<br>569<br>590                      | May 29.49<br>May 29.2<br>June 25.16<br>July 21.98<br>Aug. 18.31  | 1293<br>1294 †<br>1294<br>1295<br>1296                       | 8<br>3<br>12<br>13<br>13                   | May 23<br>June 2<br>June 20<br>July 15<br>Aug. 12                                   | -82<br>+59<br>-65<br>-88<br>-78                    | May 30<br>June 4<br>July 1<br>July 27<br>Aug. 24                                     | +10<br>+82<br>+86<br>+71<br>+79                      | 37<br>81<br>373<br>276<br>93                     | 46<br>50<br>53<br>58<br>56                   | +12<br>+10<br>+10<br>+8<br>+8                        |
| 16                         | 16523<br>543   | May 31.3<br>June 27.11   | 1293<br>1294   | 3<br>9                                     | June 1<br>June 21   | +14<br>-76   | June 3<br>June 29  | +41<br>+32   | 31<br>86   | 22<br>27                                     | +17<br>+15   |
| 17                         | 16529<br>557   | June 5.7<br>July 3.1   | 1294<br>1295   | 4<br>5                                     | June 8<br>July 5  | +34<br>+37   | June 11<br>July 9  | +77<br>+81   | 107<br>220                                       | 310<br>308                                   | +18<br>+19   |
| 18                         | 16533<br>556   | June 8.4<br>July 5.82  | 1294<br>1295   | 2<br>10                                    | June 11<br>July 3   | +37<br>-31   | June 12<br>July 12   | +54<br>+83   | 8<br>476   | 274<br>272                                   | +14<br>+15   |
| 19                         | 16541<br>544<br>568<br>588<br>615<br>627<br>650<br>661 | June 22.55<br>June 22.97<br>July 20.19<br>Aug. 16.33<br>Sept. 12.9<br>Oct. 10.17<br>Nov. 5.97<br>Dec. 3.29 | 1294<br>1294<br>1295<br>1296<br>1297<br>1298<br>1299<br>1300 | 6<br>3/4<br>12<br>12<br>4<br>10<br>8<br>13 | June 20<br>June 22<br>July 15<br>Aug. 10<br>Sept. 15<br>Oct. 4<br>Nov. 5<br>Nov. 27 | -26<br>-9<br>-67<br>-76<br>+34<br>-73<br>-9<br>-79 | June 25<br>June 25<br>July 26<br>Aug. 21<br>Sept. 18<br>Oct. 13<br>Nov. 12<br>Dec. 9 | +37<br>+33<br>+83<br>+68<br>+70<br>+42<br>+82<br>+78 | 24<br>11<br>503<br>286<br>61<br>44<br>644<br>235 | 87<br>82<br>82<br>83<br>78<br>79<br>85<br>85 | +13<br>+11<br>+12<br>+14<br>+13<br>+12<br>+13<br>+12 |
| 20                         | 16546<br>578   | June 27.7<br>July 24.4   | 1294 *<br>1296   | 3<br>2                                     | June 22<br>July 28  | -71<br>+56   | June 24<br>July 29   | -44<br>+66   | 16<br>102  | 20<br>27                                     | + 5<br>+ 7   |
| 21                         | 16548<br>563<br>585                                    | June 19.2<br>July 16.56<br>Aug. 12.26  | 1294<br>1295<br>1296   | 2<br>9/10<br>9                             | June 23<br>July 11<br>Aug. 6  | +57<br>-71<br>-78                                  | June 24<br>July 20<br>Aug. 14  | +68<br>+47<br>+26                                    | 38<br>44<br>84                                   | 132<br>130<br>136                            | -12<br>-12<br>-10                                    |

† Group 16526 does not appear until Rotation 1293 has ended. \* Group 16546 has disappeared before Rotation 1295 begins.

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

| REVIVAL GROUPS OF SUNSPOTS |                            |   |                              |                   |   |                                 |  |                                 |                      |  |                     |
|----------------------------|----------------------------|---|------------------------------|-------------------|---|---------------------------------|--|---------------------------------|----------------------|--|---------------------|
| No.                        | No. of Group               | U.T. of Central Meridian Passage                | Rotation                     | Duration in Days  | First Seen                              |                                 | Last Seen                              |                                 | Area                 | Mean Position                            | Reference to Ledger |
|                            |                            |   |                              |                   | Date                                    | Longitude from Central Meridian | Date                                   | Longitude from Central Meridian |                      |  |                     |
| 22                         | 16549<br>571               | 1950-51<br>June 29.01<br>July 25.66             | 1294<br>1295                 | 4/7<br>11         | 1950-51<br>June 23<br>July 19           | °<br>-72<br>-80                 | 1950-51<br>June 29<br>July 29          | °<br>+ 5<br>+49                 | 9<br>130             | ° °<br>2 + 6<br>9 + 5                    | I 1609 (2)<br>II    |
| 23                         | 16558<br>586               | July 11.82<br>Aug. 8.38                         | 1295<br>1296                 | 13<br>7           | July 5<br>Aug. 7                        | -78<br>-13                      | July 17<br>Aug. 13                     | +72<br>+66                      | 182<br>17            | 192 -18<br>188 -18                       | I 1610 (2)<br>II    |
| 24                         | 16572<br>601<br>614        | July 26.38<br>Aug. 22.1<br>Sept. 18.41          | 1296<br>1297<br>1297         | 12<br>4<br>10     | July 20<br>Aug. 23<br>Sept. 14          | -80<br>+16<br>-56               | July 31<br>Aug. 26<br>Sept. 23         | +66<br>+56<br>+72               | 44<br>24<br>13       | 0 -12<br>6 -15<br>6 -12                  | II                  |
| 25                         | 16594<br>619               | Aug. 21.67<br>Sept. 17.6                        | 1296<br>1298 †               | 12<br>2           | Aug. 16<br>Sept. 19                     | -69<br>+25                      | Aug. 27<br>Sept. 20                    | +76<br>+37                      | 235<br>4             | 12 +14<br>16 +13                         | II                  |
| 26                         | 16600<br>617<br>631        | Aug. 21.5<br>Sept. 17.4<br>Oct. 14.72           | 1296<br>1297<br>1298         | 6<br>4<br>12      | Aug. 22<br>Sept. 18<br>Oct. 8           | +12<br>+12<br>-82               | Aug. 27<br>Sept. 21<br>Oct. 19         | +80<br>+53<br>+63               | 262<br>58<br>257     | 14 -13<br>20 -12<br>19 -13               | II                  |
| 27                         | 16606<br>623               | Sept. 3.68<br>Oct. 1.3                          | 1297<br>1298                 | 7<br>5            | Aug. 29<br>Sept. 27                     | -69<br>-50                      | Sept. 4<br>Oct. 1                      | +11<br>0                        | 12<br>22             | 200 -21<br>195 -21                       | II                  |
| 28                         | 16609<br>626<br>634<br>644 | Sept. 10.7<br>Oct. 7.0<br>Oct. 7.7<br>Nov. 3.55 | 1297<br>1298<br>1298<br>1299 | 2<br>5<br>2<br>12 | Sept. 5<br>Oct. 1<br>Oct. 12<br>Oct. 28 | -70<br>-75<br>+61<br>-83        | Sept. 6<br>Oct. 5<br>Oct. 13<br>Nov. 8 | -57<br>-22<br>+77<br>+62        | 8<br>42<br>24<br>148 | 108 +14<br>120 +12<br>112 +12<br>117 +13 | II                  |
| 29                         | 16648<br>670               | Nov. 10.0<br>Dec. 7.4                           | 1299<br>1301 *               | 2<br>4            | Nov. 4<br>Dec. 10                       | -75<br>+41                      | Nov. 5<br>Dec. 13                      | -60<br>+76                      | 13<br>70             | 32 +13<br>31 +13                         |                     |
| 30                         | 16655<br>671               | Nov. 17.93<br>Dec. 15.4                         | 1300<br>1301                 | 8/9<br>2          | Nov. 14<br>Dec. 11                      | -46<br>-53                      | Nov. 22<br>Dec. 12                     | +60<br>-38                      | 39<br>8              | 287 +17<br>286 +15                       | II                  |
| 31                         | 16665<br>678               | Dec. 10.26<br>Jan. 6.29                         | 1301<br>1302                 | 8<br>12           | Dec. 4<br>Jan. 1                        | -77<br>-64                      | Dec. 11<br>Jan. 12                     | +16<br>+80                      | 70<br>354            | 353 -15<br>357 -12                       | II<br>II (1951)     |
| 32                         | 16669<br>683<br>684        | Dec. 13.55<br>Jan. 9.4<br>Jan. 9.7              | 1301<br>1302<br>1302         | 13<br>5<br>3      | Dec. 7<br>Jan. 11<br>Jan. 12            | -77<br>+20<br>+36               | Dec. 19<br>Jan. 15<br>Jan. 14          | +73<br>+82<br>+62               | 233<br>24<br>63      | 310 +16<br>316 +17<br>312 +19            | II                  |
| 33                         | 16676<br>686<br>709        | Dec. 27.63<br>Jan. 23.6<br>Feb. 19.9            | 1301<br>1302<br>1303         | 10<br>7<br>5      | Dec. 24<br>Jan. 17<br>Feb. 15           | -44<br>-79<br>-61               | Jan. 2<br>Jan. 23<br>Feb. 19           | +77<br>- 3<br>- 8               | 218<br>40<br>12      | 124 +11<br>129 +12<br>129 +11            | II<br>II (1951)     |
| 34                         | 16677<br>688               | Dec. 28.4<br>Jan. 24.37                         | 1301<br>1302                 | 4<br>5            | Dec. 24<br>Jan. 20                      | -55<br>-54                      | Dec. 27<br>Jan. 24                     | -12<br>+ 2                      | 27<br>7              | 114 - 7<br>119 - 5                       |                     |

† Group 16619 does not appear until Rotation 1297 has ended. \* Group 16670 does not appear until Rotation 1300 has ended.

ROYAL GREENWICH OBSERVATORY

*Ledgers of Groups of Sunspots*

For the year 1950

Ledger I :

Recurrent Groups

Ledger II :

Non-Recurrent Groups

GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1950

LEDGERS OF GROUPS OF SUNSPOTS FOR THE YEAR 1950.

LEDGER I. - RECURRENT GROUPS

LEDGER II. - NON-RECURRENT GROUPS

The time (U.T.) at which the photograph was taken is expressed in the *first* column by the day of the year and decimal of a day reckoned from Greenwich mean midnight.

The place where the photograph was taken is also indicated in the *first* column. A photograph taken at Greenwich is indicated by the letter G, and those taken at the Cape, Kodaikanal and Mount Wilson by the letters C, K and Mt. W respectively.

The projected area of the umbræ and whole spots, given in the *second* and *third* columns, is the area as it is measured on the photograph, uncorrected for the effect of foreshortening, and expressed in millionths of the Sun's apparent disk.

The area corrected for foreshortening given in the *fourth* and *fifth* columns is expressed in millionths of the Sun's visible hemisphere.

The longitude given in the *sixth* column is based on the ephemeris given in the *Nautical Almanac*, assuming a daily sidereal motion of  $14^{\circ}.18$ , due to the Sun's rotation, constant at all latitudes; this corresponds to Carrington's assumed rotation period of 25.38 days.

The proper motion given in the *seventh* column is derived from the difference of longitude thus computed from the measured positions on any given day and the first day on which the group of spots or single spot is visible, after the correction for the motion appropriate to the latitude has been applied according to the formula,  $\xi = 14^{\circ}.37 - 2^{\circ}.60 \sin^2 \phi$ . A *plus* sign (increasing longitude) indicates a motion forwards, a *minus* sign a motion backwards relative to the position on the first day.

The remaining columns correspond to those with similar headings in the preceding section.

When a group is  $80^{\circ}$  or more from the Sun's central meridian, the measures for that day are not included in taking the mean area or the mean longitude and latitude of the group. In such cases of close proximity to the Sun's limb, the addition of brackets denotes that only part of the group is visible.

## LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>itude<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>itude<br>from<br>C.M. |  |  |  |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|------------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|--------------------------------|--|--|--|--|--|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                        |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                                |  |  |  |  |  |
| No. 1588. Latitude +12°.4   |                   |                |                   |                |                                   |                |                        |                       |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Group 16369 in Rotation 1288<br>" 16398 " " 1289  |                   |                |                   |                |                                   |                |                        |                       |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Group 16369. Jan. 10-14. A pair of spots, <i>a</i> and <i>b</i> , suddenly appearing west of the central meridian. These are growing into a bi-polar group as they pass round the limb. |                   |                |                   |                |                                   |                |                        |                       |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 9.285 C   | 36                | 195            | 20                | 109            | 102.6                             | 0.0            | +12.2                  | +20.5                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 10.284 C  | 62                | 343            | 40                | 220            | 103.3                             | +0.6           | +12.3                  | +34.4                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 11.386 G  | 118               | 573            | 97                | 467            | 104.1                             | +1.4           | +11.9                  | +49.7                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 12.290 C  | 71                | 476            | 81                | 536            | 104.1                             | +1.3           | +12.1                  | +61.6                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 13.282 C  | 55                | 339            | 116               | 708            | 103.2                             | +0.3           | +12.2                  | +73.8                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Means   | ..                | ..             | 71                | 408            | 103.5                             | ..             | +12.1                  | ..                    |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Spot <i>a</i>   |                   |                |                   |                |                                   |                |                        |                       |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 9.285 C   | 19                | 86             | 11                | 49             | 104.9                             | 0.0            | +12.4                  | +22.8                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 10.284 C  | 33                | 134            | 22                | 90             | 107.0                             | +2.0           | +12.1                  | +38.1                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 11.386 G  | 70                | 279            | 60                | 240            | 106.8                             | +1.8           | +11.3                  | +52.4                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 12.290 C  | 44                | 280            | 53                | 336            | 106.3                             | +1.2           | +11.6                  | +63.8                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 13.282 C  | 38                | 222            | 87                | 511            | 106.7                             | +1.5           | +13.1                  | +77.3                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Spot <i>b</i>   |                   |                |                   |                |                                   |                |                        |                       |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 9.285 C   | 17                | 109            | 9                 | 60             | 100.6                             | 0.0            | +12.3                  | +18.5                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 10.284 C  | 29                | 209            | 18                | 130            | 100.8                             | +0.1           | +12.4                  | +31.9                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 11.386 G  | 39                | 246            | 30                | 189            | 100.9                             | +0.2           | +12.8                  | +46.5                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 12.290 C  | 27                | 196            | 28                | 200            | 101.0                             | +0.2           | +12.7                  | +58.5                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 13.282 C  | 17                | 117            | 29                | 197            | 100.6                             | -0.3           | +12.7                  | +71.2                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Group 16398. Jan. 30-Feb. 10. A few small spots, not seen on February 6.  |                   |                |                   |                |                                   |                |                        |                       |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 29.294 C  | 0                 | 8              | 0                 | 18             | 103.2                             | -0.8           | +12.7                  | -75.4                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 30.294 C  | 2                 | 17             | 2                 | 20             | 103.6                             | -0.5           | +12.5                  | -61.8                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 31.293 C  | 8                 | 42             | 6                 | 34             | 103.6                             | -0.5           | +12.1                  | -48.7                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 32.345 C  | 0                 | 13             | 0                 | 8              | 103.3                             | -0.9           | +12.1                  | -35.1                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 33.295 C  | 6                 | 26             | 3                 | 15             | 102.9                             | -1.4           | +12.8                  | -23.0                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 34.478 G  | 4                 | 17             | 2                 | 9              | 103.8                             | -0.6           | +11.8                  | -6.6                  |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 35.404 G  | 2                 | 9              | 1                 | 5              | 103.8                             | -0.6           | +11.9                  | +5.6                  |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 36.297 C  | 0                 | 0              | 0                 | 0              | ..                                | ..             | ..                     | ..                    |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 37.411 G  | 11                | 56             | 7                 | 34             | 99.2                              | -5.4           | +14.3                  | +27.5                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 38.291 C  | 16                | 95             | 11                | 65             | 98.4                              | -6.2           | +13.9                  | +38.2                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Means   | ..                | ..             | 28                | 152            | 109.6                             | ..             | -8.3                   | ..                    |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| No. 1588. Group 16398 - continued   |                   |                |                   |                |                                   |                |                        |                       |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 39.294 C  | 6                 | 34             | 8                 | 44             | 98.7                              | -6.0           | +13.7                  | +51.8                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 40.295 C  | 6                 | 42             | 7                 | 52             | 97.1                              | -7.7           | +12.2                  | +63.3                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Means   | ..                | ..             | 4                 | 25             | 101.6                             | ..             | +12.7                  | ..                    |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| No. 1589. Latitude -8°.6  |                   |                |                   |                |                                   |                |                        |                       |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Group 16374 in Rotation 1289<br>" 16403 " " 1290<br>" 18441 " " 1291  |                   |                |                   |                |                                   |                |                        |                       |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Group 16374. Jan. 14-26. A stable regular spot, with occasional companions.   |                   |                |                   |                |                                   |                |                        |                       |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 13.282 C  | 10                | 84             | 32                | 265            | 308.0                             | ..             | -8.3                   | -81.4                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 14.300 C  | 27                | 240            | 35                | 307            | 308.6                             | 0.0            | -8.4                   | -67.4                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 15.463 G  | 60                | 374            | 49                | 303            | 308.5                             | -0.3           | -8.9                   | -52.2                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 16.283 C  | 65                | 424            | 44                | 284            | 308.3                             | -0.6           | -8.9                   | -41.6                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 17.390 G  | 113               | 480            | 63                | 269            | 308.3                             | -0.7           | -9.1                   | -27.0                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 18.487 G  | 89                | 584            | 45                | 298            | 307.9                             | -1.3           | -9.1                   | -13.0                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 19.427 C  | 111               | 500            | 56                | 250            | 308.1                             | -1.2           | -9.0                   | -0.4                  |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 20.489 G  | 82                | 451            | 43                | 235            | 308.1                             | -1.3           | -8.8                   | +13.6                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 21.303 C  | 59                | 481            | 32                | 265            | 308.0                             | -1.5           | -8.6                   | +24.2                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 22.384 G  | 76                | 377            | 49                | 241            | 308.4                             | -1.3           | -8.5                   | +38.8                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 23.388 G  | 65                | 312            | 53                | 253            | 308.7                             | -1.1           | -8.2                   | +52.3                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 24.286 C  | 33                | 207            | 37                | 234            | 308.8                             | -1.1           | -8.4                   | +64.2                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 25.584 G  | 13                | 91             | 47                | 329            | 310.3                             | ..             | -8.3                   | +82.8                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Means   | ..                | ..             | 46                | 267            | 308.3                             | ..             | -8.7                   | ..                    |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Group 16403. Feb. 10 - 22. A small stable regular spot.   |                   |                |                   |                |                                   |                |                        |                       |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 40.295 C  | 4                 | 38             | 18                | 167            | 309.3                             | ..             | -8.3                   | -84.5                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 41.294 C  | 17                | 118            | 25                | 175            | 309.6                             | -2.6           | -8.4                   | -71.0                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 42.410 G  | 50                | 174            | 44                | 155            | 309.6                             | -2.7           | -8.4                   | -56.3                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 43.409 G  | 41                | 264            | 28                | 180            | 309.5                             | -2.9           | -8.4                   | -43.3                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 44.561 C  | 52                | 277            | 29                | 155            | 309.8                             | -2.8           | -8.2                   | -27.8                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 45.299 C  | 50                | 281            | 26                | 149            | 309.5                             | -3.2           | -8.5                   | -18.4                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 46.297 C  | 78                | 323            | 39                | 162            | 309.5                             | -3.3           | -8.4                   | -5.2                  |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 47.311 C  | 51                | 304            | 26                | 155            | 309.5                             | -3.5           | -8.2                   | +8.1                  |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 48.374 G  | 50                | 270            | 27                | 146            | 309.6                             | -3.5           | -8.2                   | +22.2                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 49.314 C  | 30                | 283            | 18                | 170            | 309.4                             | -3.8           | -8.3                   | +34.4                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 50.397 G  | 31                | 177            | 23                | 133            | 309.4                             | -4.0           | -8.0                   | +48.7                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 51.436 G  | 22                | 135            | 23                | 143            | 309.5                             | -4.0           | -8.2                   | +62.4                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| 52.447 G  | 13                | 53             | 25                | 104            | 309.7                             | -3.9           | -8.0                   | +76.0                 |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |
| Means   | ..                | ..             | 28                | 152            | 309.6                             | ..             | -8.3                   | ..                    |                   |                |                   |                |                                   |                |                                |  |  |  |  |  |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

| LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950   |                   |                |                   |                |                                   |                |                       |                       |   |                |  |                |                                   |                |                       |       |  |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|---|----------------|--|----------------|-----------------------------------|----------------|-----------------------|-------|--|--|--|
| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area   |                | Corrected<br>Area  |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. |       |  |  |  |
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ   | Whole<br>Spots | Umbræ  | Whole<br>Spots |                                   |                |                       |       |  |  |  |
| No. 1589 - continued  |                   |                |                   |                |                                   |                |                       |                       |   |                | No. 1590 - continued   |                |                                   |                |                       |       |  |  |  |
| Group 16441. Mar. 10-21. A single small spot until March 14; a pair on March 15 and 16. Nothing is then seen until March 19, when a few small spots appear.     |                   |                |                   |                |                                   |                |                       |                       |   |                | Group 16401. Feb. 8-19. A stable regular spot.                 |                |                                   |                |                       |       |  |  |  |
| 68.305 C  | 4                 | 23             | 7                 | 37             | 311.8                             | -3.9           | -9.6                  | -73.0                 | 38.291 C  | 19             | 97   | 36             | 184                               | 348.5 +11.0    | +17.4                 | -71.7 |  |  |  |
| 69.307 C  | 11                | 40             | 11                | 39             | 311.8                             | -4.1           | -9.1                  | -59.8                 | 39.294 C  | 34             | 151  | 37             | 166                               | 348.0 +10.5    | +17.3                 | -58.9 |  |  |  |
| 70.307 C  | 6                 | 28             | 4                 | 20             | 311.8                             | -4.2           | -9.4                  | -46.7                 | 40.295 C  | 42             | 235  | 34             | 188                               | 347.9 +10.4    | +17.4                 | -45.9 |  |  |  |
| 71.377 G  | 13                | 22             | 8                 | 13             | 311.8                             | -4.3           | -9.3                  | -32.6                 | 41.294 C  | 42             | 302  | 28             | 199                               | 347.4 + 9.9    | +17.1                 | -33.2 |  |  |  |
| 72.312 C  | 6                 | 38             | 3                 | 20             | 312.2                             | -4.1           | -9.4                  | -19.8                 | 42.410 G  | 52             | 319  | 30             | 185                               | 347.3 + 9.8    | +17.3                 | -18.6 |  |  |  |
| 73.488 G  | 7                 | 29             | 4                 | 14             | 311.6                             | -4.8           | -9.7                  | -4.9                  | 43.409 G  | 50             | 320  | 28             | 176                               | 347.1 + 9.6    | +17.1                 | - 5.7 |  |  |  |
| 74.383 G  | 4                 | 22             | 2                 | 11             | 311.5                             | -5.0           | -9.8                  | +6.8                  | 44.561 C  | 50             | 321  | 28             | 177                               | 346.9 + 9.4    | +17.1                 | + 9.3 |  |  |  |
| 75.650 G  | 0                 | 0              | 0                 | 0              | ..                                | ..             | ..                    | ..                    | 45.299 C  | 34             | 242  | 20             | 140                               | 346.7 + 9.3    | +17.1                 | +18.8 |  |  |  |
| 76.324 C  | 0                 | 0              | 0                 | 0              | ..                                | ..             | ..                    | ..                    | 46.297 C  | 44             | 246  | 29             | 160                               | 346.5 + 9.1    | +16.9                 | +31.8 |  |  |  |
| 77.368 G  | 2                 | 20             | 1                 | 13             | 307.7                             | -9.2           | -7.9                  | +42.3                 | 47.311 C  | 34             | 219  | 27             | 173                               | 346.7 + 9.3    | +17.2                 | +45.3 |  |  |  |
| 78.648 G  | 2                 | 18             | 2                 | 17             | 307.2                             | -9.9           | -8.0                  | +58.7                 | 48.374 G  | 17             | 113  | 19             | 128                               | 347.0 + 9.6    | +17.2                 | +59.6 |  |  |  |
| 79.602 G  | 0                 | 7              | 0                 | 13             | 310.5                             | -6.7           | -7.3                  | +74.6                 | 49.314 C  | 13             | 91   | 25             | 176                               | 346.9 + 9.5    | +16.9                 | +71.9 |  |  |  |
| Means   | ..                | ..             | 4                 | 16             | 310.8                             | ..             | -9.0                  | ..                    | Means   | ..             | ..   | 28             | 171                               | 347.2 ..       | +17.2                 | ..    |  |  |  |
| No. 1590. Latitude +16°.2   |                   |                |                   |                |                                   |                |                       |                       |   |                | No. 1591. Latitude +15°.0                                      |                |                                   |                |                       |       |  |  |  |
| Group 16375 in Rotation 1289<br>" 18401 " " 1290  |                   |                |                   |                |                                   |                |                       |                       |   |                | Group 16389 in Rotation 1289<br>" 18404 " " 1290               |                |                                   |                |                       |       |  |  |  |
| Group 16375. Jan. 15-23. A stream, developing from a tiny spot when first seen. The leader becomes a regular spot, <i>a</i> , and is the most stable component. |                   |                |                   |                |                                   |                |                       |                       |   |                | Group 16389. Jan. 24-27. A stream, forming near the west limb. |                |                                   |                |                       |       |  |  |  |
| 14.300 C  | 4                 | 21             | 3                 | 14             | 336.3                             | 0.0            | +13.4                 | -39.7                 | 23.388 G  | 20             | 103  | 14             | 76                                | 298.9 0.0      | +15.4                 | +42.5 |  |  |  |
| 15.463 G  | 37                | 173            | 22                | 101            | 336.0                             | -0.3           | +15.1                 | -24.7                 | 24.286 C  | 33             | 130  | 34             | 133                               | 301.8 + 2.9    | +14.8                 | +57.2 |  |  |  |
| 16.283 C  | 23                | 112            | 12                | 62             | 336.8                             | +0.5           | +15.8                 | -13.1                 | 25.584 G  | 28             | 187  | 72             | 491                               | 303.0 + 4.1    | +14.9                 | +75.5 |  |  |  |
| 17.390 G  | 28                | 202            | 15                | 108            | 337.3                             | +1.0           | +15.8                 | + 2.0                 | 26.496 G  | 0              | 9  | (0             | 37                                | 296.6 ..       | +15.5)                | +81.2 |  |  |  |
| 18.487 G  | 37                | 178            | 21                | 101            | 338.7                             | +2.4           | +15.9                 | +17.8                 | Means   | ..             | ..   | 40             | 233                               | 301.2 ..       | +15.0                 | ..    |  |  |  |
| 19.427 C  | 75                | 341            | 47                | 217            | 339.5                             | +3.3           | +16.0                 | +31.0                 | Group 16404. Feb. 11-23. A stable regular spot, with occasional companions. |                |  |                |                                   |                |                       |       |  |  |  |
| 20.489 G  | 64                | 323            | 52                | 260            | 341.4                             | +5.2           | +15.0                 | +46.9                 | 41.294 C  | 32             | 147  | 81             | 370                               | 304.3 + 5.1    | +14.8                 | -76.3 |  |  |  |
| 21.303 C  | 71                | 314            | 81                | 352            | 344.2                             | +8.0           | +14.8                 | +60.4                 | 42.410 G  | 50             | 239  | 58             | 275                               | 304.8 + 5.6    | +15.0                 | -61.1 |  |  |  |
| 22.384 G  | 17                | 150            | 40                | 364            | 343.6                             | +7.4           | +15.3                 | +74.0                 | 43.409 G  | 83             | 368  | 68             | 302                               | 304.6 + 5.4    | +15.0                 | -48.2 |  |  |  |
| Means   | ..                | ..             | 33                | 175            | 339.3                             | ..             | +15.2                 | ..                    | 44.561 C  | 69             | 433  | 44             | 277                               | 304.8 + 5.6    | +15.0                 | -32.8 |  |  |  |
| Spot <i>a</i>   |                   |                |                   |                |                                   |                |                       |                       |   |                | 45.299 C   |                |                                   |                |                       |       |  |  |  |
| 15.463 G  | 13                | 69             | 8                 | 40             | 337.8                             | 0.0            | +15.1                 | -22.9                 | 82  | 452            | 48   | 267            | 304.6 + 5.3                       | +14.9          | -23.3                 |       |  |  |  |
| 16.283 C  | 8                 | 56             | 4                 | 31             | 338.9                             | +1.1           | +16.0                 | -11.0                 | 46.297 C  | 76             | 649  | 42             | 357                               | 304.9 + 5.6    | +14.8                 | - 9.8 |  |  |  |
| 17.390 G  | 13                | 113            | 7                 | 61             | 339.1                             | +1.3           | +15.8                 | + 3.8                 | 47.311 C  | 108            | 665  | 58             | 359                               | 304.8 + 5.5    | +15.2                 | + 3.4 |  |  |  |
| 18.487 G  | 24                | 89             | 14                | 51             | 340.9                             | +3.1           | +15.7                 | +20.0                 | 48.374 G  | 87             | 449  | 50             | 256                               | 305.0 + 5.7    | +15.0                 | +17.6 |  |  |  |
| 19.427 C  | 36                | 184            | 23                | 120            | 342.9                             | +5.2           | +15.4                 | +34.4                 | 49.314 C  | 95             | 443  | 59             | 275                               | 304.7 + 5.4    | +15.0                 | +29.7 |  |  |  |
| 20.489 G  | 48                | 200            | 40                | 168            | 344.7                             | +7.0           | +14.3                 | +50.2                 | 50.397 G  | 72             | 351  | 55             | 267                               | 304.9 + 5.6    | +15.2                 | +44.2 |  |  |  |
| 21.303 C  | 65                | 276            | 75                | 317            | 345.4                             | +7.7           | +14.7                 | +61.6                 | 51.436 G  | 52             | 266  | 54             | 277                               | 304.9 + 5.6    | +15.2                 | +57.8 |  |  |  |
| 22.384 G  | 13                | 126            | 34                | 326            | 346.5                             | +8.8           | +15.5                 | +76.9                 | 52.447 G  | 26             | 145  | 46             | 257                               | 304.6 + 5.2    | +15.2                 | +70.9 |  |  |  |
| Means   | ..                | ..             | 55                | 295            | 304.7                             | ..             | +15.0                 | ..                    | 53.427 G  | 2              | 13   | 15             | 96                                | 305.0 ..       | +14.6                 | +84.2 |  |  |  |

## LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |   | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude  | Long.<br>from<br>C.M. |                 |                 |                 |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|-------------------|---|-------------------|----------------|-----------------------------------|-----------------|-----------------------|-----------------|-----------------|-----------------|--|--|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ             | Whole<br>Spots  | Umbræ             | Whole<br>Spots |                                   |                 |                       |                 |                 |                 |  |  |
| <b>No. 1592. Latitude <math>-17^{\circ}.3</math></b>  |                   |                |                   |                |                                   |                |                       |                       |                   | <b>No. 1592 - continued</b>   |                   |                |                                   |                 |                       |                 |                 |                 |  |  |
| Group 16402 in Rotation 1290<br>" 16439 " " 1291  |                   |                |                   |                |                                   |                |                       |                       |                   | Group 16439. Mar. 7-19. A regular spot, <i>a</i> , followed by a few small unstable companions. |                   |                |                                   |                 |                       |                 |                 |                 |  |  |
| Group 16402. Feb. 10-20. A stream, whose leader, <i>a</i> , soon becomes a fairly stable composite spot and alone remains at the west limb. The follower, <i>b</i> , which is also composite at first, soon breaks up and dies out. |                   |                |                   |                |                                   |                |                       |                       |                   | 65.384 G  | 13                | 154            | 38                                | 450             | $341.5^{\circ}$       | ..              | $-17.5^{\circ}$ | $-81.8^{\circ}$ |  |  |
| 40.295 C  | 8                 | 50             | 7                 | 42             | $340.7^{\circ}$                   | $0.0^{\circ}$  | $-17.5^{\circ}$       | $-53.1^{\circ}$       | 66.373 G          | 74  | 454               | 102            | 616                               | $340.4^{\circ}$ | $-1.7^{\circ}$        | $-16.5^{\circ}$ | $-69.9^{\circ}$ |                 |  |  |
| 41.294 C  | 61                | 370            | 40                | 245            | $340.3^{\circ}$                   | $-0.4^{\circ}$ | $-17.3^{\circ}$       | $-40.3^{\circ}$       | 67.378 G          | 83  | 566               | 75             | 517                               | $339.6^{\circ}$ | $-2.5^{\circ}$        | $-17.3^{\circ}$ | $-57.5^{\circ}$ |                 |  |  |
| 42.410 G  | 210               | 1045           | 116               | 585            | $340.9^{\circ}$                   | $+0.3^{\circ}$ | $-16.9^{\circ}$       | $-25.0^{\circ}$       | 68.305 C          | 100   | 726               | 71             | 516                               | $339.5^{\circ}$ | $-2.5^{\circ}$        | $-17.5^{\circ}$ | $-45.3^{\circ}$ |                 |  |  |
| 43.409 G  | 227               | 1703           | 118               | 883            | $342.2^{\circ}$                   | $+1.6^{\circ}$ | $-16.7^{\circ}$       | $-10.6^{\circ}$       | 69.307 C          | 100   | 643               | 59             | 380                               | $339.6^{\circ}$ | $-2.4^{\circ}$        | $-17.5^{\circ}$ | $-32.0^{\circ}$ |                 |  |  |
| 44.561 C  | 229               | 1393           | 116               | 710            | $343.3^{\circ}$                   | $+2.8^{\circ}$ | $-16.8^{\circ}$       | $+5.7^{\circ}$        | 70.307 C          | 126   | 743               | 67             | 396                               | $340.2^{\circ}$ | $-1.7^{\circ}$        | $-17.7^{\circ}$ | $-18.3^{\circ}$ |                 |  |  |
| 45.299 C  | 261               | 1560           | 139               | 827            | $343.3^{\circ}$                   | $+2.8^{\circ}$ | $-17.1^{\circ}$       | $+15.4^{\circ}$       | 71.377 G          | 136   | 770               | 70             | 395                               | $339.8^{\circ}$ | $-2.1^{\circ}$        | $-17.5^{\circ}$ | $-4.6^{\circ}$  |                 |  |  |
| 46.297 C  | 212               | 1764           | 123               | 1014           | $342.6^{\circ}$                   | $+2.1^{\circ}$ | $-17.4^{\circ}$       | $+27.9^{\circ}$       | 72.312 C          | 113   | 645               | 58             | 329                               | $340.4^{\circ}$ | $-1.5^{\circ}$        | $-17.7^{\circ}$ | $+8.4^{\circ}$  |                 |  |  |
| 47.311 C  | 125               | 1178           | 85                | 798            | $342.3^{\circ}$                   | $+1.9^{\circ}$ | $-17.2^{\circ}$       | $+40.9^{\circ}$       | 73.488 G          | 110   | 625               | 62             | 348                               | $339.8^{\circ}$ | $-2.0^{\circ}$        | $-17.9^{\circ}$ | $+23.3^{\circ}$ |                 |  |  |
| 48.374 G  | 115               | 807            | 104               | 729            | $342.8^{\circ}$                   | $+2.4^{\circ}$ | $-17.5^{\circ}$       | $+55.4^{\circ}$       | 74.383 G          | 97  | 612               | 59             | 376                               | $339.6^{\circ}$ | $-2.2^{\circ}$        | $-17.8^{\circ}$ | $+34.9^{\circ}$ |                 |  |  |
| 49.314 C  | 49                | 413            | 70                | 605            | $345.0^{\circ}$                   | $+4.7^{\circ}$ | $-17.7^{\circ}$       | $+70.0^{\circ}$       | 75.650 G          | 79  | 440               | 63             | 353                               | $339.4^{\circ}$ | $-2.3^{\circ}$        | $-17.2^{\circ}$ | $+51.4^{\circ}$ |                 |  |  |
| 50.397 G  | 26                | 124            | 125               | 594            | $346.9^{\circ}$                   | ..             | $-17.9^{\circ}$       | $+86.2^{\circ}$       | 76.324 C          | 71  | 380               | 71             | 378                               | $339.6^{\circ}$ | $-2.1^{\circ}$        | $-17.3^{\circ}$ | $+60.4^{\circ}$ |                 |  |  |
| Means   | ..                | ..             | 92                | 644            | $342.3^{\circ}$                   | ..             | $-17.2^{\circ}$       | ..                    | 77.368 G          | 35  | 173               | 62             | 309                               | $340.3^{\circ}$ | $-1.4^{\circ}$        | $-17.2^{\circ}$ | $+74.9^{\circ}$ |                 |  |  |
| Means   |                   |                |                   |                |                                   |                |                       |                       |                   | Means   | ..                | ..             | 68                                | 409             | $339.8^{\circ}$       | ..              | $-17.4^{\circ}$ | ..              |  |  |
| Spot <i>a</i>   |                   |                |                   |                |                                   |                |                       |                       |                   | Spot <i>a</i>   |                   |                |                                   |                 |                       |                 |                 |                 |  |  |
| 41.294 C  | 21                | 164            | 13                | 105            | $343.1^{\circ}$                   | $0.0^{\circ}$  | $-17.8^{\circ}$       | $-37.5^{\circ}$       | 65.384 G          | 13  | 154               | 38             | 450                               | $341.5^{\circ}$ | ..                    | $-17.5^{\circ}$ | $-81.8^{\circ}$ |                 |  |  |
| 42.410 G  | 91                | 371            | 49                | 200            | $345.1^{\circ}$                   | $+2.0^{\circ}$ | $-17.0^{\circ}$       | $-20.8^{\circ}$       | 66.373 G          | 59  | 392               | 77             | 514                               | $341.6^{\circ}$ | $-0.5^{\circ}$        | $-17.3^{\circ}$ | $-68.7^{\circ}$ |                 |  |  |
| 43.409 G  | 135               | 955            | 69                | 487            | $346.0^{\circ}$                   | $+3.0^{\circ}$ | $-16.3^{\circ}$       | $-6.8^{\circ}$        | 67.378 G          | 59  | 392               | 51             | 341                               | $341.5^{\circ}$ | $-0.6^{\circ}$        | $-17.0^{\circ}$ | $-55.6^{\circ}$ |                 |  |  |
| 44.561 C  | 183               | 914            | 93                | 466            | $347.0^{\circ}$                   | $+4.0^{\circ}$ | $-16.3^{\circ}$       | $+9.4^{\circ}$        | 68.305 C          | 85  | 543               | 59             | 375                               | $341.4^{\circ}$ | $-0.6^{\circ}$        | $-17.5^{\circ}$ | $-43.4^{\circ}$ |                 |  |  |
| 45.299 C  | 185               | 1069           | 100               | 577            | $346.9^{\circ}$                   | $+4.0^{\circ}$ | $-16.7^{\circ}$       | $+19.0^{\circ}$       | 69.307 C          | 79  | 492               | 46             | 285                               | $341.3^{\circ}$ | $-0.7^{\circ}$        | $-17.3^{\circ}$ | $-30.3^{\circ}$ |                 |  |  |
| 46.297 C  | 172               | 1222           | 101               | 721            | $346.6^{\circ}$                   | $+3.7^{\circ}$ | $-17.3^{\circ}$       | $+31.9^{\circ}$       | 70.307 C          | 111   | 626               | 59             | 332                               | $341.3^{\circ}$ | $-0.6^{\circ}$        | $-17.8^{\circ}$ | $-17.2^{\circ}$ |                 |  |  |
| 47.311 C  | 95                | 779            | 67                | 553            | $346.7^{\circ}$                   | $+3.8^{\circ}$ | $-17.3^{\circ}$       | $+45.3^{\circ}$       | 71.377 G          | 123   | 570               | 63             | 291                               | $341.1^{\circ}$ | $-0.8^{\circ}$        | $-17.4^{\circ}$ | $-3.3^{\circ}$  |                 |  |  |
| 48.374 G  | 78                | 580            | 75                | 557            | $346.5^{\circ}$                   | $+3.7^{\circ}$ | $-17.7^{\circ}$       | $+59.1^{\circ}$       | 72.312 C          | 109   | 607               | 56             | 310                               | $340.8^{\circ}$ | $-1.1^{\circ}$        | $-17.7^{\circ}$ | $+8.8^{\circ}$  |                 |  |  |
| 49.314 C  | 38                | 354            | 58                | 538            | $347.0^{\circ}$                   | $+4.2^{\circ}$ | $-18.2^{\circ}$       | $+72.0^{\circ}$       | 73.488 G          | 101   | 550               | 57             | 308                               | $340.7^{\circ}$ | $-1.1^{\circ}$        | $-17.6^{\circ}$ | $+24.2^{\circ}$ |                 |  |  |
| 50.397 G  | 26                | 124            | 125               | 594            | $346.9^{\circ}$                   | ..             | $-17.9^{\circ}$       | $+86.2^{\circ}$       | 74.383 G          | 86  | 537               | 53             | 333                               | $340.6^{\circ}$ | $-1.2^{\circ}$        | $-17.5^{\circ}$ | $+35.9^{\circ}$ |                 |  |  |
| Means   | ..                | ..             | 33                | 164            | ..                                | ..             | ..                    | ..                    | 75.650 G          | 64  | 338               | 52             | 277                               | $340.5^{\circ}$ | $-1.2^{\circ}$        | $-17.8^{\circ}$ | $+52.5^{\circ}$ |                 |  |  |
| Spot <i>b</i>   |                   |                |                   |                |                                   |                |                       |                       |                   | 76.324 C  | 62                | 312            | 63                                | 315             | $340.4^{\circ}$       | $-1.3^{\circ}$  | $-17.6^{\circ}$ | $+61.2^{\circ}$ |  |  |
| 77.368 G  | 33                | 164            | 59                | 295            | ..                                | ..             | ..                    | ..                    | 77.368 G          | 33  | 164               | 59             | 295                               | $340.6^{\circ}$ | $-1.1^{\circ}$        | $-17.3^{\circ}$ | $+75.2^{\circ}$ |                 |  |  |
| No. 1593. Latitude $+11^{\circ}.1$  |                   |                |                   |                |                                   |                |                       |                       |                   | No. 1593. Latitude $+11^{\circ}.1$  |                   |                |                                   |                 |                       |                 |                 |                 |  |  |
| Group 16406, in Rotation 1290<br>" 16410, " " 1291<br>" 16443, " " 1291   |                   |                |                   |                |                                   |                |                       |                       |                   | Group 16406, in Rotation 1290<br>" 16410, " " 1291<br>" 16443, " " 1291                         |                   |                |                                   |                 |                       |                 |                 |                 |  |  |
| Group 16406. Feb. 13-25. A composite spot, immediately preceding Group 16410.   |                   |                |                   |                |                                   |                |                       |                       |                   | 43.409 G  | 11                | 133            | 35                                | 419             | $273.5^{\circ}$       | $0.0^{\circ}$   | $+10.5^{\circ}$ | $-79.3^{\circ}$ |  |  |
| 42.410 G  | 54                | 347            | 31                | 201            | $336.3^{\circ}$                   | $-1.7^{\circ}$ | $-16.7^{\circ}$       | $-29.6^{\circ}$       | 44.561 C          | 29  | 233               | 35             | 277                               | $274.6^{\circ}$ | $+1.0^{\circ}$        | $+11.0^{\circ}$ | $-63.0^{\circ}$ |                 |  |  |
| 43.409 G  | 92                | 748            | 49                | 396            | $336.0^{\circ}$                   | $-1.9^{\circ}$ | $-17.2^{\circ}$       | $-16.8^{\circ}$       | 45.299 C          | 57  | 454               | 51             | 409                               | $274.3^{\circ}$ | $+0.6^{\circ}$        | $+11.2^{\circ}$ | $-53.6^{\circ}$ |                 |  |  |
| 44.561 C  | 46                | 479            | 23                | 244            | $335.4^{\circ}$                   | $-2.5^{\circ}$ | $-16.9^{\circ}$       | $-2.2^{\circ}$        | 46.297 C          | 109   | 624               | 75             | 431                               | $274.5^{\circ}$ | $+0.7^{\circ}$        | $+11.2^{\circ}$ | $-40.2^{\circ}$ |                 |  |  |
| 45.299 C  | 76                | 491            | 39                | 250            | $335.3^{\circ}$                   | $-2.5^{\circ}$ | $-16.5^{\circ}$       | $+7.4^{\circ}$        | 47.311 C          | 17  | 342               | 10             | 209                               | $335.4^{\circ}$ | $-2.4^{\circ}$        | $-16.9^{\circ}$ | $+34.0^{\circ}$ |                 |  |  |
| 46.297 C  | 40                | 542            | 22                | 293            | $335.2^{\circ}$                   | $-2.6^{\circ}$ | $-17.1^{\circ}$       | $+20.5^{\circ}$       | 48.374 G          | 26  | 192               | 20             | 144                               | $335.5^{\circ}$ | $-2.2^{\circ}$        | $-16.8^{\circ}$ | $+48.1^{\circ}$ |                 |  |  |
| 47.311 C  | 17                | 342            | 10                | 209            | $335.4^{\circ}$                   | $-2.4^{\circ}$ | $-16.9^{\circ}$       | $+34.0^{\circ}$       | 49.314 C          | 11  | 59                | 12             | 67                                | $339.7^{\circ}$ | $+2.0^{\circ}$        | $-15.2^{\circ}$ | $+64.7^{\circ}$ |                 |  |  |
| 48.374 G  | 26                | 192            | 20                | 144            | $335.5^{\circ}$                   | $-2.2^{\circ}$ | $-16.8^{\circ}$       | $+48.1^{\circ}$       | 49.314 C          | 11  | 59                | 12             | 67                                | $339.7^{\circ}$ | $+2.0^{\circ}$        | $-15.2^{\circ}$ | $+64.7^{\circ}$ |                 |  |  |

## GREENWICH PHOTO-HELIOGRAPHIC RESULTS. 1950.

LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |
| No. 1593. Group 18406 - continued  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 47.311 C   | 74                | 675            | 44                | 398            | 275.1                             | +1.2          | +11.6                 | -26.3                 |                   |                |                   |                |                                   |               |                       |
| 48.374 G   | 116               | 652            | 63                | 352            | 275.6                             | +1.6          | +11.6                 | -11.8                 |                   |                |                   |                |                                   |               |                       |
| 49.314 C   | 158               | 774            | 84                | 410            | 276.1                             | +2.0          | +11.8                 | + 1.1                 |                   |                |                   |                |                                   |               |                       |
| 50.397 G   | 124               | 676            | 68                | 372            | 276.4                             | +2.2          | +11.9                 | +15.7                 |                   |                |                   |                |                                   |               |                       |
| 51.436 G   | 111               | 556            | 68                | 339            | 276.6                             | +2.3          | +11.9                 | +29.5                 |                   |                |                   |                |                                   |               |                       |
| 52.447 G   | 50                | 326            | 36                | 238            | 276.8                             | +2.4          | +12.1                 | +43.1                 |                   |                |                   |                |                                   |               |                       |
| 53.427 G   | 35                | 278            | 34                | 270            | 276.6                             | +2.2          | +12.4                 | +55.8                 |                   |                |                   |                |                                   |               |                       |
| 54.217 K   | 18                | 143            | 25                | 199            | 277.1                             | +2.6          | +12.1                 | +66.7                 |                   |                |                   |                |                                   |               |                       |
| 55.389 G   | 4                 | 31             | 21                | 165            | 277.8                             | ..            | +12.4                 | +82.8                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 52                | 343            | 275.6                             | ..            | +11.6                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 18410. Feb. 14-26. A notable group, in which both leader, a, and follower, b, are composite spots. a becomes regular by the time it reaches the west limb. b, at first the larger component, breaks up and slowly diminishes. An intense solar flare (magnitude 3+) was associated with this group on February 17 at 01.6 U.T. |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 44.561 C   | 111               | 718            | 232               | 1533           | 263.6                             | 0.0           | +10.8                 | -74.0                 |                   |                |                   |                |                                   |               |                       |
| 45.299 C   | 185               | 1461           | 240               | 1910           | 263.2                             | -0.5          | +10.0                 | -64.7                 |                   |                |                   |                |                                   |               |                       |
| 46.297 C   | 378               | 3280           | 325               | 2856           | 262.9                             | -0.9          | +10.2                 | -51.8                 |                   |                |                   |                |                                   |               |                       |
| 47.311 C   | 473               | 3978           | 315               | 2704           | 262.8                             | -1.1          | +10.7                 | -38.6                 |                   |                |                   |                |                                   |               |                       |
| 48.374 G   | 730               | 4039           | 422               | 2341           | 262.8                             | -1.2          | + 9.7                 | -24.6                 |                   |                |                   |                |                                   |               |                       |
| 49.314 C   | 627               | 4026           | 334               | 2151           | 263.0                             | -1.0          | + 9.7                 | -12.0                 |                   |                |                   |                |                                   |               |                       |
| 50.397 G   | 654               | 3717           | 344               | 1948           | 263.9                             | -0.2          | +10.0                 | + 3.2                 |                   |                |                   |                |                                   |               |                       |
| 51.436 G   | 635               | 3410           | 352               | 1882           | 264.2                             | 0.0           | + 9.7                 | +17.1                 |                   |                |                   |                |                                   |               |                       |
| 52.447 G   | 445               | 2374           | 278               | 1476           | 264.3                             | 0.0           | +10.1                 | +30.6                 |                   |                |                   |                |                                   |               |                       |
| 53.427 G   | 269               | 2101           | 205               | 1584           | 264.7                             | +0.3          | +10.1                 | +43.9                 |                   |                |                   |                |                                   |               |                       |
| 54.217 K   | 189               | 1038           | 190               | 1020           | 266.1                             | +1.6          | + 9.6                 | +55.7                 |                   |                |                   |                |                                   |               |                       |
| 55.389 G   | 53                | 401            | 118               | 834            | 268.3                             | +3.7          | +10.4                 | +73.3                 |                   |                |                   |                |                                   |               |                       |
| 56.411 G   | 4                 | 22             | (18)              | 91             | 263.2                             | ..            | + 8.7                 | +81.7                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 280               | 1853           | 264.2                             | ..            | +10.1                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Spot a   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 44.561 C   | 67                | 401            | 115               | 690            | 266.3                             | 0.0           | +10.7                 | -71.3                 |                   |                |                   |                |                                   |               |                       |
| 45.299 C   | 101               | 760            | 113               | 851            | 266.7                             | +0.3          | +10.5                 | -61.2                 |                   |                |                   |                |                                   |               |                       |
| 46.297 C   | 191               | 1466           | 147               | 1129           | 268.3                             | +1.8          | +11.0                 | -46.4                 |                   |                |                   |                |                                   |               |                       |
| 47.311 C   | 268               | 1530           | 169               | 964            | 268.8                             | +2.2          | +11.9                 | -32.6                 |                   |                |                   |                |                                   |               |                       |
| 48.374 G   | 323               | 1395           | 181               | 781            | 268.7                             | +2.0          | +11.7                 | -18.7                 |                   |                |                   |                |                                   |               |                       |
| 49.314 C   | 310               | 1452           | 164               | 770            | 268.9                             | +2.2          | +11.5                 | - 6.1                 |                   |                |                   |                |                                   |               |                       |
| 50.397 G   | 290               | 1452           | 154               | 770            | 269.3                             | +2.5          | +11.2                 | + 8.6                 |                   |                |                   |                |                                   |               |                       |
| 51.436 G   | 362               | 1770           | 206               | 1009           | 269.3                             | +2.4          | +10.8                 | +22.2                 |                   |                |                   |                |                                   |               |                       |
| 52.447 G   | 274               | 1338           | 178               | 870            | 269.1                             | +2.1          | +10.9                 | +35.4                 |                   |                |                   |                |                                   |               |                       |
| 53.427 G   | 166               | 1183           | 134               | 958            | 269.5                             | +2.4          | +10.7                 | +48.7                 |                   |                |                   |                |                                   |               |                       |
| 54.217 K   | 85                | 386            | 97                | 440            | 272.0                             | +4.8          | +11.2                 | +61.6                 |                   |                |                   |                |                                   |               |                       |
| 55.389 G   | 28                | 171            | 79                | 482            | 273.0                             | +5.7          | +11.7                 | +78.0                 |                   |                |                   |                |                                   |               |                       |
| Spot b   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 44.561 C   | 44                |                | 317               |                | 117                               | 843           | 259.4                 | 0.0                   | +10.0             |                |                   |                |                                   |               |                       |
| 45.299 C   | 84                |                | 701               |                | 127                               | 1059          | 258.9                 | -0.6                  | + 9.4             |                |                   |                |                                   |               |                       |
| 46.297 C   | 183               |                | 1785              |                | 174                               | 1696          | 258.5                 | -1.1                  | + 9.9             |                |                   |                |                                   |               |                       |
| 47.311 C   | 194               |                | 2408              |                | 138                               | 1710          | 258.9                 | -0.8                  | + 9.8             |                |                   |                |                                   |               |                       |
| 48.374 G   | 283               |                | 1733              |                | 170                               | 1040          | 258.7                 | -1.1                  | + 9.7             |                |                   |                |                                   |               |                       |
| 49.314 C   | 230               |                | 1677              |                | 124                               | 906           | 258.6                 | -1.2                  | + 9.4             |                |                   |                |                                   |               |                       |
| 50.397 G   | 257               |                | 1517              |                | 134                               | 789           | 258.5                 | -1.4                  | + 9.3             |                |                   |                |                                   |               |                       |
| 51.436 G   | 205               |                | 1254              |                | 109                               | 665           | 258.5                 | -1.5                  | + 9.3             |                |                   |                |                                   |               |                       |
| 52.447 G   | 125               |                | 771               |                | 72                                | 447           | 258.3                 | -1.8                  | + 9.7             |                |                   |                |                                   |               |                       |
| 53.427 G   | 61                |                | 703               |                | 41                                | 471           | 258.7                 | -1.5                  | +10.0             |                |                   |                |                                   |               |                       |
| 54.217 K   | 42                |                | 242               |                | 34                                | 194           | 258.8                 | -1.5                  | + 9.6             |                |                   |                |                                   |               |                       |
| 55.389 G   | 7                 |                | 61                |                | 9                                 | 75            | 259.2                 | -1.2                  | + 9.4             |                |                   |                |                                   |               |                       |
| 56.411 G   | 0                 |                | 4                 |                | 0                                 | 12            | 260.1                 | -0.4                  | + 9.8             |                |                   |                |                                   |               |                       |
| Group 18443. Mar. 12-24. A regular spot which becomes elongated and which has divided into two by March 18. It then slowly dies out.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 70.307 C   | 28                |                | 104               |                | 134                               | 498           | 276.3                 | ..                    | +12.1             |                |                   |                |                                   |               |                       |
| 71.377 G   | 92                |                | 433               |                | 139                               | 654           | 276.0                 | +7.2                  | +12.1             |                |                   |                |                                   |               |                       |
| 72.312 C   | 109               |                | 626               |                | 105                               | 601           | 276.4                 | +7.5                  | +12.0             |                |                   |                |                                   |               |                       |
| 73.488 G   | 136               |                | 827               |                | 95                                | 579           | 276.2                 | +7.2                  | +12.1             |                |                   |                |                                   |               |                       |
| 74.383 G   | 143               |                | 1001              |                | 86                                | 601           | 276.2                 | +7.1                  | +11.9             |                |                   |                |                                   |               |                       |
| 75.650 G   | 128               |                | 855               |                | 69                                | 462           | 276.6                 | +7.4                  | +11.9             |                |                   |                |                                   |               |                       |
| 76.324 C   | 118               |                | 916               |                | 63                                | 486           | 276.8                 | +7.5                  | +11.5             |                |                   |                |                                   |               |                       |
| 77.368 G   | 150               |                | 734               |                | 81                                | 397           | 276.1                 | +6.7                  | +11.5             |                |                   |                |                                   |               |                       |
| 78.648 G   | 95                |                | 535               |                | 56                                | 320           | 276.4                 | +6.9                  | +11.3             |                |                   |                |                                   |               |                       |
| 79.602 G   | 64                |                | 384               |                | 45                                | 269           | 276.8                 | +7.2                  | +11.1             |                |                   |                |                                   |               |                       |
| 80.343 C   | 49                |                | 328               |                | 41                                | 276           | 276.7                 | +7.0                  | +11.0             |                |                   |                |                                   |               |                       |
| 81.303 C   | 19                |                | 129               |                | 24                                | 157           | 277.0                 | +7.2                  | +10.8             |                |                   |                |                                   |               |                       |
| 82.356 G   | 0                 |                | 7                 | (0)            | 16                                | 275.6         | ..                    | +11.0                 | +76.0             |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 73                |                | 437                               | 276.5         | ..                    | +11.6                 | ..                |                |                   |                |                                   |               |                       |
| No. 1594. Latitude -18°.3  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Group 18408 in Rotation 1290<br>" 16430 " " 1290†  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Group 18408. Feb. 14-17. A small bi-polar group, forming near the west limb.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 44.561 C   | 31                | 189            | 22                | 136            | 23.0                              | 0.0           | -17.9                 |                       | +45.4             |                |                   |                |                                   |               |                       |
| 45.299 C   | 82                | 430            | 72                | 374            | 22.5                              | -0.5          | -17.8                 |                       | +54.6             |                |                   |                |                                   |               |                       |
| 46.297 C   | 52                | 514            | 67                | 644            | 21.8                              | -1.1          | -17.4                 |                       | +67.1             |                |                   |                |                                   |               |                       |
| 47.311 C   | 21                | 164            | 59                | 465            | 20.9                              | -1.9          | -17.2                 |                       | +79.5             |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 55                | 405            | 22.0                              | ..            | -17.6                 | ..                    |                   |                |                   |                |                                   |               |                       |

<sup>†</sup> Group 16430 has disappeared before Rotation 1291 begins.

## LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place                    | Projected<br>Area                                     |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |       |       |  |  |  |  |  |  |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|--|---|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-------|-------|--|--|--|--|--|--|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |  | Umbræ   | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |       |       |  |  |  |  |  |  |
| <b>No. 1594. Group 16408 - continued</b>   |                   |                |                   |                |                                   |               |                       | <b>No. 1595. Group 16415 - continued</b> |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| Spot a   |                   |                |                   |                |                                   |               |                       |  |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| 44.561 C   | 21                | 120            | 15                | 88             | 24.0                              | 0.0           | -17.7                 | +46.4                                    | 58.395 G  | 55             | 311               | 34             | 193                               | 187.8         | +0.9                  | + 8.7 | +32.4 |  |  |  |  |  |  |
| 45.299 C   | 63                | 302            | 57                | 272            | 24.4                              | +0.4          | -17.8                 | +56.5                                    | 59.407 G  | 50             | 261               | 38             | 196                               | 187.9         | +0.9                  | + 8.7 | +45.8 |  |  |  |  |  |  |
| 46.297 C   | 29                | 220            | 41                | 315            | 25.3                              | +1.4          | -18.4                 | +70.6                                    | 60.395 G  | 44             | 206               | 45             | 210                               | 187.9         | +0.8                  | + 8.7 | +58.8 |  |  |  |  |  |  |
| 47.311 C   | 8                 | 65             | 33                | 265            | 26.0                              | ..            | -18.3                 | +84.6                                    | 61.304 C  | 25             | 110               | 41             | 180                               | 187.9         | +0.6                  | + 8.5 | +70.8 |  |  |  |  |  |  |
| Group 16430. Mar. 4-7. One or two small spots.   |                   |                |                   |                |                                   |               |                       | Spot b                                   |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| 62.381 G   | 9                 | 53             | 19                | 113            | 24.9                              | +2.1          | -20.9                 | -78.0                                    | 50.397 G  | 4              | 37                | 19             | 177                               | 178.1         | ..                    | + 9.6 | -82.6 |  |  |  |  |  |  |
| 63.451 G   | 11                | 86             | 13                | 97             | 24.1                              | +1.3          | -18.1                 | -64.7                                    | 51.436 G  | 24             | 126               | 37             | 194                               | 177.8         | 0.0                   | + 9.3 | -69.3 |  |  |  |  |  |  |
| 64.370 G   | 18                | 86             | 14                | 69             | 25.0                              | +2.3          | -18.4                 | -51.7                                    | 52.447 G  | 26             | 145               | 24             | 136                               | 177.8         | -0.1                  | + 8.9 | -55.9 |  |  |  |  |  |  |
| 65.384 G   | 9                 | 46             | 5                 | 30             | 23.3                              | +0.7          | -18.7                 | -40.0                                    | 53.427 G  | 13             | 177               | 9              | 127                               | 177.8         | -0.2                  | + 9.3 | -43.0 |  |  |  |  |  |  |
| Means  | ..                | ..             | 13                | 77             | 24.3                              | ..            | -19.0                 | ..                                       | 54.217 K  | 10             | 71                | 6              | 44                                | 178.1         | -0.0                  | + 9.3 | -32.3 |  |  |  |  |  |  |
| No. 1595. Latitude +9°.1   |                   |                |                   |                |                                   |               |                       | Spot b                                   |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| Group 16415 in Rotation 1290   |                   |                |                   |                |                                   |               |                       | 55.389 G                                 | 9   | 77             | 5                 | 42             | 180.1                             | +1.8          | +11.0                 | -14.9 |       |  |  |  |  |  |  |
| " 16449 " " 1291   |                   |                |                   |                |                                   |               |                       | 56.411 G                                 | 0   | 18             | 0                 | 10             | 179.3                             | +0.9          | +11.0                 | - 2.2 |       |  |  |  |  |  |  |
| Group 16415. Feb. 20-Mar. 3. A bi-polar group, of which the leader, a, a regular spot, alone remains by March 1. |                   |                |                   |                |                                   |               |                       | 57.377 G                                 | 2   | 26             | 1                 | 14             | 179.5                             | +1.0          | +11.0                 | +10.7 |       |  |  |  |  |  |  |
| 50.397 G   |                   |                |                   |                |                                   |               |                       | 58.395 G                                 | 0   | 18             | 0                 | 10             | 178.8                             | +0.1          | +10.7                 | +23.4 |       |  |  |  |  |  |  |
| 51.436 G   | 70                | 372            | 87                | 462            | 183.9                             | +1.1          | + 8.8                 | -63.2                                    | Means   | ..             | ..                | 18             | 106                               | 189.9         | ..                    | + 9.4 | ..    |  |  |  |  |  |  |
| 52.447 G   | 87                | 454            | 71                | 374            | 183.9                             | +0.9          | + 8.7                 | -49.8                                    | Group 16449. Mar. 19-30. A small stable regular spot. |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| 53.427 G   | 70                | 554            | 45                | 365            | 183.9                             | +0.8          | + 9.1                 | -36.9                                    | 77.368 G  | 11             | 46                | 25             | 104                               | 189.6         | +0.3                  | + 9.0 | -75.8 |  |  |  |  |  |  |
| 54.217 K   | 77                | 420            | 44                | 243            | 185.5                             | +2.3          | + 9.1                 | -24.9                                    | 78.648 G  | 15             | 117               | 15             | 121                               | 189.5         | +0.1                  | + 9.2 | -59.0 |  |  |  |  |  |  |
| 55.389 G   | 81                | 451            | 42                | 236            | 186.2                             | +2.9          | + 9.3                 | - 8.8                                    | 79.602 G  | 22             | 122               | 17             | 93                                | 189.6         | 0.0                   | + 9.1 | -46.3 |  |  |  |  |  |  |
| 56.411 G   | 92                | 406            | 48                | 212            | 187.1                             | +3.6          | + 9.0                 | + 5.6                                    | 80.343 C  | 26             | 188               | 17             | 122                               | 190.1         | +0.5                  | + 9.2 | -36.1 |  |  |  |  |  |  |
| 57.377 G   | 83                | 425            | 46                | 233            | 187.2                             | +3.6          | + 8.7                 | +18.4                                    | 81.303 C  | 26             | 190               | 15             | 108                               | 189.8         | 0.0                   | + 9.3 | -23.7 |  |  |  |  |  |  |
| 58.395 G   | 55                | 329            | 34                | 203            | 187.7                             | +4.0          | + 8.2                 | +32.3                                    | 82.356 G  | 27             | 223               | 14             | 118                               | 189.7         | -0.2                  | + 9.3 | - 9.9 |  |  |  |  |  |  |
| 59.407 G   | 50                | 261            | 38                | 196            | 187.9                             | +4.1          | + 8.7                 | +45.8                                    | 83.362 G  | 42             | 218               | 22             | 113                               | 189.9         | -0.1                  | + 9.4 | + 3.5 |  |  |  |  |  |  |
| 60.395 G   | 44                | 206            | 45                | 210            | 187.9                             | +4.0          | + 8.7                 | +58.8                                    | 84.442 G  | 42             | 222               | 23             | 122                               | 190.0         | -0.2                  | + 9.6 | +17.9 |  |  |  |  |  |  |
| 61.304 C   | 25                | 110            | 41                | 180            | 187.9                             | +3.8          | + 8.5                 | +70.8                                    | 85.366 G  | 33             | 178               | 20             | 107                               | 190.0         | -0.3                  | + 9.4 | +30.1 |  |  |  |  |  |  |
| Means  | ..                | ..             | 53                | 279            | 186.0                             | ..            | + 8.8                 | ..                                       | 86.342 C  | 28             | 138               | 20             | 99                                | 190.1         | -0.3                  | + 9.7 | +43.1 |  |  |  |  |  |  |
| Spot a   |                   |                |                   |                |                                   |               |                       | Spot b                                   |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| 50.397 G   | 35                | 124            | 73                | 259            | 185.9                             | 0.0           | + 9.0                 | -74.8                                    | 87.304 C  | 9              | 82                | 8              | 77                                | 190.1         | -0.4                  | + 9.7 | +55.7 |  |  |  |  |  |  |
| 51.436 G   | 46                | 246            | 50                | 268            | 186.3                             | +0.3          | + 8.8                 | -60.8                                    | 88.589 G  | 9              | 44                | 17             | 83                                | 190.4         | -0.2                  | + 9.8 | +73.0 |  |  |  |  |  |  |
| 52.447 G   | 61                | 309            | 47                | 238            | 186.5                             | +0.3          | + 8.7                 | -47.2                                    | Means   | ..             | ..                | 18             | 106                               | 189.9         | ..                    | + 9.4 | ..    |  |  |  |  |  |  |
| 53.427 G   | 57                | 377            | 36                | 238            | 186.7                             | +0.4          | + 9.0                 | -34.1                                    | No. 1596. Latitude +13°.3                             |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| 54.217 K   | 67                | 349            | 38                | 199            | 187.2                             | +0.8          | + 9.1                 | -23.2                                    | Group 16416 in Rotation 1290                          |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| 55.389 G   | 72                | 374            | 37                | 194            | 187.3                             | +0.8          | + 8.8                 | - 7.7                                    | 51.436 G  | 6              | 35                | 4              | 26                                | 289.7         | 0.0                   | +12.9 | +42.6 |  |  |  |  |  |  |
| 56.411 G   | 92                | 388            | 48                | 202            | 187.4                             | +0.7          | + 8.9                 | + 5.9                                    | 52.447 G  | 43             | 188               | 43             | 190                               | 290.5         | +0.7                  | +13.8 | +56.8 |  |  |  |  |  |  |
| 57.377 G   | 81                | 399            | 45                | 219            | 187.6                             | +0.8          | + 8.7                 | +18.8                                    | 53.427 G  | 24             | 144               | 41             | 244                               | 290.7         | +0.9                  | +14.1 | +69.9 |  |  |  |  |  |  |
| continued  |                   |                |                   |                |                                   |               |                       | continued                                |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| Means  | ..                | ..             | ..                | ..             | ..                                | ..            | ..                    | 54.217 K                                 | 20  | 79             | 63                | 249            | 289.0                             | -0.8          | +13.9                 | +78.6 |       |  |  |  |  |  |  |

## GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1950.

LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

## LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area                        |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |        |       |  |  |  |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|--|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|--------|-------|--|--|--|--|--|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ                                    | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |        |       |  |  |  |  |  |
| <b>No. 1598. Latitude +26°.7</b>  |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| Group 16426 in Rotation 1290<br>" 16456 " " 1291  |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| Group 16425. Mar. 3-9. A small stream, of which the leader<br>is the most stable component.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| 61.304 C  | 10                | 53             | 6                 | 32             | 113.0                             | 0.0           | +25.8                 | - 4.1                 | 72.312 C                                 | 200            | 978               | 106            | 518                               | 348.7         | -1.2                  | -15.5  | +16.7 |  |  |  |  |  |
| 62.381 G  | 42                | 227            | 26                | 139            | 112.0                             | -0.6          | +26.6                 | + 9.1                 | 73.488 G                                 | 194            | 810               | 114            | 478                               | 348.6         | -1.2                  | -15.2  | +32.1 |  |  |  |  |  |
| 63.451 G  | 59                | 310            | 39                | 206            | 113.0                             | +0.7          | +25.6                 | +24.2                 | 74.383 G                                 | 183            | 726               | 126            | 501                               | 348.7         | -1.1                  | -14.8  | +44.0 |  |  |  |  |  |
| 64.370 G  | 35                | 231            | 27                | 178            | 114.4                             | +2.4          | +26.4                 | +37.7                 | 75.650 G                                 | 99             | 477               | 98             | 472                               | 348.4         | -1.4                  | -15.0  | +60.4 |  |  |  |  |  |
| 65.384 G  | 24                | 187            | 24                | 185            | 113.8                             | +2.2          | +26.6                 | +50.5                 | 76.324 C                                 | 62             | 360               | 84             | 486                               | 348.6         | -1.2                  | -15.1  | +69.4 |  |  |  |  |  |
| 66.373 G  | 22                | 172            | 32                | 249            | 113.4                             | +2.1          | +26.6                 | +63.1                 | 77.368 G                                 | 31             | 150               | 102            | 492                               | 348.3         | ..                    | -14.8  | +82.9 |  |  |  |  |  |
| 67.378 G  | 13                | 62             | 43                | 203            | 113.3                             | +2.3          | +27.5                 | +76.2                 | <b>No. 1599. Group 16435 - continued</b> |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| Means   | ..                | ..             | 28                | 170            | 113.3                             | ..            | +26.4                 | ..                    | Means                                    | ..             | ..                | 109            | 523                               | 349.1         | ..                    | -15.5  | ..    |  |  |  |  |  |
| Group 16456. Mar. 25-Apr. 6. A small regular spot, with a tiny<br>companion on April 4 and 5. |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| 83.362 G  | 9                 | 31             | 66                | 228            | 104.4                             | ..            | +27.8                 | -82.0                 | 92.407 G                                 | 11             | 62                | 33             | 188                               | 345.0         | ..                    | -16.7  | -82.0 |  |  |  |  |  |
| 84.442 G  | 20                | 109            | 35                | 192            | 104.8                             | -0.5          | +27.5                 | -67.3                 | 93.331 C                                 | 26             | 210               | 37             | 300                               | 344.6         | -5.1                  | -16.3  | -70.3 |  |  |  |  |  |
| 85.366 G  | 20                | 144            | 23                | 163            | 104.3                             | -0.6          | +27.3                 | -55.6                 | 94.373 G                                 | 56             | 332               | 51             | 302                               | 344.2         | -5.5                  | -16.5  | -56.9 |  |  |  |  |  |
| 86.342 C  | 28                | 176            | 24                | 150            | 103.8                             | -0.8          | +27.5                 | -43.2                 | 95.364 G                                 | 72             | 415               | 51             | 291                               | 344.1         | -5.6                  | -16.6  | -43.9 |  |  |  |  |  |
| 87.304 C  | 30                | 189            | 21                | 134            | 103.6                             | -0.7          | +27.3                 | -30.8                 | 96.364 G                                 | 84             | 468               | 50             | 277                               | 343.7         | -6.0                  | -16.6  | -31.1 |  |  |  |  |  |
| 88.589 G  | 33                | 189            | 20                | 117            | 102.9                             | -1.0          | +27.3                 | -14.5                 | 97.391 C                                 | 91             | 514               | 48             | 272                               | 343.7         | -6.0                  | -16.6  | -17.6 |  |  |  |  |  |
| 89.307 C  | 30                | 200            | 18                | 120            | 102.6                             | -1.0          | +27.1                 | -5.3                  | 98.464 G                                 | 76             | 461               | 39             | 235                               | 343.6         | -6.0                  | -16.4  | -3.5  |  |  |  |  |  |
| 90.439 G  | 33                | 133            | 20                | 81             | 102.0                             | -1.3          | +26.9                 | + 9.0                 | 99.417 C                                 | 67             | 521               | 34             | 266                               | 343.4         | -6.3                  | -16.6  | + 8.9 |  |  |  |  |  |
| 91.473 G  | 36                | 134            | 23                | 87             | 101.5                             | -1.4          | +26.9                 | +22.1                 | 100.366 G                                | 25             | 459               | 14             | 249                               | 343.0         | -6.7                  | -16.9  | +21.0 |  |  |  |  |  |
| 92.407 G  | 18                | 134            | 13                | 96             | 100.7                             | -1.9          | +26.4                 | +33.7                 | 101.363 G                                | 40             | 321               | 24             | 195                               | 342.3         | -7.3                  | -17.0  | +33.5 |  |  |  |  |  |
| 93.331 C  | 21                | 145            | 19                | 127            | 100.7                             | -1.6          | +26.5                 | +45.8                 | 102.366 G                                | 31             | 211               | 23             | 156                               | 342.9         | -6.7                  | -16.2  | +47.3 |  |  |  |  |  |
| 94.373 G  | 18                | 83             | 21                | 98             | 99.2                              | -2.7          | +26.2                 | +58.1                 | 103.311 C                                | 22             | 117               | 21             | 113                               | 342.5         | -7.1                  | -15.9  | +59.4 |  |  |  |  |  |
| 95.364 G  | 16                | 60             | 33                | 123            | 99.0                              | -2.6          | +26.0                 | +71.0                 | 104.373 G                                | 9              | 34                | 15             | 56                                | 342.4         | -7.2                  | -16.0  | +73.3 |  |  |  |  |  |
| Means   | ..                | ..             | 22                | 124            | 102.1                             | ..            | +26.9                 | ..                    | Means                                    | ..             | ..                | 34             | 226                               | 343.4         | ..                    | -16.5  | ..    |  |  |  |  |  |
| <b>No. 1599. Latitude -18°.0</b>  |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| Group 16435 in Rotation 1291<br>" 16466 " " 1292  |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| Group 16435. Mar. 6-10. A stable regular spot.  |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| 64.370 G  | 13                | 95             | 79                | 580            | 349.7                             | ..            | -15.8                 | -87.0                 | 65.384 G                                 | 24             | 141               | 15             | 87                                | 57.3          | 0.0                   | +27.9  | - 6.0 |  |  |  |  |  |
| 65.384 G  | 62                | 337            | 101               | 549            | 349.9                             | 0.0           | -15.8                 | -73.4                 | 66.373 G                                 | 66             | 359               | 41             | 221                               | 56.4          | -0.6                  | +28.2  | + 6.1 |  |  |  |  |  |
| 66.373 G  | 123               | 550            | 122               | 544            | 349.9                             | 0.0           | -16.1                 | -60.4                 | 67.378 G                                 | 88             | 424               | 57             | 280                               | 56.1          | -0.5                  | +28.8  | +19.0 |  |  |  |  |  |
| 67.378 G  | 136               | 748            | 101               | 554            | 349.6                             | -0.3          | -15.9                 | -47.5                 | 68.305 C                                 | 62             | 537               | 45             | 394                               | 56.0          | -0.3                  | +28.0  | +31.2 |  |  |  |  |  |
| 68.305 C  | 194               | 988            | 120               | 613            | 349.5                             | -0.4          | -16.1                 | -35.3                 | 69.307 C                                 | 74             | 518               | 67             | 473                               | 56.5          | +0.6                  | +28.6  | +44.9 |  |  |  |  |  |
| 69.307 C  | 190               | 958            | 104               | 527            | 349.1                             | -0.8          | -15.7                 | -22.5                 | 70.307 C                                 | 49             | 496               | 67             | 644                               | 56.7          | +1.1                  | +28.8  | +58.2 |  |  |  |  |  |
| 70.307 C  | 211               | 971            | 108               | 495            | 349.0                             | -0.9          | -15.8                 | - 9.5                 | 71.377 G                                 | 26             | 209               | 73             | 562                               | 54.2          | -1.0                  | +29.1  | +69.8 |  |  |  |  |  |
| 71.377 G  | 242               | 1049           | 123               | 535            | 348.9                             | -1.0          | -15.5                 | + 4.5                 | 72.312 C                                 | 0              | 11                | (0             | 81                                | 53.3          | ..                    | +29.9) | +81.3 |  |  |  |  |  |
| Means   | ..                | ..             | ..                | ..             | ..                                | ..            | ..                    | ..                    | Means                                    | ..             | ..                | 52             | 380                               | 56.2          | ..                    | +28.5  | ..    |  |  |  |  |  |

## GREENWICH PHOTO-HELIOGRAPHIC RESULTS. 1950.

LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|---|---------------|-----------------------|------|-------|------|------|-------|-------|-----------|----------|----|-----|----|-------|-------|------|-------|--|----------|-----|-----|-----|------|------|-------|-------|-----------|----------|----|-----|----|-------|-------|------|-------|----------|----------|-----|-----|-----|------|------|-------|-------|-----------|----------|----|-----|----|-------|-------|------|-------|----------|----------|-----|-----|-----|------|------|-------|-------|-----------|----------|----|-----|----|-------|-------|------|-------|----------|----------|-----|-----|-----|------|------|-------|-------|-----------|----------|----|-----|----|-----|-------|------|------|----------|----------|-----|-----|-----|------|------|-------|-------|-----------|---|----|---|----|-------|------|------|------|--|-----|-----|----|-----|------|------|-------|------|--|--|--|--|--|--|--|--|----------|-----|-----|-----|-----|------|------|-------|-------|--|--|--|--|--|--|--|--|----------|-----|-----|-----|-----|------|------|-------|-------|--|--|--|--|--|--|--|--|----------|-----|-----|-----|-----|------|------|-------|-------|--|--|--|--|--|--|--|--|----------|-----|-----|-----|-----|------|------|-------|-------|--|--|--|--|--|--|--|--|----------|----|-----|-----|-----|------|------|-------|-------|--|--|--|--|--|--|--|--|----------|----|-----|----|-----|------|------|-------|-------|--|--|--|--|--|--|--|--|-------------------------------------|--|
| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion   | Latit-<br>ude | Long.<br>from<br>C.M. |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
|   | Umbras            | Whole<br>Spots | Umbras            | Whole<br>Spots |                                   |               |                       |                       | Umbras            | Whole<br>Spots | Umbras            | Whole<br>Spots |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| <b>No. 1600. Group 16437 - continued</b>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | <b>No. 1601. Latitude <math>-2^{\circ}.8</math></b>   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| Spot <i>a</i>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | Group 16454 in Rotation 1291  |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| " 16470 " " 1292  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | Group 16454. Mar. 25-29. A pair of regular spots, appearing suddenly in the western hemisphere. |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| <table border="0"> <tr><td>66.373 G</td><td>20</td><td>90</td><td>13</td><td>57</td><td>61.3</td><td>0.0</td><td>+28.4</td><td>+11.0</td><td>83.362 G</td><td>51</td><td>273</td><td>27</td><td>143</td><td>203.0</td><td>0.0</td><td>-3.2</td><td>+16.6</td></tr> <tr><td>67.378 G</td><td>33</td><td>147</td><td>22</td><td>100</td><td>61.4</td><td>+0.4</td><td>+28.8</td><td>+24.3</td><td>84.442 G</td><td>56</td><td>431</td><td>34</td><td>256</td><td>204.0</td><td>+0.8</td><td>-3.2</td><td>+31.9</td></tr> <tr><td>68.305 C</td><td>26</td><td>183</td><td>20</td><td>141</td><td>60.7</td><td>+0.1</td><td>+28.4</td><td>+35.9</td><td>85.366 G</td><td>80</td><td>604</td><td>56</td><td>426</td><td>204.5</td><td>+1.1</td><td>-3.3</td><td>+44.6</td></tr> <tr><td>69.307 C</td><td>23</td><td>198</td><td>23</td><td>200</td><td>62.0</td><td>+1.7</td><td>+28.8</td><td>+50.4</td><td>86.342 C</td><td>58</td><td>357</td><td>55</td><td>338</td><td>204.6</td><td>+1.1</td><td>-3.6</td><td>+57.6</td></tr> <tr><td>70.307 C</td><td>34</td><td>247</td><td>51</td><td>370</td><td>61.7</td><td>+1.8</td><td>+28.2</td><td>+63.2</td><td>87.304 C</td><td>30</td><td>189</td><td>46</td><td>291</td><td>204.7</td><td>+1.0</td><td>-3.8</td><td>+70.3</td></tr> <tr><td>71.377 G</td><td>11</td><td>77</td><td>45</td><td>313</td><td>62.6</td><td>+3.0</td><td>+27.3</td><td>+78.2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | 66.373 G  |               | 20                    | 90   | 13    | 57   | 61.3 | 0.0   | +28.4 | +11.0     | 83.362 G | 51 | 273 | 27 | 143   | 203.0 | 0.0  | -3.2  | +16.6                                  | 67.378 G | 33  | 147 | 22  | 100  | 61.4 | +0.4  | +28.8 | +24.3     | 84.442 G | 56 | 431 | 34 | 256   | 204.0 | +0.8 | -3.2  | +31.9    | 68.305 C | 26  | 183 | 20  | 141  | 60.7 | +0.1  | +28.4 | +35.9     | 85.366 G | 80 | 604 | 56 | 426   | 204.5 | +1.1 | -3.3  | +44.6    | 69.307 C | 23  | 198 | 23  | 200  | 62.0 | +1.7  | +28.8 | +50.4     | 86.342 C | 58 | 357 | 55 | 338   | 204.6 | +1.1 | -3.6  | +57.6    | 70.307 C | 34  | 247 | 51  | 370  | 61.7 | +1.8  | +28.2 | +63.2     | 87.304 C | 30 | 189 | 46 | 291 | 204.7 | +1.0 | -3.8 | +70.3    | 71.377 G | 11  | 77  | 45  | 313  | 62.6 | +3.0  | +27.3 | +78.2     |   |    |   |    |       |      |      |      | Group 16460. Mar. 29-Apr. 10. Possibly only a revival of Group 16437. A stable regular spot. The umbra is crossed by a bright "bridge" between March 30 and April 1. |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 66.373 G  | 20                | 90             | 13                | 57             | 61.3                              | 0.0           | +28.4                 | +11.0                 | 83.362 G          | 51             | 273               | 27             | 143   | 203.0         | 0.0                   | -3.2 | +16.6 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 67.378 G  | 33                | 147            | 22                | 100            | 61.4                              | +0.4          | +28.8                 | +24.3                 | 84.442 G          | 56             | 431               | 34             | 256   | 204.0         | +0.8                  | -3.2 | +31.9 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 68.305 C  | 26                | 183            | 20                | 141            | 60.7                              | +0.1          | +28.4                 | +35.9                 | 85.366 G          | 80             | 604               | 56             | 426   | 204.5         | +1.1                  | -3.3 | +44.6 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 69.307 C  | 23                | 198            | 23                | 200            | 62.0                              | +1.7          | +28.8                 | +50.4                 | 86.342 C          | 58             | 357               | 55             | 338   | 204.6         | +1.1                  | -3.6 | +57.6 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 70.307 C  | 34                | 247            | 51                | 370            | 61.7                              | +1.8          | +28.2                 | +63.2                 | 87.304 C          | 30             | 189               | 46             | 291   | 204.7         | +1.0                  | -3.8 | +70.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 71.377 G  | 11                | 77             | 45                | 313            | 62.6                              | +3.0          | +27.3                 | +78.2                 |                   |                |                   |                |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| <table border="0"> <tr><td>87.304 C</td><td>26</td><td>133</td><td>85</td><td>436</td><td>58.0</td><td>+4.0</td><td>+27.6</td><td>-76.4</td><td>103.311 C</td><td>4</td><td>13</td><td>8</td><td>26</td><td>207.2</td><td>+0.5</td><td>-2.8</td><td>-75.9</td></tr> <tr><td>88.589 G</td><td>73</td><td>373</td><td>94</td><td>481</td><td>57.3</td><td>+3.8</td><td>+27.8</td><td>-60.1</td><td>104.373 G</td><td>11</td><td>36</td><td>12</td><td>40</td><td>205.8</td><td>-1.1</td><td>-2.7</td><td>-63.3</td></tr> <tr><td>89.307 C</td><td>133</td><td>540</td><td>132</td><td>535</td><td>57.1</td><td>+3.8</td><td>+27.3</td><td>-50.8</td><td>105.514 C</td><td>7</td><td>37</td><td>5</td><td>27</td><td>206.8</td><td>-0.3</td><td>-2.6</td><td>-47.3</td></tr> <tr><td>90.439 G</td><td>93</td><td>679</td><td>71</td><td>516</td><td>56.9</td><td>+4.0</td><td>+27.3</td><td>-36.1</td><td>106.461 G</td><td>2</td><td>16</td><td>1</td><td>10</td><td>207.2</td><td>-0.1</td><td>-2.4</td><td>-34.3</td></tr> <tr><td>91.473 G</td><td>176</td><td>792</td><td>116</td><td>523</td><td>56.5</td><td>+4.0</td><td>+27.3</td><td>-22.9</td><td>107.410 C</td><td>0</td><td>0</td><td>0</td><td>..</td><td>..</td><td>..</td><td>..</td><td>..</td></tr> <tr><td>92.407 G</td><td>172</td><td>899</td><td>105</td><td>548</td><td>56.2</td><td>+4.0</td><td>+26.9</td><td>-10.8</td><td>108.316 C</td><td>2</td><td>20</td><td>1</td><td>10</td><td>208.1</td><td>+0.5</td><td>-0.9</td><td>-8.9</td></tr> <tr><td>93.331 C</td><td>164</td><td>855</td><td>98</td><td>513</td><td>56.6</td><td>+4.7</td><td>+27.1</td><td>+1.7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>94.373 G</td><td>163</td><td>863</td><td>101</td><td>535</td><td>55.3</td><td>+3.8</td><td>+26.8</td><td>+14.2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>95.364 G</td><td>183</td><td>798</td><td>123</td><td>535</td><td>55.0</td><td>+3.8</td><td>+26.7</td><td>+27.0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>96.364 G</td><td>156</td><td>667</td><td>122</td><td>520</td><td>54.3</td><td>+3.5</td><td>+26.6</td><td>+39.5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>97.391 C</td><td>104</td><td>477</td><td>105</td><td>482</td><td>53.7</td><td>+3.3</td><td>+26.5</td><td>+52.4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>98.464 G</td><td>67</td><td>308</td><td>108</td><td>496</td><td>53.5</td><td>+3.4</td><td>+26.5</td><td>+66.4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>99.417 C</td><td>15</td><td>126</td><td>54</td><td>455</td><td>52.5</td><td>+2.8</td><td>+26.0</td><td>+78.0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | 87.304 C  | 26            | 133                   | 85   | 436   | 58.0 | +4.0 | +27.6 | -76.4 | 103.311 C | 4        | 13 | 8   | 26 | 207.2 | +0.5  | -2.8 | -75.9 | 88.589 G                               | 73       | 373 | 94  | 481 | 57.3 | +3.8 | +27.8 | -60.1 | 104.373 G | 11       | 36 | 12  | 40 | 205.8 | -1.1  | -2.7 | -63.3 | 89.307 C | 133      | 540 | 132 | 535 | 57.1 | +3.8 | +27.3 | -50.8 | 105.514 C | 7        | 37 | 5   | 27 | 206.8 | -0.3  | -2.6 | -47.3 | 90.439 G | 93       | 679 | 71  | 516 | 56.9 | +4.0 | +27.3 | -36.1 | 106.461 G | 2        | 16 | 1   | 10 | 207.2 | -0.1  | -2.4 | -34.3 | 91.473 G | 176      | 792 | 116 | 523 | 56.5 | +4.0 | +27.3 | -22.9 | 107.410 C | 0        | 0  | 0   | .. | ..  | ..    | ..   | ..   | 92.407 G | 172      | 899 | 105 | 548 | 56.2 | +4.0 | +26.9 | -10.8 | 108.316 C | 2 | 20 | 1 | 10 | 208.1 | +0.5 | -0.9 | -8.9 | 93.331 C   | 164 | 855 | 98 | 513 | 56.6 | +4.7 | +27.1 | +1.7 |  |  |  |  |  |  |  |  | 94.373 G | 163 | 863 | 101 | 535 | 55.3 | +3.8 | +26.8 | +14.2 |  |  |  |  |  |  |  |  | 95.364 G | 183 | 798 | 123 | 535 | 55.0 | +3.8 | +26.7 | +27.0 |  |  |  |  |  |  |  |  | 96.364 G | 156 | 667 | 122 | 520 | 54.3 | +3.5 | +26.6 | +39.5 |  |  |  |  |  |  |  |  | 97.391 C | 104 | 477 | 105 | 482 | 53.7 | +3.3 | +26.5 | +52.4 |  |  |  |  |  |  |  |  | 98.464 G | 67 | 308 | 108 | 496 | 53.5 | +3.4 | +26.5 | +66.4 |  |  |  |  |  |  |  |  | 99.417 C | 15 | 126 | 54 | 455 | 52.5 | +2.8 | +26.0 | +78.0 |  |  |  |  |  |  |  |  | Means .. .. 44 291 204.2 .. -3.4 .. |  |
| 87.304 C  | 26                | 133            | 85                | 436            | 58.0                              | +4.0          | +27.6                 | -76.4                 | 103.311 C         | 4              | 13                | 8              | 26  | 207.2         | +0.5                  | -2.8 | -75.9 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 88.589 G  | 73                | 373            | 94                | 481            | 57.3                              | +3.8          | +27.8                 | -60.1                 | 104.373 G         | 11             | 36                | 12             | 40  | 205.8         | -1.1                  | -2.7 | -63.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 89.307 C  | 133               | 540            | 132               | 535            | 57.1                              | +3.8          | +27.3                 | -50.8                 | 105.514 C         | 7              | 37                | 5              | 27  | 206.8         | -0.3                  | -2.6 | -47.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 90.439 G  | 93                | 679            | 71                | 516            | 56.9                              | +4.0          | +27.3                 | -36.1                 | 106.461 G         | 2              | 16                | 1              | 10  | 207.2         | -0.1                  | -2.4 | -34.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 91.473 G  | 176               | 792            | 116               | 523            | 56.5                              | +4.0          | +27.3                 | -22.9                 | 107.410 C         | 0              | 0                 | 0              | ..  | ..            | ..                    | ..   | ..    |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 92.407 G  | 172               | 899            | 105               | 548            | 56.2                              | +4.0          | +26.9                 | -10.8                 | 108.316 C         | 2              | 20                | 1              | 10  | 208.1         | +0.5                  | -0.9 | -8.9  |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 93.331 C  | 164               | 855            | 98                | 513            | 56.6                              | +4.7          | +27.1                 | +1.7                  |                   |                |                   |                |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 94.373 G  | 163               | 863            | 101               | 535            | 55.3                              | +3.8          | +26.8                 | +14.2                 |                   |                |                   |                |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 95.364 G  | 183               | 798            | 123               | 535            | 55.0                              | +3.8          | +26.7                 | +27.0                 |                   |                |                   |                |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 96.364 G  | 156               | 667            | 122               | 520            | 54.3                              | +3.5          | +26.6                 | +39.5                 |                   |                |                   |                |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 97.391 C  | 104               | 477            | 105               | 482            | 53.7                              | +3.3          | +26.5                 | +52.4                 |                   |                |                   |                |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 98.464 G  | 67                | 308            | 108               | 496            | 53.5                              | +3.4          | +26.5                 | +66.4                 |                   |                |                   |                |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| 99.417 C  | 15                | 126            | 54                | 455            | 52.5                              | +2.8          | +26.0                 | +78.0                 |                   |                |                   |                |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| <table border="0"> <tr><td>Means</td><td>..</td><td>..</td><td>101</td><td>506</td><td>55.6</td><td>..</td><td>+27.0</td><td>..</td><td>103.311 C</td><td>4</td><td>13</td><td>8</td><td>26</td><td>207.2</td><td>+0.5</td><td>-2.8</td><td>-75.9</td></tr> </table>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | Means   | ..            | ..                    | 101  | 506   | 55.6 | ..   | +27.0 | ..    | 103.311 C | 4        | 13 | 8   | 26 | 207.2 | +0.5  | -2.8 | -75.9 | Group 16470. Apr. 14-19. A small spot. |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 103.311 C         | 4              | 13                | 8              | 26  | 207.2         | +0.5                  | -2.8 | -75.9 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| <table border="0"> <tr><td>Means</td><td>..</td><td>..</td><td>101</td><td>506</td><td>55.6</td><td>..</td><td>+27.0</td><td>..</td><td>104.373 G</td><td>11</td><td>36</td><td>12</td><td>40</td><td>205.8</td><td>-1.1</td><td>-2.7</td><td>-63.3</td></tr> </table>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | Means   | ..            | ..                    | 101  | 506   | 55.6 | ..   | +27.0 | ..    | 104.373 G | 11       | 36 | 12  | 40 | 205.8 | -1.1  | -2.7 | -63.3 | Group 16470. Apr. 14-19. A small spot. |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 104.373 G         | 11             | 36                | 12             | 40  | 205.8         | -1.1                  | -2.7 | -63.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| <table border="0"> <tr><td>Means</td><td>..</td><td>..</td><td>101</td><td>506</td><td>55.6</td><td>..</td><td>+27.0</td><td>..</td><td>105.514 C</td><td>7</td><td>37</td><td>5</td><td>27</td><td>206.8</td><td>-0.3</td><td>-2.6</td><td>-47.3</td></tr> </table>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | Means   | ..            | ..                    | 101  | 506   | 55.6 | ..   | +27.0 | ..    | 105.514 C | 7        | 37 | 5   | 27 | 206.8 | -0.3  | -2.6 | -47.3 | Group 16470. Apr. 14-19. A small spot. |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 105.514 C         | 7              | 37                | 5              | 27  | 206.8         | -0.3                  | -2.6 | -47.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| <table border="0"> <tr><td>Means</td><td>..</td><td>..</td><td>101</td><td>506</td><td>55.6</td><td>..</td><td>+27.0</td><td>..</td><td>106.461 G</td><td>2</td><td>16</td><td>1</td><td>10</td><td>207.2</td><td>-0.1</td><td>-2.4</td><td>-34.3</td></tr> </table>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | Means   | ..            | ..                    | 101  | 506   | 55.6 | ..   | +27.0 | ..    | 106.461 G | 2        | 16 | 1   | 10 | 207.2 | -0.1  | -2.4 | -34.3 | Group 16470. Apr. 14-19. A small spot. |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 106.461 G         | 2              | 16                | 1              | 10  | 207.2         | -0.1                  | -2.4 | -34.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
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| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 107.410 C         | 0              | 0                 | 0              | ..  | ..            | ..                    | ..   | ..    |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
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| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 105.514 C         | 7              | 37                | 5              | 27  | 206.8         | -0.3                  | -2.6 | -47.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
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| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 106.461 G         | 2              | 16                | 1              | 10  | 207.2         | -0.1                  | -2.4 | -34.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| <table border="0"> <tr><td>Means</td><td>..</td><td>..</td><td>101</td><td>506</td><td>55.6</td><td>..</td><td>+27.0</td><td>..</td><td>107.410 C</td><td>0</td><td>0</td><td>0</td><td>..</td><td>..</td><td>..</td><td>..</td><td>..</td></tr> </table>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | Means   | ..            | ..                    | 101  | 506   | 55.6 | ..   | +27.0 | ..    | 107.410 C | 0        | 0  | 0   | .. | ..    | ..    | ..   | ..    | Group 16470. Apr. 14-19. A small spot. |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 107.410 C         | 0              | 0                 | 0              | ..  | ..            | ..                    | ..   | ..    |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
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| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 105.514 C         | 7              | 37                | 5              | 27  | 206.8         | -0.3                  | -2.6 | -47.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
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| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 106.461 G         | 2              | 16                | 1              | 10  | 207.2         | -0.1                  | -2.4 | -34.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
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| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 107.410 C         | 0              | 0                 | 0              | ..  | ..            | ..                    | ..   | ..    |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
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| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 108.316 C         | 2              | 20                | 1              | 10  | 208.1         | +0.5                  | -0.9 | -8.9  |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
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| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 104.373 G         | 11             | 36                | 12             | 40  | 205.8         | -1.1                  | -2.7 | -63.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| <table border="0"> <tr><td>Means</td><td>..</td><td>..</td><td>101</td><td>506</td><td>55.6</td><td>..</td><td>+27.0</td><td>..</td><td>105.514 C</td><td>7</td><td>37</td><td>5</td><td>27</td><td>206.8</td><td>-0.3</td><td>-2.6</td><td>-47.3</td></tr> </table>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | Means   | ..            | ..                    | 101  | 506   | 55.6 | ..   | +27.0 | ..    | 105.514 C | 7        | 37 | 5   | 27 | 206.8 | -0.3  | -2.6 | -47.3 | Group 16470. Apr. 14-19. A small spot. |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 105.514 C         | 7              | 37                | 5              | 27  | 206.8         | -0.3                  | -2.6 | -47.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| <table border="0"> <tr><td>Means</td><td>..</td><td>..</td><td>101</td><td>506</td><td>55.6</td><td>..</td><td>+27.0</td><td>..</td><td>106.461 G</td><td>2</td><td>16</td><td>1</td><td>10</td><td>207.2</td><td>-0.1</td><td>-2.4</td><td>-34.3</td></tr> </table>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                | Means   | ..            | ..                    | 101  | 506   | 55.6 | ..   | +27.0 | ..    | 106.461 G | 2        | 16 | 1   | 10 | 207.2 | -0.1  | -2.4 | -34.3 | Group 16470. Apr. 14-19. A small spot. |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            | +27.0                 | ..                    | 106.461 G         | 2              | 16                | 1              | 10  | 207.2         | -0.1                  | -2.4 | -34.3 |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| <table border="0"> <tr><td>Means</td><td>..</td><td>..</td><td>101</td><td>506</td><td>55.6</td><td>..</td></tr></table>  | Means             | ..             | ..                | 101            | 506                               | 55.6          | ..                    |                       |                   |                |                   |                |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |
| Means   | ..                | ..             | 101               | 506            | 55.6                              | ..            |                       |                       |                   |                |                   |                |   |               |                       |      |       |      |      |       |       |           |          |    |     |    |       |       |      |       |  |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |       |       |      |       |          |          |     |     |     |      |      |       |       |           |          |    |     |    |     |       |      |      |          |          |     |     |     |      |      |       |       |           |   |    |   |    |       |      |      |      |  |     |     |    |     |      |      |       |      |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |     |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |     |     |      |      |       |       |  |  |  |  |  |  |  |  |          |    |     |    |     |      |      |       |       |  |  |  |  |  |  |  |  |                                     |  |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS. 1950.

C 87

LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|
| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                |
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |
| <b>No. 1604. Group 16468 - continued</b>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 102.366 G   | 13                | 115            | 8                 | 72             | 260.9 + 3.3                       | + 7.2         | -34.7                 |                       |                   |                |                   |                |
| 103.311 C   | 26                | 154            | 14                | 85             | 260.6 + 2.8                       | + 7.1         | -22.5                 |                       |                   |                |                   |                |
| 104.373 G   | 49                | 190            | 25                | 98             | 261.1 + 3.1                       | + 7.1         | - 8.0                 |                       |                   |                |                   |                |
| 105.514 C   | 41                | 348            | 22                | 181            | 262.2 + 4.1                       | + 6.8         | + 8.1                 |                       |                   |                |                   |                |
| 106.461 G   | 92                | 936            | 50                | 516            | 262.5 + 4.2                       | + 6.5         | +21.0                 |                       |                   |                |                   |                |
| 107.410 C   | 161               | 1049           | 100               | 647            | 262.9 + 4.4                       | + 6.0         | +33.9                 |                       |                   |                |                   |                |
| 108.316 C   | 157               | 1299           | 116               | 953            | 262.9 + 4.3                       | + 6.1         | +45.9                 |                       |                   |                |                   |                |
| 109.362 G   | 63                | 1051           | 64                | 1062           | 262.3 + 3.5                       | + 6.9         | +59.1                 |                       |                   |                |                   |                |
| 110.365 G   | 74                | 475            | 133               | 855            | 262.9 + 4.0                       | + 7.5         | +72.9                 |                       |                   |                |                   |                |
| 111.332 G   | 0                 | 18             | (0                | 86             | 260.5 ..                          | + 6.2)        | +83.3                 |                       |                   |                |                   |                |
| <b>Means</b>  | ..                | ..             | 49                | 409            | 261.3 ..                          | + 6.8         | ..                    |                       |                   |                |                   |                |
| <b>No. 1605. Latitude -15°.7</b>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| Group 16474 in Rotation 1292  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
|   |                   |                |                   |                | "                                 | 18508         | "                     | "                     | 1293              |                |                   |                |
| Group 16474. Apr. 19-May 1. A stream, in which both leader, a, and follower, b, undergo slight changes; the whole is diminishing as it passes out of sight. |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 108.316 C   | 0                 | 17             | (0                | 75             | 132.5 ..                          | ..            | -15.9)                |                       |                   |                |                   |                |
| 109.362 G   | 11                | 106            | 14                | 142            | 134.5 ..                          | 0.0           | -15.7                 |                       |                   |                |                   |                |
| 110.365 G   | 61                | 358            | 55                | 328            | 133.3 ..                          | -1.2          | -15.8                 |                       |                   |                |                   |                |
| 111.332 G   | 194               | 974            | 136               | 687            | 133.3 ..                          | -1.2          | -16.6                 |                       |                   |                |                   |                |
| 112.603 Mt.W  | 371               | 1875           | 215               | 1085           | 133.0 ..                          | -1.5          | -16.7                 |                       |                   |                |                   |                |
| 113.333 G   | 293               | 1861           | 158               | 1005           | 132.9 ..                          | -1.6          | -16.9                 |                       |                   |                |                   |                |
| 114.441 C   | 206               | 1938           | 106               | 997            | 132.6 ..                          | -1.9          | -16.7                 |                       |                   |                |                   |                |
| 115.373 G   | 229               | 1528           | 119               | 794            | 132.9 ..                          | -1.6          | -17.0                 |                       |                   |                |                   |                |
| 116.369 G   | 224               | 1539           | 126               | 857            | 132.8 ..                          | -1.7          | -17.3                 |                       |                   |                |                   |                |
| 117.419 G   | 172               | 1087           | 110               | 694            | 132.9 ..                          | -1.6          | -17.5                 |                       |                   |                |                   |                |
| 118.315 C   | 139               | 795            | 108               | 616            | 133.5 ..                          | -1.0          | -17.6                 |                       |                   |                |                   |                |
| 119.399 G   | 72                | 511            | 85                | 601            | 134.2 ..                          | -0.3          | -17.5                 |                       |                   |                |                   |                |
| 120.319 C   | 37                | 238            | 77                | 514            | 134.2 ..                          | -0.3          | -17.0                 |                       |                   |                |                   |                |
| <b>Means</b>  | ..                | ..             | 99                | 658            | 133.4 ..                          | ..            | -16.9                 | ..                    |                   |                |                   |                |
| Group 16493. May 6-18. A regular spot, with some variable companions until May 16. The umbra is crossed by a bright "bridge" between May 14 and 17.         |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 125.325 C   | 15                | 112            | 44                | 327            | 272.5 +11.1                       | + 5.6         | -79.8                 |                       |                   |                |                   |                |
| 126.451 G   | 109               | 645            | 135               | 800            | 271.7 +10.1                       | + 5.5         | -65.7                 |                       |                   |                |                   |                |
| 127.330 G   | 168               | 944            | 146               | 821            | 271.5 + 9.8                       | + 5.6         | -54.3                 |                       |                   |                |                   |                |
| 128.355 G   | 188               | 1049           | 126               | 703            | 271.5 + 9.6                       | + 5.7         | -40.7                 |                       |                   |                |                   |                |
| 129.636 G   | 179               | 1095           | 99                | 606            | 271.7 + 9.6                       | + 6.0         | -23.6                 |                       |                   |                |                   |                |
| 130.614 G   | 173               | 1282           | 90                | 662            | 271.3 + 9.0                       | + 6.4         | -11.0                 |                       |                   |                |                   |                |
| 131.624 G   | 180               | 1047           | 92                | 535            | 270.9 + 8.5                       | + 7.0         | + 1.9                 |                       |                   |                |                   |                |
| 132.322 G   | 196               | 1033           | 102               | 538            | 270.3 + 7.8                       | + 7.4         | +10.5                 |                       |                   |                |                   |                |
| 133.514 G   | 123               | 638            | 71                | 367            | 271.3 + 8.6                       | + 6.6         | +27.3                 |                       |                   |                |                   |                |
| 134.334 C   | 104               | 534            | 68                | 345            | 271.9 + 9.0                       | + 5.9         | +38.8                 |                       |                   |                |                   |                |
| 135.488 C   | 66                | 376            | 57                | 324            | 271.7 + 8.6                       | + 5.9         | +53.8                 |                       |                   |                |                   |                |
| 136.323 C   | 42                | 278            | 52                | 342            | 272.4 + 9.2                       | + 5.5         | +65.6                 |                       |                   |                |                   |                |
| 137.321 C   | 15                | 104            | 40                | 277            | 272.6 + 9.2                       | + 5.7         | +79.0                 |                       |                   |                |                   |                |
| <b>Means</b>  | ..                | ..             | 86                | 511            | 271.6 ..                          | + 6.1         | ..                    |                       |                   |                |                   |                |
| Group 16527. June 2-11. A few small variable spots.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 152.607 G   | 7                 | 57             | 15                | 126            | 274.6 + 8.7                       | + 5.6         | -76.8                 |                       |                   |                |                   |                |
| 153.321 G   | 14                | 60             | 18                | 78             | 274.6 + 8.6                       | + 5.4         | -67.3                 |                       |                   |                |                   |                |
| 154.360 G   | 9                 | 32             | 8                 | 27             | 274.2 + 8.0                       | + 5.2         | -54.0                 |                       |                   |                |                   |                |
| 155.336 G   | 7                 | 44             | 5                 | 29             | 274.1 + 7.8                       | + 4.7         | -41.2                 |                       |                   |                |                   |                |
| 156.376 C   | 2                 | 9              | 2                 | 5              | 273.7 + 7.2                       | + 4.6         | -27.8                 |                       |                   |                |                   |                |
| 157.350 C   | 11                | 58             | 6                 | 30             | 274.2 + 7.6                       | + 3.6         | -14.4                 |                       |                   |                |                   |                |
| 158.348 G   | 9                 | 60             | 5                 | 30             | 275.1 + 8.3                       | + 3.1         | - 0.3                 |                       |                   |                |                   |                |
| 159.336 C   | 7                 | 31             | 4                 | 16             | 276.5 + 9.5                       | + 2.9         | +14.2                 |                       |                   |                |                   |                |
| 160.327 G   | 14                | 92             | 8                 | 52             | 277.7 +10.6                       | + 3.3         | +28.5                 |                       |                   |                |                   |                |
| 161.387 G   | 2                 | 14             | 1                 | 10             | 277.5 +10.2                       | + 4.0         | +42.3                 |                       |                   |                |                   |                |
| <b>Means</b>  | ..                | ..             | 7                 | 40             | 275.2 ..                          | + 4.2         | ..                    |                       |                   |                |                   |                |
| Spot a  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 109.362 G   | 11                | 97             | 14                | 126            | 135.2 ..                          | 0.0           | -15.4                 |                       |                   |                |                   |                |
| 110.365 G   | 34                | 176            | 29                | 151            | 135.6 ..                          | +0.4          | -15.3                 |                       |                   |                |                   |                |
| 111.332 G   | 106               | 461            | 72                | 313            | 135.5 ..                          | +0.3          | -15.5                 |                       |                   |                |                   |                |
| 112.603 Mt.W  | 194               | 1009           | 109               | 565            | 135.9 ..                          | +0.7          | -15.8                 |                       |                   |                |                   |                |
| 113.333 G   | 142               | 954            | 75                | 506            | 136.5 ..                          | +1.3          | -16.0                 |                       |                   |                |                   |                |
| 114.441 C   | 127               | 1077           | 65                | 549            | 136.6 ..                          | +1.4          | -16.1                 |                       |                   |                |                   |                |
| 115.373 G   | 154               | 841            | 80                | 437            | 136.8 ..                          | +1.6          | -16.3                 |                       |                   |                |                   |                |
| 116.369 G   | 154               | 845            | 88                | 482            | 136.9 ..                          | +1.7          | -16.9                 |                       |                   |                |                   |                |
| 117.419 G   | 106               | 637            | 71                | 427            | 137.5 ..                          | +2.3          | -17.1                 |                       |                   |                |                   |                |
| 118.315 C   | 85                | 480            | 71                | 398            | 137.5 ..                          | +2.3          | -17.3                 |                       |                   |                |                   |                |
| 119.399 G   | 54                | 384            | 68                | 484            | 137.5 ..                          | +2.3          | -17.0                 |                       |                   |                |                   |                |
| 120.319 C   | 26                | 183            | 62                | 439            | 137.2 ..                          | +2.0          | -16.9                 |                       |                   |                |                   |                |
| Spot b  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 109.362 G   | 0                 | 9              | 0                 | 16             | 129.2 ..                          | 0.0           | -17.8                 |                       |                   |                |                   |                |
| 110.365 G   | 27                | 182            | 26                | 177            | 130.8 ..                          | +1.6          | -16.6                 |                       |                   |                |                   |                |
| 111.332 G   | 88                | 513            | 64                | 374            | 130.9 ..                          | +1.7          | -17.6                 |                       |                   |                |                   |                |
| 112.603 Mt.W  | 177               | 866            | 106               | 520            | 129.5 ..                          | +0.3          | -17.9                 |                       |                   |                |                   |                |
| 113.333 G   | 151               | 907            | 83                | 499            | 128.4 ..                          | -0.8          | -18.1                 |                       |                   |                |                   |                |
| 114.441 C   | 79                | 861            | 41                | 448            | 127.4 ..                          | -1.8          | -18.0                 |                       |                   |                |                   |                |
| 115.373 G   | 75                | 687            | 39                | 357            | 127.5 ..                          | -1.7          | -18.0                 |                       |                   |                |                   |                |
| 116.369 G   | 70                | 694            | 38                | 375            | 126.9 ..                          | -2.3          | -17.9                 |                       |                   |                |                   |                |
| 117.419 G   | 61                | 398            | 36                | 235            | 127.4 ..                          | -1.8          | -17.8                 |                       |                   |                |                   |                |
| 118.315 C   | 50                | 276            | 34                | 190            | 127.0 ..                          | -2.2          | -17.7                 |                       |                   |                |                   |                |
| 119.399 G   | 18                | 127            | 17                | 117            | 127.2 ..                          | -2.0          | -17.7                 |                       |                   |                |                   |                |
| 120.319 C   | 11                | 55             | 15                | 75             | 127.2 ..                          | -2.0          | -17.7                 |                       |                   |                |                   |                |

## GREENWICH PHOTO-HELIOGRAPHIC RESULTS. 1950.

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LEDOER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |  |  |  |  |  |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|--|--|--|--|--|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |  |  |  |  |  |
| <b>No. 1607. Latitude +9°.5</b>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Group 16513 in Rotation 1293   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
|  | "                 | 16540          | "                 | "              | 1294                              |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
|  | "                 | 16565          | "                 | "              | 1295                              |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
|  | "                 | 16567          | {                 | "              |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Group 16513. May 20-June 1. At first a stream of normal type, of which both leader, <i>a</i> , and follower are regular spots and the intermediate component composite. This middle component appears to move forward and to have amalgamated with <i>a</i> by May 27. From this date the following portion dies out, leaving the leader alone at the west limb. |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 139.325 C  | 17                | 111            | (43               | 286            | 89.5                              | ..            | + 7.6                 | -77.6                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 140.330 G  | 96                | 720            | 153               | 1115           | 85.4                              | 0.0           | + 8.5                 | -68.4                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 141.325 G  | 127               | 1175           | 120               | 1089           | 85.7                              | +0.2          | + 8.3                 | -55.0                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 142.346 C  | 298               | 1691           | 204               | 1160           | 86.0                              | +0.4          | + 8.3                 | -41.2                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 143.329 C  | 260               | 1803           | 150               | 1046           | 85.8                              | 0.0           | + 8.6                 | -28.4                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 144.345 C  | 258               | 1669           | 136               | 879            | 86.9                              | +1.0          | + 8.7                 | -13.8                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 145.329 C  | 249               | 1616           | 127               | 824            | 87.2                              | +1.2          | + 8.5                 | -0.5                  |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 146.393 G  | 289               | 1572           | 154               | 835            | 88.4                              | +2.3          | + 8.5                 | +14.8                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 147.405 G  | 256               | 1409           | 159               | 875            | 88.5                              | +2.3          | + 8.0                 | +28.3                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 148.420 C  | 193               | 1047           | 137               | 746            | 91.2                              | +4.8          | + 7.4                 | +44.4                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 149.340 C  | 180               | 890            | 167               | 837            | 91.1                              | +4.6          | + 7.6                 | +56.5                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 150.333 G  | 80                | 476            | 126               | 755            | 91.9                              | +5.3          | + 7.2                 | +70.4                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 151.335 C  | 4                 | 29             | 18                | 127            | 91.6                              | ..            | + 8.9                 | +83.4                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Means  | ..                | ..             | 148               | 924            | 88.0                              | ..            | + 8.1                 | ..                    |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| <b>Spot <i>a</i></b>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 139.325 C  | 13                | 82             | 28                | 175            | 91.1                              | 0.0           | + 7.3                 | -76.0                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 140.330 G  | 18                | 246            | 20                | 278            | 90.7                              | -0.5          | + 7.3                 | -63.1                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 141.325 G  | 27                | 299            | 21                | 230            | 91.8                              | +0.5          | + 7.4                 | -48.9                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 142.346 C  | 51                | 275            | 31                | 168            | 93.1                              | +1.6          | + 7.5                 | -34.1                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 143.329 C  | 40                | 284            | 22                | 153            | 93.6                              | +2.0          | + 7.4                 | -20.6                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 144.345 C  | 47                | 317            | 24                | 162            | 93.4                              | +1.7          | + 7.2                 | -7.3                  |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 145.329 C  | 138               | 835            | 70                | 426            | 92.7                              | +0.9          | + 7.8                 | +5.0                  |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 146.393 G  | 172               | 994            | 93                | 537            | 93.3                              | +1.4          | + 7.3                 | +19.7                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 147.405 G  | 151               | 795            | 101               | 533            | 93.5                              | +1.4          | + 7.2                 | +33.3                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 148.420 C  | 169               | 910            | 123               | 664            | 93.0                              | +0.8          | + 7.3                 | +46.2                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 149.340 C  | 153               | 786            | 148               | 762            | 93.3                              | +1.0          | + 7.4                 | +58.7                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 150.333 G  | 73                | 444            | 119               | 724            | 93.3                              | +0.9          | + 7.5                 | +71.8                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 151.335 C  | 4                 | 29             | 18                | 127            | 91.6                              | ..            | + 8.9                 | +83.4                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Group 16540. June 16-28. A regular spot, with occasional companions. The umbra is divided from June 18 to 22.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 166.639 G  | 41                | 230            | 67                | 375            | 93.6                              | -0.8          | + 8.7                 | -72.1                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 167.346 G  | 53                | 391            | 59                | 434            | 93.3                              | -1.1          | + 8.8                 | -63.0                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 168.381 G  | 92                | 554            | 71                | 427            | 93.2                              | -1.4          | + 9.0                 | -49.4                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 169.564 C  | 83                | 571            | 50                | 343            | 93.3                              | -1.4          | + 9.0                 | -33.6                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 170.538 G  | 115               | 660            | 62                | 356            | 93.0                              | -1.8          | + 9.2                 | -21.0                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| <b>No. 1607. Group 16540 - continued</b>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 171.474 G  | 94                | 531            | 48                | 271            | 92.8                              | -2.1          | + 9.4                 | -8.9                  |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 172.339 G  | 120               | 619            | 60                | 310            | 92.5                              | -2.5          | + 9.4                 | +2.3                  |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 173.466 G  | 85                | 494            | 45                | 262            | 92.4                              | -2.8          | + 9.5                 | +17.1                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 174.321 G  | 74                | 451            | 42                | 257            | 92.3                              | -3.0          | + 9.4                 | +28.3                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 175.340 C  | 74                | 415            | 50                | 278            | 92.1                              | -3.3          | + 9.6                 | +41.6                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 176.361 C  | 40                | 268            | 35                | 236            | 92.2                              | -3.3          | + 9.4                 | +55.2                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 177.330 G  | 25                | 180            | 34                | 245            | 92.7                              | -3.0          | + 9.6                 | +68.6                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 178.394 C  | 11                | 58             | 38                | 199            | 92.1                              | ..            | + 9.7                 | +82.0                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Means  | ..                | ..             | 52                | 316            | 92.8                              | ..            | + 9.2                 | ..                    |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| <b>Group 16565. July 13-15. A small spot, seen only on July 13 and 15.</b>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 193.342 G  | 0                 | 5              | 0                 | 19             | 88.8                              | ..            | +11.2                 | -83.4                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 194.417 G  | 0                 | 0              | 0                 | 0              | ..                                | ..            | ..                    | ..                    |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 195.341 G  | 0                 | 7              | 0                 | 6              | 89.7                              | -8.1          | +11.8                 | -56.1                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Means  | ..                | ..             | 0                 | 6              | 89.7                              | ..            | +11.8                 | ..                    |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| <b>Group 16567. July 14-15. A small spot.</b>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 194.417 G  | 2                 | 12             | 3                 | 15             | 90.5                              | -7.2          | + 8.9                 | -67.5                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 195.341 G  | 2                 | 7              | 2                 | 6              | 90.6                              | -7.2          | + 8.9                 | -55.2                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Means  | ..                | ..             | 2                 | 10             | 90.6                              | ..            | + 8.9                 | ..                    |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| <b>No. 1608. Latitude +17°.3</b>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Group 16514 in Rotation 1293   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
|  | "                 | 16537          | "                 | "              | 1294                              |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Group 16514. May 21-29. A bi-polar group, growing rapidly from a tiny spot near the C.M. The follower, <i>b</i> , a stable regular spot, is the most stable component.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 140.330 G  | 0                 | 7              | 0                 | 4              | 135.5                             | 0.0           | +16.9                 | -18.3                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 141.325 G  | 0                 | 7              | 0                 | 4              | 134.7                             | -0.8          | +16.7                 | -6.0                  |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 142.346 C  | 58                | 224            | 30                | 119            | 132.6                             | -2.8          | +17.0                 | +5.4                  |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 143.329 C  | 224               | 1436           | 124               | 796            | 132.4                             | -3.0          | +17.3                 | +18.2                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 144.345 C  | 249               | 1427           | 156               | 891            | 132.6                             | -2.7          | +17.6                 | +31.9                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 145.329 C  | 193               | 1305           | 143               | 980            | 132.7                             | -2.6          | +17.8                 | +45.0                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 146.393 G  | 137               | 811            | 139               | 854            | 131.8                             | -3.5          | +17.6                 | +58.2                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 147.405 G  | 81                | 375            | 145               | 687            | 131.4                             | -3.8          | +17.5                 | +71.2                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 148.420 C  | 11                | 71             | (36               | 233            | 127.1                             | ..            | +19.1                 | +80.3                 |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Means  | ..                | ..             | 92                | 542            | 133.0                             | ..            | +17.3                 | ..                    |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |

## LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |  | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. |       |       |  |  |  |  |  |  |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|-------------------|--|-------------------|----------------|-----------------------------------|----------------|-----------------------|-------|-------|--|--|--|--|--|--|--|--|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ             | Whole<br>Spots                           | Umbræ             | Whole<br>Spots |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| <b>No. 1608. Group 16514 - continued</b>  |                   |                |                   |                |                                   |                |                       |                       |                   | <b>No. 1609. Group 16520 - continued</b> |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| Spot a  |                   |                |                   |                |                                   |                |                       |                       |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 142.346 C   | 31                | 100            | 16                | 53             | 134.1                             | 0.0            | +16.9                 | + 6.9                 | 150.333 G         | 90                                       | 414               | 47             | 218                               | 2.9            | -0.8                  | + 5.3 | -18.6 |  |  |  |  |  |  |  |  |
| 143.329 C   | 133               | 677            | 74                | 379            | 134.7                             | + 0.6          | +17.0                 | +20.5                 | 151.335 C         | 80                                       | 588               | 40             | 295                               | 4.4            | +0.6                  | + 5.0 | - 3.8 |  |  |  |  |  |  |  |  |
| 144.345 C   | 131               | 710            | 84                | 454            | 135.8                             | + 1.8          | +16.6                 | +35.1                 | 152.607 G         | 82                                       | 937               | 43             | 483                               | 4.1            | 0.0                   | + 5.1 | +12.7 |  |  |  |  |  |  |  |  |
| 145.329 C   | 93                | 746            | 73                | 589            | 135.9                             | + 1.9          | +16.3                 | +48.2                 | 153.321 G         | 145                                      | 870               | 80             | 474                               | 4.3            | +0.1                  | + 5.3 | +22.4 |  |  |  |  |  |  |  |  |
| 146.393 G   | 48                | 417            | 57                | 492            | 136.9                             | + 3.0          | +16.3                 | +63.3                 | 154.360 G         | 139                                      | 751               | 87             | 472                               | 5.3            | +1.0                  | + 5.0 | +37.1 |  |  |  |  |  |  |  |  |
| 147.405 G   | 37                | 190            | 83                | 428            | 136.5                             | + 2.6          | +16.0                 | +76.3                 | 155.336 G         | 114                                      | 676               | 93             | 549                               | 6.7            | +2.2                  | + 5.1 | +51.4 |  |  |  |  |  |  |  |  |
|   |                   |                |                   |                |                                   |                |                       |                       | 156.376 C         | 43                                       | 392               | 53             | 497                               | 7.5            | +2.8                  | + 4.8 | +66.0 |  |  |  |  |  |  |  |  |
|   |                   |                |                   |                |                                   |                |                       |                       | 157.350 C         | 13                                       | 84                | 39             | 248                               | 8.0            | +3.2                  | + 5.3 | +79.4 |  |  |  |  |  |  |  |  |
| Spot b  |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 142.346 C   | 27                | 124            | 14                | 66             | 131.0                             | 0.0            | +17.2                 | + 3.8                 |                   | ..                                       | ..                | 45             | 302                               | 4.7            | ..                    | + 5.3 | ..    |  |  |  |  |  |  |  |  |
| 143.329 C   | 91                | 759            | 50                | 417            | 130.2                             | - 0.8          | +17.7                 | +16.0                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 144.345 C   | 118               | 717            | 72                | 437            | 129.3                             | - 1.6          | +18.9                 | +28.6                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 145.329 C   | 100               | 559            | 70                | 391            | 128.1                             | - 2.8          | +19.3                 | +40.4                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 146.393 G   | 89                | 394            | 82                | 362            | 127.9                             | - 2.9          | +19.4                 | +54.3                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 147.405 G   | 44                | 185            | 62                | 259            | 127.6                             | - 3.2          | +19.4                 | +67.4                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 148.420 C   | 11                | 71             | 36                | 233            | 127.1                             | ..             | +19.1                 | +80.3                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| Group 16537. June 13-23. A small regular spot slowly declining, preceded by a distant companion until June 19.  |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 163.333 C   | 0                 | 9              | (0                | 18             | 134.0                             | ..             | +17.3)                | -75.4                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 164.360 C   | 13                | 78             | 21                | 125            | 125.9                             | - 4.2          | +17.2                 | -69.9                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 165.334 C   | 13                | 110            | 13                | 110            | 124.9                             | - 5.2          | +17.3                 | -58.0                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 166.639 G   | 26                | 127            | 18                | 89             | 124.2                             | - 5.8          | +17.1                 | -41.5                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 167.346 G   | 28                | 147            | 17                | 91             | 124.2                             | - 5.8          | +17.4                 | -32.1                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 168.381 G   | 20                | 117            | 11                | 64             | 123.2                             | - 6.8          | +17.2                 | -19.4                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 169.564 C   | 18                | 73             | 9                 | 38             | 122.5                             | - 7.4          | +16.8                 | - 4.4                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 170.538 G   | 14                | 46             | 7                 | 24             | 121.2                             | - 8.7          | +17.3                 | + 7.2                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 171.474 G   | 7                 | 21             | 4                 | 12             | 120.8                             | - 9.0          | +17.2                 | +19.1                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 172.339 G   | 7                 | 14             | 4                 | 8              | 120.3                             | - 9.5          | +17.3                 | +30.1                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 173.466 G   | 2                 | 12             | 1                 | 9              | 119.8                             | -10.0          | +17.5                 | +44.5                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| Means   | ..                | ..             | 10                | 57             | 122.7                             | ..             | +17.2                 | ..                    |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| No. 1609. Latitude +5°.6  |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| Group 16520 in Rotation 1293  |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| " 16549 " " 1294  |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| Group 16520. May 28-June 7. A stream, developing from a tiny spot on May 28. The leader, a, becomes the largest and most stable component.                                    |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 147.405 G   | 0                 | 9              | 0                 | 8              | 3.2                               | 0.0            | + 6.5                 | -57.0                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 148.420 C   | 4                 | 36             | 3                 | 25             | 3.6                               | + 0.2          | + 5.2                 | -43.2                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 149.340 C   | 14                | 96             | 8                 | 57             | 1.7                               | - 1.8          | + 5.3                 | -32.9                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| No. 1609. Latitude +5°.6  |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| Group 16520 in Rotation 1293  |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| " 16549 " " 1294  |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| Group 16520. May 28-June 7. A stream, developing from a tiny spot on May 28. The leader, a, becomes the largest and most stable component.                                    |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 158.348 G   | 27                | 213            | 97                | 769            | 193.8                             | ..             | -17.8                 | -81.6                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| 159.336 C   | 98                | 673            | 135               | 929            | 194.8                             | 0.0            | -17.9                 | -67.5                 |                   |  |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| No. 1610. Latitude -17°.9   |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| Group 16531 in Rotation 1294  |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| " 16558 " " 1295  |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |
| Group 16531. June 8-20. A big spot with double umbra which becomes elongated and splits into two by June 14. It has, however, recombined by June 17 to form a composite spot. |                   |                |                   |                |                                   |                |                       |                       |                   | Means                                    |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |  |  |

## GREENWICH PHOTO-HELIOGRAPHIC RESULTS. 1950.

LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

| LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|
| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                |
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |
| <b>No. 1613. Group 16588 - continued</b>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 228.383 G  | 109               | 748            | 57                | 388            | 82.8                              | -0.4          | +14.4                 | +14.0                 |                   |                |                   |                |
| 229.325 G  | 71                | 463            | 40                | 259            | 82.6                              | -0.7          | +14.4                 | +26.3                 |                   |                |                   |                |
| 230.333 G  | 32                | 219            | 21                | 142            | 82.8                              | -0.5          | +14.4                 | +39.8                 |                   |                |                   |                |
| 231.430 C  | 4                 | 22             | 3                 | 19             | 83.4                              | 0.0           | +14.3                 | +54.9                 |                   |                |                   |                |
| 232.337 G  | 0                 | 2              | 0                 | 3              | 84.6                              | +1.2          | +15.7                 | +68.1                 |                   |                |                   |                |
| Means  | ..                | ..             | 38                | 286            | 82.7                              | ..            | +14.4                 | ..                    |                   |                |                   |                |
| <b>No. 1614. Latitude -10°.4</b>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| Group 16570 in Rotation 1295   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| " 16592  | "                 | "              |                   |                | 1296                              |               |                       |                       |                   |                |                   |                |
| " 16612  | "                 | "              |                   |                | 1297                              |               |                       |                       |                   |                |                   |                |
| Group 16570. July 19-31. A stable regular spot, followed by a few small companions until July 25.                            |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 199.589 G  | 60                | 354            | 103               | 609            | 18.1                              | 0.0           | -12.5                 | -71.5                 |                   |                |                   |                |
| 200.362 C  | 83                | 564            | 90                | 609            | 18.7                              | +0.5          | -11.9                 | -60.6                 |                   |                |                   |                |
| 201.493 G  | 166               | 826            | 126               | 628            | 18.2                              | -0.1          | -11.7                 | -46.2                 |                   |                |                   |                |
| 202.387 G  | 196               | 1063           | 124               | 672            | 18.1                              | -0.3          | -11.5                 | -34.4                 |                   |                |                   |                |
| 203.418 G  | 246               | 1206           | 138               | 677            | 18.0                              | -0.5          | -11.4                 | -20.9                 |                   |                |                   |                |
| 204.388 G  | 218               | 1247           | 116               | 663            | 18.3                              | -0.3          | -11.6                 | -7.8                  |                   |                |                   |                |
| 205.642 G  | 193               | 1082           | 103               | 574            | 18.4                              | -0.3          | -11.3                 | +8.9                  |                   |                |                   |                |
| 206.377 G  | 221               | 1024           | 122               | 563            | 18.6                              | -0.2          | -10.9                 | +18.8                 |                   |                |                   |                |
| 207.335 G  | 223               | 920            | 136               | 561            | 18.5                              | -0.4          | -11.0                 | +31.4                 |                   |                |                   |                |
| 208.594 G  | 121               | 568            | 96                | 449            | 18.5                              | -0.5          | -10.8                 | +48.1                 |                   |                |                   |                |
| 209.322 G  | 106               | 536            | 106               | 536            | 18.6                              | -0.5          | -10.8                 | +57.8                 |                   |                |                   |                |
| 210.585 C  | 31                | 212            | 62                | 422            | 18.1                              | -1.2          | -10.5                 | +74.0                 |                   |                |                   |                |
| 211.330 C  | 9                 | 42             | 48                | 223            | 17.6                              | ..            | -10.5                 | +83.4                 |                   |                |                   |                |
| Means  | ..                | ..             | 110               | 580            | 18.3                              | ..            | -11.3                 | ..                    |                   |                |                   |                |
| Group 16592. Aug. 15-26. A stable regular spot, with occasional companions.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 226.325 C  | 31                | 168            | 74                | 403            | 19.5                              | -1.4          | -10.4                 | -76.5                 |                   |                |                   |                |
| 227.325 G  | 80                | 392            | 99                | 484            | 18.7                              | -2.3          | -10.7                 | -64.1                 |                   |                |                   |                |
| 228.383 G  | 124               | 575            | 103               | 476            | 18.6                              | -2.5          | -10.6                 | -50.2                 |                   |                |                   |                |
| 229.325 G  | 109               | 645            | 72                | 426            | 18.9                              | -2.3          | -10.4                 | -37.4                 |                   |                |                   |                |
| 230.333 G  | 128               | 801            | 73                | 457            | 19.0                              | -2.3          | -10.3                 | -24.0                 |                   |                |                   |                |
| 231.430 C  | 190               | 818            | 101               | 434            | 18.5                              | -2.9          | -10.0                 | -10.0                 |                   |                |                   |                |
| 232.337 G  | 125               | 784            | 65                | 408            | 18.3                              | -3.2          | -10.1                 | +1.8                  |                   |                |                   |                |
| 233.440 G  | 144               | 762            | 79                | 419            | 18.4                              | -3.3          | -9.8                  | +16.5                 |                   |                |                   |                |
| 234.301 G  | 132               | 670            | 78                | 395            | 18.4                              | -2.3          | -10.0                 | +27.8                 |                   |                |                   |                |
| 235.323 G  | 103               | 458            | 72                | 321            | 18.5                              | -3.4          | -10.0                 | +41.4                 |                   |                |                   |                |
| 236.356 G  | 82                | 378            | 76                | 352            | 18.5                              | -3.5          | -10.0                 | +55.1                 |                   |                |                   |                |
| 237.351 G  | 41                | 249            | 60                | 364            | 18.4                              | -3.7          | -9.9                  | +68.1                 |                   |                |                   |                |
| Means  | ..                | ..             | 79                | 412            | 18.6                              | ..            | -10.2                 | ..                    |                   |                |                   |                |
| <b>No. 1614. - continued</b>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| Group 16612. Sept. 11-23. A small regular spot with occasional companions.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 253.669 G  | 23                | 93             | 60                | 241            | 17.3                              | -6.5          | -9.7                  | -77.4                 |                   |                |                   |                |
| 254.325 G  | 29                | 153            | 44                | 230            | 17.8                              | -6.1          | -9.8                  | -68.3                 |                   |                |                   |                |
| 255.368 G  | 43                | 193            | 40                | 181            | 17.1                              | -6.9          | -9.7                  | -55.2                 |                   |                |                   |                |
| 256.636 G  | 66                | 289            | 45                | 197            | 16.8                              | -7.3          | -9.8                  | -38.8                 |                   |                |                   |                |
| 257.491 G  | 43                | 267            | 25                | 158            | 16.8                              | -7.4          | -9.8                  | -27.5                 |                   |                |                   |                |
| 258.323 G  | 47                | 219            | 25                | 118            | 17.1                              | -7.2          | -9.6                  | -16.2                 |                   |                |                   |                |
| 259.374 G  | 29                | 179            | 15                | 93             | 17.5                              | -6.9          | -9.6                  | -1.9                  |                   |                |                   |                |
| 260.323 G  | 34                | 149            | 18                | 78             | 16.8                              | -7.7          | -9.7                  | +9.9                  |                   |                |                   |                |
| 261.614 G  | 16                | 146            | 9                 | 86             | 17.0                              | -7.6          | -10.0                 | +27.2                 |                   |                |                   |                |
| 262.332 G  | 18                | 108            | 12                | 70             | 16.9                              | -7.8          | -10.1                 | +36.5                 |                   |                |                   |                |
| 263.326 G  | 14                | 65             | 11                | 53             | 17.0                              | -7.8          | -10.0                 | +49.8                 |                   |                |                   |                |
| 264.442 G  | 14                | 58             | 18                | 72             | 16.9                              | -8.0          | -10.2                 | +64.4                 |                   |                |                   |                |
| 265.366 G  | 4                 | 16             | 10                | 39             | 16.9                              | -8.1          | -10.2                 | +76.6                 |                   |                |                   |                |
| Means  | ..                | ..             | 26                | 124            | 17.1                              | ..            | -9.9                  | ..                    |                   |                |                   |                |
| <b>No. 1615. Latitude +22°.2</b>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| Group 16611 in Rotation 1297   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| " 16625  | "                 | "              |                   |                | 1298                              |               |                       |                       |                   |                |                   |                |
| " 16643  | "                 | "              |                   |                | 1299                              |               |                       |                       |                   |                |                   |                |
| Group 16611. Sept. 11-14. A b1-polar group appearing near the west limb. There is a sudden increase in area on September 13. |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 253.669 G  | 5                 | 25             | 3                 | 17             | 136.2                             | 0.0           | +21.4                 | +41.5                 |                   |                |                   |                |
| 254.325 G  | 7                 | 27             | 6                 | 22             | 137.3                             | +1.2          | +21.2                 | +51.2                 |                   |                |                   |                |
| 255.368 G  | 68                | 308            | 78                | 355            | 137.1                             | +1.2          | +20.3                 | +64.8                 |                   |                |                   |                |
| 256.636 G  | 18                | 129            | 59                | 369            | 136.3                             | ..            | +20.5                 | +80.7                 |                   |                |                   |                |
| Means  | ..                | ..             | 29                | 131            | 136.9'                            | ..            | +21.0                 | ..                    |                   |                |                   |                |
| <b>No. 1615. - continued</b>   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| Group 16625. Sept. 20-Oct. 12. A stable regular spot.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |
| 271.311 C  | 7                 | 35             | 34                | 168            | 135.8                             | ..            | +22.3                 | -86.1                 |                   |                |                   |                |
| 272.316 C  | 22                | 123            | 36                | 200            | 135.2                             | +2.4          | +23.0                 | -73.4                 |                   |                |                   |                |
| 273.383 G  | 40                | 164            | 40                | 166            | 134.1                             | +1.5          | +23.1                 | -60.4                 |                   |                |                   |                |
| 274.538 G  | 56                | 252            | 41                | 184            | 133.8                             | +1.4          | +23.1                 | -45.5                 |                   |                |                   |                |
| 275.326 G  | 65                | 323            | 41                | 203            | 133.4                             | +1.1          | +23.1                 | -35.5                 |                   |                |                   |                |
| 276.557 G  | 83                | 330            | 46                | 182            | 133.0                             | +0.9          | +23.1                 | -19.6                 |                   |                |                   |                |
| 277.320 G  | 74                | 329            | 39                | 174            | 132.9                             | +1.0          | +23.3                 | -9.7                  |                   |                |                   |                |
| 278.343 G  | 60                | 308            | 31                | 160            | 132.6                             | +0.9          | +23.4                 | +3.5                  |                   |                |                   |                |
| 279.301 C  | 67                | 284            | 36                | 153            | 132.3                             | +0.7          | +23.7                 | +15.9                 |                   |                |                   |                |
| 280.449 G  | 58                | 319            | 35                | 195            | 132.2                             | +0.8          | +23.8                 | +30.9                 |                   |                |                   |                |

## LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |
| No. 1615. Group 16625 - continued  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| 281.301 C  | 47                | 230            | 32                | 159            | 131.4                             | +0.2           | °                     | +23.8                 | °                 | +41.4          |                   |                |                                   |                |                       |
| 282.302 C  | 32                | 198            | 28                | 174            | 131.4                             | +0.4           | °                     | +23.5                 | °                 | +54.6          |                   |                |                                   |                |                       |
| 283.427 G  | 27                | 122            | 37                | 167            | 131.4                             | +0.6           | °                     | +23.3                 | °                 | +69.4          |                   |                |                                   |                |                       |
| 284.341 G  | 13                | 69             | 38                | 199            | 131.5                             | ..             | °                     | +23.5                 | °                 | +81.6          |                   |                |                                   |                |                       |
| Means  | ..                | ..             | 37                | 176            | 132.8                             | ..             | °                     | +23.4                 | ..                |                |                   |                |                                   |                |                       |
| Group 16643. Oct. 28-30. A small spot.   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| 300.370 G  | 2                 | 11             | 3                 | 18             | 126.2                             | -1.5           | °                     | +22.4                 | °                 | -72.3          |                   |                |                                   |                |                       |
| 301.452 G  | 4                 | 18             | 4                 | 17             | 126.7                             | -0.9           | °                     | +22.2                 | °                 | -57.6          |                   |                |                                   |                |                       |
| 302.391 G  | 2                 | 13             | 1                 | 9              | 126.7                             | -0.7           | °                     | +21.8                 | °                 | -45.2          |                   |                |                                   |                |                       |
| Means  | ..                | ..             | 3                 | 15             | 126.5                             | ..             | °                     | +22.1                 | ..                |                |                   |                |                                   |                |                       |
| No. 1616. Latitude +12°.2  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| Group 16615 in Rotation 1297<br>" 16627 " " 1298                                   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| Group 16615. Sept. 15-18. A few small spots.                                       |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| 257.491 G  | 2                 | 11             | 1                 | 7              | 77.9                              | 0.0            | °                     | +11.7                 | °                 | +33.6          |                   |                |                                   |                |                       |
| 257.323 G  | 11                | 95             | 8                 | 66             | 78.0                              | 0.0            | °                     | +12.8                 | °                 | +44.7          |                   |                |                                   |                |                       |
| 259.374 G  | 11                | 115            | 10                | 105            | 78.9                              | +0.9           | °                     | +13.3                 | °                 | +59.5          |                   |                |                                   |                |                       |
| 260.323 G  | 16                | 47             | 23                | 66             | 77.2                              | -0.9           | °                     | +12.6                 | °                 | +70.3          |                   |                |                                   |                |                       |
| Means  | ..                | ..             | 10                | 61             | 78.0                              | ..             | °                     | +12.6                 | ..                |                |                   |                |                                   |                |                       |
| Group 16627. Oct. 4-13. Possibly only a revival of Group 16615. A variable stream. |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| 276.557 G  | 6                 | 26             | 10                | 43             | 79.8                              | +0.5           | °                     | +11.8                 | °                 | -72.8          |                   |                |                                   |                |                       |
| 277.320 G  | 20                | 74             | 22                | 80             | 79.4                              | 0.0            | °                     | +11.6                 | °                 | -63.2          |                   |                |                                   |                |                       |
| 278.343 G  | 16                | 71             | 12                | 55             | 79.1                              | -0.3           | °                     | +11.8                 | °                 | -50.0          |                   |                |                                   |                |                       |
| 279.301 C  | 4                 | 45             | 3                 | 29             | 79.2                              | -0.3           | °                     | +11.8                 | °                 | -37.2          |                   |                |                                   |                |                       |
| 280.449 G  | 29                | 149            | 16                | 82             | 78.3                              | -1.3           | °                     | +12.1                 | °                 | -23.0          |                   |                |                                   |                |                       |
| 281.301 C  | 13                | 52             | 7                 | 27             | 78.6                              | -1.1           | °                     | +12.0                 | °                 | -11.4          |                   |                |                                   |                |                       |
| 282.302 C  | 11                | 61             | 6                 | 31             | 78.2                              | -1.5           | °                     | +12.3                 | °                 | +1.4           |                   |                |                                   |                |                       |
| 283.427 G  | 20                | 115            | 10                | 60             | 78.1                              | -1.7           | °                     | +11.2                 | °                 | +16.1          |                   |                |                                   |                |                       |
| 284.341 G  | 7                 | 38             | 4                 | 22             | 77.9                              | -2.0           | °                     | +11.5                 | °                 | +28.0          |                   |                |                                   |                |                       |
| 285.378 G  | 2                 | 11             | 1                 | 7              | 77.8                              | -2.2           | °                     | +12.4                 | °                 | +41.5          |                   |                |                                   |                |                       |
| Means  | ..                | ..             | 9                 | 44             | 78.6                              | ..             | °                     | +11.8                 | ..                |                |                   |                |                                   |                |                       |
| No. 1617. Latitude +16°.8  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| Group 16616 in Rotation 1298<br>" 16636 " " 1299                                   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| Group 16616. Sept. 15-27. A stable regular spot.                                   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| 257.491 G  | 20                | 118            | 43                | 251            | 326.5                             | 0.0            | °                     | +17.2                 | °                 | -77.8          |                   |                |                                   |                |                       |
| 258.323 G  | 29                | 188            | 35                | 229            | 326.5                             | 0.0            | °                     | +17.6                 | °                 | -66.8          |                   |                |                                   |                |                       |
| 259.374 G  | 38                | 287            | 32                | 238            | 326.1                             | -0.3           | °                     | +17.8                 | °                 | -53.3          |                   |                |                                   |                |                       |
| 260.323 G  | 72                | 373            | 48                | 246            | 326.6                             | +0.2           | °                     | +17.6                 | °                 | -40.3          |                   |                |                                   |                |                       |
| 261.614 G  | 88                | 504            | 48                | 277            | 326.3                             | -0.1           | °                     | +17.6                 | °                 | -23.5          |                   |                |                                   |                |                       |
| 262.332 G  | 119               | 554            | 62                | 288            | 326.1                             | -0.3           | °                     | +17.5                 | °                 | -14.3          |                   |                |                                   |                |                       |
| 263.326 G  | 119               | 549            | 61                | 280            | 326.3                             | 0.0            | °                     | +17.6                 | °                 | -0.9           |                   |                |                                   |                |                       |
| 264.442 G  | 104               | 490            | 54                | 255            | 326.2                             | -0.1           | °                     | +17.6                 | °                 | +13.7          |                   |                |                                   |                |                       |
| 265.366 G  | 90                | 470            | 50                | 263            | 325.9                             | -0.4           | °                     | +17.7                 | °                 | +25.6          |                   |                |                                   |                |                       |
| 266.438 C  | 83                | 390            | 55                | 257            | 326.3                             | +0.1           | °                     | +17.5                 | °                 | +40.1          |                   |                |                                   |                |                       |
| 267.418 G  | 43                | 323            | 35                | 265            | 325.9                             | -0.3           | °                     | +17.7                 | °                 | +52.7          |                   |                |                                   |                |                       |
| 268.354 G  | 45                | 231            | 52                | 266            | 326.1                             | -0.1           | °                     | +17.9                 | °                 | +65.2          |                   |                |                                   |                |                       |
| 269.545 G  | 7                 | 83             | 19                | 221            | 325.8                             | ..             | °                     | +18.1                 | ..                | +80.6          |                   |                |                                   |                |                       |
| Means  | ..                | ..             | 48                | 260            | 326.2                             | ..             | °                     | +17.6                 | ..                |                |                   |                |                                   |                |                       |
| No. 1616. Latitude +12°.2  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| Group 16615 in Rotation 1297<br>" 16627 " " 1298                                   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| Group 16636. Oct. 12-18. A small spot, with a faint companion on October 15.       |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| 284.341 G  | 9                 | 31             | 24                | 82             | 329.3                             | ..             | °                     | +16.7                 | °                 | -80.6          |                   |                |                                   |                |                       |
| 285.378 G  | 9                 | 40             | 11                | 50             | 329.2                             | +3.5           | °                     | +16.5                 | °                 | -67.1          |                   |                |                                   |                |                       |
| 286.329 G  | 13                | 64             | 11                | 55             | 329.1                             | +3.4           | °                     | +16.0                 | °                 | -54.6          |                   |                |                                   |                |                       |
| 287.374 G  | 17                | 106            | 12                | 70             | 328.8                             | +3.1           | °                     | +16.8                 | °                 | -41.1          |                   |                |                                   |                |                       |
| 288.634 G  | 20                | 64             | 11                | 35             | 329.4                             | +3.8           | °                     | +15.8                 | °                 | -23.9          |                   |                |                                   |                |                       |
| 289.310 C  | 24                | 49             | 12                | 25             | 329.9                             | +4.3           | °                     | +15.7                 | °                 | -14.5          |                   |                |                                   |                |                       |
| 290.357 G  | 7                 | 29             | 4                 | 15             | 330.1                             | +4.5           | °                     | +15.4                 | °                 | -0.5           |                   |                |                                   |                |                       |
| Means  | ..                | ..             | 10                | 42             | 329.4                             | ..             | °                     | +16.0                 | ..                |                |                   |                |                                   |                |                       |
| No. 1618. Latitude +1°.6   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| Group 16618 in Rotation 1298<br>" 16628 " " 1298+                                  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| Group 16618. Sept. 19-20. A group appearing quite near the west limb.              |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |
| 261.614 G  | 4                 | 27             | 5                 | 33             | 55.9                              | 0.0            | °                     | +1.4                  | °                 | +66.1          |                   |                |                                   |                |                       |
| 262.332 G  | 20                | 101            | 42                | 214            | 56.4                              | +0.4           | °                     | +1.6                  | °                 | +76.0          |                   |                |                                   |                |                       |
| Means  | ..                | ..             | 24                | 124            | 56.2                              | ..             | °                     | +1.5                  | ..                |                |                   |                |                                   |                |                       |

† Group 16628 has disappeared before Rotation 1299 begins.

LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR. 1950

| LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950  |                   |                |                   |                |                                   |                |                       |                       |  |                |                   |                |  |                |                       |        |       |           |      |      |       |       |      |      |       |       |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|--|----------------|-------------------|----------------|--|----------------|-----------------------|--------|-------|-----------|------|------|-------|-------|------|------|-------|-------|
| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area  |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion                | Latit-<br>tude | Long.<br>from<br>C.M. |        |       |           |      |      |       |       |      |      |       |       |
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ  | Whole<br>Spots | Umbræ             | Whole<br>Spots |  |                |                       |        |       |           |      |      |       |       |      |      |       |       |
| No. 1618. - <i>continued</i>   |                   |                |                   |                |                                   |                |                       |                       |  |                |                   |                | No. 1620. Latitude $-14^{\circ}.5$               |                |                       |        |       |           |      |      |       |       |      |      |       |       |
| Group 16628. Oct. 5-8. A tiny spot on each day.  |                   |                |                   |                |                                   |                |                       |                       |  |                |                   |                | Group 16649 in Rotation 1299<br>" 16663 " " 1300 |                |                       |        |       |           |      |      |       |       |      |      |       |       |
| 277.320 G  | 0                 | 4              | 0                 | 11             | 62.7                              | +3.8           | + 1.3                 | -79.9                 | 307.291 C  | 13             | 98                | (36            | 269  | 29.2           | ..                    | -13.7) | -78.1 |           |      |      |       |       |      |      |       |       |
| 278.343 G  | 0                 | 4              | 0                 | 5              | 63.3                              | +4.3           | + 1.4                 | -65.8                 | 308.386 G  | 37             | 299               | 47             | 378  | 28.1           | 0.0                   | -13.5  | -64.7 |           |      |      |       |       |      |      |       |       |
| 279.301 C  | 0                 | 4              | 0                 | 3              | 62.8                              | +3.6           | + 2.8                 | -53.6                 | 309.320 C  | 51             | 301               | 43             | 253  | 29.5           | +1.4                  | -13.5  | -51.0 |           |      |      |       |       |      |      |       |       |
| 280.449 G  | 0                 | 7              | 0                 | 4              | 64.0                              | +4.6           | + 1.1                 | -37.3                 | 310.431 G  | 79             | 435               | 51             | 283  | 29.4           | +1.2                  | -13.2  | -36.5 |           |      |      |       |       |      |      |       |       |
| Means  | ..                | ..             | 0                 | 6              | 63.2                              | ..             | + 1.6                 | ..                    | 311.293 C  | 97             | 439               | 56             | 253  | 29.5           | +1.3                  | -13.1  | -25.0 |           |      |      |       |       |      |      |       |       |
| No. 1619. Latitude $-6^{\circ}.2$  |                   |                |                   |                |                                   |                |                       |                       |  |                |                   |                | 312.293 C  |                | 81                    | 475    | 43    | 255       | 29.2 | +1.0 | -13.0 | -12.1 |      |      |       |       |
| Group 16639 in Rotation 1299<br>" 16652 " " 1300   |                   |                |                   |                |                                   |                |                       |                       |  |                |                   |                | 313.343 C  |                | 49                    | 305    | 25    | 159       | 28.9 | +0.7 | -13.7 | + 1.4 |      |      |       |       |
| Group 16639. Oct. 16-27. A stream of small changing spots which almost die out by October 21. On the next day there is an increase in activity and a bi-polar group is formed.                     |                   |                |                   |                |                                   |                |                       |                       |  |                |                   |                | 314.416 G  |                | 53                    | 270    | 29    | 146       | 28.7 | +0.4 | -13.9 | +15.4 |      |      |       |       |
| 288.634 G  | 22                | 75             | 26                | 90             | 288.8                             | 0.0            | - 6.8                 | -64.5                 | 315.440 G  | 6              | 45                | 3              | 23   | 292.0          | +2.4                  | - 6.9  | + 2.1 | 315.440 G | 61   | 256  | 37    | 154   | 29.2 | +0.9 | -14.2 | +29.4 |
| 289.310 C  | 22                | 88             | 19                | 78             | 289.8                             | +0.9           | - 6.7                 | -54.6                 | 316.492 G  | 44             | 228               | 32             | 164  | 29.0           | +0.7                  | -14.1  | +43.0 |           |      |      |       |       |      |      |       |       |
| 290.357 G  | 42                | 229            | 28                | 157            | 289.6                             | +0.5           | - 6.8                 | -41.0                 | 317.462 G  | 18             | 153               | 17             | 144  | 29.1           | +0.8                  | -14.1  | +55.9 |           |      |      |       |       |      |      |       |       |
| 291.434 G  | 23                | 182            | 13                | 105            | 289.4                             | +0.2           | - 6.3                 | -27.0                 | 318.379 G  | 20             | 85                | 29             | 123  | 29.5           | +1.1                  | -13.9  | +68.4 |           |      |      |       |       |      |      |       |       |
| 292.429 G  | 22                | 154            | 12                | 81             | 289.0                             | -0.4           | - 6.5                 | -14.3                 | 319.291 C  | 6              | 57                | 19             | 180  | 29.0           | +0.6                  | -14.5  | +79.9 |           |      |      |       |       |      |      |       |       |
| 293.440 C  | 6                 | 45             | 3                 | 23             | 292.0                             | +2.4           | - 6.9                 | + 2.1                 | Means  | ..             | ..                | 36             | 208  | 29.1           | ..                    | -13.7  | ..    |           |      |      |       |       |      |      |       |       |
| 294.288 C  | 12                | 85             | 6                 | 44             | 291.3                             | +1.6           | - 6.4                 | +12.6                 | Group 16663. Dec. 1-10. A small, slowly-declining spot.  |                |                   |                |  |                |                       |        |       |           |      |      |       |       |      |      |       |       |
| 295.608 G  | 35                | 309            | 21                | 184            | 291.9                             | +2.0           | - 6.2                 | +30.6                 | 334.358 C  | 8              | 27                | 27             | 93   | 29.3           | ..                    | -14.5  | -81.2 |           |      |      |       |       |      |      |       |       |
| 296.389 G  | 73                | 343            | 51                | 235            | 292.7                             | +2.7           | - 5.9                 | +41.7                 | 335.358 C  | 6              | 59                | 8              | 83   | 28.9           | +0.1                  | -14.8  | -68.4 |           |      |      |       |       |      |      |       |       |
| 297.371 G  | 70                | 415            | 63                | 371            | 292.3                             | +2.1           | - 5.5                 | +54.2                 | 336.448 G  | 17             | 115               | 15             | 104  | 28.4           | -0.5                  | -14.9  | -54.5 |           |      |      |       |       |      |      |       |       |
| 298.384 G  | 16                | 192            | 23                | 273            | 292.6                             | +2.2           | - 5.3                 | +67.9                 | 337.441 G  | 20             | 137               | 14             | 96   | 28.1           | -0.8                  | -15.2  | -41.7 |           |      |      |       |       |      |      |       |       |
| 299.364 G  | 7                 | 49             | 18                | 127            | 290.2                             | -0.3           | - 4.8                 | +78.4                 | 338.402 G  | 15             | 135               | 9              | 80   | 28.1           | -0.8                  | -15.3  | -29.1 |           |      |      |       |       |      |      |       |       |
| Means  | ..                | .              | 24                | 147            | 290.8                             | ..             | - 6.2                 | ..                    | 339.372 G  | 18             | 121               | 10             | 65   | 27.9           | -1.0                  | -15.5  | -16.5 |           |      |      |       |       |      |      |       |       |
| Group 16652. Nov. 11-17. A small spot.   |                   |                |                   |                |                                   |                |                       |                       |  |                |                   |                | 340.548 C  |                | 17                    | 86     | 9     | 45        | 27.7 | -1.3 | -15.4 | - 1.2 |      |      |       |       |
| Group 16650. Nov. 5-12. A bi-polar group, with a rapid increase in area, appearing suddenly near the C.M. The leader, <i>a</i> , is a stable regular spot, and the follower, <i>b</i> , composite. |                   |                |                   |                |                                   |                |                       |                       |  |                |                   |                | 341.290 C  |                | 17                    | 69     | 9     | 36        | 27.4 | -1.6 | -15.7 | + 8.3 |      |      |       |       |
| 314.416 G  | 11                | 42             | 18                | 69             | 301.5                             | +8.6           | - 6.5                 | -71.8                 | 342.285 C  | 17             | 71                | 10             | 40   | 27.0           | -2.0                  | -15.4  | +21.0 |           |      |      |       |       |      |      |       |       |
| 315.440 G  | 11                | 59             | 11                | 57             | 301.9                             | +8.8           | - 6.1                 | -57.9                 | 343.321 C  | 4              | 17                | 3              | 11   | 27.2           | -1.8                  | -15.5  | +34.8 |           |      |      |       |       |      |      |       |       |
| 316.492 G  | 9                 | 55             | 6                 | 38             | 302.3                             | +9.0           | - 6.1                 | -43.7                 | Means  | ..             | ..                | 10             | 62   | 27.9           | ..                    | -15.3  | ..    |           |      |      |       |       |      |      |       |       |
| 317.462 G  | 7                 | 31             | 4                 | 18             | 302.5                             | +9.1           | - 6.3                 | -30.7                 | No. 1621. Latitude $+12^{\circ}.6$   |                |                   |                |  |                |                       |        |       |           |      |      |       |       |      |      |       |       |
| 318.379 G  | 7                 | 24             | 4                 | 13             | 303.0                             | +9.4           | - 6.2                 | -18.1                 | Group 16650 in Rotation 1299<br>" 16661 " " 1300   |                |                   |                |  |                |                       |        |       |           |      |      |       |       |      |      |       |       |
| 319.291 C  | 0                 | 11             | 0                 | 6              | 303.2                             | +9.5           | - 6.5                 | - 5.9                 | Group 16650. Nov. 5-12. A bi-polar group, with a rapid increase in area, appearing suddenly near the C.M. The leader, <i>a</i> , is a stable regular spot, and the follower, <i>b</i> , composite. |                |                   |                |  |                |                       |        |       |           |      |      |       |       |      |      |       |       |
| 320.475 G  | 0                 | 7              | 0                 | 4              | 303.3                             | +9.4           | - 6.5                 | + 9.8                 | 308.386 G  | 35             | 143               | 18             | 73   | 84.0           | 0.0                   | +12.5  | - 8.8 |           |      |      |       |       |      |      |       |       |
| Means  | ..                | ..             | 6                 | 29             | 302.5                             | ..             | - 6.3                 | ..                    | 309.320 C  | 180            | 878               | 92             | 448  | 85.5           | +1.4                  | +12.4  | + 5.0 |           |      |      |       |       |      |      |       |       |
|  |                   |                |                   |                |                                   |                |                       |                       | 310.431 G  | 218            | 1234              | 119            | 667  | 85.4           | +1.3                  | +12.7  | +19.5 |           |      |      |       |       |      |      |       |       |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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| LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950                                      |                   |                |                   |                |                                   |  |                       |                       |                   |                |                   |  |     |       |      |        |       |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|--|-----------------------|-----------------------|-------------------|----------------|-------------------|--|-----|-------|------|--------|-------|
| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude                            | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |  |     |       |      |        |       |
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |  |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots   |     |       |      |        |       |
| <b>No. 1621. Group 16650 - continued</b>   |                   |                |                   |                |                                   | <b>No. 1621. Group 16661 - continued</b> |                       |                       |                   |                |                   |  |     |       |      |        |       |
| 311.293 C  | 172               | 1215           | 103               | 720            | 85.6                              | +1.4                                     | +12.6                 | +31.1                 | 341.290 C         | 17             | 81                | 21   | 100 | 84.7  | -4.1 | +12.4  | +65.6 |
| 312.293 C  | 144               | 1119           | 102               | 783            | 84.9                              | +0.6                                     | +12.8                 | +43.6                 | 342.285 C         | 6              | 33                | 16   | 85  | 84.5  | -4.3 | +12.1  | +78.5 |
| 313.343 C  | 104               | 1056           | 99                | 985            | 85.2                              | +0.9                                     | +13.2                 | +57.7                 | Means             | ..             | ..                | 36   | 235 | 85.0  | ..   | +12.4  | ..    |
| 314.416 G  | 84                | 521            | 136               | 834            | 85.1                              | +0.7                                     | +13.1                 | +71.8                 |                   |                |                   |  |     |       |      |        |       |
| 315.440 G  | 7                 | 81             | (24               | 278            | 81.8                              | ..                                       | +13.7)                | +82.0                 |                   |                |                   |  |     |       |      |        |       |
| Means  | ..                | ..             | 96                | 644            | 85.1                              | ..                                       | +12.8                 | ..                    |                   |                |                   |  |     |       |      |        |       |
| Spot a   |                   |                |                   |                |                                   | No. 1622. Latitude $-14^{\circ}.5$       |                       |                       |                   |                |                   | Group 16651 in Rotation 1300   |     |       |      |        |       |
| Spot b   |                   |                |                   |                |                                   | " 16668 " " 1301                         |                       |                       |                   |                |                   | Group 16651. Nov. 9-21. A long stream of normal type. The leader, a, and follower, b, are fairly stable regular spots. The intermediate spots grow into a composite structure by November 15 and after November 17 begin to die out. |     |       |      |        |       |
| 308.386 G  | 15                | 51             | 8                 | 26             | 86.6                              | 0.0                                      | +11.5                 | -6.2                  | 312.293 C         | 8              | 55                | (19  | 129 | 325.0 | ..   | +14.8) | -76.3 |
| 309.320 C  | 110               | 458            | 56                | 234            | 87.9                              | +1.2                                     | +11.5                 | +7.4                  | 313.343 C         | 29             | 176               | 35   | 211 | 321.9 | 0.0  | +15.6  | -65.6 |
| 310.431 G  | 134               | 625            | 74                | 344            | 88.4                              | +1.7                                     | +11.6                 | +22.5                 | 314.416 G         | 79             | 487               | 68   | 418 | 320.1 | -1.8 | +15.3  | -53.2 |
| 311.293 C  | 121               | 672            | 74                | 410            | 88.2                              | +1.4                                     | +11.8                 | +33.7                 | 315.440 G         | 88             | 701               | 58   | 471 | 321.2 | -0.8 | +15.3  | -38.6 |
| 312.293 C  | 83                | 553            | 61                | 404            | 88.2                              | +1.3                                     | +11.9                 | +46.9                 | 316.492 G         | 162            | 974               | 91   | 556 | 320.5 | -1.5 | +15.4  | -25.5 |
| 313.343 C  | 70                | 547            | 70                | 547            | 87.7                              | +0.8                                     | +12.3                 | +60.2                 | 317.462 G         | 210            | 1233              | 112  | 652 | 320.5 | -1.5 | +15.1  | -12.7 |
| 314.416 G  | 53                | 310            | 94                | 549            | 87.4                              | +0.4                                     | +12.4                 | +74.1                 | 318.379 G         | 252            | 1500              | 130  | 775 | 319.2 | -2.8 | +15.6  | -1.9  |
| Means  | ..                | ..             | 96                | 644            | 85.1                              | ..                                       | +12.8                 | ..                    | 319.291 C         | 274            | 1608              | 144  | 848 | 319.6 | -2.5 | +15.5  | +10.5 |
|  |                   |                |                   |                |                                   |  |                       |                       | 320.475 G         | 228            | 1395              | 132  | 804 | 319.1 | -3.0 | +15.5  | +25.6 |
|  |                   |                |                   |                |                                   |  |                       |                       | 321.385 G         | 118            | 833               | 78   | 553 | 319.6 | -2.5 | +15.0  | +38.1 |
|  |                   |                |                   |                |                                   |  |                       |                       | 322.459 G         | 81             | 613               | 71   | 529 | 320.0 | -2.1 | +15.2  | +52.7 |
|  |                   |                |                   |                |                                   |  |                       |                       | 323.426 G         | 43             | 333               | 58   | 439 | 320.0 | -2.2 | +15.3  | +65.4 |
|  |                   |                |                   |                |                                   |  |                       |                       | 324.162 K         | 16             | 122               | (26  | 243 | 316.5 | ..   | +15.4) | +71.6 |
|  |                   |                |                   |                |                                   |  |                       |                       | Means             | ..             | ..                | 89   | 569 | 320.2 | ..   | +15.3  | ..    |
| Group 16661. Nov. 27-Dec. 9. A regular spot, whose umbra divides into two as the whole declines. |                   |                |                   |                |                                   | Spot a                                   |                       |                       |                   |                |                   |  |     |       |      |        |       |
| 330.371 G  | 18                | 152            | 48                | 404            | 83.8                              | -4.3                                     | +12.2                 | -79.2                 | 312.293 C         | 8              | 55                | 19   | 129 | 325.0 | 0.0  | +14.8  | -76.3 |
| 331.290 C  | 38                | 242            | 46                | 290            | 85.8                              | -2.3                                     | +12.5                 | -65.1                 | 313.343 C         | 23             | 140               | 26   | 157 | 324.1 | -0.9 | +15.5  | -63.4 |
| 332.466 G  | 70                | 449            | 55                | 355            | 85.8                              | -2.4                                     | +12.6                 | -49.6                 | 314.416 G         | 48             | 293               | 37   | 226 | 324.1 | -1.0 | +14.7  | -49.2 |
| 333.505 G  | 61                | 497            | 38                | 313            | 85.2                              | -3.1                                     | +12.6                 | -36.5                 | 315.440 G         | 55             | 377               | 34   | 234 | 324.9 | -0.2 | +14.4  | -34.9 |
| 334.358 C  | 99                | 521            | 55                | 292            | 85.4                              | -2.9                                     | +12.2                 | -25.1                 | 316.492 G         | 92             | 464               | 50   | 251 | 325.7 | +0.6 | +13.9  | -20.3 |
| 335.358 C  | 86                | 567            | 45                | 295            | 85.0                              | -3.4                                     | +12.4                 | -12.3                 | 317.462 G         | 81             | 515               | 41   | 263 | 326.2 | +1.1 | +13.9  | -7.0  |
| 336.448 G  | 61                | 490            | 31                | 250            | 84.9                              | -3.6                                     | +12.4                 | +2.0                  | 318.379 G         | 99             | 545               | 50   | 278 | 326.8 | +1.6 | +13.9  | +5.7  |
| 337.441 G  | 72                | 375            | 38                | 199            | 85.1                              | -3.4                                     | +12.4                 | +15.3                 | 319.291 C         | 112            | 610               | 60   | 329 | 327.1 | +1.9 | +14.0  | +18.0 |
| 338.402 G  | 48                | 373            | 28                | 216            | 85.1                              | -3.5                                     | +12.4                 | +27.9                 | 320.475 G         | 100            | 521               | 61   | 318 | 327.1 | +1.9 | +13.9  | +33.6 |
| 339.372 G  | 31                | 209            | 21                | 142            | 85.3                              | -3.3                                     | +12.5                 | +40.9                 | 321.385 G         | 44             | 320               | 32   | 234 | 327.3 | +2.1 | +14.0  | +45.8 |
| 340.548 C  | 25                | 126            | 23                | 116            | 84.9                              | -3.8                                     | +12.9                 | +56.0                 |                   |                |                   |  |     |       |      |        |       |

continued

## GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1950.

LEDGER I. - RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

## GREENWICH PHOTO-HELIOGRAPHIC RESULTS. 1950.

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LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR. 1950

## GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1950.

LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|
| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |
| Group 16378 - continued  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 15.463 G   | 9                 | 41             | 8                 | 36             | 308.6                             | 0.0           | +14.9                 | -52.1                 |                   |                |                   |                |                                   |               |                       |
| 16.283 C   | 27                | 88             | 18                | 59             | 311.7                             | +3.1          | +14.3                 | -38.2                 |                   |                |                   |                |                                   |               |                       |
| 17.390 G   | 59                | 303            | 34                | 173            | 313.3                             | +4.7          | +13.8                 | -22.0                 |                   |                |                   |                |                                   |               |                       |
| 18.487 G   | 82                | 740            | 44                | 393            | 315.1                             | +6.5          | +14.7                 | -5.8                  |                   |                |                   |                |                                   |               |                       |
| 19.427 C   | 129               | 800            | 69                | 429            | 314.9                             | +6.2          | +14.5                 | +6.4                  |                   |                |                   |                |                                   |               |                       |
| 20.489 G   | 206               | 1213           | 118               | 693            | 315.6                             | +6.9          | +15.0                 | +21.1                 |                   |                |                   |                |                                   |               |                       |
| 21.303 C   | 198               | 1389           | 125               | 879            | 314.8                             | +6.1          | +15.0                 | +31.0                 |                   |                |                   |                |                                   |               |                       |
| 22.384 G   | 173               | 945            | 138               | 748            | 316.0                             | +7.3          | +15.7                 | +46.4                 |                   |                |                   |                |                                   |               |                       |
| 23.388 G   | 111               | 531            | 124               | 594            | 315.8                             | +7.1          | +15.8                 | +59.4                 |                   |                |                   |                |                                   |               |                       |
| 24.286 C   | 37                | 234            | 72                | 454            | 316.4                             | +7.7          | +15.8                 | +71.8                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 75                | 446            | 314.2                             | ..            | +15.0                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 16382.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Jan. 19-30. A variable stream, led by a composite spot.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 18.487 G   | 22                | 102            | 35                | 163            | 250.1                             | 0.0           | +8.3                  | -70.8                 |                   |                |                   |                |                                   |               |                       |
| 19.427 C   | 29                | 211            | 28                | 200            | 251.4                             | +1.2          | +7.4                  | -57.1                 |                   |                |                   |                |                                   |               |                       |
| 20.489 G   | 50                | 252            | 35                | 176            | 252.2                             | +1.8          | +7.9                  | -42.3                 |                   |                |                   |                |                                   |               |                       |
| 21.303 C   | 90                | 315            | 54                | 194            | 251.2                             | +0.7          | +8.5                  | -32.6                 |                   |                |                   |                |                                   |               |                       |
| 22.384 G   | 105               | 502            | 57                | 273            | 250.9                             | +0.3          | +8.8                  | -18.7                 |                   |                |                   |                |                                   |               |                       |
| 23.388 G   | 142               | 705            | 74                | 368            | 250.6                             | -0.1          | +8.8                  | -5.8                  |                   |                |                   |                |                                   |               |                       |
| 24.286 C   | 113               | 552            | 59                | 287            | 251.2                             | +0.4          | +9.1                  | +6.6                  |                   |                |                   |                |                                   |               |                       |
| 25.584 G   | 74                | 473            | 42                | 268            | 251.4                             | +0.4          | +9.4                  | +23.9                 |                   |                |                   |                |                                   |               |                       |
| 26.496 G   | 54                | 298            | 34                | 192            | 251.7                             | +0.6          | +9.5                  | +36.3                 |                   |                |                   |                |                                   |               |                       |
| 27.288 C   | 27                | 265            | 21                | 204            | 252.3                             | +1.1          | +9.5                  | +47.3                 |                   |                |                   |                |                                   |               |                       |
| 28.483 G   | 24                | 160            | 28                | 181            | 249.9                             | -1.5          | +10.4                 | +60.6                 |                   |                |                   |                |                                   |               |                       |
| 29.294 C   | 6                 | 33             | 10                | 57             | 248.5                             | -3.0          | +11.0                 | +69.9                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 40                | 214            | 251.0                             | ..            | +9.0                  | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 16383.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Jan. 19-26. A spot which dies out just past the central meridian.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 18.487 G   | 11                | 76             | 25                | 171            | 244.9                             | 0.0           | +10.7                 | -76.0                 |                   |                |                   |                |                                   |               |                       |
| 19.427 C   | 13                | 136            | 16                | 169            | 243.8                             | -1.2          | +10.7                 | -64.7                 |                   |                |                   |                |                                   |               |                       |
| 20.489 G   | 50                | 230            | 42                | 193            | 243.8                             | -1.2          | +12.1                 | -50.7                 |                   |                |                   |                |                                   |               |                       |
| 21.303 C   | 59                | 293            | 41                | 202            | 244.0                             | -1.1          | +12.4                 | -39.8                 |                   |                |                   |                |                                   |               |                       |
| 22.384 G   | 33                | 233            | 19                | 135            | 244.2                             | -1.0          | +12.7                 | -25.4                 |                   |                |                   |                |                                   |               |                       |
| 23.388 G   | 37                | 181            | 20                | 98             | 244.1                             | -1.2          | +13.1                 | -12.3                 |                   |                |                   |                |                                   |               |                       |
| 24.286 C   | 27                | 117            | 14                | 62             | 243.6                             | -1.7          | +13.0                 | -1.0                  |                   |                |                   |                |                                   |               |                       |
| 25.584 G   | 9                 | 52             | 5                 | 29             | 243.5                             | -1.9          | +13.2                 | +16.0                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 23                | 132            | 244.0                             | ..            | +12.2                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 16384.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Jan. 20-27. A stream of changing spots, of which the follower becomes the most stable and longest-lived component. |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 19.427 C   | 6                 | 38             | 3                 | 19             | 297.5                             | 0.0           | -11.5                 | -11.0                 |                   |                |                   |                |                                   |               |                       |
| 20.489 G   | 82                | 401            | 41                | 202            | 296.4                             | -1.2          | -12.4                 | +1.9                  |                   |                |                   |                |                                   |               |                       |
| 21.303 C   | 83                | 504            | 42                | 260            | 296.1                             | -1.5          | -13.0                 | +12.3                 |                   |                |                   |                |                                   |               |                       |
| 22.384 G   | 131               | 713            | 74                | 405            | 296.3                             | -1.4          | -13.1                 | +26.7                 |                   |                |                   |                |                                   |               |                       |
| 23.388 G   | 103               | 609            | 66                | 388            | 295.8                             | -1.9          | -12.8                 | +39.4                 |                   |                |                   |                |                                   |               |                       |
| 24.286 C   | 39                | 269            | 31                | 210            | 294.9                             | -2.9          | -13.3                 | +50.3                 |                   |                |                   |                |                                   |               |                       |
| 25.584 G   | 13                | 91             | 16                | 110            | 293.6                             | -4.3          | -13.8                 | +66.1                 |                   |                |                   |                |                                   |               |                       |
| 26.496 G   | 0                 | 17             | 0                 | 58             | 297.9                             | ..            | -12.4                 | +82.5                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 39                | 236            | 295.8                             | ..            | -12.8                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 16385.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Jan. 20-28. A string of small variable spots which spread out in longitude and die out before reaching the limb.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 19.427 C   | 6                 | 27             | 5                 | 25             | 252.3                             | 0.0           | +3.8                  | -56.2                 |                   |                |                   |                |                                   |               |                       |
| 20.489 G   | 15                | 70             | 11                | 48             | 252.4                             | -0.1          | +4.2                  | -42.1                 |                   |                |                   |                |                                   |               |                       |
| 21.303 C   | 23                | 96             | 14                | 57             | 252.1                             | -0.5          | +4.2                  | -31.7                 |                   |                |                   |                |                                   |               |                       |
| 22.384 G   | 19                | 87             | 10                | 46             | 253.1                             | +0.3          | +3.9                  | -16.5                 |                   |                |                   |                |                                   |               |                       |
| 23.388 G   | 7                 | 32             | 4                 | 17             | 254.6                             | +1.6          | +3.7                  | -1.8                  |                   |                |                   |                |                                   |               |                       |
| 24.286 C   | 0                 | 4              | 0                 | 2              | 257.3                             | +4.1          | +4.0                  | +12.7                 |                   |                |                   |                |                                   |               |                       |
| 25.584 G   | 0                 | 7              | 0                 | 4              | 259.2                             | +5.8          | +3.6                  | +31.7                 |                   |                |                   |                |                                   |               |                       |
| 26.496 G   | 7                 | 39             | 5                 | 27             | 259.2                             | +5.6          | +3.4                  | +43.8                 |                   |                |                   |                |                                   |               |                       |
| 27.288 C   | 0                 | 25             | 0                 | 23             | 261.2                             | +7.5          | +3.1                  | +56.2                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 5                 | 28             | 255.7                             | ..            | +3.8                  | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 16386.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Jan. 21-Feb. 2. A composite spot, undergoing small changes as it slowly diminishes.                                |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 20.489 G   | 63                | 286            | 145               | 658            | 219.7                             | 0.0           | +19.3                 | -74.8                 |                   |                |                   |                |                                   |               |                       |
| 21.303 C   | 71                | 554            | 94                | 737            | 219.5                             | -0.1          | +19.4                 | -64.3                 |                   |                |                   |                |                                   |               |                       |
| 22.384 G   | 135               | 737            | 116               | 634            | 220.2                             | +0.7          | +19.3                 | -49.4                 |                   |                |                   |                |                                   |               |                       |
| 23.388 G   | 200               | 940            | 140               | 657            | 219.6                             | +0.2          | +19.6                 | -36.8                 |                   |                |                   |                |                                   |               |                       |
| 24.286 C   | 168               | 951            | 104               | 586            | 219.4                             | +0.1          | +19.8                 | -25.2                 |                   |                |                   |                |                                   |               |                       |
| 25.584 G   | 176               | 1133           | 99                | 634            | 219.1                             | 0.0           | +20.1                 | -8.4                  |                   |                |                   |                |                                   |               |                       |
| 26.496 G   | 161               | 904            | 90                | 505            | 219.2                             | +0.2          | +20.2                 | +3.8                  |                   |                |                   |                |                                   |               |                       |
| 27.288 C   | 123               | 1041           | 71                | 604            | 219.8                             | +0.9          | +20.1                 | +14.8                 |                   |                |                   |                |                                   |               |                       |
| 28.483 G   | 154               | 1124           | 100               | 731            | 219.9                             | +1.1          | +20.2                 | +30.6                 |                   |                |                   |                |                                   |               |                       |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place   | Projected<br>Area   |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |       |       |  |  |  |  |  |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-------------------------|---|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-------|-------|--|--|--|--|--|--|--|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                         | Umbræ   | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| Group 16386 - continued   |                   |                |                   |                |                                   |               |                       |                         |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| 29.294 C  | 79                | 535            | 59                | 401            | 219.9                             | +1.2          | +20.4                 | +41.3                   | 30.294 C  | 6              | 29                | 5              | 23                                | 114.0         | +1.0                  | -17.2 | -51.4 |  |  |  |  |  |  |  |
| 30.294 C  | 46                | 322            | 46                | 319            | 219.5                             | +0.9          | +20.9                 | +54.1                   | 31.293 C  | 6              | 46                | 4              | 29                                | 114.0         | +1.0                  | -17.3 | -38.3 |  |  |  |  |  |  |  |
| 31.293 C  | 21                | 151            | 34                | 246            | 220.6                             | +2.1          | +20.4                 | +68.3                   | 32.345 C  | 4              | 29                | 2              | 16                                | 114.3         | +1.4                  | -17.2 | -24.1 |  |  |  |  |  |  |  |
| 32.345 C  | 4                 | 25             | 16                | 102            | 218.8                             | ..            | +19.1                 | +80.4                   | 33.295 C  | 0              | 0                 | 0              | 0                                 | ..            | ..                    | ..    | ..    |  |  |  |  |  |  |  |
| Means   | ..                | ..             | 92                | 560            | 219.7                             | ..            | +20.0                 | ..                      | 34.478 G  | 22             | 50                | 11             | 26                                | 116.1         | +3.2                  | -18.1 | +5.7  |  |  |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                         | 35.404 G  | 7              | 24                | 4              | 13                                | 116.1         | +3.3                  | -17.5 | +17.9 |  |  |  |  |  |  |  |
| Group 16387.  |                   |                |                   |                |                                   |               |                       |                         |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| Jan. 22-Feb. 1. A stream of small variable spots, of which only the leader remains by February 1. |                   |                |                   |                |                                   |               |                       | Group 16397 - continued |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| 21.303 C  | 33                | 65             | 79                | 156            | 206.8                             | 0.0           | + 8.7                 | -77.0                   | 30.294 C  | 6              | 29                | 5              | 23                                | 114.0         | +1.0                  | -17.2 | -51.4 |  |  |  |  |  |  |  |
| 22.384 G  | 13                | 102            | 14                | 110            | 208.7                             | +1.8          | + 8.3                 | -60.9                   | 31.293 C  | 6              | 46                | 4              | 29                                | 114.0         | +1.0                  | -17.3 | -38.3 |  |  |  |  |  |  |  |
| 23.388 G  | 33                | 131            | 25                | 100            | 208.6                             | +1.5          | + 8.5                 | -47.8                   | 32.345 C  | 4              | 29                | 2              | 16                                | 114.3         | +1.4                  | -17.2 | -24.1 |  |  |  |  |  |  |  |
| 24.286 C  | 10                | 73             | 7                 | 46             | 209.3                             | +2.1          | + 8.2                 | -35.3                   | 33.295 C  | 0              | 0                 | 0              | 0                                 | ..            | ..                    | ..    | ..    |  |  |  |  |  |  |  |
| 25.584 G  | 33                | 137            | 18                | 74             | 210.0                             | +2.6          | + 8.3                 | -17.5                   | 34.478 G  | 22             | 50                | 11             | 26                                | 116.1         | +3.2                  | -18.1 | +5.7  |  |  |  |  |  |  |  |
| 26.496 G  | 42                | 265            | 22                | 138            | 210.4                             | +2.9          | + 9.1                 | - 5.0                   | 35.404 G  | 7              | 24                | 4              | 13                                | 116.1         | +3.3                  | -17.5 | +17.9 |  |  |  |  |  |  |  |
| 27.288 C  | 39                | 234            | 20                | 122            | 212.1                             | +4.5          | + 9.4                 | + 7.1                   | Means   | ..             | ..                | 4              | 17                                | 114.4         | ..                    | -17.3 | ..    |  |  |  |  |  |  |  |
| 28.483 G  | 21                | 141            | 12                | 80             | 212.9                             | +5.2          | + 9.5                 | +23.6                   |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| 29.294 C  | 17                | 86             | 11                | 55             | 213.9                             | +6.1          | + 9.4                 | +35.3                   | Group 16407.  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| 30.294 C  | 17                | 61             | 14                | 50             | 214.9                             | +6.9          | + 9.0                 | +49.5                   | Feb. 13-25. A small regular spot, with a few tiny companions just north of it from February 18 to 20. |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| 31.293 C  | 6                 | 34             | 7                 | 42             | 216.9                             | +8.8          | + 8.4                 | +64.6                   | 43.409 G  | 7              | 76                | 31             | 334                               | 269.4         | ..                    | + 0.9 | -83.4 |  |  |  |  |  |  |  |
| Means   | ..                | ..             | 21                | 88             | 211.3                             | ..            | + 8.8                 | ..                      | 44.561 C  | 13             | 107               | 17             | 139                               | 270.5         | 0.0                   | + 1.3 | -67.1 |  |  |  |  |  |  |  |
| Group 16390.  |                   |                |                   |                |                                   |               |                       |                         |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| Jan. 24-Feb. 1. A regular spot, with occasional companions.                                       |                   |                |                   |                |                                   |               |                       | Group 16409.            |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| 23.388 G  | 26                | 115            | 36                | 158            | 190.2                             | 0.0           | +13.4                 | -66.2                   | 45.299 C  | 29             | 155               | 27             | 146                               | 270.5         | -0.1                  | + 1.3 | -57.4 |  |  |  |  |  |  |  |
| 24.286 C  | 19                | 182            | 17                | 164            | 191.3                             | +1.0          | +13.1                 | -53.3                   | 46.297 C  | 46             | 233               | 32             | 163                               | 270.7         | -0.1                  | + 1.3 | -44.0 |  |  |  |  |  |  |  |
| 25.584 G  | 54                | 245            | 35                | 159            | 191.6                             | +1.2          | +12.9                 | -35.9                   | 47.311 C  | 34             | 207               | 20             | 122                               | 271.0         | 0.0                   | + 1.4 | -30.4 |  |  |  |  |  |  |  |
| 26.496 G  | 37                | 210            | 21                | 120            | 192.5                             | +2.0          | +11.9                 | -22.9                   | 48.374 G  | 50             | 336               | 27             | 178                               | 270.6         | -0.6                  | + 1.9 | -16.8 |  |  |  |  |  |  |  |
| 27.288 C  | 48                | 301            | 26                | 163            | 192.8                             | +2.3          | +11.9                 | -12.2                   | 49.314 C  | 48             | 294               | 24             | 150                               | 270.7         | -0.7                  | + 1.9 | - 4.3 |  |  |  |  |  |  |  |
| 28.483 G  | 56                | 265            | 29                | 138            | 192.7                             | +2.1          | +11.4                 | + 3.4                   | 50.397 G  | 43             | 236               | 22             | 121                               | 271.2         | -0.4                  | + 1.4 | +10.5 |  |  |  |  |  |  |  |
| 29.294 C  | 44                | 236            | 24                | 127            | 192.4                             | +1.7          | +11.2                 | +13.8                   | 51.436 G  | 48             | 216               | 27             | 121                               | 271.6         | -0.2                  | + 1.3 | +24.5 |  |  |  |  |  |  |  |
| 30.294 C  | 25                | 147            | 15                | 87             | 192.1                             | +1.3          | +10.7                 | +26.7                   | 52.447 G  | 24             | 164               | 15             | 105                               | 271.7         | -0.3                  | + 1.8 | +38.0 |  |  |  |  |  |  |  |
| 31.293 C  | 8                 | 50             | 5                 | 34             | 192.0                             | +1.2          | + 9.8                 | +39.7                   | 53.427 G  | 15             | 136               | 12             | 110                               | 271.9         | -0.3                  | + 1.5 | +51.1 |  |  |  |  |  |  |  |
| Means   | ..                | ..             | 23                | 128            | 192.0                             | ..            | +11.8                 | ..                      | 54.217 K  | 14             | 75                | 15             | 80                                | 272.1         | -0.2                  | + 1.3 | +61.7 |  |  |  |  |  |  |  |
| Group 16397.  |                   |                |                   |                |                                   |               |                       |                         |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| Jan. 29-Feb. 5. One or two small spots, not seen on February 3.                                   |                   |                |                   |                |                                   |               |                       | Group 16409.            |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| 28.483 G  | 0                 | 4              | 0                 | 8              | 113.1                             | 0.0           | -17.1                 | -76.2                   | 45.299 C  | 29             | 153               | 36             | 188                               | 267.9         | +0.7                  | +23.5 | -60.0 |  |  |  |  |  |  |  |
| 29.294 C  | 4                 | 19             | 5                 | 22             | 113.1                             | 0.0           | -16.9                 | -65.5                   | 46.297 C  | 25             | 153               | 22             | 132                               | 268.4         | +1.4                  | +23.2 | -46.3 |  |  |  |  |  |  |  |
| Means   | ..                | ..             | 27                | 145            | 267.5                             | ..            | +22.8                 | ..                      | 47.311 C  | 36             | 260               | 24             | 177                               | 269.3         | +2.6                  | +22.6 | -32.1 |  |  |  |  |  |  |  |
| Group 16397.  |                   |                |                   |                |                                   |               |                       |                         |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| Jan. 29-Feb. 5. One or two small spots, not seen on February 3.                                   |                   |                |                   |                |                                   |               |                       | Group 16409.            |   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |  |
| 28.483 G  | 0                 | 4              | 0                 | 8              | 113.1                             | 0.0           | -17.1                 | -76.2                   | 48.374 G  | 52             | 266               | 32             | 162                               | 268.4         | +1.9                  | +22.4 | -19.0 |  |  |  |  |  |  |  |
| 29.294 C  | 4                 | 19             | 5                 | 22             | 113.1                             | 0.0           | -16.9                 | -65.5                   | 49.314 C  | 89             | 306               | 52             | 177                               | 267.8         | +1.5                  | +22.6 | - 7.2 |  |  |  |  |  |  |  |
| Means   | ..                | ..             | 27                | 145            | 267.5                             | ..            | +22.8                 | ..                      | 50.397 G  | 37             | 194               | 21             | 113                               | 267.3         | +1.2                  | +22.8 | + 6.6 |  |  |  |  |  |  |  |

## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area   |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. |       |       |  |  |  |  |  |  |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|---|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-------|-------|--|--|--|--|--|--|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ   | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |       |       |  |  |  |  |  |  |
| Group 16411.   |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |
| Feb. 18-28. The last phase of a regular spot.                                |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |
| 48.374 G   | 15                | 87             | 24                | 142            | 218.4                             | 0.0            | +16.3                 | -69.0                 | 54.217 K  | 26             | 99                | 13             | 53                                | 205.9          | +1.6                  | +13.6 | - 4.5 |  |  |  |  |  |  |
| 49.314 C   | 25                | 152            | 26                | 157            | 218.3                             | -0.1           | +16.6                 | -56.7                 | 55.389 G  | 46             | 219               | 25             | 119                               | 205.4          | +1.0                  | +13.4 | +10.4 |  |  |  |  |  |  |
| 50.397 G   | 24                | 116            | 18                | 87             | 218.3                             | -0.1           | +16.7                 | -42.4                 | 56.411 G  | 24             | 156               | 14             | 91                                | 205.0          | +0.6                  | +13.4 | +23.5 |  |  |  |  |  |  |
| 51.436 G   | 26                | 157            | 16                | 99             | 218.3                             | 0.0            | +16.7                 | -28.8                 | 57.377 G  | 8              | 53                | 6              | 36                                | 206.4          | +1.9                  | +12.9 | +37.6 |  |  |  |  |  |  |
| 52.447 G   | 22                | 147            | 13                | 84             | 218.4                             | +0.1           | +16.7                 | -15.3                 | 58.395 G  | 6              | 28                | 6              | 24                                | 205.8          | +1.3                  | +12.9 | +50.4 |  |  |  |  |  |  |
| 53.427 G   | 26                | 158            | 14                | 87             | 218.4                             | +0.1           | +16.7                 | - 2.4                 | 59.407 G  | 0              | 4                 | 0              | 6                                 | 208.7          | +4.1                  | +12.3 | +66.6 |  |  |  |  |  |  |
| 54.217 K   | 18                | 121            | 10                | 67             | 218.4                             | +0.1           | +16.7                 | + 8.0                 | Means   | ..             | ..                | 12             | 58                                | 205.7          | ..                    | +13.2 | ..    |  |  |  |  |  |  |
| 55.389 G   | 20                | 92             | 12                | 55             | 218.3                             | +0.1           | +16.5                 | +23.3                 | Group 16414 - continued   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |
| 56.411 G   | 7                 | 44             | 5                 | 30             | 218.3                             | +0.1           | +16.6                 | +36.8                 | Feb. 28-Mar. 7. A few small variable spots.   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |
| 57.377 G   | 4                 | 20             | 3                 | 17             | 218.2                             | 0.0            | +16.5                 | +49.4                 | 58.395 G  | 13             | 63                | 7              | 34                                | 136.4          | 0.0                   | - 7.1 | -19.0 |  |  |  |  |  |  |
| 58.395 G   | 2                 | 9              | 2                 | 11             | 218.0                             | -0.2           | +16.6                 | +62.6                 | 59.407 G  | 20             | 109               | 10             | 55                                | 137.2          | +0.6                  | - 7.5 | - 4.9 |  |  |  |  |  |  |
| Means  | ..                | ..             | 13                | 76             | 218.3                             | ..             | +16.6                 | ..                    | 60.395 G  | 22             | 135               | 11             | 68                                | 136.6          | -0.1                  | - 7.4 | + 7.5 |  |  |  |  |  |  |
| Group 16413.   |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |
| Feb. 19-Mar. 3. A small stable regular spot.                                 |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |
| 49.314 C   | 11                | 53             | 26                | 125            | 197.9                             | 0.0            | + 3.8                 | -77.1                 | 61.304 C  | 12             | 96                | 6              | 51                                | 137.0          | +0.2                  | - 6.9 | +19.9 |  |  |  |  |  |  |
| 50.397 G   | 20                | 83             | 22                | 93             | 198.2                             | +0.1           | + 4.3                 | -62.5                 | 62.381 G  | 16             | 103               | 9              | 61                                | 135.5          | -1.5                  | - 5.8 | +32.6 |  |  |  |  |  |  |
| 51.436 G   | 20                | 109            | 16                | 85             | 198.2                             | -0.1           | + 4.4                 | -48.9                 | 63.451 G  | 18             | 92                | 13             | 67                                | 136.2          | -1.0                  | - 7.6 | +47.4 |  |  |  |  |  |  |
| 52.447 G   | 22                | 142            | 14                | 89             | 198.2                             | -0.2           | + 4.5                 | -35.5                 | 64.370 G  | 4              | 28                | 4              | 28                                | 137.1          | -0.2                  | - 7.7 | +60.4 |  |  |  |  |  |  |
| 53.427 G   | 35                | 175            | 19                | 96             | 198.3                             | -0.3           | + 4.3                 | -22.5                 | 65.384 G  | 2              | 9                 | 4              | 18                                | 139.9          | +2.5                  | - 7.4 | +76.6 |  |  |  |  |  |  |
| 54.217 K   | 36                | 145            | 19                | 75             | 198.3                             | -0.5           | + 4.5                 | -12.1                 | Means   | ..             | ..                | 8              | 48                                | 137.0          | ..                    | - 7.2 | ..    |  |  |  |  |  |  |
| 55.389 G   | 39                | 149            | 20                | 76             | 198.3                             | -0.7           | + 3.9                 | + 3.3                 | Group 16420.  |                |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |
| 56.411 G   | 18                | 140            | 10                | 74             | 198.4                             | -0.7           | + 4.0                 | +16.9                 | Feb. 28-Mar. 12. A small regular spot, with occasional companions until March 8, after which it breaks up and dies out. |                |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |
| 57.377 G   | 31                | 136            | 18                | 80             | 198.5                             | -0.8           | + 4.2                 | +29.7                 | 58.395 G  | 9              | 77                | 17             | 146                               | 78.8           | 0.0                   | -21.0 | -76.6 |  |  |  |  |  |  |
| 58.395 G   | 18                | 96             | 13                | 67             | 198.6                             | -0.9           | + 4.3                 | +43.2                 | 59.407 G  | 28             | 145               | 30             | 157                               | 79.0           | +0.3                  | -21.3 | -63.1 |  |  |  |  |  |  |
| 59.407 G   | 20                | 90             | 19                | 84             | 198.7                             | -1.0           | + 4.4                 | +56.6                 | 60.395 G  | 35             | 252               | 27             | 197                               | 79.1           | +0.6                  | -21.2 | -50.0 |  |  |  |  |  |  |
| 60.395 G   | 4                 | 44             | 6                 | 67             | 199.1                             | -0.7           | + 4.5                 | +70.0                 | 61.304 C  | 42             | 259               | 27             | 168                               | 78.9           | +0.5                  | -21.3 | -38.2 |  |  |  |  |  |  |
| 61.304 C   | 0                 | 4              | 0                 | 14             | 198.5                             | ..             | + 4.3                 | +81.4                 | 62.381 G  | 40             | 264               | 22             | 148                               | 79.2           | +1.0                  | -22.3 | -23.7 |  |  |  |  |  |  |
| Means  | ..                | ..             | 17                | 84             | 198.4                             | ..             | + 4.3                 | ..                    | 63.451 G  | 44             | 295               | 23             | 153                               | 78.2           | +0.1                  | -20.0 | -10.6 |  |  |  |  |  |  |
| Group 16414.   |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |
| Feb. 20-Mar. 1. A stream of small spots, undergoing changes from day to day. |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |  |  |
| 50.397 G   | 15                | 39             | 15                | 39             | 204.1                             | 0.0            | +13.4                 | -56.6                 | 64.370 G  | 51             | 246               | 27             | 128                               | 77.4           | -0.5                  | -21.1 | + 0.7 |  |  |  |  |  |  |
| 51.436 G   | 19                | 109            | 14                | 80             | 204.7                             | +0.5           | +13.3                 | -42.4                 | 65.384 G  | 29             | 205               | 15             | 109                               | 77.1           | -0.7                  | -21.0 | +13.8 |  |  |  |  |  |  |
| 52.447 G   | 33                | 127            | 20                | 78             | 204.6                             | +0.4           | +13.2                 | -29.1                 | 66.373 G  | 24             | 136               | 14             | 78                                | 76.9           | -0.8                  | -21.2 | +26.6 |  |  |  |  |  |  |
| 53.427 G   | 15                | 92             | 8                 | 51             | 206.8                             | +2.5           | +13.2                 | -14.0                 | 67.378 G  | 11             | 62                | 7              | 41                                | 76.4           | -1.1                  | -21.0 | +39.3 |  |  |  |  |  |  |
| Means  | ..                | ..             | ..                | ..             | ..                                | ..             | ..                    | ..                    | 68.305 C  | 4              | 26                | 3              | 21                                | 77.6           | +0.2                  | -20.5 | +52.8 |  |  |  |  |  |  |
| 69.307 C   | 0                 | 6              | 0                 | 7              | ..                                | ..             | ..                    | ..                    | 70.307 C  | 0              | 6                 | 0              | 12                                | 75.9           | -1.2                  | -20.2 | +77.4 |  |  |  |  |  |  |
| Means  | ..                | ..             | ..                | ..             | ..                                | ..             | ..                    | ..                    | Means   | ..             | ..                | 16             | 105                               | 77.7           | ..                    | -21.0 | ..    |  |  |  |  |  |  |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |  |  |  |  |  |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|--|--|--|--|--|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |  |  |  |  |  |
| Group 16424.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Mar. 1-11. A small diminishing regular spot.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 59.407 G 9 57 40 250 59.4 .. + 5.2 -82.7<br>60.395 G 24 118 35 173 59.8 0.0 + 5.0 -69.3<br>61.304 C 25 167 24 157 60.3 +0.3 + 5.0 -56.8<br>62.381 G 31 209 22 146 59.8 -0.3 + 4.1 -43.1<br>63.451 G 40 249 23 144 60.3 0.0 + 4.6 -28.5<br>64.370 G 51 271 27 144 60.5 0.0 + 4.6 -16.2<br>65.384 G 44 264 22 135 60.8 +0.1 + 4.4 -2.5<br>66.373 G 40 191 21 99 61.2 +0.4 + 4.1 +10.9<br>67.378 G 29 152 16 85 61.3 +0.3 + 4.1 +24.2<br>68.305 C 21 106 13 67 61.3 +0.1 + 3.7 +36.5<br>69.307 C 6 32 5 25 60.9 -0.5 + 3.8 +49.3  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Means  | ..                | ..             | 21                | 118            | 60.6                              | ..            | + 4.3                 | ..                    |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Group 16434 - continued  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 64.370 G 2 18 4 38 4.4 0.0 +21.3 -72.3<br>65.384 G 37 200 42 228 5.0 +0.8 +21.7 -58.3<br>66.373 G 57 321 47 266 5.0 +0.9 +21.7 -45.3<br>67.378 G 81 515 55 350 4.3 +0.4 +21.4 -32.8<br>68.305 C 79 814 48 497 3.9 +0.1 +21.0 -20.9<br>69.307 C 132 882 75 503 3.4 -0.2 +21.0 -8.2<br>70.307 C 130 956 74 545 2.5 -1.0 +20.9 +4.0<br>71.377 G 123 937 74 562 2.2 -1.1 +21.0 +17.8<br>72.312 C 119 1050 79 693 1.8 -1.4 +21.1 +29.8<br>73.488 G 117 669 96 549 1.5 -1.5 +21.5 +45.0<br>74.383 G 42 484 45 518 1.0 -1.9 +21.5 +56.3<br>75.650 G 24 210 53 464 0.9 -1.8 +21.2 +72.9<br>76.324 C 11 90 53 431 359.9 .. +21.0 +80.7        |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Means  | ..                | ..             | 21                | 118            | 60.6                              | ..            | + 4.3                 | ..                    |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Group 16438.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Mar. 7-17. A small spot, with occasional companions.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 65.384 G 9 28 15 48 352.7 0.0 +12.3 -70.6<br>66.373 G 9 70 9 69 353.7 +0.9 +11.7 -56.6<br>67.378 G 15 90 11 66 354.3 +1.4 +11.2 -42.8<br>68.305 C 21 132 13 81 355.0 +2.0 +10.7 -29.8<br>69.307 C 15 130 8 72 354.5 +1.5 +11.0 -17.1<br>70.307 C 26 190 14 101 354.3 +1.2 +10.5 -4.2<br>71.377 G 18 106 10 57 354.2 +1.0 +10.8 +9.8<br>72.312 C 17 94 10 54 354.6 +1.3 +10.7 +22.6<br>73.488 G 7 24 5 16 354.3 +0.9 +11.2 +37.8<br>74.383 G 4 42 3 35 354.3 +0.8 +11.3 +49.6<br>75.650 G 2 9 3 16 358.6 +5.0 +14.8 +70.6   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Means  | ..                | ..             | 4                 | 20             | 53.4                              | ..            | + 9.3                 | ..                    |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Group 16434.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Mar. 6-18. A stream, led by a small regular spot, a, which becomes the largest member and alone remains by March 14. From March 10 this spot is elongated for a few days.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 64.370 G 4 38 10 101 1.7 0.0 +21.3 -75.0<br>65.384 G 44 240 52 285 3.7 +2.2 +21.5 -59.6<br>66.373 G 68 427 58 368 3.3 +1.9 +21.5 -47.0<br>67.378 G 121 724 85 507 2.5 +1.3 +21.4 -34.6<br>68.305 C 105 1048 65 649 2.3 +1.2 +21.2 -22.5<br>69.307 C 166 1067 95 612 2.2 +1.3 +21.2 -9.4<br>70.307 C 141 1071 80 611 2.2 +1.4 +21.0 +3.7<br>71.377 G 132 999 79 599 1.7 +1.1 +21.0 +17.3<br>72.312 C 119 1050 79 693 1.8 +1.3 +21.1 +29.8<br>73.488 G 117 669 96 549 1.5 +1.2 +21.5 +45.0<br>74.383 G 42 484 45 518 1.0 +0.8 +21.5 +56.3<br>75.650 G 24 210 53 464 0.9 +0.9 +21.2 +72.9<br>76.324 C 11 90 53 431 359.9 .. +21.0 +80.7 |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Means  | ..                | ..             | 66                | 496            | 2.1                               | ..            | +21.3                 | ..                    |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Group 16445.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Mar. 14-25. A slowly-diminishing regular spot.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| 72.312 C 13 83 22 141 263.0 0.0 +19.2 -69.0<br>73.488 G 26 222 26 225 261.1 -1.8 +19.4 -55.4<br>74.383 G 35 332 27 256 262.0 -0.8 +19.1 -42.7<br>75.650 G 46 307 29 190 262.3 -0.3 +19.3 -25.7<br>76.324 C 41 347 24 205 261.5 -1.1 +19.5 -17.7<br>77.368 G 49 283 27 158 261.5 -1.0 +19.6 -3.9<br>78.648 G 62 245 36 142 261.5 -0.8 +19.8 +13.0<br>79.602 G 35 223 22 140 261.7 -0.5 +19.8 +25.8<br>80.343 C 28 195 19 135 261.4 -0.8 +20.0 +35.2<br>81.303 C 19 135 16 115 261.2 -0.9 +20.1 +47.7<br>82.356 G 7 73 9 91 261.2 -0.7 +20.2 +61.6<br>83.362 G 7 33 17 79 260.8 -1.0 +20.4 +74.4                                       |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |
| Means  | ..                | ..             | 23                | 156            | 261.6                             | ..            | +19.7                 | ..                    |                   |                |                   |                |                                   |               |                       |  |  |  |  |  |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area                            |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |       |       |  |  |  |  |  |  |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|--|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-------|-------|--|--|--|--|--|--|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ  | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |       |       |  |  |  |  |  |  |
| Group 16446.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| Mar. 17-23. A stream of small changing spots with an equatorwards drift. By March 22 the rear part has disappeared and on the next day a single small spot is present. |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| 75.650 G   | 29                | 97             | 16                | 52             | 288.5                             | 0.0           | +13.7                 | + 0.5                 | 82.356 G                                     | 4              | 49                | 3              | 38                                | 157.4         | 0.0                   | +21.7 | -42.2 |  |  |  |  |  |  |
| 76.324 C   | 22                | 116            | 12                | 62             | 288.5                             | -0.1          | +12.5                 | + 9.3                 | 83.362 G                                     | 26             | 187               | 17             | 122                               | 158.4         | +1.2                  | +21.8 | -28.0 |  |  |  |  |  |  |
| 77.368 G   | 28                | 181            | 17                | 106            | 289.7                             | +1.1          | +12.7                 | +24.3                 | 84.442 G                                     | 56             | 238               | 33             | 140                               | 158.1         | +1.1                  | +21.7 | -14.0 |  |  |  |  |  |  |
| 78.648 G   | 18                | 89             | 13                | 63             | 289.3                             | +0.6          | +12.1                 | +40.8                 | 85.366 G                                     | 42             | 171               | 24             | 97                                | 157.7         | +0.8                  | +22.0 | - 2.2 |  |  |  |  |  |  |
| 79.602 G   | 16                | 93             | 14                | 85             | 289.5                             | +0.7          | +11.7                 | +53.6                 | 86.342 C                                     | 31             | 155               | 18             | 91                                | 157.0         | +0.3                  | +22.1 | +10.0 |  |  |  |  |  |  |
| 80.343 C   | 4                 | 26             | 5                 | 33             | 291.2                             | +2.3          | + 9.0                 | +65.0                 | 87.304 C                                     | 21             | 136               | 13             | 84                                | 156.2         | -0.3                  | +22.0 | +21.8 |  |  |  |  |  |  |
| 81.303 C   | 0                 | 4              | 0                 | 8              | 286.6                             | -2.4          | + 8.7                 | +73.1                 | 88.589 G                                     | 13             | 67                | 9              | 49                                | 154.6         | -1.7                  | +22.7 | +37.2 |  |  |  |  |  |  |
| Means  | ..                | ..             | 11                | 58             | 289.0                             | ..            | +11.8                 | ..                    | 89.307 C                                     | 2              | 11                | 2              | 9                                 | 154.2         | -2.0                  | +23.1 | +46.3 |  |  |  |  |  |  |
| Group 16452 - continued  |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| Means  | ..                | ..             | 15                | 79             | 156.7                             | ..            | +22.1                 | ..                    |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| Group 16458.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| Mar. 29-Apr. 8. A small spot until March 31, after which there is a stream to the rear, except on April 3 and 4.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| 75.650 G   | 0                 | 7              | 0                 | 4              | 279.3                             | 0.0           | +15.4                 | - 8.7                 | 87.304 C                                     | 9              | 34                | 16             | 60                                | 63.1          | 0.0                   | +12.8 | -71.3 |  |  |  |  |  |  |
| 76.324 C   | 0                 | 11             | 0                 | 6              | 279.2                             | -0.1          | +15.7                 | 0.0                   | 88.589 G                                     | 20             | 82                | 18             | 75                                | 63.8          | +0.6                  | +13.2 | -53.6 |  |  |  |  |  |  |
| 77.368 G   | 0                 | 4              | 0                 | 2              | 281.1                             | +1.8          | +15.1                 | +15.7                 | 89.307 C                                     | 17             | 97                | 13             | 72                                | 64.3          | +1.1                  | +13.2 | -43.6 |  |  |  |  |  |  |
| 78.648 G   | 14                | 58             | 8                 | 37             | 280.1                             | +0.8          | +15.0                 | +31.6                 | 90.439 G                                     | 31             | 135               | 19             | 82                                | 63.9          | +0.6                  | +12.7 | -29.1 |  |  |  |  |  |  |
| 79.602 G   | 4                 | 24             | 3                 | 19             | 282.9                             | +3.5          | +14.7                 | +47.0                 | 91.473 G                                     | 22             | 134               | 12             | 74                                | 64.7          | +1.4                  | +13.4 | -14.7 |  |  |  |  |  |  |
| 80.343 C   | 0                 | 6              | 0                 | 7              | 286.1                             | +6.7          | +14.8                 | +59.9                 | 92.407 G                                     | 29             | 118               | 15             | 63                                | 65.0          | +1.6                  | +13.3 | - 2.0 |  |  |  |  |  |  |
| Means  | ..                | ..             | 2                 | 12             | 281.4                             | ..            | +15.1                 | ..                    | 93.331 C                                     | 26             | 112               | 14             | 60                                | 65.8          | +2.3                  | +13.6 | +10.9 |  |  |  |  |  |  |
| Means  | ..                | ..             | 17                | 74             | 63.7                              | ..            | +13.0                 | ..                    | 94.373 G                                     | 51             | 216               | 29             | 124                               | 62.2          | -1.3                  | +12.9 | +21.1 |  |  |  |  |  |  |
| Means  | ..                | ..             | 19                | 87             | 59.7                              | ..            | +10.2                 | ..                    | 95.364 G                                     | 34             | 142               | 22             | 92                                | 62.1          | -1.5                  | +12.7 | +34.1 |  |  |  |  |  |  |
| Means  | ..                | ..             | 23                | 58             | 19                                | 48            | 63.8                  | +0.2                  | 96.364 G                                     | 23             | 58                | 19             | 48                                | 63.8          | +0.2                  | +13.1 | +49.0 |  |  |  |  |  |  |
| Means  | ..                | ..             | 11                | 56             | 12                                | 61            | 61.9                  | -1.8                  | 97.391 C                                     | 11             | 56                | 12             | 61                                | 61.9          | -1.8                  | +12.4 | +60.6 |  |  |  |  |  |  |
| Group 16450.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| Mar. 20-28. A small cluster, slowly dying out.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| 78.648 G   | 11                | 51             | 14                | 66             | 180.4                             | 0.0           | -17.4                 | -68.1                 | Group 16459.                                 |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| 79.602 G   | 31                | 166            | 26                | 141            | 181.5                             | +1.1          | -17.5                 | -54.4                 | Mar. 29-Apr. 9. A small stable regular spot. |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| 80.343 C   | 30                | 146            | 21                | 102            | 182.2                             | +1.9          | -17.7                 | -44.0                 | 87.304 C                                     | 13             | 54                | 28             | 115                               | 59.4          | 0.0                   | + 9.7 | -75.0 |  |  |  |  |  |  |
| 81.303 C   | 24                | 101            | 14                | 60             | 182.4                             | +2.1          | -18.4                 | -31.1                 | 88.589 G                                     | 27             | 113               | 27             | 114                               | 59.3          | -0.2                  | +10.3 | -58.1 |  |  |  |  |  |  |
| 82.356 G   | 11                | 62             | 6                 | 33             | 182.1                             | +1.9          | -18.5                 | -17.5                 | 89.307 C                                     | 32             | 146               | 25             | 115                               | 59.5          | -0.1                  | +10.0 | -48.4 |  |  |  |  |  |  |
| 83.362 G   | 13                | 100            | 7                 | 51             | 183.2                             | +3.0          | -17.2                 | - 3.2                 | 90.439 G                                     | 40             | 142               | 25             | 89                                | 59.8          | +0.1                  | +10.2 | -33.2 |  |  |  |  |  |  |
| 84.442 G   | 9                 | 51             | 5                 | 27             | 182.8                             | +2.7          | -18.4                 | +10.7                 | 91.473 G                                     | 40             | 169               | 22             | 95                                | 59.9          | 0.0                   | +10.4 | -19.5 |  |  |  |  |  |  |
| 85.366 G   | 2                 | 9              | 1                 | 5              | 183.5                             | +3.4          | -17.8                 | +23.6                 | 92.407 G                                     | 33             | 165               | 17             | 87                                | 60.2          | +0.2                  | +10.3 | - 6.8 |  |  |  |  |  |  |
| 86.342 C   | 4                 | 24             | 2                 | 14             | 179.3                             | -0.7          | -16.7                 | +32.3                 | 93.331 C                                     | 22             | 158               | 11             | 82                                | 60.7          | +0.6                  | +10.4 | + 5.8 |  |  |  |  |  |  |
| Means  | ..                | ..             | 11                | 55             | 181.9                             | ..            | -17.7                 | ..                    | 94.373 G                                     | 31             | 145               | 17             | 80                                | 60.0          | -0.2                  | +10.4 | +18.9 |  |  |  |  |  |  |
| Means  | ..                | ..             | 19                | 87             | 59.7                              | ..            | +10.2                 | ..                    | 95.364 G                                     | 20             | 143               | 12             | 89                                | 59.8          | -0.5                  | +10.3 | +31.8 |  |  |  |  |  |  |
| Means  | ..                | ..             | 27                | 85             | 20                                | 63            | 59.4                  | -1.0                  | 96.364 G                                     | 27             | 73                | 13             | 73                                | 59.4          | -1.0                  | +10.3 | +44.6 |  |  |  |  |  |  |
| Means  | ..                | ..             | 13                | 73             | 13                                | 73            | 59.2                  | -1.3                  | 97.391 C                                     | 13             | 73                | 13             | 73                                | 59.2          | -1.3                  | + 9.9 | +57.9 |  |  |  |  |  |  |
| Means  | ..                | ..             | 7                 | 27             | 12                                | 47            | 58.9                  | -1.7                  | 98.464 G                                     | 7              | 27                | 12             | 47                                | 58.9          | -1.7                  | + 9.8 | +71.8 |  |  |  |  |  |  |
| Group 16452.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| Mar. 24-31. A stream of small variable spots, of which only one remains by March 30.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |  |
| Means  | ..                | ..             | 19                | 87             | 59.7                              | ..            | +10.2                 | ..                    | Means  | ..             | ..                | 19             | 87                                | 59.7          | ..                    | +10.2 | ..    |  |  |  |  |  |  |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area   |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |        |       |  |  |  |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|---------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|--------|-------|--|--|--|--|--|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ               | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |        |       |  |  |  |  |  |
| Group 18461.  |                   |                |                   |                |                                   |               |                       |                       |                     |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| Mar. 29-Apr. 8. A stream of small variable spots, dying out as it nears the west limb.  |                   |                |                   |                |                                   |               |                       |                       |                     |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| 87.304 C  | 8                 | 52             | 17                | 114            | 57.0                              | 0.0           | - 5.3                 | -77.4                 | 96.364 G            | 42             | 259               | (118           | 730                               | 296.9         | ..                    | +13.9) | -77.9 |  |  |  |  |  |
| 88.589 G  | 40                | 204            | 39                | 197            | 59.0                              | +1.8          | - 5.1                 | -58.4                 | 97.391 C            | 110            | 959               | 170            | 1501                              | 292.9         | 0.0                   | +13.7  | -68.4 |  |  |  |  |  |
| 89.307 C  | 28                | 214            | 21                | 159            | 60.3                              | +3.0          | - 5.0                 | -47.6                 | 98.464 G            | 296            | 1669              | 280            | 1578                              | 292.9         | -0.1                  | +13.2  | -54.2 |  |  |  |  |  |
| 90.439 G  | 17                | 133            | 10                | 78             | 60.4                              | +2.9          | - 5.1                 | -32.6                 | 99.417 C            | 360            | 2630              | 261            | 1891                              | 293.4         | +0.4                  | +13.3  | -41.1 |  |  |  |  |  |
| 91.473 G  | 26                | 147            | 13                | 77             | 64.2                              | +6.5          | - 4.5                 | -15.2                 | 100.366 G           | 497            | 3309              | 302            | 2000                              | 293.6         | +0.6                  | +13.2  | -28.4 |  |  |  |  |  |
| 92.407 G  | 26                | 132            | 13                | 66             | 64.5                              | +6.6          | - 4.3                 | -2.5                  | 101.363 G           | 456            | 3503              | 250            | 1923                              | 293.7         | +0.6                  | +13.2  | -15.1 |  |  |  |  |  |
| 93.331 C  | 19                | 108            | 10                | 55             | 65.1                              | +7.1          | - 3.8                 | +10.2                 | 102.366 G           | 496            | 3042              | 262            | 1605                              | 293.4         | +0.3                  | +13.3  | - 2.2 |  |  |  |  |  |
| 94.373 G  | 20                | 81             | 11                | 45             | 65.2                              | +7.0          | - 4.4                 | +24.1                 | 103.311 C           | 353            | 2798              | 190            | 1505                              | 293.5         | +0.3                  | +13.2  | +10.4 |  |  |  |  |  |
| 95.364 G  | 22                | 114            | 14                | 71             | 64.4                              | +6.0          | - 4.5                 | +36.4                 | 104.373 G           | 397            | 2401              | 230            | 1397                              | 293.7         | +0.5                  | +13.2  | +24.6 |  |  |  |  |  |
| 96.364 G  | 14                | 58             | 11                | 45             | 64.8                              | +6.2          | - 4.7                 | +50.0                 | 105.514 C           | 264            | 1998              | 182            | 1372                              | 293.0         | -0.3                  | +13.7  | +38.9 |  |  |  |  |  |
| 97.391 C  | 2                 | 21             | 2                 | 24             | 65.5                              | +6.8          | - 4.6                 | +64.2                 | 106.461 G           | 173            | 1479              | 152            | 1270                              | 293.0         | -0.4                  | +13.5  | +51.5 |  |  |  |  |  |
| Means   | ..                | ..             | 15                | 85             | 62.8                              | ..            | - 4.7                 | ..                    | 107.410 C           | 118            | 1023              | 147            | 1219                              | 292.1         | -1.3                  | +13.4  | +63.1 |  |  |  |  |  |
| Means   | ..                | ..             | 15                | 85             | 62.8                              | ..            | - 4.7                 | ..                    | 108.316 C           | 59             | 475               | 142            | 1065                              | 292.2         | -1.2                  | +13.6  | +75.2 |  |  |  |  |  |
| Group 18462.  |                   |                |                   |                |                                   |               |                       |                       |                     |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| Mar. 30-Apr. 9. A small stream, in which the leader becomes the largest and most stable component and alone remains by April 8.   |                   |                |                   |                |                                   |               |                       |                       |                     |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| 88.589 G  | 0                 | 7              | 0                 | 9              | 51.8                              | 0.0           | + 9.1                 | -65.6                 | Spot a              |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| 89.307 C  | 0                 | 11             | 0                 | 10             | 52.3                              | +0.4          | + 9.1                 | -55.6                 | 96.364 G            | 42             | 259               | 118            | 730                               | 296.9         | 0.0                   | +13.9  | -77.9 |  |  |  |  |  |
| 90.439 G  | 8                 | 65             | 6                 | 42             | 56.0                              | +4.0          | + 8.5                 | -37.0                 | 97.391 C            | 71             | 583               | 96             | 787                               | 295.6         | -1.4                  | +13.8  | -65.7 |  |  |  |  |  |
| 91.473 G  | 38                | 281            | 21                | 160            | 55.4                              | +3.2          | + 9.3                 | -24.0                 | 98.464 G            | 158            | 910               | 139            | 801                               | 295.0         | -2.0                  | +13.1  | -52.1 |  |  |  |  |  |
| 92.407 G  | 49                | 535            | 26                | 280            | 56.4                              | +4.1          | + 8.9                 | -10.6                 | 99.417 C            | 191            | 1595              | 132            | 1101                              | 295.3         | -1.8                  | +13.2  | -39.2 |  |  |  |  |  |
| 93.331 C  | 69                | 432            | 36                | 225            | 57.9                              | +5.5          | + 8.5                 | +3.0                  | 100.366 G           | 293            | 2135              | 173            | 1260                              | 295.4         | -1.7                  | +13.0  | -26.6 |  |  |  |  |  |
| 94.373 G  | 80                | 462            | 43                | 249            | 58.5                              | +5.9          | + 8.6                 | +17.4                 | 101.363 G           | 255            | 1982              | 138            | 1070                              | 295.8         | -1.3                  | +13.0  | -13.0 |  |  |  |  |  |
| 95.364 G  | 44                | 288            | 26                | 174            | 58.9                              | +6.2          | + 8.6                 | +30.9                 |                     |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| 96.364 G  | 45                | 212            | 33                | 154            | 59.4                              | +6.6          | + 8.1                 | +44.6                 | Spot a <sup>1</sup> |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| 97.391 C  | 15                | 136            | 15                | 137            | 60.0                              | +7.0          | + 8.1                 | +58.7                 | 102.366 G           | 137            | 782               | 71             | 407                               | 296.0         | 0.0                   | +11.4  | + 0.4 |  |  |  |  |  |
| 98.464 G  | 6                 | 62             | 11                | 117            | 60.5                              | +7.4          | + 8.3                 | +73.4                 | 103.311 C           | 91             | 671               | 49             | 362                               | 296.2         | +0.2                  | +11.3  | +13.1 |  |  |  |  |  |
| Means   | ..                | ..             | 20                | 142            | 57.0                              | ..            | + 8.6                 | ..                    | 104.373 G           | 85             | 495               | 50             | 292                               | 296.8         | +0.7                  | +11.7  | +27.7 |  |  |  |  |  |
| Means   | ..                | ..             | 20                | 142            | 57.0                              | ..            | + 8.6                 | ..                    | 105.514 C           | 57             | 390               | 41             | 281                               | 296.5         | +0.3                  | +12.4  | +42.4 |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                       | 106.461 G           | 34             | 259               | 32             | 241                               | 296.5         | +0.3                  | +12.0  | +55.0 |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                       | 107.410 C           | 26             | 166               | 36             | 227                               | 295.9         | -0.4                  | +11.9  | +66.9 |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                       | 108.316 C           | 13             | 78                | 37             | 220                               | 295.4         | -0.9                  | +11.8  | +78.4 |  |  |  |  |  |
| Group 18467.  |                   |                |                   |                |                                   |               |                       |                       |                     |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
| Apr. 7-19. A very large group, which at first consists of two composite spots. The leader, a, soon begins to divide into two regular spots, a <sup>1</sup> and a <sup>2</sup> , which separate by April 13 and slowly diminish as they approach the west limb. The follower, b, becomes elongated and undergoes slight changes during its transit. It is rather surprising that this group does not last until the next rotation. Group 16498 and 16504 may represent a feeble revival. |                   |                |                   |                |                                   |               |                       |                       |                     |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                       | Spot a <sup>2</sup> |                |                   |                |                                   |               |                       |        |       |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                       | 102.366 G           | 137            | 867               | 73             | 460                               | 296.4         | 0.0                   | +14.7  | + 0.8 |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                       | 103.311 C           | 117            | 777               | 64             | 427                               | 296.5         | +0.1                  | +14.7  | +13.4 |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                       | 104.373 G           | 99             | 634               | 59             | 380                               | 296.6         | +0.1                  | +15.0  | +27.5 |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                       | 105.514 C           | 70             | 416               | 51             | 304                               | 296.3         | -0.3                  | +15.5  | +42.2 |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                       | 106.461 G           | 47             | 288               | 45             | 274                               | 296.3         | -0.3                  | +15.5  | +54.8 |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                       | 107.410 C           | 33             | 177               | 46             | 244                               | 295.3         | -1.4                  | +15.4  | +66.3 |  |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       |                       | 108.316 C           | 20             | 105               | 56             | 296                               | 294.9         | -1.8                  | +15.8  | +77.9 |  |  |  |  |  |

## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. |       |       |  |  |  |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-------|-------|--|--|--|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |       |       |  |  |  |
| Group 16467 - continued  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |
| Spot b   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |
| 97.391 C   | 39                | 376            | 74                | 714            | 288.7                             | 0.0            | +13.9                 | -72.6                 | 102.366 G         | 11             | 81                | 59             | 431                               | 212.4          | ..                    | +13.7 | -83.2 |  |  |  |
| 98.464 G   | 134               | 734            | 135               | 741            | 289.7                             | +0.9           | +13.4                 | -57.4                 | 103.311 C         | 59             | 243               | 94             | 389                               | 213.3          | 0.0                   | +12.9 | -69.8 |  |  |  |
| 99.417 C   | 165               | 1011           | 125               | 768            | 289.4                             | +0.6           | +13.5                 | -45.1                 | 104.373 G         | 99             | 560               | 95             | 538                               | 213.0          | -0.3                  | +13.1 | -56.1 |  |  |  |
| 100.366 G  | 204               | 1174           | 129               | 740            | 289.3                             | +0.5           | +13.7                 | -32.7                 | 105.514 C         | 72             | 584               | 50             | 409                               | 212.9          | -0.5                  | +12.8 | -41.2 |  |  |  |
| 101.363 G  | 199               | 1505           | 111               | 843            | 289.5                             | +0.6           | +13.5                 | -19.3                 | 106.461 G         | 88             | 594               | 53             | 356                               | 213.3          | -0.1                  | +12.8 | -28.2 |  |  |  |
| 102.366 G  | 222               | 1393           | 118               | 738            | 290.3                             | +1.4           | +13.5                 | -5.3                  | 107.410 C         | 100            | 499               | 55             | 274                               | 213.6          | +0.2                  | +12.8 | -15.4 |  |  |  |
| 103.311 C  | 145               | 1350           | 77                | 716            | 290.6                             | +1.6           | +13.4                 | +7.5                  | 108.316 C         | 98             | 528               | 52             | 280                               | 213.3          | -0.2                  | +13.0 | -3.7  |  |  |  |
| 104.373 G  | 213               | 1272           | 121               | 725            | 290.6                             | +1.6           | +13.5                 | +21.5                 | 109.362 G         | 90             | 608               | 49             | 328                               | 212.9          | -0.6                  | +13.7 | +9.7  |  |  |  |
| 105.514 C  | 137               | 1192           | 90                | 787            | 290.1                             | +1.0           | +13.8                 | +36.0                 | 110.365 G         | 88             | 389               | 50             | 222                               | 212.9          | -0.7                  | +13.7 | +22.9 |  |  |  |
| 106.461 G  | 92                | 932            | 75                | 755            | 290.1                             | +0.9           | +13.7                 | +48.6                 | 111.332 G         | 70             | 315               | 46             | 205                               | 212.6          | -1.0                  | +14.0 | +35.4 |  |  |  |
| 107.410 C  | 59                | 680            | 65                | 748            | 289.6                             | +0.4           | +13.4                 | +60.6                 | 112.603 Mt.W      | 57             | 231               | 50             | 201                               | 212.2          | -1.4                  | +15.2 | +51.8 |  |  |  |
| 108.316 C  | 26                | 292            | 49                | 549            | 289.6                             | +0.4           | +13.9                 | +72.6                 | 113.333 G         | 29             | 142               | 33             | 162                               | 212.1          | -1.6                  | +15.6 | +61.3 |  |  |  |
| Group 16469.   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |
| Spot b   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |
| 102.366 G  | 15                | 126            | 70                | 554            | 214.4                             | ..             | +13.7                 | -81.2                 | 102.366 G         | 11             | 81                | 59             | 431                               | 212.4          | ..                    | +13.7 | -83.2 |  |  |  |
| 103.311 C  | 76                | 360            | 116               | 540            | 215.6                             | 0.0            | +13.5                 | -67.5                 | 103.311 C         | 59             | 243               | 94             | 389                               | 213.3          | 0.0                   | +12.9 | -69.8 |  |  |  |
| 104.373 G  | 195               | 995            | 179               | 916            | 215.0                             | -0.6           | +13.5                 | -54.1                 | 104.373 G         | 99             | 560               | 95             | 538                               | 213.0          | -0.3                  | +13.1 | -56.1 |  |  |  |
| 105.514 C  | 118               | 1120           | 80                | 763            | 215.8                             | +0.1           | +13.7                 | -38.3                 | 105.514 C         | 72             | 584               | 50             | 409                               | 212.9          | -0.5                  | +12.8 | -41.2 |  |  |  |
| 106.461 G  | 122               | 1264           | 73                | 745            | 216.0                             | +0.3           | +13.8                 | -25.5                 | 106.461 G         | 88             | 594               | 53             | 356                               | 213.3          | -0.1                  | +12.8 | -28.2 |  |  |  |
| 107.410 C  | 209               | 1122           | 114               | 610            | 216.8                             | +1.1           | +14.1                 | -12.2                 | 107.410 C         | 100            | 499               | 55             | 274                               | 213.6          | +0.2                  | +12.8 | -15.4 |  |  |  |
| 108.316 C  | 187               | 1014           | 99                | 538            | 216.0                             | +0.2           | +13.9                 | -1.0                  | 108.316 C         | 98             | 528               | 52             | 280                               | 213.3          | -0.2                  | +13.0 | -3.7  |  |  |  |
| 109.362 G  | 158               | 952            | 86                | 517            | 215.1                             | -0.7           | +14.0                 | +11.9                 | 109.362 G         | 70             | 315               | 46             | 205                               | 212.9          | -0.6                  | +13.7 | +9.7  |  |  |  |
| 110.365 G  | 124               | 571            | 72                | 333            | 214.4                             | -1.5           | +14.2                 | +24.4                 | 110.365 G         | 88             | 389               | 50             | 222                               | 212.9          | -0.7                  | +13.7 | +22.9 |  |  |  |
| 111.332 G  | 86                | 421            | 57                | 280            | 214.2                             | -1.7           | +14.4                 | +37.0                 | 111.332 G         | 70             | 315               | 46             | 205                               | 212.6          | -1.0                  | +14.0 | +35.4 |  |  |  |
| 112.603 Mt.W   | 66                | 271            | 59                | 242            | 213.5                             | -2.4           | +15.1                 | +53.1                 | 112.603 Mt.W      | 57             | 231               | 50             | 201                               | 212.2          | -1.4                  | +15.2 | +51.8 |  |  |  |
| 113.333 G  | 33                | 162            | 39                | 191            | 213.0                             | -3.0           | +15.2                 | +62.2                 | 113.333 G         | 29             | 142               | 33             | 162                               | 212.1          | -1.6                  | +15.6 | +61.3 |  |  |  |
| 114.441 C  | 11                | 73             | 25                | 159            | 211.2                             | -4.8           | +15.0                 | +75.1                 | 114.441 C         | 9              | 64                | 19             | 134                               | 210.3          | -3.4                  | +15.1 | +74.2 |  |  |  |
| Group 16483.   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |
| Apr. 25-May 2. A small spot, with a distant companion on April 28 and 29. Nothing is seen on April 30. |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |
| 114.441 C  | 4                 | 20             | 3                 | 15             | 88.6                              | 0.0            | -15.1                 | -47.5                 | 114.441 C         | 4              | 20                | 3              | 15                                | 88.6           | 0.0                   | -15.1 | -47.5 |  |  |  |
| 115.373 G  | 5                 | 20             | 3                 | 12             | 89.4                              | +0.8           | -14.9                 | -34.4                 | 115.373 G         | 5              | 20                | 3              | 12                                | 89.4           | +0.8                  | -14.9 | -34.4 |  |  |  |
| 116.369 G  | 14                | 27             | 8                 | 15             | 89.3                              | +0.6           | -14.8                 | -21.3                 | 116.369 G         | 14             | 27                | 8              | 15                                | 89.3           | +0.6                  | -14.8 | -21.3 |  |  |  |
| 117.419 G  | 11                | 50             | 6                 | 25             | 89.1                              | +0.4           | -14.6                 | -7.7                  | 117.419 G         | 11             | 50                | 6              | 25                                | 89.1           | +0.4                  | -14.6 | -7.7  |  |  |  |
| 118.315 C  | 7                 | 31             | 4                 | 16             | 90.0                              | +1.3           | -14.4                 | +5.1                  | 118.315 C         | 7              | 31                | 4              | 16                                | 90.0           | +1.3                  | -14.4 | +5.1  |  |  |  |
| 119.399 G  | 0                 | 0              | 0                 | 0              | ..                                | ..             | ..                    | ..                    | 119.399 G         | 0              | 0                 | 0              | 0                                 | ..             | ..                    | ..    | ..    |  |  |  |
| 120.319 C  | 2                 | 13             | 1                 | 8              | 91.3                              | +2.5           | -13.2                 | +32.9                 | 120.319 C         | 2              | 13                | 1              | 8                                 | 91.3           | +2.5                  | -13.2 | +32.9 |  |  |  |
| 121.483 G  | 0                 | 7              | 0                 | 5              | 93.1                              | +4.3           | -14.7                 | +50.0                 | 121.483 G         | 0              | 7                 | 0              | 5                                 | 93.1           | +4.3                  | -14.7 | +50.0 |  |  |  |
| Means  | ..                | ..             | 3                 | 12             | 90.1                              | ..             | -14.5                 | ..                    | Means             | ..             | ..                | 3              | 12                                | 90.1           | ..                    | -14.5 | ..    |  |  |  |
| Group 16484.   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |
| Apr. 25-May 4. A few variable spots.   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |
| 114.441 C  | 4                 | 22             | 4                 | 20             | 78.3                              | 0.0            | -10.4                 | -57.8                 | 114.441 C         | 4              | 22                | 4              | 20                                | 78.3           | 0.0                   | -10.4 | -57.8 |  |  |  |
| 115.373 G  | 9                 | 52             | 7                 | 39             | 76.2                              | -2.2           | -10.3                 | -47.6                 | 115.373 G         | 9              | 52                | 7              | 39                                | 76.2           | -2.2                  | -10.3 | -47.6 |  |  |  |
| 116.369 G  | 22                | 115            | 13                | 69             | 76.6                              | -1.9           | -10.3                 | -34.0                 | 116.369 G         | 22             | 115               | 13             | 69                                | 76.6           | -1.9                  | -10.3 | -34.0 |  |  |  |
| 117.419 G  | 29                | 190            | 15                | 102            | 76.2                              | -2.4           | -10.1                 | -20.6                 | 117.419 G         | 29             | 190               | 15             | 102                               | 76.2           | -2.4                  | -10.1 | -20.6 |  |  |  |
| 118.315 C  | 39                | 212            | 20                | 108            | 77.2                              | -1.5           | -10.0                 | -7.7                  | 118.315 C         | 39             | 212               | 20             | 108                               | 77.2           | -1.5                  | -10.0 | -7.7  |  |  |  |
| 119.399 G  | 18                | 170            | 9                 | 87             | 78.7                              | -0.2           | -9.8                  | +8.1                  | 119.399 G         | 18             | 170               | 9              | 87                                | 78.7           | -0.2                  | -9.8  | +8.1  |  |  |  |
| 120.319 C  | 18                | 64             | 10                | 35             | 78.8                              | -0.2           | -9.8                  | +20.4                 | 120.319 C         | 18             | 64                | 10             | 35                                | 78.8           | -0.2                  | -9.8  | +20.4 |  |  |  |
| 121.483 G  | 5                 | 27             | 3                 | 17             | 79.0                              | -0.1           | -9.9                  | +35.9                 | 121.483 G         | 5              | 27                | 3              | 17                                | 79.0           | -0.1                  | -9.9  | +35.9 |  |  |  |
| 122.338 G  | 2                 | 11             | 1                 | 8              | 77.3                              | -1.9           | -9.5                  | +45.5                 | 122.338 G         | 2              | 11                | 1              | 8                                 | 77.3           | -1.9                  | -9.5  | +45.5 |  |  |  |
| 123.321 C  | 2                 | 13             | 2                 | 14             | 80.6                              | +1.3           | -10.1                 | +61.8                 | 123.321 C         | 2              | 13                | 2              | 14                                | 80.6           | +1.3                  | -10.1 | +61.8 |  |  |  |
| Means  | ..                | ..             | 8                 | 50             | 77.9                              | ..             | -10.0                 | ..                    | Means             | ..             | ..                | 8              | 50                                | 77.9           | ..                    | -10.0 | ..    |  |  |  |

## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. |       |       |  |  |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-------|-------|--|--|--|--|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |       |       |  |  |  |  |
| Group 16487.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |
| Apr. 28-May 8. A regular spot with changes between May 1 and 3. There is a distant companion in the rear until May 2. |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |
| 117.419 G   | 7                 | 36             | 22                | 113            | 17.2                              | 0.0            | +12.6                 | -79.6                 | 123.321 C         | 2              | 11                | 3              | 14                                | 312.1          | 0.0                   | + 7.7 | -66.7 |  |  |  |  |
| 118.315 C   | 13                | 89             | 18                | 128            | 17.3                              | 0.0            | +12.0                 | -67.6                 | 124.541 C         | 7              | 46                | 5              | 36                                | 313.6          | +1.3                  | + 8.1 | -49.0 |  |  |  |  |
| 119.399 G   | 28                | 163            | 26                | 149            | 16.0                              | -1.3           | +12.2                 | -54.6                 | 125.325 C         | 7              | 37                | 4              | 24                                | 315.3          | +2.9                  | + 7.7 | -37.0 |  |  |  |  |
| 120.319 C   | 39                | 236            | 27                | 165            | 16.4                              | -1.0           | +12.3                 | -42.0                 | 126.451 G         | 14             | 34                | 8              | 19                                | 316.5          | +4.0                  | + 7.8 | -20.9 |  |  |  |  |
| 121.483 G   | 37                | 185            | 22                | 109            | 15.5                              | -2.0           | +12.4                 | -27.6                 | 127.330 G         | 23             | 100               | 12             | 52                                | 315.3          | +2.6                  | + 7.7 | -10.5 |  |  |  |  |
| 122.338 G   | 27                | 166            | 15                | 90             | 16.7                              | -0.8           | +12.5                 | -15.1                 | 128.355 G         | 7              | 52                | 4              | 27                                | 315.4          | +2.6                  | + 7.1 | + 3.2 |  |  |  |  |
| 123.321 C   | 18                | 178            | 9                 | 93             | 16.5                              | -1.1           | +12.6                 | -2.3                  | Means             | ..             | ..                | 6              | 29                                | 314.7          | ..                    | + 7.7 | ..    |  |  |  |  |
| 124.541 C   | 26                | 141            | 14                | 76             | 16.5                              | -1.2           | +12.8                 | +13.9                 | Group 16491.      |                |                   |                |                                   |                |                       |       |       |  |  |  |  |
| 125.325 C   | 22                | 123            | 13                | 70             | 16.8                              | -0.9           | +12.5                 | +24.5                 | 123.321 C         | 2              | 11                | 3              | 14                                | 312.1          | 0.0                   | + 7.7 | -66.7 |  |  |  |  |
| 126.451 G   | 14                | 50             | 10                | 34             | 17.1                              | -0.7           | +12.5                 | +39.7                 | 124.541 C         | 7              | 46                | 5              | 36                                | 313.6          | +1.3                  | + 8.1 | -49.0 |  |  |  |  |
| 127.330 G   | 2                 | 14             | 2                 | 12             | 17.5                              | -0.4           | +12.8                 | +51.7                 | 125.325 C         | 7              | 37                | 4              | 24                                | 315.3          | +2.9                  | + 7.7 | -37.0 |  |  |  |  |
| 128.355 G   | 2                 | 7              | 3                 | 9              | 17.6                              | -0.3           | +12.8                 | +65.4                 | 126.451 G         | 14             | 34                | 8              | 19                                | 316.5          | +4.0                  | + 7.8 | -20.9 |  |  |  |  |
| Means   | ..                | ..             | 15                | 87             | 16.8                              | ..             | +12.5                 | ..                    | 127.330 G         | 23             | 100               | 12             | 52                                | 315.3          | +2.6                  | + 7.7 | -10.5 |  |  |  |  |
| Group 16502.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |
| May 10-22. A stable regular spot, with one or two companions between May 11 and 15.                                   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |
| 119.399 G   | 25                | 108            | 13                | 56             | 58.6                              | 0.0            | -11.7                 | -12.0                 | 129.636 G         | 11             | 75                | 26             | 176                               | 218.4          | 0.0                   | + 9.6 | -76.9 |  |  |  |  |
| 120.319 C   | 40                | 148            | 21                | 75             | 58.7                              | 0.0            | -11.5                 | + 0.3                 | 130.614 G         | 30             | 192               | 36             | 228                               | 218.2          | -0.3                  | + 9.8 | -64.1 |  |  |  |  |
| 121.483 G   | 34                | 101            | 19                | 53             | 60.9                              | +2.1           | -11.9                 | +17.8                 | 131.624 G         | 43             | 260               | 35             | 211                               | 218.8          | +0.2                  | + 9.9 | -50.2 |  |  |  |  |
| 122.338 G   | 12                | 50             | 7                 | 29             | 61.7                              | +2.9           | -12.1                 | +29.9                 | 132.322 G         | 87             | 332               | 59             | 226                               | 219.0          | +0.3                  | + 9.7 | -40.8 |  |  |  |  |
| 123.321 C   | 11                | 64             | 8                 | 45             | 64.0                              | +5.1           | -12.4                 | +45.2                 | 133.514 G         | 68             | 347               | 38             | 194                               | 219.5          | +0.6                  | + 9.1 | -24.5 |  |  |  |  |
| 124.541 C   | 9                 | 59             | 9                 | 62             | 64.4                              | +5.4           | -12.4                 | +61.8                 | 134.334 C         | 64             | 318               | 34             | 169                               | 219.4          | +0.4                  | + 9.1 | -13.7 |  |  |  |  |
| 125.325 C   | 2                 | 18             | 3                 | 28             | 64.2                              | +5.1           | -12.5                 | +71.9                 | 135.488 C         | 71             | 340               | 36             | 173                               | 219.5          | +0.4                  | + 9.1 | + 1.6 |  |  |  |  |
| Means   | ..                | ..             | 11                | 50             | 61.8                              | ..             | -12.1                 | ..                    | 136.323 C         | 75             | 334               | 39             | 174                               | 219.5          | +0.3                  | + 9.0 | +12.7 |  |  |  |  |
| Group 16488.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |
| Apr. 30-May 6. Small variable spots.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |
| 119.399 G   | 25                | 108            | 13                | 56             | 58.6                              | 0.0            | -11.7                 | -12.0                 | 137.321 C         | 64             | 316               | 36             | 180                               | 219.5          | +0.2                  | + 9.2 | +25.9 |  |  |  |  |
| 120.319 C   | 40                | 148            | 21                | 75             | 58.7                              | 0.0            | -11.5                 | + 0.3                 | 138.455 G         | 48             | 221               | 33             | 150                               | 219.6          | +0.1                  | + 9.2 | +41.0 |  |  |  |  |
| 121.483 G   | 34                | 101            | 19                | 53             | 60.9                              | +2.1           | -11.9                 | +17.8                 | 139.325 C         | 31             | 172               | 26             | 144                               | 219.6          | 0.0                   | + 9.0 | +52.5 |  |  |  |  |
| 122.338 G   | 12                | 50             | 7                 | 29             | 61.7                              | +2.9           | -12.1                 | +29.9                 | 140.330 G         | 18             | 121               | 23             | 156                               | 220.4          | +0.7                  | + 9.1 | +66.6 |  |  |  |  |
| 123.321 C   | 11                | 64             | 8                 | 45             | 64.0                              | +5.1           | -12.4                 | +45.2                 | 141.325 G         | 7              | 52                | 20             | 147                               | 220.1          | +0.3                  | + 9.1 | +79.4 |  |  |  |  |
| Means   | ..                | ..             | 11                | 50             | 61.8                              | ..             | -12.1                 | ..                    | Means             | ..             | ..                | 34             | 179                               | 219.3          | ..                    | + 9.3 | ..    |  |  |  |  |
| Group 16489.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |
| May 1-9. A group of variable spots with a brief maximum on May 4 - 5.   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |
| 120.319 C   | 2                 | 13             | 3                 | 21             | 348.8                             | 0.0            | +16.6                 | -69.6                 | 135.488 C         | 4              | 35                | 8              | 68                                | 142.8          | 0.0                   | -17.2 | -75.1 |  |  |  |  |
| 121.483 G   | 37                | 246            | 39                | 253            | 345.0                             | -3.8           | +16.1                 | -58.1                 | 136.323 C         | 36             | 148               | 44             | 180                               | 142.5          | -0.3                  | -17.2 | -64.3 |  |  |  |  |
| 122.338 G   | 50                | 266            | 40                | 211            | 344.9                             | -3.8           | +16.2                 | -46.9                 | 137.321 C         | 24             | 133               | 20             | 105                               | 143.6          | +0.9                  | -16.8 | -50.0 |  |  |  |  |
| 123.321 C   | 60                | 478            | 38                | 309            | 345.2                             | -3.5           | +17.0                 | -33.6                 | 138.455 G         | 48             | 184               | 30             | 116                               | 143.5          | +0.8                  | -16.9 | -35.1 |  |  |  |  |
| 124.541 C   | 66                | 500            | 38                | 282            | 344.6                             | -4.1           | +17.5                 | -18.0                 | 139.325 C         | 20             | 97                | 11             | 53                                | 145.5          | +2.8                  | -16.6 | -21.6 |  |  |  |  |
| 125.325 C   | 33                | 354            | 18                | 190            | 345.0                             | -3.7           | +16.4                 | -7.3                  | 140.330 G         | 27             | 100               | 14             | 52                                | 146.4          | +3.8                  | -16.6 | -7.4  |  |  |  |  |
| 126.451 G   | 62                | 241            | 33                | 129            | 345.4                             | -3.2           | +16.6                 | + 8.0                 | 141.325 G         | 18             | 93                | 9              | 48                                | 146.9          | +4.3                  | -16.9 | + 6.2 |  |  |  |  |
| 127.330 G   | 54                | 256            | 31                | 146            | 346.1                             | -2.5           | +17.1                 | +20.3                 | 142.346 C         | 16             | 73                | 9              | 40                                | 147.3          | +4.7                  | -17.3 | +20.1 |  |  |  |  |
| 128.355 G   | 9                 | 45             | 5                 | 29             | 345.0                             | -3.6           | +17.3                 | +32.8                 | 143.329 C         | 13             | 42                | 8              | 26                                | 147.6          | +5.1                  | -17.3 | +33.4 |  |  |  |  |
| Means   | ..                | ..             | 27                | 174            | 345.6                             | ..             | +16.8                 | ..                    | 144.345 C         | 7              | 24                | 5              | 18                                | 147.7          | +5.2                  | -17.5 | +47.0 |  |  |  |  |
| Group 16507.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |
| May 16-26. A stream of small spots, of which the leader is the most stable component and alone remains by May 23.     |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |       |       |  |  |  |  |
| 120.319 C   | 2                 | 13             | 3                 | 21             | 348.8                             | 0.0            | +16.6                 | -69.6                 | 145.329 C         | 2              | 13                | 2              | 13                                | 147.4          | +4.9                  | -17.6 | +59.7 |  |  |  |  |

## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|--|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |
| Group 16512.   |                   |                |                   |                |                                   |               |                       |  |                   |                |                   |                |                                   |               | Group 16525.          |
| May 19-24. A stream of changing spots, appearing suddenly on May 19. One small spot remains by May 23. |                   |                |                   |                |                                   |               |                       | June 1-11. Two or three small changing spots, not seen from June 6 to 9. |                   |                |                   |                |                                   |               |                       |
| 138.455 G 39 235 22 128 158.0 0.0 -14.1 -20.6  |                   |                |                   |                | °                                 | °             | °                     | 151.335 C 0 9 0 11 303.2 0.0 +9.2 -65.0                                  |                   |                |                   |                |                                   |               |                       |
| 139.325 C 46 217 24 113 158.4 +0.4 -14.7 -8.7  |                   |                |                   |                |                                   |               |                       | 152.607 G 9 50 7 38 303.4 +0.1 +9.3 -48.0                                |                   |                |                   |                |                                   |               |                       |
| 140.330 G 28 184 14 95 157.0 -1.0 -14.1 +3.2   |                   |                |                   |                |                                   |               |                       | 153.321 G 16 69 10 45 303.1 -0.3 +9.4 -38.8                              |                   |                |                   |                |                                   |               |                       |
| 141.325 G 16 91 9 49 157.5 -0.6 -14.4 +16.8  |                   |                |                   |                |                                   |               |                       | 154.360 G 14 43 8 24 303.3 -0.3 +9.5 -24.9                               |                   |                |                   |                |                                   |               |                       |
| 142.346 C 4 13 2 8 160.8 +2.7 -15.0 +33.6  |                   |                |                   |                |                                   |               |                       | 155.336 G 16 102 9 53 303.6 -0.1 +10.0 -11.7                             |                   |                |                   |                |                                   |               |                       |
| 143.329 C 2 9 1 7 160.5 +2.4 -15.0 +46.3   |                   |                |                   |                |                                   |               |                       | 156.376 C 0 0 0 .. .. .. ..  |                   |                |                   |                |                                   |               |                       |
| Means .. .. 12 67 158.7 .. -14.6 ..  |                   |                |                   |                |                                   |               |                       | 157.350 C 0 0 0 .. .. .. ..  |                   |                |                   |                |                                   |               |                       |
| Group 16517.   |                   |                |                   |                |                                   |               |                       |  |                   |                |                   |                |                                   |               | Group 16532.          |
| May 23-30. A small spot, with a tiny companion on May 28 and 29.                                       |                   |                |                   |                |                                   |               |                       | June 9-21. A composite spot, which slowly disintegrates and dies out.    |                   |                |                   |                |                                   |               |                       |
| 142.346 C 2 20 8 81 44.8 .. +12.2 -82.4  |                   |                |                   |                |                                   |               |                       | 159.336 C 9 47 (40 206 179.4 .. -19.8) -82.9                             |                   |                |                   |                |                                   |               |                       |
| 143.329 C 7 53 10 73 46.2 0.0 +11.7 -68.0  |                   |                |                   |                |                                   |               |                       | 160.327 G 25 221 45 398 176.6 0.0 -20.0 -72.6                            |                   |                |                   |                |                                   |               |                       |
| 144.345 C 11 64 10 58 45.7 -0.7 +11.8 -55.0  |                   |                |                   |                |                                   |               |                       | 161.387 G 28 380 29 395 176.2 -0.3 -19.9 -59.0                           |                   |                |                   |                |                                   |               |                       |
| 145.329 C 16 64 11 44 45.8 -0.6 +11.8 -41.9  |                   |                |                   |                |                                   |               |                       | 162.364 G 58 306 45 239 175.5 -0.9 -19.8 -46.7                           |                   |                |                   |                |                                   |               |                       |
| 146.393 G 16 55 9 32 46.0 -0.4 +12.0 -27.6   |                   |                |                   |                |                                   |               |                       | 163.333 C 38 363 24 232 175.9 -0.4 -19.8 -33.5                           |                   |                |                   |                |                                   |               |                       |
| 147.405 G 14 50 7 26 46.0 -0.5 +12.2 -14.2   |                   |                |                   |                |                                   |               |                       | 164.360 C 31 328 18 187 175.8 -0.5 -20.1 -20.0                           |                   |                |                   |                |                                   |               |                       |
| 148.420 C 7 24 4 12 46.3 -0.3 +12.7 -0.5   |                   |                |                   |                |                                   |               |                       | 165.334 C 27 216 15 117 176.2 0.0 -19.8 -6.7                             |                   |                |                   |                |                                   |               |                       |
| 149.340 C 4 24 2 12 44.8 -1.9 +12.8 +10.2  |                   |                |                   |                |                                   |               |                       | 166.639 G 7 46 4 25 176.2 +0.1 -19.0 +10.5                               |                   |                |                   |                |                                   |               |                       |
| Means .. .. 8 37 45.8 .. +12.1 ..  |                   |                |                   |                |                                   |               |                       | 167.346 G 5 60 3 34 178.1 +2.1 -17.8 +21.8                               |                   |                |                   |                |                                   |               |                       |
| Group 16518.   |                   |                |                   |                |                                   |               |                       |  |                   |                |                   |                |                                   |               | Group 16534.          |
| May 24-June 2. A regular spot, with a small preceding companion on May 26 and 27.                      |                   |                |                   |                |                                   |               |                       | June 11-16. A group of small variable spots.                             |                   |                |                   |                |                                   |               |                       |
| 143.329 C 0 7 0 16 40.0 0.0 +31.3 -74.2  |                   |                |                   |                |                                   |               |                       | 161.387 G 5 23 3 12 243.0 0.0 +13.8 +7.8                                 |                   |                |                   |                |                                   |               |                       |
| 144.345 C 33 169 42 213 39.4 -0.1 +31.1 -61.3  |                   |                |                   |                |                                   |               |                       | 162.364 G 28 80 15 44 243.7 +0.6 +12.8 +21.5                             |                   |                |                   |                |                                   |               |                       |
| 145.329 C 33 195 31 177 38.4 -0.6 +31.1 -49.3  |                   |                |                   |                |                                   |               |                       | 163.333 C 18 134 11 83 244.6 +1.5 +12.7 +35.2                            |                   |                |                   |                |                                   |               |                       |
| 146.393 G 46 185 33 136 37.5 -1.0 +30.9 -36.1  |                   |                |                   |                |                                   |               |                       | 164.360 C 11 58 8 44 242.8 -0.4 +13.1 +47.0                              |                   |                |                   |                |                                   |               |                       |
| 147.405 G 34 153 22 99 35.9 -2.1 +30.8 -24.3   |                   |                |                   |                |                                   |               |                       | 165.334 C 7 47 8 51 245.1 +1.9 +12.8 +62.2                               |                   |                |                   |                |                                   |               |                       |
| 148.420 C 27 195 16 117 35.1 -2.4 +30.3 -11.7  |                   |                |                   |                |                                   |               |                       | 166.639 G 0 9 0 25 245.1 +1.8 +12.3 +79.4                                |                   |                |                   |                |                                   |               |                       |
| 149.340 C 22 149 13 88 34.2 -2.8 +30.7 -0.4  |                   |                |                   |                |                                   |               |                       |  |                   |                |                   |                |                                   |               |                       |
| 150.333 G 14 71 8 43 33.5 -3.1 +30.3 +12.0   |                   |                |                   |                |                                   |               |                       |  |                   |                |                   |                |                                   |               |                       |
| 151.335 C 4 22 3 14 33.6 -2.5 +30.9 +25.4  |                   |                |                   |                |                                   |               |                       |  |                   |                |                   |                |                                   |               |                       |
| 152.607 G 0 9 0 7 32.9 -2.6 +31.0 +41.5  |                   |                |                   |                |                                   |               |                       |  |                   |                |                   |                |                                   |               |                       |
| Means .. .. 17 91 36.0 .. +30.8 ..   |                   |                |                   |                |                                   |               |                       | Means .. .. 8 43 244.0 .. +12.9 ..                                       |                   |                |                   |                |                                   |               |                       |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |       |       |  |  |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|---|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-------|-------|--|--|--|--|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |       |       |  |  |  |  |
| Group 16536.  |                   |                |                   |                |                                   |               |                       | Group 16545.  |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |
| June 12-22. A group of changing spots, of which only a pair remains by June 19; these die out before reaching the limb. |                   |                |                   |                |                                   |               |                       | June 22-July 2. A pair of small spots, except between June 26 and 28, when there is a nondescript stream.   |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |
| 162.364 G   | 2                 | 9              | 11                | 48             | 138.0                             | ..            | -15.2                 | -84.2   | 172.339 G         | 5              | 14                | 5              | 14                                | 33.0          | 0.0                   | -14.0 | -57.2 |  |  |  |  |
| 163.333 C   | 21                | 109            | 31                | 168            | 139.4                             | 0.0           | -17.7                 | -70.0   | 173.466 G         | 2              | 9                 | 1              | 6                                 | 34.2          | +1.1                  | -12.6 | -41.1 |  |  |  |  |
| 164.360 C   | 29                | 199            | 27                | 189            | 140.0                             | +0.6          | -17.4                 | -55.8   | 174.321 G         | 2              | 12                | 1              | 7                                 | 33.2          | +0.1                  | -13.5 | -30.8 |  |  |  |  |
| 165.334 C   | 63                | 270            | 45                | 194            | 140.8                             | +1.5          | -17.6                 | -42.1   | 175.340 C         | 8              | 58                | 4              | 32                                | 33.3          | +0.1                  | -13.7 | -17.2 |  |  |  |  |
| 166.639 G   | 55                | 233            | 31                | 136            | 140.9                             | +1.6          | -18.2                 | -24.8   | 176.361 C         | 35             | 214               | 18             | 111                               | 33.6          | +0.4                  | -13.4 | -3.4  |  |  |  |  |
| 167.346 G   | 35                | 246            | 19                | 135            | 140.7                             | +1.5          | -17.8                 | -15.6   | 177.330 G         | 37             | 150               | 19             | 79                                | 34.3          | +1.0                  | -13.9 | +10.2 |  |  |  |  |
| 168.381 G   | 33                | 170            | 17                | 91             | 141.2                             | +2.0          | -17.6                 | -1.4  | 178.394 C         | 31             | 127               | 18             | 74                                | 36.0          | +2.7                  | -13.2 | +25.9 |  |  |  |  |
| 169.564 C   | 27                | 136            | 15                | 75             | 143.1                             | +4.0          | -17.6                 | +16.2   | 179.461 G         | 9              | 74                | 6              | 52                                | 37.0          | +3.6                  | -12.8 | +41.1 |  |  |  |  |
| 170.538 G   | 11                | 37             | 6                 | 22             | 142.9                             | +3.8          | -17.9                 | +28.9   | 180.335 C         | 7              | 47                | 6              | 40                                | 36.7          | +3.3                  | -12.7 | +52.3 |  |  |  |  |
| 171.474 G   | 5                 | 19             | 4                 | 13             | 143.4                             | +4.4          | -17.3                 | +41.7   | 181.328 G         | 5              | 21                | 7              | 27                                | 36.3          | +2.8                  | -13.0 | +65.1 |  |  |  |  |
| 172.339 G   | 2                 | 9              | 2                 | 8              | 142.6                             | +3.6          | -16.1                 | +52.4   | 182.297 G         | 0              | 10                | 0              | 26                                | 34.6          | +1.1                  | -13.9 | +76.2 |  |  |  |  |
| Means   | ..                | ..             | 20                | 103            | 141.5                             | ..            | -17.5                 | ..  | Means             | ..             | ..                | 8              | 43                                | 34.7          | ..                    | -13.3 | ..    |  |  |  |  |
| Group 16541.  |                   |                |                   |                |                                   |               |                       | Group 16547.  |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |
| June 20-25. A few small variable spots.   |                   |                |                   |                |                                   |               |                       | June 22-27. A single small spot on June 22, 23 and 27; a pair on the other days.  |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |
| 170.538 G   | 5                 | 23             | 3                 | 13             | 88.3                              | 0.0           | +12.9                 | -25.7   | 172.339 G         | 2              | 12                | 4              | 23                                | 15.1          | 0.0                   | +12.6 | -75.1 |  |  |  |  |
| 171.474 G   | 18                | 104            | 9                 | 54             | 88.7                              | +0.3          | +13.2                 | -13.0   | 173.466 G         | 14             | 53                | 13             | 51                                | 17.0          | +1.8                  | +11.9 | -58.3 |  |  |  |  |
| 172.339 G   | 12                | 80             | 6                 | 41             | 87.1                              | -1.3          | +13.4                 | -3.1  | 174.321 G         | 24             | 101               | 18             | 76                                | 16.1          | +0.8                  | +12.1 | -47.9 |  |  |  |  |
| 173.466 G   | 5                 | 25             | 3                 | 13             | 86.4                              | -2.1          | +13.4                 | +11.1   | 175.340 C         | 22             | 108               | 14             | 67                                | 15.5          | +0.2                  | +12.2 | -35.0 |  |  |  |  |
| 174.321 G   | 0                 | 21             | 0                 | 12             | 86.9                              | -1.6          | +13.1                 | +22.9   | 176.361 C         | 22             | 49                | 12             | 27                                | 15.6          | +0.2                  | +12.2 | -21.4 |  |  |  |  |
| 175.340 C   | 2                 | 18             | 1                 | 11             | 87.2                              | -1.4          | +13.1                 | +36.7   | 177.330 G         | 5              | 12                | 3              | 6                                 | 19.5          | +4.0                  | +11.8 | -4.6  |  |  |  |  |
| Means   | ..                | ..             | 4                 | 24             | 87.4                              | ..            | +13.2                 | ..  | Means             | ..             | ..                | 11             | 42                                | 16.5          | ..                    | +12.1 | ..    |  |  |  |  |
| Group 16543.  |                   |                |                   |                |                                   |               |                       | Group 16556.  |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |
| June 21-29. A pair of diminishing spots; only the leader remains by June 27.  |                   |                |                   |                |                                   |               |                       | July 3-12. A stream, growing vigorously from a tiny spot when first seen. The leader is the least stable component and dies out before reaching the west limb. The follower, the largest component, is composite. |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |
| 171.474 G   | 23                | 110            | 48                | 230            | 26.1                              | 0.0           | +16.0                 | -75.6   | 183.576 Mt.W      | 3              | 9                 | 2              | 5                                 | 270.2         | 0.0                   | +17.2 | -31.3 |  |  |  |  |
| 172.339 G   | 23                | 108            | 27                | 122            | 27.0                              | +0.9          | +15.4                 | -63.2   | 184.654 G         | 44             | 187               | 24             | 100                               | 272.0         | +1.8                  | +15.9 | -15.2 |  |  |  |  |
| 173.466 G   | 32                | 195            | 25                | 153            | 26.4                              | +0.3          | +15.1                 | -48.9   | 185.878 Mt.W      | 122            | 543               | 63             | 277                               | 272.8         | +2.6                  | +15.9 | +1.8  |  |  |  |  |
| 174.321 G   | 32                | 184            | 20                | 119            | 26.3                              | +0.2          | +15.0                 | -37.7   | 186.333 C         | 122            | 678               | 63             | 351                               | 272.3         | +2.1                  | +15.4 | +7.3  |  |  |  |  |
| 175.340 C   | 37                | 147            | 20                | 83             | 26.7                              | +0.6          | +15.4                 | -23.8   | 187.621 G         | 131            | 1047              | 74             | 585                               | 272.1         | +1.9                  | +15.0 | +24.2 |  |  |  |  |
| 176.361 C   | 18                | 75             | 9                 | 39             | 27.0                              | +0.8          | +15.5                 | -10.0   | 188.325 G         | 148            | 1040              | 90             | 636                               | 272.2         | +1.9                  | +14.9 | +33.6 |  |  |  |  |
| 177.330 G   | 9                 | 18             | 5                 | 9              | 27.7                              | +1.5          | +15.0                 | +3.6  | 189.344 C         | 141            | 763               | 104            | 565                               | 271.7         | +1.4                  | +14.5 | +46.6 |  |  |  |  |
| 178.394 C   | 9                 | 22             | 5                 | 12             | 28.0                              | +1.8          | +14.8                 | +17.9   | 190.331 G         | 118            | 687               | 119            | 686                               | 270.8         | +0.5                  | +15.2 | +58.7 |  |  |  |  |
| 179.461 G   | 2                 | 12             | 1                 | 7              | 28.4                              | +2.2          | +14.8                 | +32.5   | 191.333 G         | 39             | 254               | 62             | 406                               | 271.0         | +0.7                  | +15.3 | +72.2 |  |  |  |  |
| Means   | ..                | ..             | 18                | 86             | 27.1                              | ..            | +15.2                 | ..  | 192.354 G         | 9              | 49                | (34)           | 187                               | 268.7         | ..                    | +16.0 | +83.4 |  |  |  |  |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. |  |  |  |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|--|--|--|--|--|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |  |  |  |  |  |
| Group 16561.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| July 9-14. Small changing spots, appearing past the C.M.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 189.344 C   | 11                | 66             | 6                 | 34             | 238.1                             | 0.0            | + 7.3                 | +13.0                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 190.331 G   | 30                | 168            | 17                | 94             | 238.4                             | +0.2           | + 7.1                 | +26.3                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 191.333 G   | 25                | 206            | 16                | 132            | 237.7                             | -0.7           | + 7.5                 | +38.9                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 192.354 G   | 39                | 188            | 32                | 151            | 237.4                             | -1.1           | + 8.1                 | +52.1                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 193.342 G   | 23                | 115            | 28                | 139            | 238.2                             | -0.5           | + 8.6                 | +66.0                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 194.417 G   | 5                 | 18             | (13)              | 47             | 237.4                             | ..             | + 9.9                 | +79.4                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| Means   | ..                | ..             | 20                | 110            | 238.0                             | ..             | + 7.7                 | ..                    |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| Group 16562.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| July 10-21. A broken group, slowly declining as it crosses the disk.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 190.331 G   | 46                | 377            | 88                | 709            | 137.5                             | 0.0            | +20.1                 | -74.6                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 191.333 G   | 79                | 508            | 88                | 589            | 134.6                             | -2.8           | +20.7                 | -64.2                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 192.354 G   | 92                | 596            | 75                | 488            | 134.9                             | -2.4           | +20.5                 | -50.4                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 193.342 G   | 99                | 603            | 64                | 394            | 135.0                             | -2.1           | +20.2                 | -37.2                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 194.417 G   | 67                | 541            | 38                | 306            | 134.5                             | -2.5           | +20.2                 | -23.5                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 195.341 G   | 72                | 374            | 39                | 200            | 134.3                             | -2.6           | +20.7                 | -11.5                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 196.380 G   | 25                | 213            | 13                | 111            | 136.2                             | -0.6           | +20.1                 | +4.2                  |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 197.327 G   | 25                | 182            | 14                | 98             | 136.0                             | -0.7           | +20.1                 | +16.5                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 198.360 G   | 23                | 136            | 14                | 82             | 135.9                             | -0.7           | +20.2                 | +30.1                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 199.589 G   | 28                | 111            | 20                | 81             | 134.6                             | -1.8           | +20.1                 | +45.0                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 200.362 C   | 11                | 56             | 10                | 49             | 134.2                             | -2.1           | +19.5                 | +54.9                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 201.493 G   | 2                 | 23             | 3                 | 33             | 134.6                             | -1.6           | +18.8                 | +70.2                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| Means   | ..                | ..             | 39                | 262            | 135.2                             | ..             | +20.1                 | ..                    |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| Group 16563.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| July 11-20. A stream of small variable spots, not seen on July 12.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 191.333 G   | 0                 | 7              | 0                 | 11             | 128.0                             | 0.0            | -13.5                 | -70.8                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 192.354 G   | 0                 | 0              | 0                 | 0              | ..                                | ..             | ..                    | ..                    |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 193.342 G   | 7                 | 42             | 5                 | 30             | 130.0                             | +1.9           | -12.8                 | -42.2                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 194.417 G   | 30                | 93             | 18                | 56             | 129.2                             | +1.0           | -12.4                 | -28.8                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 195.341 G   | 19                | 111            | 10                | 60             | 130.2                             | +1.9           | -12.1                 | -15.6                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 196.380 G   | 25                | 127            | 13                | 67             | 130.3                             | +2.0           | -11.9                 | -1.7                  |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 197.327 G   | 16                | 233            | 9                 | 123            | 130.6                             | +2.2           | -11.8                 | +11.1                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 198.360 G   | 23                | 122            | 13                | 70             | 131.0                             | +2.5           | -11.9                 | +25.2                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 199.589 G   | 0                 | 18             | 0                 | 13             | 130.5                             | +1.9           | -13.0                 | +40.9                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 200.362 C   | 0                 | 9              | 0                 | 7              | 126.3                             | -2.3           | -12.9                 | +47.0                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| Means   | ..                | ..             | 7                 | 44             | 129.6                             | ..             | -12.5                 | ..                    |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| Group 16564.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| July 19-29. A small regular spot, with a few variable companions. On July 26 it begins to disintegrate and soon dies out. |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 199.589 G   | 9                 | 67             | 25                | 189            | 9.5                               | ..             | + 4.8                 | -80.1                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 200.362 C   | 18                | 143            | 27                | 212            | 8.7                               | 0.0            | + 5.0                 | -70.6                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 201.493 G   | 44                | 237            | 39                | 209            | 8.6                               | -0.3           | + 5.0                 | -55.8                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 202.387 G   | 64                | 343            | 44                | 233            | 9.3                               | +0.3           | + 5.2                 | -43.2                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 203.418 G   | 55                | 310            | 31                | 177            | 9.4                               | +0.2           | + 5.9                 | -29.5                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 204.388 G   | 60                | 332            | 31                | 172            | 9.4                               | 0.0            | + 5.2                 | -16.7                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 205.642 G   | 37                | 145            | 18                | 72             | 9.0                               | -0.6           | + 4.7                 | -0.5                  |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 206.377 G   | 30                | 219            | 15                | 112            | 9.1                               | -0.6           | + 5.0                 | + 9.3                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 207.335 G   | 25                | 152            | 14                | 82             | 9.4                               | -0.5           | + 4.7                 | + 22.3                |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 208.594 G   | 7                 | 23             | 4                 | 15             | 9.6                               | -0.5           | + 4.5                 | + 39.2                |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 209.322 G   | 5                 | 23             | 4                 | 17             | 9.9                               | -0.3           | + 4.6                 | + 49.1                |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| Means   | ..                | ..             | 23                | 130            | 9.2                               | ..             | + 5.0                 | ..                    |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| Group 16572.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| July 20-31. A small persistent spot.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 200.362 C   | 4                 | 42             | 13                | 132            | 359.7                             | 0.0            | -11.8                 | -79.6                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 201.493 G   | 14                | 76             | 18                | 96             | 359.7                             | -0.1           | -12.1                 | -64.7                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 202.387 G   | 14                | 99             | 12                | 86             | 0.2                               | +0.4           | -12.4                 | -52.3                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 203.418 G   | 14                | 108            | 10                | 73             | 0.3                               | +0.4           | -12.6                 | -38.6                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 204.388 G   | 23                | 76             | 13                | 44             | 0.3                               | +0.3           | -12.4                 | -25.8                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 205.642 G   | 9                 | 48             | 5                 | 25             | 359.9                             | -0.2           | -12.3                 | -9.6                  |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 206.377 G   | 9                 | 37             | 5                 | 19             | 359.7                             | -0.4           | -12.1                 | -0.1                  |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 207.335 G   | 5                 | 14             | 3                 | 8              | 359.4                             | -0.8           | -12.3                 | +12.3                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 208.594 G   | 2                 | 12             | 1                 | 7              | 359.1                             | -1.2           | -12.7                 | +28.7                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 209.322 G   | 5                 | 16             | 3                 | 11             | 359.9                             | -0.4           | -12.8                 | +39.1                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 210.585 C   | 2                 | 13             | 2                 | 12             | 358.0                             | -2.4           | -12.8                 | +53.9                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 211.330 C   | 0                 | 9              | 0                 | 12             | 359.9                             | -0.6           | -13.1                 | +65.7                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| Means   | ..                | ..             | 7                 | 44             | 359.7                             | ..             | -12.4                 | ..                    |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| Group 16573.  |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| July 21-27. A small variable group, appearing immediately north of Group 16569.   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 201.493 G   | 5                 | 26             | 3                 | 13             | 55.1                              | 0.0            | +12.9                 | -9.3                  |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 202.387 G   | 18                | 186            | 9                 | 93             | 56.7                              | +1.5           | +11.5                 | + 4.2                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 203.418 G   | 41                | 239            | 22                | 128            | 57.6                              | +2.3           | +12.0                 | +18.7                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 204.388 G   | 14                | 94             | 8                 | 55             | 57.5                              | +2.2           | +11.9                 | +31.4                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 205.642 G   | 7                 | 25             | 5                 | 20             | 59.8                              | +4.4           | +11.9                 | +50.3                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 206.377 G   | 7                 | 39             | 6                 | 35             | 56.4                              | +0.9           | +11.2                 | +56.6                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| 207.335 G   | 0                 | 7              | 0                 | 10             | 56.7                              | +1.1           | +11.2                 | +69.6                 |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |
| Means   | ..                | ..             | 8                 | 51             | 57.1                              | ..             | +11.8                 | ..                    |                   |                |                   |                |                                   |                |                       |  |  |  |  |  |

## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |       |       |  |  |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-------------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-------|-------|--|--|--|--|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                         | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |       |       |  |  |  |  |
| Group 16575.  |                   |                |                   |                |                                   |               |                       | Group 16581 - continued |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |
| July 24-Aug. 3. A stream of small spots, undergoing minor changes before dying out.   |                   |                |                   |                |                                   |               |                       |                         |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |
| 204.388 G   | 5                 | 25             | 9                 | 45             | 313.7                             | 0.0           | -11.1                 | -72.4                   | 211.330 C         | 130            | 875               | 124            | 864                               | 236.4         | 0.0                   | -8.8  | -57.8 |  |  |  |  |
| 205.642 G   | 46                | 216            | 44                | 210            | 312.4                             | -1.4          | -10.8                 | -57.1                   | 212.345 G         | 162            | 1056              | 118            | 769                               | 236.8         | +0.3                  | -9.2  | -44.0 |  |  |  |  |
| 206.377 G   | 81                | 430            | 64                | 337            | 312.8                             | -1.1          | -10.8                 | -47.0                   | 213.362 G         | 224            | 1252              | 135            | 753                               | 236.8         | +0.1                  | -9.4  | -30.6 |  |  |  |  |
| 207.335 G   | 121               | 709            | 80                | 470            | 309.6                             | -4.3          | -11.4                 | -37.5                   | 214.329 G         | 199            | 2049              | 107            | 1104                              | 238.0         | +1.2                  | -8.7  | -16.6 |  |  |  |  |
| 208.594 G   | 115               | 611            | 65                | 346            | 308.3                             | -5.7          | -11.9                 | -22.1                   | 215.326 G         | 343            | 2167              | 178            | 1126                              | 236.3         | -0.6                  | -9.7  | -5.1  |  |  |  |  |
| 209.322 G   | 119               | 591            | 64                | 321            | 308.8                             | -5.3          | -11.8                 | -12.0                   | 216.328 C         | 225            | 1785              | 118            | 934                               | 235.9         | -1.1                  | -9.0  | +7.8  |  |  |  |  |
| 210.585 C   | 74                | 415            | 39                | 220            | 308.6                             | -5.6          | -11.5                 | +4.5                    | 217.328 C         | 190            | 1621              | 106            | 901                               | 236.5         | -0.7                  | -8.5  | +21.6 |  |  |  |  |
| 211.330 C   | 42                | 363            | 23                | 198            | 308.0                             | -6.3          | -12.1                 | +13.8                   | 218.382 G         | 140            | 1175              | 89             | 751                               | 236.5         | -0.8                  | -8.7  | +35.5 |  |  |  |  |
| 212.345 G   | 53                | 245            | 31                | 145            | 307.7                             | -6.7          | -12.5                 | +26.9                   | 219.373 G         | 151            | 673               | 122            | 544                               | 236.7         | -0.7                  | -9.0  | +48.8 |  |  |  |  |
| 213.362 G   | 19                | 105            | 13                | 73             | 306.4                             | -8.0          | -12.3                 | +39.0                   | 220.340 C         | 39             | 399               | 43             | 457                               | 236.6         | -0.9                  | -8.7  | +61.5 |  |  |  |  |
| 214.329 G   | 9                 | 41             | 8                 | 36             | 305.8                             | -8.7          | -12.8                 | +51.2                   | 221.648 G         | 21             | 135               | 54             | 357                               | 235.8         | -1.0                  | -8.9  | +78.0 |  |  |  |  |
| Means   | ..                | ..             | 40                | 217            | 309.3                             | ..            | -11.7                 | ..                      | Means             | ..             | ..                | 109            | 770                               | 236.6         | ..                    | -8.9  | ..    |  |  |  |  |
| Group 16579.  |                   |                |                   |                |                                   |               |                       | Spot a                  |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |
| July 29-Aug. 9. A regular spot, with some small close companions from August 7.   |                   |                |                   |                |                                   |               |                       | 209.322 G               | 9                 | 28             | 37                | 114            | 238.7                             | ..            | -7.1                  | -82.1 |       |  |  |  |  |
| 208.594 G   | 12                | 60             | 39                | 197            | 248.6                             | ..            | +7.7                  | -81.8                   | 210.585 C         | 31             | 158               | 38             | 194                               | 239.2         | 0.0                   | -7.8  | -64.9 |  |  |  |  |
| 209.322 G   | 32                | 136            | 52                | 222            | 248.2                             | 0.0           | +7.6                  | -72.6                   | 211.330 C         | 76             | 326               | 68             | 293                               | 239.7         | +0.4                  | -8.3  | -54.5 |  |  |  |  |
| 210.585 C   | 42                | 190            | 37                | 165            | 248.7                             | +0.3          | +7.8                  | -55.4                   | 212.345 G         | 66             | 408               | 45             | 277                               | 240.3         | +0.9                  | -8.5  | -40.5 |  |  |  |  |
| 211.330 C   | 47                | 252            | 33                | 179            | 248.7                             | +0.2          | +7.7                  | -45.5                   | 213.362 G         | 98             | 579               | 57             | 336                               | 240.4         | +0.8                  | -8.5  | -27.0 |  |  |  |  |
| 212.345 G   | 48                | 268            | 28                | 158            | 248.9                             | +0.3          | +7.8                  | -31.9                   | 214.329 G         | 103            | 893               | 55             | 473                               | 240.5         | +0.8                  | -8.2  | -14.1 |  |  |  |  |
| 213.362 G   | 62                | 302            | 33                | 160            | 249.1                             | +0.3          | +7.4                  | -18.3                   | 215.326 G         | 124            | 676               | 64             | 352                               | 240.7         | +0.9                  | -8.0  | -0.7  |  |  |  |  |
| 214.329 G   | 66                | 348            | 33                | 174            | 249.2                             | +0.3          | +7.4                  | -5.4                    | 216.328 C         | 107            | 493               | 57             | 261                               | 240.2         | +0.3                  | -7.7  | +12.1 |  |  |  |  |
| 215.326 G   | 71                | 325            | 36                | 162            | 249.3                             | +0.2          | +7.4                  | +7.9                    | Spot b            |                |                   |                |                                   |               |                       |       |       |  |  |  |  |
| 216.328 C   | 51                | 326            | 28                | 176            | 249.3                             | +0.1          | +7.7                  | +21.2                   | 210.585 C         | 51             | 317               | 79             | 488                               | 234.4         | 0.0                   | -9.1  | -69.7 |  |  |  |  |
| 217.328 C   | 49                | 283            | 29                | 170            | 249.4                             | 0.0           | +7.7                  | +34.5                   | 211.330 C         | 54             | 549               | 56             | 571                               | 234.6         | +0.1                  | -9.2  | -59.6 |  |  |  |  |
| 218.382 G   | 44                | 270            | 33                | 202            | 249.4                             | -0.1          | +7.8                  | +48.4                   | 212.345 G         | 96             | 648               | 73             | 492                               | 234.6         | 0.0                   | -9.7  | -46.2 |  |  |  |  |
| 219.373 G   | 30                | 208            | 31                | 214            | 249.3                             | -0.3          | +7.7                  | +61.4                   | 213.362 G         | 126            | 673               | 78             | 417                               | 234.4         | -0.4                  | -9.9  | -33.0 |  |  |  |  |
| 220.340 C   | 9                 | 118            | 16                | 209            | 249.4                             | -0.4          | +7.4                  | +74.3                   | 214.329 G         | 73             | 1019              | 40             | 560                               | 234.3         | -0.6                  | -9.7  | -20.3 |  |  |  |  |
| Means   | ..                | ..             | 32                | 183            | 249.1                             | ..            | +7.6                  | ..                      | 215.326 G         | 192            | 1328              | 100            | 691                               | 234.4         | -0.6                  | -9.6  | -7.0  |  |  |  |  |
| Group 16581.  |                   |                |                   |                |                                   |               |                       | 216.328 C               | 102               | 1154           | 53                | 600            | 234.6                             | -0.5          | -9.2                  | +6.5  |       |  |  |  |  |
| July 29-Aug. 10. A group which is at first bi-polar; on August 3 other spots appear in front of the leader, a, and between the main components to form a stream. As the whole diminishes, the follower, b, becomes a small well-defined regular spot. |                   |                |                   |                |                                   |               |                       | 217.328 C               | 127               | 1193           | 70                | 656            | 234.3                             | -1.0          | -9.5                  | +19.4 |       |  |  |  |  |
| 209.322 G   | 9                 | 28             | 37                | 114            | 238.7                             | ..            | -7.1                  | -82.1                   | 218.382 G         | 78             | 566               | 48             | 351                               | 234.0         | -1.4                  | -10.0 | +33.0 |  |  |  |  |
| 210.585 C   | 82                | 475            | 117               | 682            | 236.3                             | 0.0           | -8.7                  | -67.8                   | 219.373 G         | 69             | 314               | 52             | 239                               | 234.1         | -1.4                  | -10.3 | +46.2 |  |  |  |  |
| Group 16584.  |                   |                |                   |                |                                   |               |                       | 220.340 C               | 24                | 220            | 25                | 231            | 234.7                             | -0.9          | -10.5                 | +59.6 |       |  |  |  |  |
|   |                   |                |                   |                |                                   |               |                       | 221.648 G               | 16                | 94             | 37                | 216            | 233.8                             | -2.0          | -10.0                 | +76.0 |       |  |  |  |  |



## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area  |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |       |       |  |  |  |  |  |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|--|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-------|-------|--|--|--|--|--|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ  | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |       |       |  |  |  |  |  |
| Group 16594.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| Aug. 16-27. A stream, whose follower is the largest and most stable component until August 22, after which it quickly breaks up. |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 227.325 G  | 9                 | 21             | 12                | 28             | 14.0                              | 0.0           | +14.4                 | -68.8                 | 233.440 G  | 11             | 89                | 8              | 67                                | 319.6         | -2.4                  | +36.4 | -42.3 |  |  |  |  |  |
| 228.383 G  | 27                | 255            | 23                | 222            | 13.5                              | -0.5          | +14.2                 | -55.3                 | 234.301 G  | 16             | 71                | 11             | 47                                | 319.1         | -2.3                  | +35.6 | -31.5 |  |  |  |  |  |
| 229.325 G  | 70                | 388            | 49                | 272            | 11.9                              | -2.2          | +14.1                 | -44.4                 | 235.323 G  | 14             | 64                | 8              | 38                                | 318.4         | -2.2                  | +35.4 | -18.7 |  |  |  |  |  |
| 230.333 G  | 89                | 682            | 52                | 403            | 11.2                              | -2.9          | +14.2                 | -31.8                 | 236.356 G  | 5              | 28                | 3              | 16                                | 317.1         | -2.8                  | +34.9 | -6.3  |  |  |  |  |  |
| 231.430 C  | 128               | 761            | 67                | 402            | 10.6                              | -3.5          | +14.4                 | -17.9                 | Means  | ..             | ..                | 13             | 66                                | 320.4         | ..                    | +36.1 | ..    |  |  |  |  |  |
| 232.337 G  | 124               | 775            | 62                | 394            | 10.7                              | -3.4          | +14.7                 | -5.8                  | Group 16596 - continued  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 233.440 G  | 139               | 714            | 71                | 366            | 10.3                              | -3.9          | +14.4                 | +8.4                  | 230.333 G  | 2              | 11                | 8              | 45                                | 321.5         | ..                    | -10.3 | -81.5 |  |  |  |  |  |
| 234.301 G  | 102               | 438            | 55                | 237            | 10.4                              | -3.8          | +14.4                 | +19.8                 | 231.430 C  | 15             | 46                | 21             | 64                                | 321.3         | 0.0                   | -10.2 | -67.2 |  |  |  |  |  |
| 235.323 G  | 36                | 209            | 23                | 131            | 13.0                              | -1.2          | +14.7                 | +35.9                 | 232.337 G  | 7              | 78                | 6              | 72                                | 321.6         | +0.2                  | -9.9  | -54.9 |  |  |  |  |  |
| 236.356 G  | 23                | 107            | 18                | 84             | 13.4                              | -0.8          | +15.0                 | +50.0                 | 233.440 G  | 21             | 96                | 14             | 66                                | 321.6         | 0.0                   | -9.7  | -40.3 |  |  |  |  |  |
| 237.351 G  | 7                 | 39             | 8                 | 45             | 14.2                              | -0.1          | +15.0                 | +63.9                 | 234.301 G  | 18             | 62                | 11             | 37                                | 322.0         | +0.3                  | -9.4  | -28.6 |  |  |  |  |  |
| 238.667 G  | 0                 | 18             | (0)               | 35             | 9.1                               | ..            | +14.9                 | +76.2                 | 235.323 G  | 16             | 66                | 9              | 36                                | 321.8         | 0.0                   | -9.1  | -15.3 |  |  |  |  |  |
| Means  | ..                | ..             | 40                | 235            | 12.1                              | ..            | +14.5                 | ..                    | 236.356 G  | 11             | 50                | 6              | 26                                | 321.9         | 0.0                   | -9.1  | -1.5  |  |  |  |  |  |
| Group 16595.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| Aug. 19-30. A small regular spot, with a double umbra between August 22 and 27.  |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 230.333 G  | 16                | 93             | 28                | 165            | 332.5                             | 0.0           | -17.6                 | -70.5                 | 237.351 G  | 11             | 59                | 6              | 31                                | 322.1         | +0.1                  | -8.6  | +11.8 |  |  |  |  |  |
| 231.430 C  | 29                | 197            | 30                | 203            | 331.9                             | -0.7          | -17.8                 | -56.6                 | 238.667 G  | 9              | 30                | 5              | 18                                | 322.7         | +0.5                  | -8.6  | +20.8 |  |  |  |  |  |
| 232.337 G  | 27                | 246            | 21                | 192            | 332.1                             | -0.6          | -17.8                 | -44.4                 | 239.601 G  | 11             | 32                | 8              | 23                                | 322.9         | +0.6                  | -8.6  | +42.4 |  |  |  |  |  |
| 233.440 G  | 55                | 312            | 35                | 200            | 331.3                             | -1.4          | -17.8                 | -30.6                 | 240.482 G  | 5              | 14                | 4              | 13                                | 323.1         | +0.7                  | -8.7  | +54.2 |  |  |  |  |  |
| 234.301 G  | 75                | 385            | 44                | 227            | 331.1                             | -1.7          | -17.9                 | -19.5                 | 241.582 G  | 0              | 7                 | 0              | 10                                | 323.1         | +0.5                  | -8.7  | +68.7 |  |  |  |  |  |
| 235.323 G  | 62                | 349            | 35                | 195            | 330.7                             | -2.2          | -18.2                 | -6.4                  | Means  | ..             | ..                | 8              | 36                                | 322.2         | ..                    | -9.1  | ..    |  |  |  |  |  |
| 236.356 G  | 55                | 369            | 31                | 207            | 330.2                             | -2.8          | -18.5                 | +6.8                  | Group 16600.   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 237.351 G  | 50                | 276            | 30                | 163            | 329.9                             | -3.1          | -18.7                 | +19.6                 | Aug. 22-27. One or two small spots which develop into a stream. The leader, a small regular spot, nearly touches Group 16592; the follower becomes composite by August 25. |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 238.667 G  | 25                | 187            | 18                | 133            | 330.0                             | -3.1          | -19.3                 | +37.1                 | 233.440 G  | 2              | 16                | 1              | 9                                 | 14.4          | 0.0                   | -12.4 | +12.5 |  |  |  |  |  |
| 239.601 G  | 18                | 125            | 16                | 111            | 330.0                             | -3.2          | -19.9                 | +49.5                 | 234.301 G  | 32             | 104               | 18             | 61                                | 15.0          | +0.5                  | -12.8 | +24.4 |  |  |  |  |  |
| 240.482 G  | 9                 | 73             | 11                | 91             | 330.4                             | -2.9          | -20.1                 | +61.5                 | 235.323 G  | 75             | 481               | 51             | 324                               | 14.5          | 0.0                   | -12.7 | +37.4 |  |  |  |  |  |
| 241.582 G  | 5                 | 21             | 13                | 56             | 330.2                             | -3.1          | -19.8                 | +75.8                 | 236.356 G  | 73             | 598               | 63             | 509                               | 13.9          | -0.7                  | -12.6 | +50.5 |  |  |  |  |  |
| Means  | ..                | ..             | 26                | 162            | 330.9                             | ..            | -18.6                 | ..                    | 237.351 G  | 48             | 406               | 64             | 528                               | 14.9          | +0.2                  | -12.4 | +64.6 |  |  |  |  |  |
| Group 16596.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| Aug. 19-25. A small spot, which soon breaks up and dies out.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 230.333 G  | 7                 | 30             | 15                | 66             | 324.2                             | 0.0           | +37.0                 | -78.8                 | 238.667 G  | 7              | 41                | 26             | 144                               | 12.7          | -2.0                  | -12.4 | +79.8 |  |  |  |  |  |
| 231.430 C  | 20                | 95             | 25                | 120            | 322.7                             | -0.7          | +36.9                 | -65.8                 | Means  | ..             | ..                | 37             | 262                               | 14.2          | ..                    | -12.6 | ..    |  |  |  |  |  |
| 232.337 G  | 21                | 112            | 20                | 105            | 321.9                             | -0.9          | +36.5                 | -54.6                 | Group 16602.   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| Aug. 25-Sept. 2. A small spot, with a companion until August 29.   |                   |                |                   |                |                                   |               |                       |                       |  |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 236.356 G  | 14                | 44             | 20                | 62             | 254.3                             | 0.0           | -4.9                  | -69.1                 | 237.351 G  | 23             | 121               | 21             | 108                               | 255.2         | +0.7                  | -4.8  | -55.1 |  |  |  |  |  |

LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|
| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |
| Group 16602 - continued  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 238.667 G  | 20                | 96             | 13                | 62             | 256.0                             | +1.3          | - 5.1                 | -36.9                 |                   |                |                   |                |                                   |               |                       |
| 239.601 G  | 23                | 123            | 13                | 69             | 256.8                             | +1.9          | - 4.7                 | -23.7                 |                   |                |                   |                |                                   |               |                       |
| 240.482 G  | 23                | 116            | 12                | 61             | 256.7                             | +1.7          | - 4.7                 | -12.2                 |                   |                |                   |                |                                   |               |                       |
| 241.582 G  | 16                | 100            | 8                 | 51             | 257.0                             | +1.8          | - 4.5                 | +2.6                  |                   |                |                   |                |                                   |               |                       |
| 242.373 C  | 7                 | 53             | 4                 | 28             | 257.3                             | +2.0          | - 4.2                 | +13.4                 |                   |                |                   |                |                                   |               |                       |
| 243.347 G  | 11                | 27             | 6                 | 15             | 257.5                             | +2.0          | - 4.1                 | +26.5                 |                   |                |                   |                |                                   |               |                       |
| 244.345 G  | 2                 | 11             | 1                 | 7              | 257.9                             | +2.2          | - 3.8                 | +40.0                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 11                | 51             | 256.5                             | ..            | - 4.5                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 16604.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Aug. 28-Sept. 9. A stream, led by a regular spot, <i>a</i> , which alone remains by September 5.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 239.601 G  | 2                 | 18             | 6                 | 57             | 198.3                             | ..            | +14.0                 | -82.2                 |                   |                |                   |                |                                   |               |                       |
| 240.482 G  | 36                | 219            | 49                | 296            | 199.5                             | 0.0           | +14.5                 | -69.4                 |                   |                |                   |                |                                   |               |                       |
| 241.582 G  | 57                | 397            | 48                | 338            | 199.5                             | 0.0           | +15.1                 | -54.9                 |                   |                |                   |                |                                   |               |                       |
| 242.373 C  | 49                | 352            | 34                | 241            | 200.3                             | +0.7          | +14.8                 | -43.6                 |                   |                |                   |                |                                   |               |                       |
| 243.347 G  | 50                | 408            | 30                | 239            | 200.9                             | +1.3          | +14.6                 | -30.1                 |                   |                |                   |                |                                   |               |                       |
| 244.345 G  | 48                | 291            | 25                | 153            | 202.4                             | +2.8          | +14.1                 | -15.5                 |                   |                |                   |                |                                   |               |                       |
| 245.457 C  | 53                | 279            | 27                | 140            | 202.4                             | +2.8          | +14.8                 | - 0.8                 |                   |                |                   |                |                                   |               |                       |
| 246.416 G  | 45                | 247            | 24                | 128            | 202.0                             | +2.3          | +14.9                 | +11.5                 |                   |                |                   |                |                                   |               |                       |
| 247.464 G  | 30                | 177            | 17                | 103            | 206.0                             | +6.3          | +14.1                 | +29.3                 |                   |                |                   |                |                                   |               |                       |
| 248.329 G  | 23                | 163            | 15                | 108            | 206.1                             | +6.4          | +14.0                 | +40.9                 |                   |                |                   |                |                                   |               |                       |
| 249.442 G  | 20                | 120            | 18                | 106            | 206.4                             | +6.7          | +14.0                 | +55.9                 |                   |                |                   |                |                                   |               |                       |
| 250.417 G  | 5                 | 63             | 7                 | 85             | 207.0                             | +7.2          | +14.2                 | +69.3                 |                   |                |                   |                |                                   |               |                       |
| 251.313 C  | 7                 | 50             | 19                | 133            | 206.4                             | ..            | +14.0                 | +80.6                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 27                | 176            | 203.0                             | ..            | +14.5                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Spot <i>a</i>  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 240.482 G  | 18                | 119            | 22                | 148            | 201.6                             | 0.0           | +14.3                 | -67.3                 |                   |                |                   |                |                                   |               |                       |
| 241.582 G  | 34                | 217            | 27                | 174            | 202.5                             | +0.9          | +14.5                 | -51.9                 |                   |                |                   |                |                                   |               |                       |
| 242.373 C  | 29                | 242            | 19                | 160            | 203.0                             | +1.3          | +14.4                 | -40.9                 |                   |                |                   |                |                                   |               |                       |
| 243.347 G  | 36                | 271            | 21                | 154            | 203.6                             | +1.9          | +14.0                 | -27.4                 |                   |                |                   |                |                                   |               |                       |
| 244.345 G  | 41                | 241            | 21                | 125            | 204.2                             | +2.5          | +13.7                 | -13.7                 |                   |                |                   |                |                                   |               |                       |
| 245.457 C  | 46                | 224            | 23                | 112            | 204.7                             | +3.0          | +13.8                 | + 1.5                 |                   |                |                   |                |                                   |               |                       |
| 246.416 G  | 36                | 186            | 19                | 97             | 205.2                             | +3.4          | +13.9                 | +14.7                 |                   |                |                   |                |                                   |               |                       |
| 247.464 G  | 30                | 177            | 17                | 103            | 206.0                             | +4.2          | +14.1                 | +29.3                 |                   |                |                   |                |                                   |               |                       |
| 248.329 G  | 23                | 163            | 15                | 108            | 206.1                             | +4.3          | +14.0                 | +40.9                 |                   |                |                   |                |                                   |               |                       |
| 249.442 G  | 20                | 120            | 18                | 106            | 206.4                             | +4.6          | +14.0                 | +55.9                 |                   |                |                   |                |                                   |               |                       |
| 250.417 G  | 5                 | 63             | 7                 | 85             | 207.0                             | +5.1          | +14.2                 | +69.3                 |                   |                |                   |                |                                   |               |                       |
| 251.313 C  | 7                 | 50             | 19                | 133            | 206.4                             | ..            | +14.0                 | +80.6                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 23                | 132            | 84.3                              | ..            | - 3.2                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 16606.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Aug. 29-Sept. 4. A small spot, except on September 4 when there is a pair.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 240.482 G  | 2                 | 11             | 4                 | 19             | 199.8                             | 0.0           | -22.2                 | -69.1                 |                   |                |                   |                |                                   |               |                       |
| 241.582 G  | 2                 | 14             | 2                 | 15             | 199.5                             | -0.1          | -22.0                 | -54.9                 |                   |                |                   |                |                                   |               |                       |
| 242.373 C  | 4                 | 18             | 3                 | 15             | 200.0                             | +0.5          | -21.9                 | -43.9                 |                   |                |                   |                |                                   |               |                       |
| 243.347 G  | 7                 | 21             | 5                 | 14             | 200.2                             | +0.8          | -21.4                 | -30.8                 |                   |                |                   |                |                                   |               |                       |
| 244.345 G  | 7                 | 18             | 4                 | 11             | 200.1                             | +0.9          | -21.3                 | -17.8                 |                   |                |                   |                |                                   |               |                       |
| 245.457 C  | 0                 | 7              | 0                 | 4              | 200.2                             | +1.2          | -21.0                 | - 3.0                 |                   |                |                   |                |                                   |               |                       |
| 246.416 G  | 2                 | 16             | 1                 | 9              | 201.6                             | +2.7          | -19.0                 | +11.1                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 3                 | 12             | 200.2                             | ..            | -21.3                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 16607.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Aug. 30-Sept. 4. A small stream, developing from a pair of tiny spots first seen on August 30.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 241.582 G  | 7                 | 27             | 4                 | 14             | 267.9                             | 0.0           | +12.5                 | +13.5                 |                   |                |                   |                |                                   |               |                       |
| 242.373 C  | 8                 | 68             | 4                 | 38             | 269.2                             | +1.2          | +12.3                 | +25.3                 |                   |                |                   |                |                                   |               |                       |
| 243.347 G  | 31                | 171            | 19                | 108            | 268.8                             | +0.8          | +12.7                 | +37.8                 |                   |                |                   |                |                                   |               |                       |
| 244.345 G  | 34                | 191            | 27                | 153            | 269.1                             | +1.0          | +12.7                 | +51.2                 |                   |                |                   |                |                                   |               |                       |
| 245.457 C  | 24                | 169            | 30                | 212            | 269.9                             | +1.7          | +12.5                 | +66.7                 |                   |                |                   |                |                                   |               |                       |
| 246.416 G  | 5                 | 30             | 22                | 132            | 275.5                             | ..            | +13.1                 | +85.0                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 17                | 105            | 269.0                             | ..            | +12.5                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 16610.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Sept. 6-18. A string of small spots until September 12; on the next day considerable changes have taken place and from then onwards the group begins to die out. |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 248.329 G  | 5                 | 18             | 20                | 73             | 82.7                              | ..            | - 2.6                 | -82.5                 |                   |                |                   |                |                                   |               |                       |
| 249.442 G  | 14                | 70             | 21                | 99             | 81.6                              | 0.0           | - 2.6                 | -68.9                 |                   |                |                   |                |                                   |               |                       |
| 250.417 G  | 16                | 99             | 15                | 90             | 82.4                              | +0.6          | - 2.6                 | -55.3                 |                   |                |                   |                |                                   |               |                       |
| 251.313 C  | 25                | 144            | 17                | 101            | 82.6                              | +0.7          | - 3.1                 | -43.2                 |                   |                |                   |                |                                   |               |                       |
| 252.581 G  | 39                | 185            | 22                | 103            | 84.3                              | +2.1          | - 3.2                 | -24.8                 |                   |                |                   |                |                                   |               |                       |
| 253.669 G  | 55                | 283            | 30                | 147            | 83.9                              | +1.5          | - 3.6                 | -10.8                 |                   |                |                   |                |                                   |               |                       |
| 254.325 G  | 47                | 250            | 24                | 127            | 83.9                              | +1.4          | - 3.8                 | - 2.2                 |                   |                |                   |                |                                   |               |                       |
| 255.368 G  | 68                | 407            | 35                | 212            | 84.2                              | +1.5          | - 3.8                 | +11.9                 |                   |                |                   |                |                                   |               |                       |
| 256.636 G  | 56                | 321            | 33                | 191            | 85.7                              | +2.8          | - 3.8                 | +30.1                 |                   |                |                   |                |                                   |               |                       |
| 257.491 G  | 59                | 285            | 41                | 198            | 86.0                              | +2.9          | - 3.6                 | +41.7                 |                   |                |                   |                |                                   |               |                       |
| 258.323 G  | 27                | 240            | 23                | 205            | 86.0                              | +2.8          | - 3.3                 | +52.7                 |                   |                |                   |                |                                   |               |                       |
| 259.374 G  | 12                | 75             | 16                | 97             | 85.2                              | +1.8          | - 3.5                 | +65.8                 |                   |                |                   |                |                                   |               |                       |
| 260.323 G  | 0                 | 5              | 0                 | 14             | 86.3                              | +2.7          | - 2.1                 | +79.4                 |                   |                |                   |                |                                   |               |                       |
| Means  | ..                | ..             | 23                | 132            | 84.3                              | ..            | - 3.2                 | ..                    |                   |                |                   |                |                                   |               |                       |

## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. |         |         |  |  |  |  |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|---------|---------|--|--|--|--|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |         |         |  |  |  |  |
| Group 16613.   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| Sept. 13-24. A wide pair of nearly regular spots, a and b, each with a few small variable companions until September 19. |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 255.368 G  | 16                | 54             | 22                | 73             | ° 2.7                             | ° 0.0          | ° +13.6               | -69.6                 | 256.636 G         | 4              | 27                | 4              | 26                                | ° 359.9        | ° 0.0                 | ° -12.6 | ° -55.7 |  |  |  |  |
| 256.636 G  | 52                | 380            | 42                | 304            | ° 3.9                             | ° +1.1         | ° +13.3               | -51.7                 | 257.491 G         | 0              | 7                 | 0              | 5                                 | ° 3.6          | + 3.6                 | ° -12.1 | ° -40.7 |  |  |  |  |
| 257.491 G  | 145               | 660            | 95                | 431            | ° 4.1                             | ° +1.3         | ° +13.3               | -40.2                 | 258.323 G         | 2              | 7                 | 1              | 4                                 | ° 4.2          | + 4.2                 | ° -12.1 | ° -29.1 |  |  |  |  |
| 258.323 G  | 149               | 673            | 85                | 385            | ° 4.6                             | ° +1.8         | ° +13.6               | -28.7                 | 259.374 G         | 2              | 7                 | 1              | 4                                 | ° 4.5          | + 4.4                 | ° -12.5 | ° -14.9 |  |  |  |  |
| 259.374 G  | 86                | 660            | 44                | 341            | ° 4.8                             | ° +1.9         | ° +13.8               | -14.6                 | 260.323 G         | 2              | 13                | 1              | 7                                 | ° 4.7          | + 4.5                 | ° -12.8 | ° -2.2  |  |  |  |  |
| 260.323 G  | 102               | 653            | 52                | 328            | ° 4.9                             | ° +2.0         | ° +13.4               | -2.0                  | 261.614 G         | 6              | 48                | 3              | 27                                | ° 5.6          | + 5.3                 | ° -12.3 | +15.8   |  |  |  |  |
| 261.614 G  | 79                | 446            | 41                | 234            | ° 4.8                             | ° +1.8         | ° +13.6               | +15.0                 | 262.332 G         | 13             | 43                | 7              | 25                                | ° 6.3          | + 6.0                 | ° -12.1 | +25.9   |  |  |  |  |
| 262.332 G  | 70                | 353            | 38                | 195            | ° 5.0                             | ° +2.0         | ° +13.8               | +24.6                 | 263.326 G         | 4              | 16                | 3              | 12                                | ° 10.4         | + 10.0                | ° -11.5 | +43.2   |  |  |  |  |
| 263.326 G  | 50                | 290            | 31                | 184            | ° 5.1                             | ° +2.1         | ° +14.2               | +37.9                 | 264.442 G         | 4              | 18                | 4              | 16                                | ° 6.3          | + 5.8                 | ° -12.8 | +53.8   |  |  |  |  |
| 264.442 G  | 26                | 149            | 22                | 123            | ° 5.7                             | ° +2.6         | ° +14.4               | +53.2                 | 265.366 G         | 0              | 4                 | 0              | 7                                 | ° 12.0         | + 11.5                | ° -11.6 | +71.7   |  |  |  |  |
| 265.366 G  | 13                | 61             | 16                | 73             | ° 5.8                             | ° +2.7         | ° +14.6               | +65.5                 |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 266.438 C  | 4                 | 24             | 12                | 64             | ° 4.7                             | ° +1.5         | ° +14.2               | +78.5                 |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| Means  | ..                | ..             | 42                | 228            | 4.7                               | ..             | ° +13.8               | ..                    | Means             | ..             | ..                | 2              | 13                                | 5.8            | ..                    | -12.2   | ..      |  |  |  |  |
| Spot a   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 255.368 G  | 7                 | 27             | 9                 | 34             | ° 4.6                             | ° 0.0          | ° +14.1               | -67.7                 | 263.326 G         | 0              | 11                | 0              | 23                                | ° 249.5        | ° 0.0                 | ° +14.4 | -77.7   |  |  |  |  |
| 256.636 G  | 23                | 192            | 17                | 144            | ° 6.7                             | ° +2.0         | ° +13.7               | -48.9                 | 264.442 G         | 15             | 84                | 17             | 97                                | ° 248.0        | - 1.5                 | ° +14.4 | -64.5   |  |  |  |  |
| 257.491 G  | 75                | 359            | 47                | 226            | ° 6.7                             | ° +2.0         | ° +13.6               | -37.6                 | 265.366 G         | 16             | 106               | 13             | 86                                | ° 247.8        | - 1.8                 | ° +14.5 | -52.5   |  |  |  |  |
| 258.323 G  | 99                | 411            | 55                | 230            | ° 7.2                             | ° +2.5         | ° +13.3               | -26.1                 | 266.438 C         | 35             | 202               | 21             | 128                               | ° 248.8        | - 0.8                 | ° +14.3 | -37.4   |  |  |  |  |
| 259.374 G  | 63                | 470            | 32                | 240            | ° 7.4                             | ° +2.6         | ° +13.4               | -12.0                 | 267.614 G         | 47             | 241               | 26             | 134                               | ° 249.0        | - 0.6                 | ° +14.2 | -24.2   |  |  |  |  |
| 260.323 G  | 59                | 429            | 30                | 214            | ° 7.5                             | ° +2.7         | ° +13.2               | +0.6                  | 268.332 G         | 43             | 262               | 22             | 134                               | ° 249.4        | - 0.2                 | ° +14.3 | -11.5   |  |  |  |  |
| 261.614 G  | 63                | 284            | 33                | 151            | ° 7.5                             | ° +2.6         | ° +13.6               | +17.7                 | 269.545 G         | 49             | 265               | 25             | 136                               | ° 249.7        | 0.0                   | ° +14.8 | + 4.5   |  |  |  |  |
| 262.332 G  | 54                | 263            | 30                | 147            | ° 7.3                             | ° +2.4         | ° +14.0               | +26.9                 | 270.310 C         | 31             | 158               | 16             | 82                                | ° 249.0        | - 0.7                 | ° +15.2 | +13.9   |  |  |  |  |
| 263.326 G  | 36                | 214            | 23                | 139            | ° 7.0                             | ° +2.1         | ° +14.5               | +39.8                 | 271.311 C         | 18             | 105               | 10             | 59                                | ° 248.3        | - 1.4                 | ° +14.7 | +26.4   |  |  |  |  |
| 264.442 G  | 22                | 124            | 19                | 105            | ° 7.1                             | ° +2.1         | ° +14.7               | +54.6                 | 272.316 C         | 11             | 37                | 7              | 24                                | ° 248.5        | - 1.2                 | ° +14.2 | +39.9   |  |  |  |  |
| 265.366 G  | 11                | 52             | 14                | 64             | ° 7.4                             | ° +2.4         | ° +14.8               | +67.1                 | 273.383 G         | 0              | 11                | 0              | 10                                | ° 250.7        | + 0.9                 | ° +14.2 | +56.2   |  |  |  |  |
| 266.438 C  | 4                 | 20             | 12                | 58             | ° 7.8                             | ..             | ° +14.5               | +81.6                 | Means             | ..             | ..                | 14             | 83                                | 249.0          | ..                    | +14.5   | ..      |  |  |  |  |
| Spot b   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 255.368 G  | 9                 | 27             | 13                | 39             | ° 1.5                             | ° 0.0          | ° +12.9               | -70.8                 | 271.311 C         | 6              | 31                | 12             | 60                                | ° 147.9        | ° 0.0                 | - 5.0   | -74.0   |  |  |  |  |
| 256.636 G  | 29                | 188            | 25                | 160            | ° 1.2                             | -0.4           | ° +12.9               | -54.4                 | 272.316 C         | 19             | 103               | 20             | 106                               | ° 149.1        | + 1.0                 | - 5.3   | -59.5   |  |  |  |  |
| 257.491 G  | 70                | 301            | 48                | 205            | ° 0.9                             | -0.7           | ° +13.1               | -43.4                 | 273.383 G         | 36             | 159               | 26             | 115                               | ° 149.9        | + 1.7                 | - 5.6   | -44.6   |  |  |  |  |
| 258.323 G  | 50                | 262            | 30                | 155            | ° 0.5                             | -1.1           | ° +13.6               | -32.8                 | 274.538 G         | 65             | 287               | 38             | 168                               | ° 151.0        | + 2.6                 | - 6.1   | -28.3   |  |  |  |  |
| 259.374 G  | 23                | 190            | 12                | 101            | ° 0.1                             | -1.6           | ° +14.0               | -19.3                 | 275.326 G         | 59             | 426               | 32             | 228                               | ° 151.2        | + 2.6                 | - 5.8   | -17.7   |  |  |  |  |
| 260.323 G  | 43                | 224            | 22                | 114            | ° 0.3                             | -1.4           | ° +13.8               | -6.6                  | 276.557 G         | 94             | 515               | 48             | 262                               | ° 150.6        | + 1.8                 | - 6.0   | -2.0    |  |  |  |  |
| 261.614 G  | 16                | 162            | 8                 | 83             | ° 0.0                             | -1.8           | ° +13.4               | +10.2                 | 277.320 G         | 80             | 399               | 42             | 207                               | ° 151.5        | + 2.6                 | - 5.9   | + 8.9   |  |  |  |  |
| 262.332 G  | 16                | 90             | 8                 | 48             | ° 359.8                           | -2.0           | ° +13.1               | +19.4                 | 278.343 G         | 53             | 277               | 29             | 155                               | ° 153.1        | + 4.1                 | - 5.9   | +24.0   |  |  |  |  |
| 263.326 G  | 14                | 76             | 8                 | 45             | ° 359.5                           | -2.3           | ° +13.2               | +32.3                 | 279.301 C         | 24             | 239               | 15             | 153                               | ° 153.1        | + 3.9                 | - 5.8   | +36.7   |  |  |  |  |
| 264.442 G  | 4                 | 25             | 3                 | 18             | ° 359.7                           | -2.2           | ° +13.9               | +47.2                 | 280.449 G         | 16             | 125               | 13             | 105                               | ° 153.6        | + 4.2                 | - 5.8   | +52.3   |  |  |  |  |
| 265.366 G  | 2                 | 9              | 2                 | 9              | ° 359.4                           | -2.5           | ° +13.1               | +59.1                 |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 266.438 C  | 0                 | 4              | 0                 | 6              | ° 357.2                           | -4.8           | ° +12.9               | +71.0                 |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| Group 16614.   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| Sept. 14-23. One or two small spots.   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 256.636 G  | 4                 | 27             | 4                 | 26             | ° 359.9                           | ° 0.0          | ° -12.6               | ° -55.7               |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 257.491 G  | 0                 | 7              | 0                 | 5              | ° 3.6                             | + 3.6          | ° -12.1               | ° -40.7               |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 258.323 G  | 2                 | 7              | 1                 | 4              | ° 4.2                             | + 4.2          | ° -12.1               | ° -29.1               |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 259.374 G  | 2                 | 7              | 1                 | 4              | ° 4.5                             | + 4.4          | ° -12.5               | ° -14.9               |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 260.323 G  | 2                 | 13             | 1                 | 7              | ° 4.7                             | + 4.5          | ° -12.8               | ° -2.2                |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 261.614 G  | 6                 | 48             | 3                 | 27             | ° 5.6                             | + 5.3          | ° -12.3               | +15.8                 |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 262.332 G  | 13                | 43             | 7                 | 25             | ° 6.3                             | + 6.0          | ° -12.1               | +25.9                 |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 263.326 G  | 4                 | 16             | 3                 | 12             | ° 10.4                            | + 10.0         | ° -11.5               | +43.2                 |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 264.442 G  | 4                 | 18             | 4                 | 16             | ° 6.3                             | + 5.8          | ° -12.8               | +53.8                 |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| 265.366 G  | 0                 | 4              | 0                 | 7              | ° 12.0                            | + 11.5         | ° -11.6               | +71.7                 |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| Means  | ..                | ..             | 2                 | 13             | 5.8                               | ..             | -12.2                 | ..                    |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| Group 16620.   |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |
| Sept. 21-Oct. 1. A string of small variable spots, of which the leader is the most stable component.                     |                   |                |                   |                |                                   |                |                       |                       |                   |                |                   |                |                                   |                |                       |         |         |  |  |  |  |

## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M.  |       |       |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|--|-------|-------|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |  |       |       |
| Group 16624 - continued   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               | Group 16631 - continued  |       |       |
| 281.301 C   | 11                | 68             | 13                | 78             | 152.6                             | +3.1          | - 6.1                 | +62.6                 | 282.302 C         | 43             | 368               | 45             | 384                               | 18.2          | -0.4   | -12.5 | -58.6 |
| 282.302 C   | 4                 | 30             | 9                 | 63             | 151.3                             | +1.6          | - 6.3                 | +74.5                 | 283.427 G         | 105            | 457               | 77             | 339                               | 18.2          | -0.4   | -12.7 | -43.8 |
| Means   | ..                | ..             | 25                | 142            | 151.2                             | ..            | - 5.8                 | ..                    | 284.341 G         | 92             | 560               | 58             | 352                               | 17.5          | -1.2   | -12.3 | -32.4 |
| Group 16629.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               | Group 16635.   |       |       |
| Oct. 8-15. A regular spot, followed by a few companions appearing suddenly near the central meridian. By October 13 the diminishing regular spot alone remains. |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               | Oct. 12-20. One or two small spots, which within a few days develop into an elongated composite spot, which on October 18 splits into two. |       |       |
| 280.449 G   | 53                | 339            | 27                | 173            | 90.0                              | 0.0           | + 3.4                 | -11.3                 | 281.301 C         | 78             | 497               | 39             | 248                               | 89.4          | -0.8   | + 3.6 | - 0.6 |
| 281.301 C   | 78                | 497            | 39                | 248            | 89.4                              | -0.8          | + 3.6                 | - 0.6                 | 282.302 C         | 73             | 382               | 38             | 198                               | 89.8          | -0.5   | + 3.3 | +13.0 |
| 282.302 C   | 73                | 382            | 38                | 198            | 89.8                              | -0.5          | + 3.3                 | +13.0                 | 283.427 G         | 58             | 278               | 33             | 158                               | 90.3          | -0.2   | + 3.4 | +28.3 |
| 283.427 G   | 58                | 278            | 33                | 158            | 90.3                              | -0.2          | + 3.4                 | +28.3                 | 284.341 G         | 46             | 259               | 31             | 170                               | 90.2          | -0.5   | + 3.6 | +40.3 |
| 284.341 G   | 46                | 259            | 31                | 170            | 90.2                              | -0.5          | + 3.6                 | +40.3                 | 285.378 G         | 29             | 147               | 25             | 126                               | 90.9          | 0.0  | + 3.2 | +54.6 |
| 285.378 G   | 29                | 147            | 25                | 126            | 90.9                              | 0.0           | + 3.2                 | +54.6                 | 286.329 G         | 24             | 93                | 31             | 119                               | 90.9          | -0.2   | + 2.8 | +67.2 |
| 286.329 G   | 24                | 93             | 31                | 119            | 90.9                              | -0.2          | + 2.8                 | +67.2                 | 287.374 G         | 9              | 58                | 27             | 176                               | 90.5          | ..   | + 2.6 | +80.6 |
| Means   | ..                | ..             | 32                | 170            | 90.2                              | ..            | + 3.3                 | ..                    | 288.634 G         | 179            | 1152              | 101            | 656                               | 13.1          | +3.2   | -15.8 | +19.8 |
| Group 16630.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               | Oct. 18-20. One or two small spots, which within a few days develop into an elongated composite spot, which on October 18 splits into two. |       |       |
| Oct. 8-14. A group of small dying spots.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               | Oct. 25-31. Two or three small spots, not seen on October 28.  |       |       |
| 280.449 G   | 11                | 42             | 23                | 88             | 25.8                              | 0.0           | - 4.9                 | -75.5                 | 281.301 C         | 12             | 92                | 15             | 106                               | 26.3          | +0.3   | - 4.0 | -63.7 |
| 281.301 C   | 12                | 92             | 15                | 106            | 26.3                              | +0.3          | - 4.0                 | -63.7                 | 282.302 C         | 4              | 39                | 3              | 30                                | 28.7          | +2.6   | - 4.0 | -48.1 |
| 282.302 C   | 4                 | 39             | 3                 | 30             | 28.7                              | +2.6          | - 4.0                 | -48.1                 | 283.427 G         | 2              | 9                 | 1              | 6                                 | 26.8          | +0.5   | - 4.4 | -35.2 |
| 283.427 G   | 2                 | 9              | 1                 | 6              | 26.8                              | +0.5          | - 4.4                 | -35.2                 | 284.341 G         | 2              | 9                 | 1              | 5                                 | 22.6          | -3.9   | - 5.8 | -27.3 |
| 284.341 G   | 2                 | 9              | 1                 | 5              | 22.6                              | -3.9          | - 5.8                 | -27.3                 | 285.378 G         | 2              | 51                | 1              | 26                                | 26.4          | -0.3   | - 3.1 | - 9.9 |
| 285.378 G   | 2                 | 51             | 1                 | 26             | 26.4                              | -0.3          | - 3.1                 | - 9.9                 | 286.329 G         | 2              | 9                 | 1              | 5                                 | 31.1          | +4.3   | - 2.6 | + 7.4 |
| Means   | ..                | ..             | 6                 | 38             | 26.8                              | ..            | - 4.1                 | ..                    | 287.374 G         | 27             | 205               | 59             | 441                               | 17.5          | +7.6   | -15.7 | +74.2 |
| Group 16631.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               | Oct. 25-31. Two or three small spots, not seen on October 28.  |       |       |
| Oct. 8-19. At first, a composite spot with a few small companions. On October 15 it breaks up into numerous small spots which die out before reaching the limb. |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               | Oct. 25-31. Two or three small spots, not seen on October 28.  |       |       |
| 280.449 G   | 13                | 80             | 61                | 388            | 19.4                              | ..            | -12.9                 | -81.9                 | 281.301 C         | 26             | 226               | 45             | 398                               | 18.5          | 0.0  | -12.5 | -71.5 |
| Means   | ..                | ..             | ..                | ..             | ..                                | ..            | ..                    | ..                    | 297.371 G         | 4              | 36                | 2              | 21                                | 216.2         | 0.0  | +28.9 | -21.9 |
| Group 16632.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               | Oct. 25-31. Two or three small spots, not seen on October 28.  |       |       |
| Oct. 25-31. Two or three small spots, not seen on October 28.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               | Oct. 25-31. Two or three small spots, not seen on October 28.  |       |       |
| 298.384 G   | 11                | 65             | 6                 | 36             | 216.7                             | +0.9          | +28.7                 | - 8.0                 | 299.364 G         | 11             | 75                | 6              | 41                                | 216.3         | +0.9   | +28.5 | + 4.5 |
| 300.370 G   | 0                 | 0              | 0                 | 0              | 0                                 | ..            | ..                    | ..                    | 301.452 G         | 18             | 80                | 12             | 52                                | 218.8         | +4.3   | +28.6 | +34.5 |
| 302.391 G   | 9                 | 53             | 8                 | 42             | 218.5                             | +4.4          | +29.2                 | +46.6                 | 303.294 C         | 0              | 20                | 0              | 21                                | 218.4         | +4.6   | +28.9 | +58.4 |
| Means   | ..                | ..             | ..                | ..             | ..                                | ..            | ..                    | ..                    | 297.371 G         | 4              | 36                | 2              | 21                                | 217.5         | ..   | +28.8 | ..    |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area   |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. |       |       |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|---|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-------|-------|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ   | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |       |       |
| Group 16641.   |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |
| Oct. 26-Nov. 6. A stream, led by a regular spot which is the sole survivor by November 1.                                  |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |
| 298.384 G  | 4                 | 28             | 7                 | 54             | 150.8                             | 0.0            | -11.0                 | -73.9                 | 301.452 G   | 4              | 24                | 4              | 22                                | 129.0          | 0.0                   | -4.9  | -55.3 |
| 299.364 G  | 22                | 88             | 23                | 90             | 153.3                             | +2.4           | -11.7                 | -58.5                 | 302.391 G   | 15             | 68                | 10             | 46                                | 130.9          | +1.7                  | -4.4  | -41.0 |
| 300.370 G  | 24                | 128            | 17                | 93             | 154.5                             | +3.5           | -11.7                 | -44.0                 | 303.294 C   | 15             | 113               | 8              | 64                                | 132.5          | +3.2                  | -4.0  | -27.5 |
| 301.452 G  | 49                | 320            | 29                | 191            | 155.7                             | +4.6           | -11.2                 | -28.6                 | 304.292 C   | 25             | 187               | 13             | 97                                | 132.3          | +2.8                  | -4.4  | -14.5 |
| 302.391 G  | 51                | 301            | 28                | 162            | 156.6                             | +5.4           | -11.0                 | -15.3                 | 305.317 C   | 66             | 445               | 33             | 225                               | 131.9          | +2.2                  | -4.5  | -1.4  |
| 303.294 C  | 66                | 337            | 34                | 176            | 157.3                             | +6.0           | -11.0                 | -2.7                  | 306.493 G   | 68             | 396               | 35             | 207                               | 132.2          | +2.3                  | -4.4  | +14.4 |
| 304.292 C  | 47                | 261            | 25                | 138            | 158.7                             | +7.3           | -9.8                  | +11.9                 | 307.291 C   | 29             | 320               | 16             | 182                               | 134.5          | +4.5                  | -4.5  | +27.2 |
| 305.317 C  | 45                | 231            | 26                | 132            | 158.4                             | +6.9           | -9.8                  | +25.1                 | 308.386 G   | 27             | 185               | 18             | 128                               | 135.3          | +5.1                  | -4.0  | +42.5 |
| 306.493 G  | 40                | 167            | 27                | 114            | 158.8                             | +7.2           | -9.6                  | +41.0                 | 309.320 C   | 19             | 144               | 18             | 137                               | 136.1          | +5.7                  | -3.9  | +55.6 |
| 307.291 C  | 13                | 134            | 11                | 110            | 158.2                             | +6.5           | -10.0                 | +50.9                 | 310.431 G   | 15             | 75                | 25             | 123                               | 137.4          | +6.8                  | -3.4  | +71.5 |
| 308.386 G  | 15                | 84             | 19                | 107            | 158.4                             | +6.6           | -10.1                 | +65.6                 | 311.293 C   | 2              | 11                | 9              | 48                                | 137.8          | ..                    | -3.1  | +83.3 |
| 309.320 C  | 8                 | 42             | 20                | 106            | 158.2                             | +6.3           | -10.3                 | +77.7                 |   |                |                   |                |                                   |                |                       |       |       |
| Means  | ..                | ..             | 22                | 123            | 156.6                             | ..             | -10.6                 | ..                    | Means   | ..             | ..                | 18             | 123                               | 133.2          | ..                    | -4.2  | ..    |
| Group 16642.   |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |
| Oct. 28-Nov. 1. A small diminishing regular spot.  |                   |                |                   |                |                                   |                |                       |                       | Group 16647.  |                |                   |                |                                   |                |                       |       |       |
| 298.384 G  | 11                | 49             | 28                | 127            | 146.2                             | 0.0            | -2.6                  | -78.5                 | Nov. 4-9. A few small changing spots, dying out on the central meridian.    |                |                   |                |                                   |                |                       |       |       |
| 299.364 G  | 13                | 86             | 16                | 106            | 146.2                             | -0.2           | -2.6                  | -65.6                 | 307.291 C   | 4              | 32                | 7              | 52                                | 35.0           | 0.0                   | +3.6  | -72.3 |
| 300.370 G  | 18                | 106            | 15                | 88             | 145.7                             | -0.9           | -2.5                  | -52.8                 | 308.386 G   | 20             | 110               | 18             | 98                                | 36.7           | +1.5                  | +2.3  | -56.1 |
| 301.452 G  | 15                | 106            | 10                | 68             | 145.7                             | -1.1           | -2.1                  | -38.6                 | 309.320 C   | 14             | 98                | 9              | 67                                | 37.3           | +1.9                  | +3.6  | -43.2 |
| 302.391 G  | 24                | 99             | 13                | 55             | 146.2                             | -0.7           | -2.1                  | -25.7                 | 310.431 G   | 13             | 55                | 7              | 32                                | 36.8           | +1.2                  | +3.2  | -29.1 |
| 303.294 C  | 6                 | 53             | 3                 | 28             | 146.6                             | -0.5           | -2.4                  | -13.4                 | 311.293 C   | 6              | 34                | 3              | 18                                | 36.4           | +0.7                  | +3.0  | -18.1 |
| 304.292 C  | 6                 | 34             | 3                 | 17             | 146.8                             | -0.5           | -2.1                  | 0.0                   | 312.293 C   | 0              | 6                 | 0              | 3                                 | 37.8           | +1.9                  | +2.5  | -3.5  |
| Means  | ..                | ..             | 13                | 70             | 146.2                             | ..             | -2.3                  | ..                    | Means   | ..             | ..                | 7              | 45                                | 36.7           | ..                    | +3.0  | ..    |
| Group 16644.   |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |
| Oct. 28-Nov. 8. A close pair of spots, which join together for a few days and then separate again before slowly dying out. |                   |                |                   |                |                                   |                |                       |                       | Group 16655.  |                |                   |                |                                   |                |                       |       |       |
| 300.370 G  | 13                | 49             | (47               | 177            | 115.6                             | ..             | +13.7)                | -82.9                 | Nov. 14-22. A small group of faint variable spots, not seen on November 21. |                |                   |                |                                   |                |                       |       |       |
| 301.452 G  | 37                | 234            | 53                | 328            | 114.4                             | 0.0            | +13.8                 | -69.9                 | 317.462 G   | 0              | 4                 | 0              | 3                                 | 287.1          | 0.0                   | +14.8 | -46.1 |
| 302.391 G  | 49                | 328            | 44                | 294            | 115.6                             | +1.1           | +13.5                 | -56.3                 | 318.379 G   | 4              | 28                | 2              | 17                                | 287.1          | 0.0                   | +16.2 | -34.0 |
| 303.294 C  | 27                | 360            | 18                | 247            | 116.8                             | +2.3           | +13.2                 | -43.2                 | 319.291 C   | 15             | 95                | 8              | 52                                | 287.1          | 0.0                   | +16.4 | -22.0 |
| 304.292 C  | 49                | 401            | 28                | 233            | 117.3                             | +2.7           | +13.2                 | -29.5                 | 320.475 G   | 30             | 204               | 16             | 107                               | 286.7          | -0.3                  | +16.9 | -6.8  |
| 305.317 C  | 76                | 343            | 40                | 182            | 117.3                             | +2.7           | +12.7                 | -16.0                 | 321.385 G   | 18             | 105               | 10             | 55                                | 287.8          | +0.8                  | +16.8 | +6.3  |
| 306.493 G  | 48                | 244            | 24                | 124            | 117.6                             | +2.9           | +12.5                 | -0.2                  | 322.459 G   | 11             | 142               | 6              | 79                                | 287.1          | +0.1                  | +17.3 | +19.8 |
| 307.291 C  | 36                | 178            | 18                | 91             | 117.5                             | +2.7           | +12.2                 | +10.2                 | 323.426 G   | 2              | 35                | 1              | 22                                | 287.3          | +0.3                  | +17.5 | +32.7 |
| 308.386 G  | 26                | 129            | 14                | 73             | 118.5                             | +3.7           | +11.2                 | +25.7                 | 324.162 K   | 0              | 0                 | 0              | ..                                | ..             | ..                    | ..    | ..    |
| 309.320 C  | 23                | 51             | 15                | 33             | 118.3                             | +3.4           | +11.9                 | +37.8                 | 325.383 G   | 0              | 15                | 0              | 16                                | 289.2          | +2.3                  | +17.9 | +60.4 |
| 310.431 G  | 4                 | 22             | 3                 | 18             | 118.5                             | +3.5           | +12.1                 | +52.6                 |   |                |                   |                |                                   |                |                       |       |       |
| 311.293 C  | 0                 | 4              | 0                 | 4              | 116.0                             | +1.0           | +14.5                 | +61.5                 |   |                |                   |                |                                   |                |                       |       |       |
| Means  | ..                | ..             | 23                | 148            | 117.1                             | ..             | +12.8                 | ..                    | Means   | ..             | ..                | 5              | 39                                | 287.4          | ..                    | +16.7 | ..    |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place  | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area   |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>tude | Long.<br>from<br>C.M. |       |       |       |    |    |    |    |  |
|--|-------------------|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-----------------------|---|----------------|-------------------|----------------|-----------------------------------|----------------|-----------------------|-------|-------|-------|----|----|----|----|--|
|  | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |                       | Umbræ   | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |                |                       |       |       |       |    |    |    |    |  |
| Group 16657.   |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |
| Nov. 22-Dec. 3. A stream of small spots, led by a regular spot which alone remains by November 29.   |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |
| 325.383 G  | 11                | 33             | 32                | 96             | 148.6                             | ..             | +19.0                 | -80.2                 | 333.505 G   | 35             | 253               | 18             | 128                               | 122.7          | -0.9                  | -5.6  | +1.0  |       |    |    |    |    |  |
| 326.544 C  | 17                | 116            | 20                | 138            | 149.7                             | 0.0            | +19.0                 | -63.8                 | 334.358 C   | 46             | 189               | 23             | 97                                | 122.5          | -1.2                  | -5.7  | +12.0 |       |    |    |    |    |  |
| 327.366 G  | 37                | 150            | 32                | 132            | 148.8                             | -0.8           | +19.0                 | -53.8                 | 335.358 C   | 19             | 109               | 10             | 60                                | 120.9          | -3.0                  | -5.9  | +23.6 |       |    |    |    |    |  |
| 328.430 G  | 30                | 122            | 20                | 83             | 148.3                             | -1.2           | +19.3                 | -40.3                 | 336.448 G   | 7              | 35                | 5              | 23                                | 121.6          | -2.4                  | -6.0  | +38.7 |       |    |    |    |    |  |
| 329.483 G  | 37                | 199            | 22                | 118            | 147.4                             | -2.0           | +19.4                 | -27.3                 | Means   |                | ..                | ..             | 17                                | 101            | 122.7                 | ..    | -5.8  | ..    |    |    |    |    |  |
| 330.371 G  | 24                | 218            | 13                | 119            | 147.9                             | -1.4           | +19.5                 | -15.1                 | Group 16659 - continued   |                |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |
| 331.290 C  | 25                | 109            | 13                | 58             | 149.7                             | +0.5           | +19.4                 | -1.2                  | 333.505 G   | 35             | 253               | 18             | 128                               | 122.7          | ..                    | ..    | ..    | ..    | .. | .. | .. | .. |  |
| 332.466 G  | 28                | 76             | 15                | 41             | 150.0                             | +0.9           | +19.5                 | +14.6                 | 334.358 C   | 46             | 189               | 23             | 97                                | 122.5          | -1.2                  | -5.7  | +12.0 | ..    | .. | .. | .. | .. |  |
| 333.505 G  | 7                 | 57             | 4                 | 34             | 149.3                             | +0.3           | +19.7                 | +27.6                 | 335.358 C   | 19             | 109               | 10             | 60                                | 120.9          | -3.0                  | -5.9  | +23.6 | ..    | .. | .. | .. | .. |  |
| 334.358 C  | 10                | 25             | 7                 | 17             | 149.3                             | +0.4           | +19.7                 | +38.8                 | 336.448 G   | 7              | 35                | 5              | 23                                | 121.6          | -2.4                  | -6.0  | +38.7 | ..    | .. | .. | .. | .. |  |
| 335.358 C  | 4                 | 19             | 3                 | 16             | 149.3                             | +0.5           | +19.6                 | +52.0                 | Group 16660.  |                |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |
| 336.448 G  | 2                 | 15             | 3                 | 20             | 149.3                             | +0.6           | +19.6                 | +66.4                 | Nov. 27-Dec. 6. A pair of widely-separated spots, a and b, with a few companions on November 29. The group dies out before reaching the limb. |                |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |
| Means  |                   | ..             | ..                | 14             | 71                                | 149.0          | ..                    | +19.4                 | ..  | 330.371 G      | 2                 | 11             | 3                                 | 15             | 98.0                  | 0.0   | -23.2 | -65.0 |    |    |    |    |  |
| Group 16658.   |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |
| Nov. 25-Dec. 6. A long changing stream, developing from a tiny spot when first seen at the east limb. By December 3 only the leader and follower remain. |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |
| 328.430 G  | 4                 | 13             | 9                 | 30             | 112.1                             | 0.0            | -16.0                 | -76.5                 | 331.290 C   | 33             | 92                | 30             | 82                                | 99.1           | +1.3                  | -22.6 | -51.8 |       |    |    |    |    |  |
| 329.483 G  | 6                 | 24             | 6                 | 27             | 113.3                             | +1.2           | -16.0                 | -61.4                 | 332.466 G   | 85             | 510               | 57             | 334                               | 102.4          | +4.8                  | -22.2 | -33.0 |       |    |    |    |    |  |
| 330.371 G  | 17                | 97             | 13                | 75             | 115.2                             | +3.1           | -15.9                 | -47.8                 | 333.505 G   | 65             | 381               | 38             | 223                               | 101.6          | +4.2                  | -22.8 | -20.1 |       |    |    |    |    |  |
| 331.290 C  | 70                | 354            | 44                | 225            | 116.5                             | +4.4           | -15.7                 | -34.4                 | 334.358 C   | 69             | 275               | 39             | 152                               | 101.7          | +4.5                  | -23.3 | -8.8  |       |    |    |    |    |  |
| 332.466 G  | 92                | 808            | 51                | 446            | 117.3                             | +5.2           | -15.4                 | -18.1                 | 335.358 C   | 30             | 177               | 16             | 97                                | 100.5          | +3.5                  | -23.1 | +3.2  |       |    |    |    |    |  |
| 333.505 G  | 81                | 464            | 43                | 243            | 116.4                             | +4.3           | -15.2                 | -5.3                  | 336.448 G   | 28             | 109               | 16             | 63                                | 99.9           | +3.1                  | -23.0 | +17.0 |       |    |    |    |    |  |
| 334.358 C  | 97                | 310            | 51                | 163            | 117.6                             | +5.5           | -15.8                 | +7.1                  | 337.441 G   | 6              | 34                | 4              | 22                                | 101.5          | +4.9                  | -22.4 | +31.7 |       |    |    |    |    |  |
| 335.358 C  | 51                | 286            | 29                | 161            | 117.7                             | +5.6           | -15.4                 | +20.4                 | 338.402 G   | 2              | 13                | 2              | 10                                | 103.8          | +7.4                  | -21.8 | +46.6 |       |    |    |    |    |  |
| 336.448 G  | 63                | 181            | 41                | 118            | 120.8                             | +8.7           | -15.3                 | +37.9                 | 339.372 G   | 0              | 2                 | 0              | 2                                 | 103.9          | +7.6                  | -21.9 | +59.5 |       |    |    |    |    |  |
| Means  |                   | ..             | ..                | 29             | 148                               | 117.1          | ..                    | -15.6                 | ..  | Spot a         |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |
| Group 16659.   |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |
| Nov. 26-Dec. 3. A few small variable spots which go through their whole life-history on the disk.  |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |
| 329.483 G  | 4                 | 20             | 3                 | 16             | 122.9                             | 0.0            | -5.7                  | -51.8                 | 332.466 G   | 44             | 323               | 28             | 203                               | 105.0          | 0.0                   | -21.6 | -30.4 |       |    |    |    |    |  |
| 330.371 G  | 24                | 209            | 15                | 136            | 123.6                             | +0.6           | -5.9                  | -39.4                 | 333.505 G   | 41             | 194               | 23             | 109                               | 105.9          | +1.1                  | -21.5 | -15.8 |       |    |    |    |    |  |
| 331.290 C  | 65                | 322            | 37                | 183            | 123.7                             | +0.5           | -5.8                  | -27.2                 | 334.358 C   | 27             | 145               | 15             | 78                                | 105.8          | +1.2                  | -21.8 | -4.7  |       |    |    |    |    |  |
| 332.446 G  | 50                | 321            | 25                | 166            | 124.0                             | +0.6           | -5.5                  | -11.4                 | 335.358 C   | 13             | 78                | 7              | 43                                | 105.1          | +0.7                  | -21.7 | +7.8  |       |    |    |    |    |  |
| Means  |                   | ..             | ..                | 29             | 148                               | 117.1          | ..                    | -15.6                 | ..  | 336.448 G      | 11                | 46             | 6                                 | 27             | 104.7                 | +0.5  | -21.6 | +21.8 |    |    |    |    |  |
| Spot b   |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |
|  |                   |                |                   |                |                                   |                |                       |                       |   |                |                   |                |                                   |                |                       |       |       |       |    |    |    |    |  |

LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |
| Group 18662.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Nov. 30-Dec. 5. A stream, appearing suddenly in front of Group 18659 and growing rapidly. The group is diminishing as it passes round the limb, the leader having died out by December 5. On December 2 only, there is a composite spot to the south of the group-centre. |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 333.505 G   | 8                 | 66             | 4                 | 34             | 131.7                             | 0.0           | - 5.6                 | +10.0                 |                   |                |                   |                |                                   |               |                       |
| 334.358 C   | 38                | 179            | 20                | 98             | 132.3                             | +0.5          | - 6.7                 | +21.8                 |                   |                |                   |                |                                   |               |                       |
| 335.358 C   | 84                | 800            | 52                | 494            | 132.4                             | +0.4          | - 5.8                 | +35.1                 |                   |                |                   |                |                                   |               |                       |
| 336.448 G   | 91                | 610            | 70                | 482            | 132.9                             | +0.7          | - 5.2                 | +50.0                 |                   |                |                   |                |                                   |               |                       |
| 337.441 G   | 74                | 410            | 84                | 479            | 132.9                             | +0.6          | - 5.3                 | +63.1                 |                   |                |                   |                |                                   |               |                       |
| 338.402 G   | 13                | 98             | 22                | 163            | 129.6                             | -2.9          | - 5.2                 | +72.4                 |                   |                |                   |                |                                   |               |                       |
| Means   | ..                | ..             | 42                | 292            | 132.0                             | ..            | - 5.6                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 18664.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Dec. 3-15. A stable regular spot, with a following companion until December 10.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 336.448 G   | 7                 | 56             | 34                | 268            | 359.2                             | ..            | -12.3                 | -83.7                 |                   |                |                   |                |                                   |               |                       |
| 337.441 G   | 39                | 180            | 59                | 274            | 359.5                             | 0.0           | -12.2                 | -70.3                 |                   |                |                   |                |                                   |               |                       |
| 338.402 G   | 70                | 353            | 66                | 335            | 359.9                             | +0.3          | -12.0                 | -57.3                 |                   |                |                   |                |                                   |               |                       |
| 339.372 G   | 60                | 322            | 44                | 234            | 359.7                             | 0.0           | -12.4                 | -44.7                 |                   |                |                   |                |                                   |               |                       |
| 340.548 C   | 65                | 395            | 38                | 230            | 0.2                               | +0.4          | -11.9                 | -28.7                 |                   |                |                   |                |                                   |               |                       |
| 341.290 C   | 88                | 400            | 47                | 216            | 0.5                               | +0.6          | -12.0                 | -18.6                 |                   |                |                   |                |                                   |               |                       |
| 342.285 C   | 65                | 384            | 33                | 196            | 1.6                               | +1.7          | -11.7                 | - 4.4                 |                   |                |                   |                |                                   |               |                       |
| 343.321 C   | 48                | 333            | 25                | 173            | 1.7                               | +1.7          | -11.9                 | + 9.3                 |                   |                |                   |                |                                   |               |                       |
| 344.420 G   | 56                | 347            | 31                | 194            | 2.4                               | +2.3          | -11.6                 | +24.5                 |                   |                |                   |                |                                   |               |                       |
| 345.453 G   | 50                | 258            | 32                | 168            | 2.7                               | +2.6          | -11.8                 | +38.4                 |                   |                |                   |                |                                   |               |                       |
| 346.463 G   | 43                | 234            | 35                | 192            | 2.8                               | +2.6          | -11.7                 | +51.8                 |                   |                |                   |                |                                   |               |                       |
| 347.292 C   | 21                | 153            | 23                | 170            | 2.8                               | +2.5          | -11.8                 | +62.8                 |                   |                |                   |                |                                   |               |                       |
| 348.331 C   | 15                | 65             | 33                | 144            | 3.3                               | +2.9          | -11.2                 | +76.9                 |                   |                |                   |                |                                   |               |                       |
| Means   | ..                | ..             | 39                | 210            | 1.4                               | ..            | -11.8                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 18665.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Dec. 4-11. A variable stream, with a brief maximum on December 7.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 337.441 G   | 0                 | 11             | 0                 | 26             | 352.4                             | 0.0           | -15.7                 | -77.4                 |                   |                |                   |                |                                   |               |                       |
| 338.402 G   | 2                 | 22             | 2                 | 27             | 352.2                             | -0.2          | -15.2                 | -65.0                 |                   |                |                   |                |                                   |               |                       |
| 339.372 G   | 26                | 177            | 22                | 148            | 352.7                             | +0.3          | -15.4                 | -51.7                 |                   |                |                   |                |                                   |               |                       |
| 340.548 C   | 35                | 302            | 21                | 193            | 353.8                             | +1.4          | -15.5                 | -35.1                 |                   |                |                   |                |                                   |               |                       |
| 341.290 C   | 32                | 228            | 19                | 132            | 352.9                             | +0.5          | -15.7                 | -26.2                 |                   |                |                   |                |                                   |               |                       |
| 342.285 C   | 8                 | 44             | 4                 | 23             | 354.2                             | +1.8          | -15.6                 | -11.8                 |                   |                |                   |                |                                   |               |                       |
| 343.321 C   | 2                 | 8              | 1                 | 4              | 353.0                             | +0.5          | -15.0                 | + 0.6                 |                   |                |                   |                |                                   |               |                       |
| 344.420 G   | 2                 | 15             | 1                 | 8              | 353.8                             | +1.3          | -14.4                 | +15.9                 |                   |                |                   |                |                                   |               |                       |
| Means   | ..                | ..             | 9                 | 70             | 353.1                             | ..            | -15.3                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Group 18667.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Dec. 7-15. A stream of normal type, of which the leader, a, is the most stable component.   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 340.548 C   | 38                | 157            | 23                | 96             | 358.3                             | 0.0           | +20.1                 | -30.6                 |                   |                |                   |                |                                   |               |                       |
| 341.290 C   | 64                | 333            | 36                | 190            | 357.9                             | -0.3          | +20.2                 | -21.2                 |                   |                |                   |                |                                   |               |                       |
| 342.285 C   | 92                | 745            | 50                | 401            | 359.1                             | +1.0          | +20.2                 | - 6.9                 |                   |                |                   |                |                                   |               |                       |
| 343.321 C   | 99                | 625            | 53                | 337            | 359.3                             | +1.3          | +20.2                 | + 6.9                 |                   |                |                   |                |                                   |               |                       |
| 344.420 G   | 105               | 702            | 60                | 404            | 358.7                             | +0.9          | +20.0                 | +20.8                 |                   |                |                   |                |                                   |               |                       |
| 345.453 G   | 74                | 493            | 48                | 321            | 358.9                             | +1.2          | +20.1                 | +34.6                 |                   |                |                   |                |                                   |               |                       |
| 346.463 G   | 63                | 577            | 50                | 463            | 358.7                             | +1.1          | +20.1                 | +47.7                 |                   |                |                   |                |                                   |               |                       |
| 347.292 C   | 40                | 317            | 41                | 340            | 359.2                             | +1.7          | +19.8                 | +59.2                 |                   |                |                   |                |                                   |               |                       |
| 348.331 C   | 6                 | 57             | 12                | 110            | 359.3                             | +1.9          | +19.8                 | +72.9                 |                   |                |                   |                |                                   |               |                       |
| Means   | ..                | ..             | 41                | 296            | 358.8                             | ..            | +20.1                 | ..                    |                   |                |                   |                |                                   |               |                       |
| Spot a  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 340.548 C   | 15                | 69             | 9                 | 41             | 1.1                               | 0.0           | +19.8                 | -27.8                 |                   |                |                   |                |                                   |               |                       |
| 341.290 C   | 33                | 134            | 18                | 75             | 1.8                               | +0.8          | +19.3                 | -17.3                 |                   |                |                   |                |                                   |               |                       |
| 342.285 C   | 52                | 389            | 28                | 206            | 2.7                               | +1.8          | +19.6                 | - 3.3                 |                   |                |                   |                |                                   |               |                       |
| 343.321 C   | 56                | 368            | 30                | 199            | 3.1                               | +2.3          | +19.8                 | +10.7                 |                   |                |                   |                |                                   |               |                       |
| 344.420 G   | 63                | 321            | 37                | 189            | 2.8                               | +2.2          | +19.9                 | +24.9                 |                   |                |                   |                |                                   |               |                       |
| 345.453 G   | 48                | 328            | 32                | 220            | 1.6                               | +1.1          | +19.4                 | +37.3                 |                   |                |                   |                |                                   |               |                       |
| 346.463 G   | 43                | 384            | 36                | 319            | 1.3                               | +0.9          | +19.4                 | +50.3                 |                   |                |                   |                |                                   |               |                       |
| 347.292 C   | 25                | 268            | 28                | 297            | 1.3                               | +1.0          | +19.2                 | +61.3                 |                   |                |                   |                |                                   |               |                       |
| 348.331 C   | 4                 | 38             | 9                 | 81             | 1.6                               | +1.4          | +19.4                 | +75.2                 |                   |                |                   |                |                                   |               |                       |
| Spot b  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 340.548 C   | 23                | 88             | 14                | 55             | 356.2                             | 0.0           | +20.3                 | -32.7                 |                   |                |                   |                |                                   |               |                       |
| 341.290 C   | 31                | 199            | 18                | 115            | 355.5                             | -0.6          | +20.4                 | -23.6                 |                   |                |                   |                |                                   |               |                       |
| 342.285 C   | 23                | 291            | 13                | 160            | 353.8                             | -2.2          | +21.0                 | -12.2                 |                   |                |                   |                |                                   |               |                       |
| 343.321 C   | 29                | 163            | 16                | 88             | 353.7                             | -2.2          | +21.2                 | + 1.3                 |                   |                |                   |                |                                   |               |                       |
| 344.420 G   | 9                 | 89             | 5                 | 50             | 352.8                             | -2.9          | +21.3                 | +14.9                 |                   |                |                   |                |                                   |               |                       |
| 345.453 G   | 17                | 89             | 10                | 54             | 352.3                             | -3.3          | +21.9                 | +28.0                 |                   |                |                   |                |                                   |               |                       |
| 346.463 G   | 9                 | 85             | 6                 | 61             | 352.0                             | -3.5          | +22.5                 | +41.0                 |                   |                |                   |                |                                   |               |                       |
| 347.292 C   | 13                | 36             | 11                | 31             | 351.4                             | -4.0          | +22.0                 | +51.4                 |                   |                |                   |                |                                   |               |                       |
| Group 18669.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| Dec. 7-19. A composite spot, which soon breaks up and spreads out to form a stream. The only definite component is a small regular spot at the rear, which alone remains on December 16.  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |
| 340.548 C   | 23                | 261            | 53                | 586            | 312.2                             | 0.0           | +14.3                 | -76.7                 |                   |                |                   |                |                                   |               |                       |
| 341.290 C   | 48                | 311            | 66                | 430            | 311.7                             | -0.5          | +14.3                 | -67.4                 |                   |                |                   |                |                                   |               |                       |

## LEDGER II. - NON-RECURRENT GROUPS OF SUNSPOTS FOR THE YEAR, 1950

| Date<br>U.T.<br>Place   | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. | Date<br>U.T.<br>Place | Projected<br>Area |                | Corrected<br>Area |                | Longitude<br>and Proper<br>Motion | Latit-<br>ude | Long.<br>from<br>C.M. |       |       |  |  |  |  |  |
|---|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-----------------------|-------------------|----------------|-------------------|----------------|-----------------------------------|---------------|-----------------------|-------|-------|--|--|--|--|--|
|   | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |                       | Umbræ             | Whole<br>Spots | Umbræ             | Whole<br>Spots |                                   |               |                       |       |       |  |  |  |  |  |
| Group 16669 - continued   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 342.285 C   | 46                | 436            | 41                | 391            | 311.4                             | -0.8          | +15.0                 | -54.6                 | 0.463 G           | 6              | 32                | 7              | 40                                | 125.3         | +1.8                  | +11.2 | +64.6 |  |  |  |  |  |
| 343.321 C   | 75                | 491            | 52                | 346            | 309.8                             | -2.4          | +15.0                 | -42.6                 | 1.337 C           | 0              | 10                | 0              | 25                                | 125.8         | +2.3                  | +11.3 | +76.6 |  |  |  |  |  |
| 344.420 G   | 74                | 481            | 43                | 284            | 310.1                             | -2.1          | +15.4                 | -27.8                 | Means             |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 345.453 G   | 83                | 421            | 45                | 224            | 311.1                             | -1.1          | +15.1                 | -13.2                 | ..                |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 346.463 G   | 68                | 657            | 35                | 342            | 311.5                             | -0.7          | +15.1                 | +0.5                  | 32                |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 347.292 C   | 41                | 314            | 21                | 167            | 310.4                             | -1.8          | +15.4                 | +10.4                 | 218               |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 348.331 C   | 23                | 205            | 13                | 116            | 308.7                             | -3.5          | +16.4                 | +22.3                 | 124.4             |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 349.462 G   | 17                | 98             | 11                | 64             | 307.7                             | -4.5          | +16.7                 | +36.2                 | ..                |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 350.402 C   | 10                | 56             | 8                 | 44             | 307.5                             | -4.7          | +16.7                 | +48.4                 | Spot a            |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 351.304 C   | 6                 | 19             | 6                 | 21             | 307.8                             | -4.4          | +17.0                 | +60.6                 | 359.364 C         | 33             | 176               | 17             | 93                                | 127.5         | 0.0                   | +11.7 | -13.5 |  |  |  |  |  |
| 352.297 C   | 0                 | 8              | 0                 | 15             | 307.4                             | -4.8          | +17.1                 | +73.3                 | 360.302 C         | 71             | 443               | 36             | 226                               | 126.8         | -0.8                  | +11.2 | -1.8  |  |  |  |  |  |
| Means   | ..                | ..             | 30                | 233            | 309.8                             | ..            | +15.7                 | ..                    | 361.596 G         | 50             | 326               | 27             | 176                               | 128.1         | +0.4                  | +11.3 | +16.5 |  |  |  |  |  |
| Group 16676 - continued   |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 362.118 K   | 22                | 211            | 12                | 118            | 128.1                             | +0.3          | +11.1                 | +23.4                 | 362.118 K         | 22             | 211               | 12             | 118                               | 128.1         | +0.3                  | +11.1 | +23.4 |  |  |  |  |  |
| 363.309 C   | 33                | 229            | 22                | 151            | 128.0                             | +0.1          | +11.2                 | +39.0                 | 363.309 C         | 33             | 229               | 22             | 151                               | 128.0         | +0.1                  | +11.2 | +39.0 |  |  |  |  |  |
| 364.290 C   | 10                | 98             | 8                 | 81             | 127.7                             | -0.3          | +11.4                 | +51.6                 | 364.290 C         | 10             | 98                | 8              | 81                                | 127.7         | -0.3                  | +11.4 | +51.6 |  |  |  |  |  |
| 0.463 G   | 4                 | 19             | 5                 | 26             | 128.0                             | -0.1          | +11.5                 | +67.3                 | 0.463 G           | 4              | 19                | 5              | 26                                | 128.0         | -0.1                  | +11.5 | +67.3 |  |  |  |  |  |
| 1.337 C   | 0                 | 8              | 0                 | 21             | 127.2                             | -1.0          | +11.4                 | +78.0                 | 1.337 C           | 0              | 8                 | 0              | 21                                | 127.2         | -1.0                  | +11.4 | +78.0 |  |  |  |  |  |
| Dec. 24-1951 Jan. 2. A stream, growing rapidly to a maximum on December 27 and then declining quickly. The follower, b, is the largest component but is the first to die out. |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| Spot b  |                   |                |                   |                |                                   |               |                       |                       |                   |                |                   |                |                                   |               |                       |       |       |  |  |  |  |  |
| 357.454 G   | 27                | 91             | 19                | 65             | 122.7                             | 0.0           | +10.4                 | -43.5                 | 358.454 G         | 11             | 117               | 7              | 70                                | 121.3         | 0.0                   | +10.3 | -31.7 |  |  |  |  |  |
| 358.454 G   | 26                | 238            | 16                | 139            | 123.8                             | +1.0          | +11.0                 | -29.2                 | 359.364 C         | 63             | 456               | 34             | 246                               | 121.9         | +0.5                  | +10.4 | -19.1 |  |  |  |  |  |
| 359.364 C   | 113               | 753            | 60                | 403            | 123.5                             | +0.6          | +10.9                 | -17.5                 | 360.302 C         | 102            | 520               | 53             | 270                               | 121.6         | +0.1                  | +10.7 | -7.0  |  |  |  |  |  |
| 360.302 C   | 173               | 963            | 89                | 496            | 124.0                             | +1.0          | +11.1                 | -4.6                  | 361.596 G         | 52             | 477               | 27             | 248                               | 121.8         | +0.2                  | +11.1 | +10.2 |  |  |  |  |  |
| 361.596 G   | 102               | 803            | 54                | 424            | 124.6                             | +1.5          | +11.1                 | +13.0                 | 362.118 K         | 20             | 193               | 11             | 104                               | 121.2         | -0.4                  | +10.8 | +16.5 |  |  |  |  |  |
| 362.118 K   | 42                | 404            | 23                | 222            | 124.6                             | +1.5          | +10.8                 | +19.9                 | 363.309 C         | 15             | 108               | 9              | 66                                | 121.9         | +0.1                  | +10.6 | +32.9 |  |  |  |  |  |
| 363.309 C   | 48                | 337            | 31                | 217            | 124.6                             | +1.3          | +10.9                 | +35.6                 | 364.290 C         | 15             | 90                | 11             | 67                                | 121.5         | -0.4                  | +11.0 | +45.4 |  |  |  |  |  |
| 364.290 C   | 25                | 188            | 19                | 148            | 124.8                             | +1.5          | +11.2                 | +48.7                 | 0.463 G           | 2              | 13                | 2              | 14                                | 122.0         | 0.0                   | +10.5 | +61.3 |  |  |  |  |  |

ROYAL GREENWICH OBSERVATORY

*Total Areas  
of Sunspots and Faculae*

for each day, and

*Mean Areas and Mean Heliographic Latitude  
of Sunspots and Faculae*

for each rotation of the sun and for the year

1950

GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1950

TOTAL AREAS OF SUNSPOTS AND FACULAE FOR EACH DAY IN THE YEAR 1950

The time (U.T.) at which the photograph was taken is expressed by the month, day of month, and decimal of a day, reckoned from Greenwich mean midnight.

The place where the photograph was taken is indicated in the second column. A photograph taken at Greenwich is indicated by the letter G, and those taken at the Cape and Kodaikanal by the letters C and K respectively. Photographs taken at Mount Wilson are indicated by Mt. W.

The projected area is the area as it is measured on the photograph, uncorrected for the effect of foreshortening and expressed in millionths of the Sun's apparent disk.

The area corrected for foreshortening is expressed in millionths of the Sun's visible hemisphere.

| U. T.    |         | Place | Projected Area |             |        | Area Corrected for Foreshortening |             |        | U. T.    | Place   | Projected Area |             |        | Area Corrected for Foreshortening |             |        |      |
|----------|---------|-------|----------------|-------------|--------|-----------------------------------|-------------|--------|----------|---------|----------------|-------------|--------|-----------------------------------|-------------|--------|------|
|          |         |       | Umbræ          | Whole Spots | Faculæ | Umbræ                             | Whole Spots | Faculæ |          |         | Umbræ          | Whole Spots | Faculæ | Umbræ                             | Whole Spots | Faculæ |      |
| 1950     | d       |       |                |             |        |                                   |             |        | 1950     | d       |                |             |        |                                   |             |        |      |
| January  | 1. 450  | G     | 421            | 2680        | 1220   | 285                               | 1740        | 1653   | February | 14. 561 | C              | 609         | 3827   | 1282                              | 573         | 3717   | 2029 |
|          | 2. 271  | C     | 360            | 2675        | 1378   | 260                               | 1821        | 1734   |          | 15. 299 | C              | 809         | 5194   | 1561                              | 659         | 4429   | 1837 |
|          | 3. 301  | C     | 407            | 2348        | 652    | 287                               | 1651        | 814    |          | 16. 297 | C              | 1020        | 7786   | 1250                              | 754         | 5919   | 1465 |
|          | 4. 291  | C     | 259            | 1587        | 909    | 201                               | 1263        | 1177   |          | 17. 311 | C              | 956         | 7650   | 1204                              | 658         | 5351   | 1424 |
|          | 5. 601  | G     | 160            | 1194        | 2937   | 176                               | 1389        | 3611   |          | 18. 374 | G              | 1241        | 7045   | 1927                              | 774         | 4452   | 2553 |
|          | 6. 398  | G     | 126            | 888         | 2104   | 130                               | 934         | 2587   |          | 19. 314 | C              | 1147        | 6850   | 1624                              | 719         | 4404   | 2025 |
|          | 7. 283  | C     | 180            | 809         | 1997   | 127                               | 614         | 2586   |          | 20. 397 | G              | 1109        | 5959   | 2787                              | 818         | 4251   | 3524 |
|          | 8. 280  | C     | 139            | 695         | 2540   | 95                                | 465         | 3333   |          | 21. 436 | G              | 1050        | 5630   | 3827                              | 687         | 3680   | 4219 |
|          | 9. 294  | C     | 101            | 799         | 887    | 56                                | 433         | 971    |          | 22. 447 | G              | 802         | 4319   | 2706                              | 587         | 3137   | 3423 |
|          | 10. 285 | C     | 140            | 931         | 1610   | 74                                | 498         | 2057   |          | 23. 427 | G              | 517         | 3824   | 2854                              | 415         | 3052   | 3471 |
|          | 11. 284 | C     | 128            | 734         | 1175   | 77                                | 440         | 1332   |          | 24. 217 | K              | 420         | 2233   | 2555                              | 403         | 2107   | 2876 |
|          | 12. 386 | G     | 192            | 1128        | 1832   | 144                               | 814         | 2056   |          | 25. 389 | G              | 269         | 1446   | 2397                              | 291         | 1694   | 3074 |
|          | 13. 290 | C     | 149            | 959         | 1691   | 136                               | 888         | 1941   |          | 26. 411 | G              | 147         | 783    | 2441                              | 99          | 524    | 4025 |
|          | 14. 282 | C     | 164            | 948         | 2037   | 219                               | 1356        | 2503   |          | 27. 377 | G              | 145         | 726    | 1928                              | 85          | 428    | 2190 |
|          | 15. 300 | C     | 118            | 776         | 1161   | 133                               | 864         | 1620   |          | 28. 395 | G              | 124         | 691    | 1651                              | 91          | 557    | 2130 |
|          | 16. 463 | G     | 144            | 802         | 1868   | 110                               | 627         | 2345   | March    | 1. 407  | G              | 146         | 763    | 2289                              | 154         | 831    | 3079 |
|          | 17. 283 | C     | 159            | 975         | 1483   | 132                               | 897         | 1671   |          | 2. 395  | G              | 137         | 809    | 2026                              | 130         | 759    | 2428 |
|          | 18. 390 | G     | 310            | 1475        | 1443   | 217                               | 1012        | 1755   |          | 3. 304  | C              | 128         | 782    | 1796                              | 118         | 692    | 2311 |
|          | 19. 487 | G     | 351            | 2406        | 1337   | 258                               | 1722        | 1693   |          | 4. 381  | G              | 220         | 1343   | 1386                              | 153         | 941    | 2020 |
|          | 20. 427 | C     | 508            | 2737        | 1326   | 343                               | 1859        | 1698   |          | 5. 451  | G              | 330         | 1838   | 1452                              | 207         | 1122   | 1937 |
|          | 21. 489 | G     | 721            | 3929        | 2008   | 577                               | 3184        | 2532   |          | 6. 370  | G              | 384         | 2020   | 2656                              | 300         | 1778   | 3242 |
|          | 22. 303 | C     | 783            | 4565        | 1975   | 613                               | 3395        | 2777   |          | 7. 384  | G              | 541         | 2954   | 1782                              | 452         | 2651   | 2501 |
|          | 23. 384 | G     | 765            | 4436        | 2169   | 554                               | 3321        | 2634   |          | 8. 373  | G              | 658         | 3600   | 2354                              | 555         | 3084   | 3069 |
|          | 24. 388 | G     | 843            | 4147        | 3727   | 621                               | 3035        | 4072   |          | 9. 378  | G              | 659         | 3706   | 1877                              | 506         | 2857   | 2048 |
|          | 25. 286 | C     | 566            | 3187        | 3436   | 436                               | 2524        | 4052   |          | 10. 305 | C              | 602         | 4100   | 1346                              | 421         | 2844   | 1539 |
|          | 26. 584 | G     | 480            | 2738        | 2385   | 385                               | 2318        | 2956   |          | 11. 307 | C              | 627         | 3781   | 2173                              | 459         | 2777   | 2726 |
|          | 27. 496 | G     | 335            | 1976        | 2582   | 192                               | 1225        | 3177   |          | 12. 307 | C              | 636         | 3937   | 2747                              | 578         | 3415   | 3686 |
|          | 28. 288 | C     | 264            | 2038        | 2080   | 156                               | 1225        | 2264   |          | 13. 377 | G              | 725         | 3973   | 1701                              | 553         | 3118   | 2381 |
|          | 29. 483 | G     | 274            | 1786        | 1281   | 181                               | 1197        | 1943   |          | 14. 312 | C              | 664         | 4001   | 1661                              | 442         | 2755   | 2254 |
|          | 30. 294 | C     | 152            | 936         | 1715   | 110                               | 693         | 2043   |          | 15. 488 | G              | 675         | 3589   | 2255                              | 450         | 2439   | 2418 |
|          | 31. 294 | C     | 96             | 576         | 2785   | 82                                | 499         | 3044   |          | 16. 383 | G              | 576         | 3676   | 1727                              | 385         | 2546   | 1952 |
| February | 1. 293  | C     | 49             | 323         | 1947   | 56                                | 385         | 2387   | 17. 650  | G       | 449            | 2637        | 1366   | 354                               | 2160        | 1886   |      |
|          | 2. 345  | C     | 8              | 67          | 2271   | 18                                | 126         | 2653   | 18. 324  | C       | 355            | 2389        | 1402   | 324                               | 2154        | 2176   |      |
|          | 3. 295  | C     | 6              | 36          | 1723   | 3                                 | 51          | 2109   | 19. 368  | G       | 321            | 1650        | 1623   | 325                               | 1619        | 2115   |      |
|          | 4. 478  | G     | 41             | 139         | 1367   | 34                                | 142         | 1837   | 20. 648  | G       | 221            | 1134        | 2057   | 147                               | 782         | 2536   |      |
|          | 5. 404  | G     | 20             | 86          | 2062   | 15                                | 70          | 2598   | 21. 602  | G       | 172            | 1019        | 1656   | 127                               | 760         | 1891   |      |
|          | 6. 297  | C     | 4              | 20          | 950    | 3                                 | 16          | 1133   | 22. 343  | C       | 137            | 889         | 1273   | 103                               | 675         | 1642   |      |
|          | 7. 411  | G     | 11             | 56          | 1035   | 7                                 | 34          | 1187   | 23. 303  | C       | 88             | 559         | 1691   | 69                                | 448         | 2343   |      |
|          | 8. 291  | C     | 35             | 192         | 1376   | 47                                | 249         | 1808   | 24. 356  | G       | 62             | 507         | 1912   | 42                                | 373         | 2378   |      |
|          | 9. 294  | C     | 40             | 185         | 995    | 45                                | 210         | 1249   | 25. 362  | G       | 167            | 936         | 1134   | 171                               | 818         | 1563   |      |
|          | 10. 295 | C     | 60             | 365         | 1270   | 66                                | 449         | 1614   | 26. 442  | G       | 190            | 1082        | 1666   | 134                               | 773         | 2160   |      |
|          | 11. 294 | C     | 152            | 937         | 989    | 174                               | 989         | 1742   | 27. 366  | G       | 197            | 1273        | 1433   | 163                               | 1118        | 1748   |      |
|          | 12. 410 | G     | 362            | 1777        | 1150   | 248                               | 1200        | 1307   | 28. 342  | C       | 196            | 1127        | 1317   | 169                               | 981         | 1612   |      |
|          | 13. 409 | G     | 428            | 2912        | 1232   | 317                               | 2342        | 1438   | 29. 304  | C       | 199            | 1241        | 1562   | 274                               | 1593        | 2349   |      |

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| TOTAL AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR 1950 |         |       |                |             |        |                                   |             |        |       |         |       |                |             |        |                                   |             |        |
|--|---------|-------|----------------|-------------|--------|-----------------------------------|-------------|--------|-------|---------|-------|----------------|-------------|--------|-----------------------------------|-------------|--------|
| U. T.  |         | Place | Projected Area |             |        | Area Corrected for Foreshortening |             |        | U. T. |         | Place | Projected Area |             |        | Area Corrected for Foreshortening |             |        |
|  |         |       | Umbræ          | Whole Spots | Faculæ | Umbræ                             | Whole Spots | Faculæ |       |         |       | Umbræ          | Whole Spots | Faculæ | Umbræ                             | Whole Spots | Faculæ |
| 1950   | d       |       |                |             |        |                                   |             |        | 1950  | d       |       |                |             |        |                                   |             |        |
| March  | 30. 589 | G     | 282            | 1438        | 2808   | 264                               | 1340        | 3704   | May   | 25. 345 | C     | 669            | 3976        | 1399   | 410                               | 2407        | 1582   |
|  | 31. 307 | C     | 332            | 1666        | 2127   | 261                               | 1266        | 2532   |       | 26. 329 | C     | 588            | 3655        | 1343   | 373                               | 2327        | 1277   |
| April  | 1. 439  | G     | 333            | 1704        | 963    | 208                               | 1101        | 1757   |       | 27. 393 | G     | 585            | 3093        | 1604   | 415                               | 2249        | 1782   |
|  | 2. 473  | G     | 460            | 2245        | 1581   | 269                               | 1315        | 1890   |       | 28. 405 | G     | 440            | 2306        | 2119   | 404                               | 2122        | 3072   |
|  | 3. 407  | G     | 510            | 3034        | 1651   | 318                               | 1887        | 2322   |       | 29. 420 | C     | 283            | 1550        | 1931   | 233                               | 1317        | 2162   |
|  | 4. 331  | C     | 556            | 3280        | 1122   | 342                               | 2075        | 1445   |       | 30. 340 | C     | 242            | 1268        | 811    | 218                               | 1179        | 1133   |
|  | 5. 373  | G     | 686            | 3768        | 1642   | 432                               | 2369        | 1841   |       | 31. 333 | G     | 193            | 1000        | 1648   | 186                               | 1040        | 2004   |
|  | 6. 364  | G     | 662            | 3432        | 1931   | 460                               | 2351        | 2248   | June  | 1. 335  | C     | 112            | 818         | 1128   | 74                                | 537         | 1573   |
|  | 7. 364  | G     | 620            | 3023        | 2755   | 571                               | 2873        | 3076   |       | 2. 607  | G     | 123            | 1227        | 2624   | 84                                | 773         | 3139   |
|  | 8. 391  | C     | 410            | 2808        | 2289   | 452                               | 3291        | 2598   |       | 3. 321  | G     | 209            | 1146        | 2145   | 143                               | 756         | 2476   |
|  | 9. 464  | G     | 503            | 2806        | 2476   | 558                               | 3072        | 3233   |       | 4. 360  | G     | 168            | 868         | 2244   | 113                               | 616         | 2618   |
|  | 10. 417 | C     | 451            | 3346        | 1628   | 358                               | 2678        | 2301   |       | 5. 336  | G     | 137            | 822         | 1799   | 107                               | 631         | 2136   |
|  | 11. 366 | G     | 526            | 3799        | 1278   | 322                               | 2296        | 1787   |       | 6. 376  | C     | 47             | 412         | 1427   | 57                                | 511         | 1666   |
|  | 12. 363 | G     | 502            | 3865        | 1377   | 280                               | 2157        | 1493   |       | 7. 350  | C     | 28             | 162         | 1094   | 48                                | 291         | 1394   |
|  | 13. 366 | G     | 555            | 3494        | 1815   | 363                               | 2387        | 2391   |       | 8. 348  | G     | 80             | 521         | 1910   | 129                               | 963         | 2328   |
|  | 14. 311 | C     | 481            | 3442        | 1430   | 349                               | 2269        | 1934   |       | 9. 336  | C     | 161            | 948         | 1544   | 215                               | 1302        | 1779   |
|  | 15. 373 | G     | 663            | 3671        | 1818   | 465                               | 2535        | 2010   |       | 10. 327 | G     | 237            | 1664        | 3093   | 241                               | 1723        | 3646   |
|  | 16. 514 | C     | 432            | 3523        | 1722   | 291                               | 2360        | 2026   |       | 11. 387 | G     | 301            | 1915        | 1127   | 234                               | 1568        | 1442   |
|  | 17. 461 | G     | 393            | 3731        | 1992   | 280                               | 2580        | 2356   |       | 12. 364 | G     | 345            | 1957        | 1519   | 227                               | 1275        | 1850   |
|  | 18. 410 | C     | 490            | 3207        | 1002   | 365                               | 2505        | 1222   |       | 13. 333 | C     | 413            | 2354        | 1472   | 255                               | 1480        | 2054   |
|  | 19. 316 | C     | 405            | 2832        | 1798   | 358                               | 2657        | 2571   |       | 14. 360 | C     | 400            | 2547        | 1606   | 285                               | 1787        | 2258   |
|  | 20. 362 | G     | 232            | 2113        | 1632   | 164                               | 1726        | 2010   |       | 15. 334 | C     | 429            | 2327        | 1851   | 253                               | 1382        | 1981   |
|  | 21. 365 | G     | 259            | 1424        | 2081   | 260                               | 1550        | 2546   |       | 16. 639 | G     | 449            | 2285        | 1079   | 312                               | 1635        | 1381   |
|  | 22. 332 | G     | 300            | 1496        | 1056   | 218                               | 1159        | 1443   |       | 17. 346 | G     | 362            | 2330        | 1115   | 262                               | 1705        | 1548   |
|  | 23. 603 | Mt.W  | 577            | 2817        | 1826   | 391                               | 1924        | 2258   |       | 18. 381 | G     | 324            | 1855        | 1151   | 253                               | 1454        | 1299   |
|  | 24. 333 | G     | 537            | 3143        | 2688   | 371                               | 2112        | 3434   |       | 19. 564 | C     | 223            | 1344        | 691    | 209                               | 1252        | 869    |
|  | 25. 441 | C     | 607            | 4191        | 1645   | 376                               | 2537        | 2125   |       | 20. 538 | G     | 182            | 1027        | 1375   | 195                               | 1217        | 1863   |
|  | 26. 373 | G     | 709            | 4283        | 1775   | 430                               | 2592        | 2274   |       | 21. 474 | G     | 170            | 877         | 1473   | 132                               | 662         | 2090   |
|  | 27. 369 | G     | 793            | 5274        | 1435   | 457                               | 2992        | 1594   |       | 22. 339 | G     | 219            | 1135        | 1143   | 140                               | 714         | 1334   |
|  | 28. 419 | G     | 906            | 5209        | 1990   | 567                               | 3316        | 2440   |       | 23. 466 | G     | 255            | 1358        | 1955   | 161                               | 838         | 2219   |
|  | 29. 315 | C     | 819            | 4842        | 1195   | 528                               | 3148        | 1352   |       | 24. 321 | G     | 292            | 1611        | 3198   | 169                               | 934         | 3678   |
|  | 30. 399 | G     | 668            | 4138        | 2285   | 477                               | 2958        | 2663   |       | 25. 340 | C     | 390            | 2039        | 604    | 218                               | 1138        | 927    |
| May  | 1. 319  | C     | 641            | 3441        | 1419   | 500                               | 2757        | 1764   |       | 26. 361 | C     | 302            | 1828        | 1221   | 175                               | 1077        | 1706   |
|  | 2. 483  | G     | 460            | 2687        | 1989   | 383                               | 2188        | 2472   |       | 27. 330 | G     | 233            | 1364        | 1744   | 155                               | 932         | 2154   |
|  | 3. 338  | G     | 369            | 2134        | 2258   | 352                               | 1894        | 3044   |       | 28. 394 | C     | 162            | 979         | 994    | 141                               | 834         | 1260   |
|  | 4. 321  | C     | 235            | 1963        | 2079   | 153                               | 1254        | 2453   |       | 29. 461 | G     | 99             | 770         | 1178   | 99                                | 757         | 1655   |
|  | 5. 541  | C     | 368            | 2223        | 2409   | 232                               | 1413        | 2927   |       | 30. 335 | C     | 112            | 636         | 1260   | 105                               | 706         | 1614   |
|  | 6. 325  | C     | 250            | 2237        | 1705   | 205                               | 1788        | 2206   | July  | 1. 328  | G     | 130            | 674         | 2448   | 142                               | 803         | 2863   |
|  | 7. 451  | G     | 432            | 2241        | 3068   | 414                               | 2212        | 3655   |       | 2. 297  | G     | 143            | 709         | 1259   | 117                               | 584         | 1324   |
|  | 8. 330  | G     | 460            | 2379        | 3361   | 487                               | 2431        | 3799   |       | 3. 576  | Mt.W  | 106            | 503         | 1226   | 119                               | 520         | 1704   |
|  | 9. 355  | G     | 297            | 1608        | 2131   | 268                               | 1424        | 2949   |       | 4. 654  | G     | 104            | 549         | 716    | 79                                | 438         | 820    |
|  | 10. 636 | G     | 230            | 1333        | 1185   | 152                               | 883         | 1730   |       | 5. 878  | Mt.W  | 183            | 841         | 1070   | 123                               | 561         | 1264   |
|  | 11. 614 | G     | 235            | 1653        | 2725   | 163                               | 1096        | 3248   |       | 6. 333  | C     | 233            | 1177        | 1060   | 162                               | 810         | 1257   |
|  | 12. 624 | G     | 228            | 1362        | 2266   | 135                               | 850         | 2782   |       | 7. 621  | G     | 281            | 1856        | 1252   | 262                               | 1539        | 1674   |
|  | 13. 322 | G     | 290            | 1401        | 2450   | 166                               | 788         | 2398   |       | 8. 325  | G     | 236            | 1731        | 1778   | 186                               | 1405        | 2300   |
|  | 14. 514 | G     | 198            | 1015        | 1277   | 113                               | 578         | 1458   |       | 9. 344  | C     | 207            | 1266        | 1584   | 156                               | 962         | 1995   |
|  | 15. 334 | C     | 172            | 881         | 840    | 104                               | 529         | 1036   |       | 10. 331 | G     | 296            | 1694        | 2323   | 294                               | 1812        | 2792   |
|  | 16. 488 | C     | 147            | 788         | 862    | 107                               | 613         | 1066   |       | 11. 333 | G     | 210            | 1342        | 2331   | 205                               | 1364        | 3070   |
|  | 17. 323 | C     | 187            | 954         | 1127   | 190                               | 1006        | 1349   |       | 12. 354 | G     | 189            | 1138        | 1629   | 167                               | 991         | 1919   |
|  | 18. 321 | C     | 192            | 1261        | 1513   | 207                               | 1479        | 2202   |       | 13. 342 | G     | 180            | 1086        | 1361   | 126                               | 766         | 1565   |
|  | 19. 455 | G     | 320            | 1766        | 1540   | 248                               | 1387        | 1848   |       | 14. 417 | G     | 160            | 952         | 948    | 108                               | 610         | 1335   |
|  | 20. 325 | C     | 310            | 1659        | 1746   | 262                               | 1478        | 2132   |       | 15. 341 | G     | 136            | 808         | 1028   | 84                                | 608         | 1151   |
|  | 21. 330 | G     | 308            | 2094        | 2242   | 288                               | 2044        | 2734   |       | 16. 380 | G     | 119            | 692         | 1503   | 129                               | 704         | 1799   |
|  | 22. 325 | G     | 314            | 2414        | 1882   | 237                               | 1880        | 2677   |       | 17. 327 | G     | 189            | 1353        | 1581   | 148                               | 1021        | 1884   |
|  | 23. 346 | C     | 541            | 2927        | 1299   | 338                               | 1879        | 1766   |       | 18. 360 | G     | 300            | 1686        | 1305   | 184                               | 1031        | 1957   |
|  | 24. 329 | C     | 634            | 4247        | 1842   | 360                               | 2428        | 2420   |       | 19. 589 | G     | 417            | 2252        | 1646   | 321                               | 1805        | 2313   |

| TOTAL AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR 1950 |        |                |             |        |                                   |             |        |      |           |                |             |        |                                   |             |        |      |      |
|--|--------|----------------|-------------|--------|-----------------------------------|-------------|--------|------|-----------|----------------|-------------|--------|-----------------------------------|-------------|--------|------|------|
| U.T.   | Place  | Projected Area |             |        | Area Corrected for Foreshortening |             |        | U.T. | Place     | Projected Area |             |        | Area Corrected for Foreshortening |             |        |      |      |
|  |        | Umbræ          | Whole Spots | Faculæ | Umbræ                             | Whole Spots | Faculæ |      |           | Umbræ          | Whole Spots | Faculæ | Umbræ                             | Whole Spots | Faculæ |      |      |
| 1950   | d      |                |             |        |                                   |             |        | 1950 | d         |                |             |        |                                   |             |        |      |      |
| July   | 20.362 | C              | 399         | 2863   | 1962                              | 287         | 2068   | 2283 | September | 14.636         | G           | 196    | 1146                              | 768         | 183    | 1087 | 748  |
|  | 21.493 | G              | 533         | 3343   | 1925                              | 346         | 2097   | 2098 |           | 15.491         | G           | 269    | 1348                              | 939         | 205    | 1050 | 1156 |
|  | 22.387 | G              | 599         | 3395   | 978                               | 362         | 2042   | 1316 |           | 16.323         | G           | 267    | 1429                              | 1084        | 179    | 1015 | 1255 |
|  | 23.418 | G              | 632         | 3344   | 805                               | 371         | 1994   | 957  |           | 17.374         | G           | 178    | 1323                              | 1165        | 118    | 878  | 1283 |
|  | 24.388 | G              | 518         | 2818   | 1289                              | 326         | 1782   | 1463 |           | 18.323         | G           | 242    | 1290                              | 707         | 151    | 767  | 942  |
|  | 25.642 | G              | 430         | 2181   | 2151                              | 340         | 1682   | 2396 |           | 19.614         | G           | 211    | 1342                              | 371         | 117    | 761  | 532  |
|  | 26.377 | G              | 456         | 2268   | 1610                              | 384         | 1895   | 2150 |           | 20.332         | G           | 260    | 1240                              | 1034        | 174    | 847  | 1310 |
|  | 27.335 | G              | 451         | 2171   | 1058                              | 309         | 1478   | 1430 |           | 21.326         | G           | 194    | 992                               | 2194        | 112    | 607  | 2534 |
|  | 28.594 | G              | 292         | 1488   | 2484                              | 231         | 1171   | 2653 |           | 22.442         | G           | 163    | 799                               | 2676        | 115    | 563  | 3275 |
|  | 29.322 | G              | 308         | 1517   | 1841                              | 298         | 1407   | 2065 |           | 23.366         | G           | 123    | 657                               | 1442        | 89     | 468  | 1758 |
|  | 30.585 | C              | 231         | 1305   | 936                               | 257         | 1501   | 1212 |           | 24.438         | C           | 122    | 616                               | 218         | 88     | 449  | 355  |
|  | 31.330 | C              | 228         | 1541   | 1608                              | 228         | 1476   | 1935 |           | 25.418         | G           | 96     | 620                               | 582         | 65     | 435  | 755  |
|  |        |                |             |        |                                   |             |        |      |           | 26.354         | G           | 105    | 609                               | 1412        | 88     | 495  | 1571 |
|  |        |                |             |        |                                   |             |        |      |           | 27.545         | G           | 64     | 392                               | 593         | 52     | 399  | 668  |
| August   | 1.345  | G              | 287         | 1666   | 1403                              | 197         | 1170   | 1840 |           | 28.310         | C           | 42     | 207                               | 358         | 24     | 127  | 412  |
|  | 2.362  | G              | 350         | 1923   | 1191                              | 223         | 1263   | 1737 |           | 29.311         | C           | 47     | 234                               | 401         | 67     | 328  | 742  |
|  | 3.329  | G              | 339         | 2752   | 1226                              | 203         | 1587   | 1505 |           | 30.316         | C           | 54     | 272                               | 647         | 64     | 335  | 814  |
|  | 4.326  | G              | 477         | 2898   | 973                               | 258         | 1572   | 1106 |           |                |             |        |                                   |             |        |      |      |
|  | 5.328  | C              | 338         | 2544   | 300                               | 183         | 1371   | 409  | October   | 1.383          | G           | 89     | 417                               | 1855        | 78     | 369  | 2140 |
|  | 6.328  | C              | 335         | 2392   | 860                               | 212         | 1449   | 1169 |           | 2.538          | G           | 134    | 606                               | 1067        | 91     | 416  | 1277 |
|  | 7.382  | G              | 249         | 1911   | 1650                              | 163         | 1269   | 2134 |           | 3.326          | G           | 135    | 816                               | 919         | 81     | 481  | 1091 |
|  | 8.373  | G              | 268         | 1335   | 2071                              | 209         | 1050   | 2190 |           | 4.557          | G           | 192    | 929                               | 915         | 109    | 521  | 920  |
|  | 9.340  | C              | 144         | 1038   | 854                               | 119         | 993    | 941  |           | 5.320          | G           | 183    | 837                               | 1388        | 108    | 489  | 1593 |
|  | 10.648 | G              | 163         | 826    | 1592                              | 164         | 922    | 2527 |           | 6.343          | G           | 129    | 660                               | 1815        | 72     | 375  | 2336 |
|  | 11.322 | G              | 148         | 999    | 1110                              | 110         | 704    | 1312 |           | 7.301          | C           | 95     | 572                               | 215         | 54     | 338  | 203  |
|  | 12.330 | G              | 196         | 1232   | 1412                              | 168         | 1011   | 1555 |           | 8.449          | G           | 180    | 1061                              | 948         | 175    | 1035 | 1368 |
|  | 13.433 | G              | 133         | 1366   | 1014                              | 113         | 1075   | 1314 |           | 9.301          | C           | 187    | 1165                              | 1139        | 151    | 1016 | 1525 |
|  | 14.319 | G              | 168         | 1106   | 665                               | 139         | 881    | 1099 |           | 10.302         | C           | 178    | 1128                              | 1266        | 139    | 931  | 1358 |
|  | 15.325 | C              | 264         | 1531   | 695                               | 204         | 1168   | 934  |           | 11.427         | G           | 221    | 1018                              | 2287        | 165    | 760  | 2469 |
|  | 16.325 | G              | 297         | 1827   | 1756                              | 225         | 1258   | 2027 |           | 12.341         | G           | 196    | 1062                              | 793         | 177    | 909  | 1033 |
|  | 17.383 | G              | 359         | 1986   | 1367                              | 237         | 1321   | 1665 |           | 13.378         | G           | 152    | 868                               | 1243        | 99     | 564  | 1464 |
|  | 18.325 | G              | 308         | 1775   | 1049                              | 192         | 1103   | 1540 |           | 14.329         | G           | 153    | 822                               | 1508        | 104    | 529  | 1701 |
|  | 19.333 | G              | 317         | 2083   | 820                               | 221         | 1411   | 1564 |           | 15.374         | G           | 179    | 1109                              | 1141        | 121    | 755  | 1546 |
|  | 20.430 | C              | 418         | 2041   | 1447                              | 269         | 1314   | 1811 |           | 16.634         | G           | 289    | 1662                              | 1032        | 180    | 1012 | 1144 |
|  | 21.337 | G              | 317         | 2091   | 1572                              | 183         | 1243   | 1727 |           | 17.310         | C           | 295    | 1453                              | 546         | 190    | 938  | 557  |
|  | 22.440 | G              | 397         | 2071   | 992                               | 232         | 1206   | 1242 |           | 18.357         | G           | 201    | 1196                              | 1842        | 151    | 902  | 1907 |
|  | 23.301 | G              | 405         | 1840   | 673                               | 240         | 1089   | 762  |           | 19.434         | G           | 99     | 650                               | 1317        | 101    | 644  | 1574 |
|  | 24.323 | G              | 337         | 1759   | 776                               | 222         | 1148   | 958  |           | 20.429         | G           | 49     | 359                               | 1493        | 71     | 522  | 1741 |
|  | 25.356 | G              | 270         | 1617   | 1633                              | 222         | 1287   | 2081 |           | 21.440         | C           | 6      | 45                                | 276         | 3      | 23   | 474  |
|  | 26.351 | G              | 182         | 1159   | 1948                              | 191         | 1248   | 2229 |           | 22.288         | C           | 12     | 85                                | 0           | 6      | 44   | 0    |
|  | 27.667 | G              | 68          | 407    | 1095                              | 71          | 434    | 1465 |           | 23.608         | G           | 35     | 309                               | 574         | 21     | 184  | 598  |
|  | 28.601 | G              | 54          | 298    | 900                               | 43          | 260    | 1142 |           | 24.389         | G           | 75     | 352                               | 683         | 52     | 240  | 248  |
|  | 29.482 | G              | 80          | 469    | 1136                              | 83          | 509    | 1323 |           | 25.371         | G           | 74     | 451                               | 906         | 65     | 392  | 987  |
|  | 30.582 | G              | 87          | 571    | 1528                              | 75          | 487    | 1791 |           | 26.384         | G           | 42     | 334                               | 839         | 64     | 490  | 1133 |
|  | 31.373 | C              | 68          | 491    | 1034                              | 45          | 322    | 1271 |           | 27.364         | G           | 53     | 298                               | 1237        | 63     | 364  | 1693 |
|  |        |                |             |        |                                   |             |        |      |           | 28.370         | G           | 57     | 294                               | 608         | 82     | 376  | 676  |
| September  | 1.347  | G              | 101         | 645    | 776                               | 61          | 385    | 1056 |           | 29.452         | G           | 161    | 975                               | 1105        | 140    | 831  | 1261 |
|  | 2.345  | G              | 91          | 513    | 886                               | 57          | 326    | 1087 |           | 30.391         | G           | 159    | 930                               | 561         | 116    | 695  | 608  |
|  | 3.457  | C              | 79          | 477    | 1155                              | 59          | 373    | 1219 |           | 31.294         | C           | 114    | 894                               | 1002        | 63     | 558  | 1189 |
|  | 4.416  | G              | 64          | 329    | 2713                              | 56          | 296    | 3110 |           |                |             |        |                                   |             |        |      |      |
|  | 5.464  | G              | 34          | 196    | 1351                              | 22          | 126    | 1671 | November  | 1.292          | C           | 127    | 883                               | 212         | 69     | 485  | 269  |
|  | 6.329  | G              | 30          | 193    | 1196                              | 37          | 195    | 1748 |           | 2.317          | C           | 191    | 1038                              | 414         | 101    | 549  | 493  |
|  | 7.442  | G              | 34          | 190    | 1522                              | 39          | 205    | 1956 |           | 3.493          | G           | 156    | 807                               | 341         | 86     | 445  | 729  |
|  | 8.417  | G              | 21          | 162    | 1752                              | 22          | 175    | 1997 |           | 4.291          | C           | 95     | 775                               | 837         | 88     | 728  | 1103 |
|  | 9.313  | C              | 38          | 227    | 985                               | 39          | 252    | 1398 |           | 5.386          | G           | 160    | 952                               | 1925        | 134    | 859  | 2358 |
|  | 10.581 | G              | 39          | 185    | 713                               | 22          | 103    | 851  |           | 6.320          | C           | 295    | 1514                              | 1421        | 197    | 1044 | 1516 |
|  | 11.669 | G              | 83          | 401    | 610                               | 93          | 405    | 924  |           | 7.431          | G           | 329    | 1821                              | 1166        | 205    | 1123 | 1294 |
|  | 12.325 | G              | 83          | 430    | 1119                              | 74          | 379    | 1231 |           | 8.293          | C           | 277    | 1703                              | 976         | 171    | 1043 | 1070 |

## GREENWICH PHOTO-HELIOPHOTOGRAPHIC RESULTS, 1950.

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## TOTAL AREAS OF SUNSPOTS AND FACULÆ FOR EACH DAY IN THE YEAR 1950

| U. T.    | Place   | Projected Area |             |         | Area Corrected for Foreshortening |             |         | U. T. | Place    | Projected Area |             |         | Area Corrected for Foreshortening |             |         |      |      |
|----------|---------|----------------|-------------|---------|-----------------------------------|-------------|---------|-------|----------|----------------|-------------|---------|-----------------------------------|-------------|---------|------|------|
|          |         | Umbrae         | Whole Spots | Faculae | Umbrae                            | Whole Spots | Faculae |       |          | Umbrae         | Whole Spots | Faculae | Umbrae                            | Whole Spots | Faculae |      |      |
| 1950     | d       |                |             |         |                                   |             |         | 1950  | d        |                |             |         |                                   |             |         |      |      |
| November | 9. 293  | C              | 233         | 1655    | 796                               | 164         | 1170    | 1162  | December | 4. 441         | G           | 250     | 1279                              | 2070        | 232     | 1206 | 2300 |
|          | 10. 343 | C              | 182         | 1537    | 763                               | 159         | 1355    | 860   |          | 5. 402         | G           | 166     | 1088                              | 1243        | 147     | 940  | 1368 |
|          | 11. 416 | G              | 229         | 1338    | 1045                              | 252         | 1477    | 1395  |          | 6. 372         | G           | 139     | 867                               | 2189        | 107     | 674  | 3019 |
|          | 12. 440 | G              | 169         | 1106    | 582                               | 132         | 969     | 969   |          | 7. 548         | C           | 230     | 1496                              | 1208        | 202     | 1494 | 1568 |
|          | 13. 492 | G              | 217         | 1268    | 1160                              | 130         | 766     | 1039  |          | 8. 290         | C           | 293     | 1637                              | 1233        | 223     | 1312 | 1431 |
|          | 14. 462 | G              | 242         | 1454    | 1116                              | 137         | 834     | 1235  |          | 9. 285         | C           | 290     | 2099                              | 1003        | 194     | 1418 | 1122 |
|          | 15. 379 | G              | 287         | 1670    | 1520                              | 167         | 946     | 1917  |          | 10. 321        | C           | 331     | 1948                              | 523         | 201     | 1171 | 482  |
|          | 16. 291 | C              | 295         | 1771    | 812                               | 171         | 1086    | 1147  |          | 11. 420        | G           | 310     | 2156                              | 1020        | 179     | 1254 | 1024 |
|          | 17. 475 | G              | 262         | 1635    | 457                               | 151         | 934     | 590   |          | 12. 453        | G           | 291     | 1641                              | 1194        | 187     | 1059 | 1622 |
|          | 18. 385 | G              | 140         | 971     | 602                               | 92          | 637     | 687   |          | 13. 463        | G           | 221     | 1903                              | 2169        | 149     | 1250 | 2566 |
|          | 19. 459 | G              | 94          | 777     | 697                               | 79          | 634     | 700   |          | 14. 292        | C           | 127     | 954                               | 961         | 99      | 780  | 971  |
|          | 20. 426 | G              | 45          | 368     | 622                               | 59          | 461     | 727   |          | 15. 331        | C           | 73      | 466                               | 680         | 76      | 456  | 1102 |
|          | 21. 162 | K              | 16          | 122     | 714                               | 26          | 243     | 929   |          | 16. 462        | G           | 30      | 161                               | 716         | 21      | 114  | 694  |
|          | 22. 383 | G              | 11          | 48      | 515                               | 32          | 112     | 707   |          | 17. 402        | C           | 16      | 87                                | 460         | 14      | 76   | 459  |
|          | 23. 544 | C              | 17          | 116     | 578                               | 20          | 138     | 810   |          | 18. 304        | C           | 6       | 19                                | 293         | 6       | 21   | 396  |
|          | 24. 366 | G              | 37          | 150     | 594                               | 32          | 132     | 733   |          | 19. 297        | C           | 0       | 8                                 | 491         | 0       | 15   | 777  |
|          | 25. 430 | G              | 34          | 135     | 741                               | 29          | 113     | 868   |          | 20. 290        | C           | 2       | 6                                 | 637         | 2       | 7    | 944  |
|          | 26. 483 | G              | 47          | 243     | 294                               | 31          | 161     | 322   |          | 21. 331        | C           | 0       | 0                                 | 395         | 0       | 0    | 463  |
|          | 27. 371 | G              | 85          | 687     | 1034                              | 92          | 749     | 1122  |          | 22. 297        | C           | 0       | 0                                 | 627         | 0       | 0    | 675  |
|          | 28. 290 | C              | 231         | 1119    | 515                               | 170         | 838     | 617   |          | 23. 331        | C           | 0       | 0                                 | 658         | 0       | 0    | 735  |
|          | 29. 466 | G              | 325         | 2164    | 392                               | 203         | 1342    | 327   |          | 24. 454        | G           | 36      | 120                               | 271         | 27      | 91   | 290  |
|          | 30. 505 | G              | 257         | 1718    | 393                               | 145         | 975     | 575   |          | 25. 454        | G           | 38      | 294                               | 280         | 24      | 177  | 602  |
|          |         |                |             |         |                                   |             |         |       |          | 26. 364        | C           | 123     | 806                               | 481         | 65      | 432  | 634  |
|          |         |                |             |         |                                   |             |         |       |          | 27. 302        | C           | 179     | 994                               | 354         | 92      | 512  | 445  |
|          |         |                |             |         |                                   |             |         |       |          | 28. 596        | G           | 102     | 803                               | 716         | 54      | 424  | 919  |
|          |         |                |             |         |                                   |             |         |       |          | 29. 118        | K           | 42      | 404                               | 121         | 23      | 222  | 146  |
|          |         |                |             |         |                                   |             |         |       |          | 30. 309        | C           | 48      | 337                               | 1227        | 31      | 217  | 1304 |
|          |         |                |             |         |                                   |             |         |       |          | 31. 290        | C           | 25      | 188                               | 1494        | 19      | 148  | 1593 |

MEAN AREAS OF SUNSPOTS AND FACULÆ FOR EACH ROTATION OF THE SUN,  
FROM 1949 DECEMBER 20 TO 1950 DECEMBER 9.

The mean areas have been formed by taking the means of the areas for each day of observation throughout each rotation of the Sun, the projected areas being the areas as measured on the photographs and expressed in millionths of the Sun's apparent disk, and the areas corrected for foreshortening being expressed in millionths of the Sun's visible hemisphere.

The rotations adopted in the following table (which is in continuation of those for the years 1873-1949 printed in the Greenwich Observations for 1884 and succeeding years) correspond to the synodic rotation of the Sun, and the commencement of each is defined by the coincidence of the assumed prime meridian with the central meridian, the assumed prime meridian being that meridian which passed through the ascending node of the Sun's equator on the ecliptic at mean noon on January 1, 1854, and the assumed period of the Sun's sidereal rotation being 25.38 days. The numeration of the rotations is in continuation of Carrington's series (*Observations of Solar Spots made at Redhill by R. C. Carrington, F.R.S.*), No. 1 being the rotation commencing 1853 November 9. The dates of commencement of the rotations are given in U.T.

| No.<br>of<br>Rotation | Date of<br>Commencement<br>of each Rotation | No. of Days<br>on which<br>Photographs<br>were taken | Mean of Daily Areas |             |        |                              |             |        |
|-----------------------|---|--|---------------------|-------------|--------|------------------------------|-------------|--------|
|                       |   |  | Projected           |             |        | Corrected for Foreshortening |             |        |
|                       |   |  | Umbræ               | Whole Spots | Faculæ | Umbræ                        | Whole Spots | Faculæ |
| 1288                  | 1949 December 20.18                         | 28   | 266                 | 1691        | 1838   | 192                          | 1235        | 2269   |
| 1289                  | 1950 January 16.52                          | 27   | 274                 | 1559        | 1810   | 206                          | 1186        | 2220   |
| 1290                  | February 12.86                              | 27   | 564                 | 3429        | 2013   | 422                          | 2607        | 2541   |
| 1291                  | March 12.19                                 | 28   | 389                 | 2215        | 1752   | 300                          | 1728        | 2232   |
| 1292                  | April 8.49                                  | 27   | 514                 | 3300        | 1781   | 365                          | 2334        | 2227   |
| 1293                  | May 5.74                                    | 27   | 328                 | 1922        | 1742   | 250                          | 1480        | 2150   |
| 1294                  | June 1.96                                   | 27   | 246                 | 1441        | 1600   | 182                          | 1091        | 1966   |
| 1295                  | June 29.15                                  | 27   | 264                 | 1543        | 1467   | 198                          | 1165        | 1806   |
| 1296                  | July 26.36                                  | 28   | 294                 | 1774        | 1270   | 212                          | 1260        | 1600   |
| 1297                  | August 22.59                                | 27   | 133                 | 743         | 1184   | 103                          | 579         | 1437   |
| 1298                  | September 18.84                             | 27   | 144                 | 780         | 1127   | 103                          | 567         | 1361   |
| 1299                  | October 16.13                               | 27   | 148                 | 900         | 886    | 111                          | 685         | 1038   |
| 1300                  | November 12.43                              | 28   | 182                 | 1112        | 882    | 129                          | 806         | 1060   |

MEAN AREAS OF SUNSPOTS AND FACULÆ FOR THE YEAR

The mean projected areas are expressed in millionths of the Sun's apparent disk.

The mean areas corrected for foreshortening are expressed in millionths of the Sun's visible hemisphere.

| Year | No. of Days<br>on which<br>Photographs<br>were taken | Mean of Daily Areas |             |        |                              |             |        |
|------|--|---------------------|-------------|--------|------------------------------|-------------|--------|
|      |  | Projected           |             |        | Corrected for Foreshortening |             |        |
|      |  | Umbræ               | Whole Spots | Faculæ | Umbræ                        | Whole Spots | Faculæ |
| 1950 | 365  | 274                 | 1638        | 1421   | 203                          | 1222        | 1754   |

MEAN HELIOGRAPHIC LATITUDES OF SUNSPOTS FOR EACH ROTATION OF THE SUN,  
FROM 1949 DECEMBER 20 TO 1950 DECEMBER 9.

The numbers given in the accompanying table have been formed as follows:-

The heliographic latitude of each spot for each day has been multiplied by its area (corrected for foreshortening), and the sum of the products, for spots north of the Equator, has been divided by the sum of the corresponding areas to form the mean heliographic latitude of spotted area north of the equator; similarly for spots south of the equator. In forming the mean heliographic latitude of entire spotted area, the algebraic sum of the products for spots north and south of the equator has been divided by the sum of the areas; and for the mean distance from the equator of all spots the numerical sum of the products, without regard to the sign of the latitude, has been similarly divided.

The mean areas have been formed by dividing the sum of the daily areas (corrected for foreshortening) by the number of days of observation for each rotation of the Sun and are expressed in millionths of the Sun's visible hemisphere.

| No.<br>of<br>Rotation | Date of<br>Commencement<br>of each Rotation | No. of Days<br>on which<br>Photographs<br>were taken | Spots North of the Equator |                                  | Spots South of the Equator |                                  | Mean<br>Heliographic<br>Latitude<br>of entire<br>Spotted Area | Mean<br>Distance from<br>Equator<br>of all Spots |
|-----------------------|---|--|----------------------------|----------------------------------|----------------------------|----------------------------------|---|--|
|                       |   |  | Mean<br>of Daily<br>Areas  | Mean<br>Heliographic<br>Latitude | Mean<br>of Daily<br>Areas  | Mean<br>Heliographic<br>Latitude |   |  |
| 1288                  | 1949 December 20.18                         | 28   | 1022                       | 13.87°                           | 213                        | 6.06°                            | +10.44°   | 12.53°   |
| 1289                  | 1950 January 16.52                          | 27   | 960                        | 14.55°                           | 226                        | 11.42°                           | +9.60°  | 13.95°   |
| 1290                  | February 12.86                              | 27   | 1820                       | 12.20°                           | 787                        | 14.27°                           | +4.21°  | 12.82°   |
| 1291                  | March 12.19                                 | 28   | 1083                       | 18.07°                           | 646                        | 12.77°                           | +6.55°  | 16.09°   |
| 1292                  | April 8.49                                  | 27   | 1362                       | 13.56°                           | 972                        | 14.07°                           | +2.06°  | 13.77°   |
| 1293                  | May 5.74                                    | 27   | 1164                       | 11.01°                           | 315                        | 12.59°                           | +5.98°  | 11.35°   |
| 1294                  | June 1.96                                   | 27   | 521                        | 9.79°                            | 570                        | 17.98°                           | -4.72°  | 14.07°   |
| 1295                  | June 29.15                                  | 27   | 808                        | 13.42°                           | 357                        | 13.82°                           | +5.08°  | 13.54°   |
| 1296                  | July 26.36                                  | 28   | 433                        | 12.46°                           | 826                        | 11.21°                           | -3.06°  | 11.64°   |
| 1297                  | August 22.59                                | 27   | 272                        | 15.32°                           | 307                        | 10.23°                           | +1.78°  | 12.62°   |
| 1298                  | September 18.84                             | 27   | 354                        | 15.45°                           | 212                        | 10.28°                           | +5.81°  | 13.51°   |
| 1299                  | October 16.13                               | 27   | 295                        | 13.47°                           | 390                        | 10.75°                           | -0.31°  | 11.93°   |
| 1300                  | November 12.43                              | 28   | 475                        | 15.04°                           | 331                        | 12.59°                           | +3.70°  | 14.04°   |

MEAN HELIOGRAPHIC LATITUDE OF SUNSPOTS FOR THE YEAR

| Year | No. of Days<br>on which<br>Photographs<br>were taken | Spots North of the Equator |                                  | Spots South of the Equator |                                  | Mean<br>Heliographic<br>Latitude<br>of entire<br>Spotted Area | Mean<br>Distance from<br>Equator<br>of all Spots |
|------|--|----------------------------|----------------------------------|----------------------------|----------------------------------|---|--|
|      |  | Mean<br>of Daily<br>Areas  | Mean<br>Heliographic<br>Latitude | Mean<br>of Daily<br>Areas  | Mean<br>Heliographic<br>Latitude |   |  |
| 1950 | 365  | 771                        | 13.62°                           | 452                        | 13.05°                           | +3.77°  | 13.41°   |

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ROYAL GREENWICH OBSERVATORY

*Observations of Solar Filaments  
and Solar Flares*

Made with the Spectrohelioscopes  
in the year 1950

GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1950

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# OBSERVATIONS OF SOLAR FILAMENTS MADE WITH THE SPECTROHELIOSCOPE IN THE YEAR 1950

The following observations relate to dark filaments visible on the Sun's disk in the light of  $H\alpha$  in the immediate vicinity of sunspots\*.

Measures of line-of-sight velocity are taken with the "line-shifter", whose scale from 0 - 10 divisions = 0.37 A. = 17 km./sec. at  $H\alpha$ . The zero of the  $H\alpha$  line is determined from measures of the darkest part of the line in an undisturbed portion of the Sun near the centre of the disk. The purpose of the observations being to locate large line-of-sight velocities\*, measured displacements are interpreted as being due to Doppler effects.

The probable error of a single measure of line-of-sight velocity, as determined from a number of successive readings, is about 3 km./sec., including the probable error of the zero determination. Three or four measures being generally made on each filament, the probable errors of the tabulated values in the third column of the following table do not usually exceed 2 km./sec., except, perhaps in the case of the larger velocities, which have accordingly been rounded off to the nearest 5 km./sec.

In the following table, the headings of which are self-explanatory, particulars are given of each dark filament as follows -

- (1) The measured line-of-sight velocity in km./sec., + indicating motion away from the observer and - motion towards the observer.

Where two values are given it is to be understood, unless otherwise stated in the footnotes, that different velocities were observed along the length of the filament, and that the tabulated values are the extreme velocities measured, which in nearly all cases correspond to the opposite ends of the marking. In those cases in which one end of a filament, showing progressive velocities along its length, appeared to touch a sunspot, the line-of-sight velocity observed at that extremity of the filament is printed in italics.

- (2) (a) The apparent length of the filament in minutes of arc, read by means of a scale inserted in the field, or from a drawing. An asterisk denotes that the marking was small and roughly circular in shape. The diameters of these circular markings are of the order of 10".

\* An analysis of the line-of-sight velocities of dark  $H\alpha$  markings near sunspots, observed at the Royal Observatory, Greenwich, 1930-33, is given in *Monthly Notices*, 94, 472, 1934. A further paper on the characteristic motions of such filaments associated with solar flares appears in *Monthly Notices*, 102, 2, 1942.

(b) The apparent least distance in minutes of arc from the centre of the nearest sunspot or group of spots. In those cases indicated by dots in the appropriate column it was not possible to obtain a measure.

(c) The position of the filament relative to the group of associated sunspots or to a single component of the group. In cases where a sunspot has been so designated in the *Ledgers* in the preceding *Results*, the appropriate letter *a* (the leader of the group) or *b* (the follower) has been added. The abbreviations *n*, *s*, *f*, *p*, *c*, stand respectively for, north, south, following, preceding, central.

- (3) Particulars of the associated group of sunspots, abstracted from the *General Catalogue*, including the longitude from the Sun's central meridian at the time of observing the filament (deduced from the mean longitude of the sunspots).

Notes have been added of unusual features seen at the time of observation. Filaments which were apparently descending into sunspots with progressive velocities and which showed a definite curvature of shape are also noted.

## OBSERVATIONS OF SOLAR FILAMENTS MADE WITH THE SPECTROHELIOSCOPES IN THE YEAR

| Dark H $\alpha$ Filament |                        |   |        |  |  |                       | Associated Group of Sunspots             |                                |               |      |  |
|--------------------------|------------------------|---|--------|--|--|-----------------------|--|--------------------------------|---------------|------|--|
| Ref.<br>No.              | Date and Time<br>U. T. | Measured<br>Line-of-sight<br>Velocity<br>km./sec. | Length | Least<br>Distance<br>from<br>Sunspot<br>or Group | Position<br>relative<br>to Sunspot<br>or Group | Number<br>of<br>Group | Longitude<br>from<br>Central<br>Meridian | Central<br>Meridian<br>Passage | Latit-<br>ude | Area |  |
| 1                        | Feb. 21 12.2           | -12 to +45  | 3.2    | 0.6  | f a  | 16410                 | +18                                      | Feb. 20.14                     | +10           | 1853 |  |
| 2                        | 28 12.0                | - 2   | 5.5    | 1.2  | c  | 413                   | +44                                      | 25.13                          | + 4           | 84   |  |
| 3                        | Mar. 7 10.0            | - 4 to +46  | 0.8    | 0.6  | f  | 434                   | -61                                      | Mar. 12.03                     | +21           | 496  |  |
| 4                        | 7 11.2                 | -26 to +42  | 1.3    | 0.5  | f  | 422                   | +16                                      | 6.28                           | - 4           | 332  |  |
| 5                        | Mar. 8 9.9             | + 3   | 0.8    | 0.2  | c  | 16434                 | -48                                      | Mar. 12.03                     | +21           | 496  |  |
| 6                        | 9 10.0                 | - 6 to +38  | 1.1    | 0.3  | f  | 437                   | +20                                      | 7.93                           | +28           | 380  |  |
| 7                        | 13 9.8                 | -201 to -22                                       | 2.4    | ..   | c  | 442                   | -46                                      | 16.88                          | +13           | 182  |  |
| 8                        | 16 14.2                | -15 to +40  | 1.1    | 2.4  | sf a   | 443                   | -25                                      | 18.53                          | +12           | 437  |  |
| 9                        | Apr. 5 9.7             | -59 to +50  | 1.4    | 0.6  | c  | 463                   | +26                                      | Apr. 3.45                      | -21           | 423  |  |
| 10                       | Apr. 12 9.2            | +52   | 0.5    | 1.7  | s a  | 16467                 | -16                                      | Apr. 13.55                     | +13           | 1527 |  |
| 11                       | 13 11.2                | -30 to +51  | 4.5    | 0.6  | c  | 467                   | - 1                                      |                                |               |      |  |
| 12                       | 21 11.0                | -12 to +48  | 1.0    | 0.6  | c  | 474                   | -55                                      | 25.65                          | -17           | 658  |  |
| 13                       | May 9 11.1             | +25   | 1.5    | 0.6  | c  | 493                   | -39                                      | May 12.42                      | + 6           | 511  |  |
| 14                       | 9 15.3                 | - 4   | 3.3    | 0.5  | f  | 493                   | -37                                      |                                |               |      |  |
| 15                       | May 10 11.3            | +18   | 3.0    | 1.1  | f  | 16493                 | -26                                      | May 12.42                      | + 6           | 511  |  |
| 16                       | 11 9.4                 | -14 to +16  | 2.5    | ..   | ..   | 493                   | -14                                      |                                |               |      |  |
| 17                       | 15 14.5                | + 2   | 2.5    | 0.4  | f  | 493                   | +42                                      |                                |               |      |  |
| 18                       | 15 14.6                | - 2   | 2.0    | 0.8  | f  | 502                   | -10                                      | 16.38                          | + 9           | 179  |  |
| 19                       | 22 9.1                 | -42 to +57  | 1.6    | 0.3  | c  | 513                   | -52                                      | 26.31                          | + 8           | 924  |  |
| 20                       | May 22 10.1            | -56 to +49  | 3.2    | ..   | c  | 16513                 | -51                                      | May 26.31                      | + 8           | 924  |  |
| 21                       | 22 13.7                | -54 to +64  | 1.7    | 0.2  | c  | 513                   | -49                                      |                                |               |      |  |
| 22                       | 23 9.2                 | -34 to +27  | 2.0    | ..   | c  | 513                   | -39                                      |                                |               |      |  |
| 23                       | June 1 10.2            | -43 to +21  | 1.5    | 1.6  | f  | 520                   | - 2                                      | June 1.60                      | + 5           | 302  |  |
| 24                       | 5 8.4                  | - 7 to +35  | 2.1    | ..   | c  | 520                   | +50                                      |                                |               |      |  |
| 25                       | June 8 15.6            | -58   | 1.3    | 1.0  | s  | 16531                 | -77                                      | June 14.46                     | -18           | 913  |  |
| 26                       | 12 8.8                 | -33 to +63  | 7.0    | 0.8  | f  | 534                   | +22                                      | 10.7                           | +13           | 43   |  |
| 27                       | 16 11.1                | - 4   | 3.5    | 0.5  | f  | 531                   | +26                                      | 14.46                          | -18           | 913  |  |
| 28                       | 16 13.1                | 0   | 1.8    | 1.0  | s  | 536                   | -25                                      | 18.46                          | -18           | 103  |  |
| 29                       | 16 13.2                | -67 to +51  | 0.5    | 0.7  | c  | 536                   | -25                                      |                                |               |      |  |
| 30                       | July 8 9.2             | -16 to +41  | 3.0    | 2.5  | f  | 16556                 | +34                                      | July 5.82                      | +15           | 476  |  |
| 31                       | 24 14.0                | -16 to +52  | 3.3    | 1.5  | s  | 570                   | - 5                                      | 24.97                          | -11           | 580  |  |
| 32                       | 29 8.2                 | - 6 to +55  | 1.3    | ..   | c  | 570                   | +58                                      |                                |               |      |  |
| 33                       | 31 13.6                | - 2   | 0.6    | 0.3  | c  | 581                   | -54                                      | Aug. 4.69                      | - 9           | 770  |  |
| 34                       | Aug. 1 10.0            | +46   | 2.0    | 0.3  | p  | 581                   | -43                                      |                                |               |      |  |
| 35                       | Aug. 1 10.0            | + 8   | 1.6    | 0.6  | f  | 16581                 | -43                                      | Aug. 4.69                      | - 9           | 770  |  |
| 36                       | 2 11.1                 | -42   | 0.6    | 0.7  | p  | 584                   | -63                                      | 7.22                           | -17           | 210  |  |
| 37                       | 2 11.1                 | +36   | 0.3    | 0.7  | p  | 584                   | -63                                      |                                |               |      |  |
| 38                       | 14 9.2                 | + 1   | 2.0    | 0.6  | n  | 588                   | -26                                      | 16.33                          | +14           | 286  |  |
| 39                       | 14 10.1                | - 4 to +39  | 0.8    | ..   | c  | 588                   | -25                                      |                                |               |      |  |
| 40                       | Aug. 14 10.2           | -57 to -12  | 1.1    | 2.0  | n  | 16588                 | -25                                      | Aug. 16.33                     | +14           | 286  |  |
| 41                       | 24 9.2                 | - 1   | 1.5    | 0.2  | c  | 600                   | +38                                      | 21.5                           | -13           | 262  |  |
| 42                       | 29 15.6                | -33 to +33  | 0.8    | 0.2  | c  | 604                   | -64                                      | Sept. 3.47                     | +14           | 176  |  |
| 43                       | Sept. 13 14.6          | -13   | 1.2    | 0.5  | f  | 611                   | +68                                      | 8.5                            | +21           | 131  |  |
| 44                       | 13 14.6                | +10   | 0.7    | 0.8  | s  | 610                   | +15                                      | 12.46                          | - 3           | 132  |  |
| 45                       | Sept. 16 8.6           | + 2   | 1.6    | 0.7  | c  | 16613                 | -28                                      | Sept. 18.49                    | +14           | 228  |  |
| 46                       | 18 8.6                 | -11 to +16  | 2.2    | 0.5  | c  | 616                   | -40                                      | 21.40                          | +18           | 260  |  |
| 47                       | 18 8.8                 | -29 to +48  | 0.6    | 0.5  | c  | 613                   | - 2                                      | 18.49                          | +14           | 228  |  |
| 48                       | 18 9.0                 | -76 to +102                                       | 1.6    | 1.2  | c  | 617                   | +14                                      | 17.4                           | -12           | 58   |  |
| 49                       | 21 9.0                 | -40 to +27  | 2.8    | 0.2  | c  | 613                   | +38                                      | 18.49                          | +14           | 228  |  |

## OBSERVATIONS OF SOLAR FILAMENTS MADE WITH THE SPECTROHELIOSCOPES IN THE YEAR

| Dark H $\alpha$ Filament |                       |   |        |                                      |  | Associated Groups of Sunspots |  |                                |               |      |
|--------------------------|-----------------------|---|--------|--------------------------------------|--|-------------------------------|--|--------------------------------|---------------|------|
| Ref.<br>No.              | Date and Time<br>U.T. | Measured<br>Line-of-sight<br>Velocity<br>km./sec. | Length | Least<br>Distance<br>from<br>Sunspot | Position<br>relative<br>to Sunspot<br>or Group | Number<br>of<br>Group         | Longitude<br>from<br>Central<br>Meridian | Central<br>Meridian<br>Passage | Latit-<br>ude | Area |
| 50                       | Sept. 21 9.0          | -15 to +20  | 2.1    | 1.2                                  | c  | 16613                         | +38                                      | Sept. 18.49                    | +14           | 228  |
| 51                       | 21 9.2                | -17 to +55  | 2.0    | 1.0                                  | p  | 617                           | +53                                      | 17.4                           | -12           | 58   |
| 52                       | 25 14.0               | -185 to -51                                       | 1.6    | 3.5                                  | s  | 616                           | +55                                      | 21.40                          | +18           | 260  |
| 53                       | Oct. 11 10.3          | -29   | 1.3    | 0.2                                  | c  | 631                           | -43                                      | Oct. 14.72                     | -13           | 257  |
| 54                       | 11 10.4               | -15 to +15  | 2.1    | 0.6                                  | f  | 631                           | -43                                      |                                |               |      |
| 55                       | Oct. 16 11.2          | -15 to +36  | 1.4    | ..                                   | c  | 16635                         | +18                                      | Oct. 15.10                     | -16           | 355  |
| 56                       | Nov. 29 11.6          | +11 to +53  | 3.1    | ..                                   | s b  | 658                           | -18                                      | Nov. 30.85                     | -16           | 148  |
| 57                       | Dec. 11 9.7           | - 4   | 2.3    | 0.5                                  | n b  | 669                           | -28                                      | Dec. 13.55                     | +16           | 233  |

## N O T E S

Ref.  
No.Ref.  
No.

7. Further measures were as follows:-

10<sup>h</sup>0 -59 to +249 km./sec.  
 10.1 -75 to +149 "  
 10.4 +19 to +110 "

By 11.0 the marking had gone.

10. Another measure at 11.5 gave -43 to +28 km./sec.

11. Associated with a flare 1. Further measures were:-

14.2 -56 to +57 km./sec.  
 14.8 +17 to +78 "  
 15.8 -35 km./sec.

16. Associated with a flare 1, this marking consisted of a pair of parallel streaks.

20. Associated with a flare 1.

21. Associated with a flare 2.

22. This marking appeared to come out from and return to the spot. A further measure at 13<sup>h</sup>.9 gave -52 to +43 km./sec.24. Associated with a flare 1. At 8<sup>h</sup>.6 the velocity was -25 to +59 km./sec.

25. Associated with a flare 1.

32. Other measures were as follows:-

8.3 -21 to +38 km./sec.  
 8.5 -26 to +27 "

# OBSERVATIONS OF SOLAR FLARES MADE WITH THE SPECTROHELIOSCOPE IN THE YEAR 1950

Observations in  $H\alpha$ -light of solar flares, otherwise bright chromospheric eruptions, were begun at Greenwich when the spectrohelioscope was installed in 1929. The observed times of flares and their positions have since 1935 been regularly communicated to Meudon for incorporation in the *Quarterly Bulletin on Solar Activity* published from Zurich under the auspices of the International Astronomical Union. Investigations made at Greenwich into the relationships between solar flares and (1) radio fade-outs (2) geomagnetic disturbances are published in *Monthly Notices* 97, 594, 1937; 103, 244, 1943 and 104, 4, 1944.

The included table gives details of flares observed at the Royal Greenwich Observatory in the year 1950. This table continues the list of flares given in the 1949 volume and preceding volumes since 1944. The following is an explanation of the material contained in the various columns:

Column 1. Reference-number of the flare.

Columns 2, 3 and 4. Date and approximate times (U.T.) of observation. Times in heavier type denote that the beginning or the end of the flare was actually observed.

Columns 5, 6 and 7. Radial distance (in terms of the Sun's apparent radius), latitude and longitude from the central meridian of the flare when observed.

Column 8. The observer's estimate, when it occurs within the times of observation, of the time of maximum of the flare. In certain cases this time of maximum has been derived from a series of intensity or line-width measurements.

Column 9. Approximate area of the flare, corrected for foreshortening and expressed in millionths of the Sun's hemisphere. A graticule inserted in the field of view has been used for the measurement of area.

Column 10. The magnitude, estimated by the observer, on an arbitrary ascending scale 1-2-3, as used in the *Quarterly Bulletin*.

Columns 11 and 12. The highest measured value of the light-intensity (not necessarily obtained at the time of maximum given in Col. 8) emitted by the flare and the time (U.T.) of the observation. The intensity is expressed as a percentage of the local continuum and is corrected for scattered light in the instrument. With a visual wedge photometer a measure is usually taken of the ratio of brightness of the flare to the brightness of the undisturbed disk, at the central wavelength of  $H\alpha$ . The following apparent central intensities (obtained experimentally and uncorrected for instrumental scattering) are assumed at the various parts of the disk in order to obtain the apparent intensity of the flare in terms of the local continuum:

| Radial Distance | Apparent Central<br>Intensity of $H\alpha$ |
|-----------------|--|
| 0.00 to 0.28    | 23   |
| 0.29 to 0.50    | 24   |
| 0.51 to 0.66    | 25   |
| 0.67 to 0.77    | 26   |
| 0.78 to 0.86    | 27   |
| 0.87 to 0.95    | 28   |
| 0.96 to 1.00    | 29   |

The value for the centre of the Sun's disk indicates the presence of scattered light of about 9 per cent; the intensities given in Column 12 incorporate the appropriate correction according to the procedure given in *Monthly Notices*, 96, 5, 1935. No correction is made for finite slit-width since such correction, for the centre of the  $H\alpha$ -line, is not expected to exceed one or two per cent.

In some cases (indicated by italicized figures in Column 12) the measurement of the intensity is made directly with the local continuum. A secondary "line-shifter" (see *Monthly Notices*, 99, 463, 1939) is used to bring the continuum 15 A.U. from the centre of the  $H\alpha$ -line into the lower half of the field to enable the comparison to be made. A correction to allow for the absorption (15 per cent) of the thick line-shifter is made and the correction for scattered light can then be applied, as in the other cases.

Columns 13 and 14. The reference number, in the *General Catalogue*, of the spot group associated with the flare and the position of the flare relative to the group or, in some cases, a principal component *a* or *b*, as designated in the *Ledgers*.

Column 15. The reference number from the preceding table of line-of-sight-velocity measures of any dark filament observed in close association with the flare.

## OBSERVATIONS OF SOLAR FLARES MADE WITH THE SPECTROHELIOSCOPE IN THE YEAR

| Ref.<br>No. | U.T. of Observation |       |       | Position        |               |                       | U.T.<br>of<br>Max. | Approx.<br>Area of Mag.<br>Flare | Central Intensity<br>of H $\alpha$ (cont. = 100) | Associated<br>Spot Group | Reference<br>Number of<br>Associated<br>Dark<br>Filament |
|-------------|---------------------|-------|-------|-----------------|---------------|-----------------------|--------------------|----------------------------------|--|--------------------------|--|
|             | Date                | From  | To    | Radial<br>Dist. | Latit-<br>ude | Long.<br>from<br>C.M. |                    |                                  | U.T.   | Int.                     |  |
|             | 1950                | h m   | h m   |                 | o             | o                     |                    |                                  | h m  |                          |  |
| 1           | Jan. 24             | 15 00 | 15 40 | .90             | 16 N          | 62 W                  | -                  | -                                | 2  | -                        | -  |
| 2           | Feb. 21             | 10 34 | 11 02 | .39             | 10 N          | 17 W                  | <10 34             | -                                | 2  | 10 34                    | 54   |
| 3           | Mar. 6              | 15 29 | 15 45 | .03             | 5 S           | 2 W                   | <15 34             | -                                | 1  | 15 34                    | 55   |
| 4           | 7                   | 09 34 | 09 50 | .56             | 28 N          | 6 E                   | <09 36             | 150                              | 1  | 09 36                    | 48   |
| 5           | 7                   | 11 15 | 11 40 | .56             | 28 N          | 6 E                   | <11 20             | 150                              | 1  | 11 20                    | 56   |
| 6           | 7                   | 11 27 | 11 43 | .66             | 18 S          | 40 E                  | <11 27             | 175                              | 1  | 11 27                    | 56   |
| 7           | 7                   | 14 20 | 14 42 | .19             | 4 S           | 11 W                  | <14 21             | -                                | 1  | 14 21                    | 67   |
| 8           | 7                   | 14 32 | 15 36 | .57             | 28 N          | 4 E                   | 14 33              | -                                | 1  | 14 33                    | 63   |
| 9           | 8                   | 11 26 | 11 43 | .93             | 17 S          | 70 E                  | 11 33              | 250                              | 1  | 11 33                    | 56   |
| 10          | Apr. 12             | 14 54 | 16 04 | .43             | 15 N          | 16 E                  | 15 03              | 275                              | 3  | 15 03                    | 167  |
| 11          | 13                  | 11 13 | 11 25 | .36             | 15 N          | 5 E                   | -                  | -                                | 1  | 11 22                    | 38   |
| 12          | 14                  | 14 12 | 14 35 | .39             | 15 N          | 10 W                  | -                  | 950                              | 1  | -                        | -  |
| 13          | May 3               | 10 01 | 10 09 | .31             | 14 N          | 1 E                   | <10 03             | -                                | 1  | 10 03                    | 51   |
| 14          | 11                  | 08 59 | 09 29 | .29             | 6 N           | 14 E                  | 09 02              | 175                              | 1  | 09 02                    | 66   |
| 15          | 11                  | 13 14 | 13 22 | .29             | 6 N           | 13 E                  | 13 16              | -                                | 1  | -                        | -  |
| 16          | 22                  | 09 59 | 10 12 | .83             | 8 N           | 56 E                  | 10 02              | 350                              | 1  | 10 02                    | 49   |
| 17          | 22                  | 13 56 | 14 31 | .81             | 6 N           | 54 E                  | 14 05              | 250                              | 2  | 14 05                    | 122  |
| 18          | June 5              | 08 17 | 08 32 | .78             | 5 N           | 52 W                  | <08 18             | 100                              | 1  | 08 18                    | 56   |
| 19          | 8                   | 15 23 | 15 53 | .96             | 18 S          | 77 E                  | 15 32              | 300                              | 1  | 15 32                    | 70   |

## N O T E S

Ref.  
No.Ref.  
No.

7. Two tiny dots.

19. This was the last flare of appreciable size observed in 1950. During the six months 1950 July - December the Sun was sub-normal in flare activity.

10. See *The Observatory*, 70, 164, 1950.

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