SUPPLIED FOR PUBLIC SERVICE.

GREENWICH PHOTO-HELIOGRAPHIC RESULTS

1931.

SUPPLIED FOR PUBLIC SERVICE

RESULTS OF MEASURES MADE AT THE
ROYAL OBSERVATORY, GREENWICH, OF

PHOTOGRAPHS OF THE SUN

TAKEN AT GREENWICH, THE CAPE AND
KODAIKANAL IN THE YEAR

1931

UNDER THE DIRECTION OF

SIR FRANK DYSON, K.B.E., F.R.S.

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GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1931.

INTRODUCTION

§1. *Positions and Areas of Sun Spots and Faculæ for each Day in the Year* 1931.

The photographs from which these measures were made were taken at the Royal Observatories of Greenwich or of the Cape, and at the Kodaikánal Observatory, Southern India.

The photographs of the Sun obtained at Greenwich were generally taken with the Dallmeyer Photo-heliograph, of 4 inches aperture (usually stopped down to 2·9 inches), or with the Thompson Photo-heliograph of 9 inches aperture. The diameter of the Sun's image at the secondary focus in both instruments is $7\frac{1}{2}$ inches at the Earth's mean distance.

The photographs from the Cape Observatory were taken under the superintendence of His Majesty's Astronomer at the Cape, Dr. H. Spencer Jones, and those from Kodaikánal under the superintendence of the Director, Dr. T. Royds. At the Cape Observatory the instrument employed was a Dallmeyer Photo-heliograph giving an image of the Sun about $7\frac{1}{2}$ inches in diameter; at Kodaikánal a Cooke photo-visual object-glass of 6 inches aperture was used, the image of the Sun being on about the same scale.

Photographs of the Sun were available for measurement upon each day in **1931**, those finally selected for measurement being supplied by the different observatories as under :

Greenwich	233
Cape	115
Kodaikánal	17
Total	365

The names of those persons who measured the photographs for the year **1931** are as follows :

H. W. Newton — H. Howes
H. Barton — A. Carter

At the principal focus of the Photo-heliographs, excepting that at Kodaikánal two spider-lines are fixed by which the zero of position-angles on the photographs can be determined. These lines are inclined at an angle of 45° to the celestial equator in the Greenwich and Cape Photo-heliographs ; in the Kodaikánal Photo-heliograph there is one wire fixed parallel to the equator.

The zero of position-angles for the Photo-heliographs has been determined by the measurement of plates which have been 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 therefore produced upon the plates, and the exposures having been so given that the line joining the cusps passed approximately through the centre of the plates, the inclination of the wires of the photo-heliograph to this line was measured with the position-micrometer, and a small correction for the inclination of the Sun's path was then applied.

At Greenwich and the Cape, transits of the Sun were also taken over the two wires ; the times of contact of the first and second limbs of the Sun with the two wires being noted. The ratio of the time taken by the Sun to pass over the NE—SW wire to that taken to pass over the SE—NW wire gives the tangent of the angle made by the Sun's path to the latter wire, the wires being assumed to be at right angles to each other. From this angle, when corrected for the Sun's motion in declination, the correction for the zero of position of the wires can be inferred.

The following table gives the correction for zero of position thus determined by the two independent methods for the 4-inch Greenwich and Cape Photo-heliographs.

Determination of Zero of Position-Angles.

Month, 1931.	Greenwich.		Cape.	
	Photographic.	Visual.	Photographic.	Visual.
	° ′	° ′	° ′	° ′
January	+2 29	+2 22	+0 33	+0 28
February	..	24	20	28
March	22	24	30 / 11	29 / 08
April	31	27	05	05
May	21	23	02	07
June	22	21	11	07
July	18	23	10	07
August	20	25	04	10
September	24	25	11	07
October	23	21	07	09
November	29	21	01	10
December	36	25	25	12

The spider-lines of the Cape Photoheliograph were replaced on March 17.

The Zero-corrections used during the year 1931 in the reduction of the photographs taken at Greenwich were as follows :

4-inch *Photoheliograph*, January 1 to December 31	+2°·4
9-inch Photoheliograph*, January 1 to September 30.. ..	+2·35
October 1 to 31	+2·4
November 1 to December 31 ..	+2·45

*The Zero-correction used for this instrument during the year 1930 was +2°·35.

The Zero-corrections used in the reductions of the photographs taken at the Cape Observatory were as follows :

January 1 to March 17	+0°·45
March 18 to May 31	+0·1
June 1 to December 31	+0·15

The zero-corrections adopted during 1931 for the six Kodaikánal photographs were :

January to June +0°·4 ; July to October +0°·6 ; December +0°·4.

The measures of the photographs were made with a large position-micrometer constructed by Messrs. Troughton and Simms for the measurement of 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 screw-action about a pivot in its circumference, 90° distant from that of the upper plate, this pivot being mounted on a circular plate with a position-circle which rotates 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 position-circle. When this has been done, a positive eyepiece, having at its 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 diametrically across the photograph, the diaphragm being nearly in contact with the photographic film, so that parallax is avoided. The distance of a spot or facula from the centre of the disc is read off by means of a scale and vernier to 1-250th of an inch (corresponding to 0·001 of the Sun's radius for photographs having a solar diameter of 8 inches). The position-angle is read off on 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° between the photograph and the plate below.

All photographs are measured independently by two persons, and the means taken.

In the case of large or complex groups of spots, the positions of the chief components are measured individually, and also for groups so near the east or west limbs of the Sun that the effects of foreshortening are appreciable. In other cases the position of the centre of a group is estimated in the micrometer. In this respect a difference had been made in the practice during years previous to 1916, where in this section components of groups are given separately and combined into groups in the Ledgers.

When required, corrections are applied to the measured distances and position-angles for differential refraction. The formula is given in the *Introduction for* 1909. It is seldom necessary, however, to apply this correction except to a few photographs taken at Greenwich in mid-winter.

The calculations of heliographic longitude and latitude are made by use of the formulæ given in " Researches on Solar Physics : Heliographical Positions and Areas of Sun Spots observed with the Kew Photo-heliograph during the years 1862 and 1863," by W. De La Rue, B. Stewart, and B. Loewy. *Phil. Trans.*, 1869. If r be the measured distance of a spot from the centre of the Sun's apparent disc, R the

measured radius of the Sun on the photograph, (R) the tabular semi-diameter of the Sun in arc, and ρ, ρ' the angular distances of a spot from the centre of the apparent disc as viewed from the Sun's centre and from the Earth respectively, ρ is obtained from the equations :

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

If D and ϕ are the heliographic latitudes of the Earth and the spot respectively referred to the Sun's equator, and l the heliographic longitude of the spot from the solar meridian passing through the centre of the disc, longitudes west of the centre being reckoned as positive, and χ the position-angle from the Sun's axis,

$$\sin\phi = \cos\rho \sin D + \sin\rho \cos D \cos\chi$$
$$\sin l = -\sin\chi \sin\rho \sec\phi.$$

The position-angle ϕ is found from the position-angle from the North Point by subtracting P, the position-angle of the N end of the Sun's axis, measured eastward from the North Point of the disc. The heliographic longitude of the spot is l+L, where L is the heliographic longitude of the centre of the disc. The three quantities P, D, and L for the time of the exposure of each photograph are derived from the Ephemeris for Physical Observations of the Sun given on p. 568 of the *Nautical Almanac* for 1931.

The inclination of the Sun's axis to the ecliptic is assumed to be 82°45′, the longitude of the ascending node of the Sun's equator on the ecliptic for 1931·0 to be 74°47′·8, and the period of the Sun's sidereal rotation to be 25·38 days ; the meridian which passed through the ascending node, 1854 January 1, Greenwich Mean Noon, being taken as the zero meridian.

§ 2. *General Catalogue of Groups of Sun Spots for* 1931.

The Catalogue contains every group of spots which lasted for two or more days, and the group numbers are in continuation of those given in 1930 and previous years. Groups seen only once are not included, but appear in the Daily Results with a distinctive numeration.

A number of " Revival " groups of spots have been tabulated in series in a table following the Catalogue. The respective groups of each series are in the same heliographic position, and were usually seen in consecutive rotations but with definite breaks in their history between each rotation. The latter feature excludes them from being classed as " Recurrent " groups ; they differ from " Intermittent " groups in their being of long period intermittency. When a " Recurrent " series forms part

of a " Revival " series, a reference is made in the last column of the table. Other groups which are given in detail in Ledger II are also indicated.

§ 3. *Ledgers of the Areas and Heliographic Positions of Groups of Sun Spots for* 1931.

Ledger I.—Recurrent Groups.—This Ledger supersedes the Catalogue of Recurrent Groups of Sun Spots given in years previous to 1916 of the *Greenwich Photo-Heliographic Results*, and the reference numbers of the series are in continuation of those given therein. The groups forming this Ledger have been abstracted from a general Ledger of all spot groups seen throughout the year, and were selected upon the following plan, reference being made to the General Catalogue :—If any spot group when first seen was 60° or more to the east of the Central Meridian, then the Catalogue, and, if necessary, the Daily Results also, were searched some fifteen or 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, then the Catalogue was searched some fifteen or sixteen days later, to ascertain whether a spot group of similar heliographic longitude and latitude was then near the east limb of the Sun. Both the search forward and the search backward have been made in the case of every spot group that was observed close to either the east or west limbs, in order that no possible case of identity might be overlooked. When there appeared to be a case of probable identity between spot groups observed in two consecutive rotations of the Sun, the character of the second group has been carefully compared with that of the first in each of the three elements—area, longitude, and latitude, before accepting it as a Recurrent Group.

Besides the Ledgers of the groups, there have been printed in a similar manner important 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.

In deriving the proper motions of spots in longitude in Ledgers I and II, the formula adopted as representing the Sun's daily sidereal motion is

$$\xi = 14^\circ{\cdot}37 - 2^\circ{\cdot}60 \sin^2\phi,$$

where ϕ is the latitude of the spot. *See Greenwich Photo-Heliographic Results*, 1924, § 5.

Ledger II.—Non-Recurrent Groups.—This Ledger contains the most important of those groups which do not last to a second rotation. Individual components are also given after their respective groups, where they are large and distinctive.

§ 4. *Total Areas of Sun Spots and Faculæ for each day, and Mean Areas and Mean Heliographic Latitude of Sun Spots and Faculæ for each Rotation of the Sun, and for the year* 1931.

Particulars relating to this section are given in the headings on pages C 60 and 64-65.

§ 5. *Observations of Solar Flocculi made with the Spectrohelioscope in the year* 1931.

This section contains measures of radial velocity of dark hydrogen flocculi seen on the Sun's disc near sunspots. The observations were made at Greenwich with a Spectrohelioscope lent by the Mount Wilson Observatory in the autumn of 1929 and set up in the south attic of the New Building. The observations were made by Mr. Newton and Mr. Barton.

F. W. DYSON.

Royal Observatory, Greenwich,
1932 June 8.

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ROYAL OBSERVATORY, GREENWICH.

Positions and Areas of Sun Spots and Faculæ

For each Day in the Year

1931

GREENWICH PHOTO-HELIOGRAPHIC RESULTS, 1931.

Positions and Areas of Sun Spots and Faculæ for each Day in the Year 1931.

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 observatory—Greenwich (G), Cape of Good Hope (C), Kodaikánal (K). (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 Faculæ from Sun's centre in terms of the Sun's radius.

Col. 4. Position Angle of Spot Group or Faculæ 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 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 Faculæ similarly expressed. The positions of Faculæ 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 the position angle of the Sun's axis from the north point : the heliographic longitude and latitude of the centre of the disc : the total areas of Spots and Faculæ for the day.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
0·436		·970	288·8					127
C		·900	270·2					101
		·760	285·8					260
Jan. 1			(+2·2)	(358·2)	(− 3·1)	(0)	(0)	(488)
1·502		·910	294·5					64
		·870	280·7					480
G	11343	·633	286·3	21·7	+ 7·7	4	17	
	11344	·982	75·3	266·4	+13·8	5	10	121*c*
		·978	101·5					127
Jan. 2			(+1·7)	(344·1)	(− 3·2)	(9)	(27)	(792)
2·368		·959	286·9					219
		·917	277·9					326
C		·764	286·0					219
	11344	·924	73·6	267·1	+13·8	0	10	245*c*
		·933	101·2					115
Jan. 3			(+1·3)	(332·7)	(− 3·3)	(0)	(10)	(1124)
3·203		·970	279·3					73
		·866	281·5					129
	1034a	·952	102·0	247·0	−15·4	6	13	180*f*
K	11345	·987	108·3	240·6	−18·6	18	91	191*f*
		·843	71·1					129
		·857	101·3					111
		·934	75·1					69
Jan. 4			(+0·9)	(321·7)	(− 3·4)	(24)	(104)	(882)
4·492		·914	280·7					184
	11345	·916	109·1	238·8	−18·9	26	125	240*c*
C		·852	102·1					150
		·958	75·3					101
		·966	84·1					160
Jan. 5			(+0·3)	(304·8)	(− 3·6)	(26)	(125)	(835)
5·498		·972	280·2					98
		·964	291·9					111
		·882	282·0					304
	11345	·801	110·6	239·4	−18·6	36	167	383*c*
		·787	100·0					104
G		·875	95·1					62
		·886	80·4					161
		·911	88·8					180
		·920	100·0					68
		·924	72·0					236
		·969	82·9					205
Jan. 6			(−0·2)	(291·5)	(− 3·7)	(36)	(167)	(1912)

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
6·519		·977	279·8					124
		·920	285·9					141
	11345	·641	114·9	240·4	−18·6	22	106	
G		·793	87·5					247
		·796	71·3					335
		·922	79·5					234
		·937	88·2					272
Jan. 7			(−0·7)	(278·1)	(− 3·8)	(22)	(106)	(1353)
7·311	11345	·510	121·7	240·4	−19·0	12	57	
C		·838	75·7					163
		·855	85·9					186
Jan. 8			(−1·1)	(267·6)	(− 3·9)	(12)	(57)	(349)
8·512	11345	·311	143·6	240·6	− 18·4	29	101	
G								
Jan. 9			(−1·7)	(251·8)	(− 4·0)	(29)	(101)	(0)
9·337	11345	·253	179·4	240·8	−18·7	16	42	
C		·982	94·0					88
Jan. 10			(−2·1)	(241·0)	(− 4·1)	(16)	(42)	(88)
10·509	11345	·358	225·1	240·9	−18·6	7	50	
		·912	105·5					151
G		·923	95·6					111
		·926	86·1					34
Jan. 11			(−2·7)	(225·5)	(− 4·2)	(7)	(50)	(296)
11·352	11345	·499	238·7	241·0	−18·8	10	32	
		·797	88·8					159
C		·830	101·5					184
		·918	88·3					216
		·939	106·6					153
Jan. 12			(−3·1)	(214·4)	(− 4·3)	(10)	(32)	(712)
12·327		·905	282·5					68
	11345	·658	246·2	240·9	−18·8	11	22	
	11346	·270	316·5	212·3	+ 6·9	14	45	
	11347	·993	84·6	119·1	+ 4·8	8	24	
C		·796	108·7					90
		·928	94·5					162
		·961	79·1					94
		·972	104·8					52
Jan. 13			(−3·5)	(201·6)	(− 4·4)	(33)	(91)	(466)

Group 11343. 1930, Dec. 25–1931, Jan. 2. Intermittent. A small spot on Dec. 25, 26 and 28; a close pair on Jan. 2.
Group 11344. 1931, Jan. 2–3. A small spot.
Group 11345. Jan 4–15. A composite spot that becomes regular before it dies out. Small companions follow it on Jan. 5 and 6.
Group 11346. Jan. 13–19. A wide pair of spots developing rapidly after Jan. 14 into a large group in which the chief components are two large composite spots.
Group 11347. Jan. 13–16. A spot followed by faculæ in which another spot is seen on Jan. 15 and 16.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
13·324		·856	261·8					253
	11345	·800	250·0	240·8	−18·6	3	7	316*f*
	1034b	·694	286·0	230·6	+ 7·7	6	26	
	11346	·451	295·5	212·6	+ 7·1	13	68	
	11347	·941	83·0	119·1	+ 5·0	6	25	555*f*
C	*1034c*	·974	94·1	112·4	− 1·4	4	17	46*c*
		·812	98·4					99
		·861	86·3					87
		·900	75·6					115
		·919	106·3					139
		·952	99·3					163
Jan. 14			(−4·0)	(188·5)	(− 4·5)	(32)	(143)	(1773)
14·372		·965	260·9					179
		·856	277·8					122
		·829	289·5					113
	11345	·913	251·5	240·4	−18·7	2	13	213*f*
C	11346	·607	288·2	210·0	+ 7·1	36	236	
	11347	·888	80·5	113·0	+ 6·3	13	59	435*c*
		·830	70·9					85
		·891	99·7					402
		·982	73·5					98
Jan. 15			(−4·5)	(174·6)	(− 4·6)	(51)	(308)	(1647)
15·313		·961	251·1					299
		·935	279·7					396
		·903	290·9					164
C	11346	·763	283·9	210·4	+ 7·4	76	730	304*c*
	11347	·755	78·9	114·4	+ 5·2	6	13	402*c*
		·788	98·7					487
		·938	70·9					378
Jan. 16			(−4·9)	(162·3)	(− 4·7)	(82)	(743)	(2430)
16·431		·987	254·0					97
		·970	286·9					119
C	11346	·898	280·7	210·2	+ 7·4	124	907	346*c*
		·835	66·9					161
		·955	67·3					139
Jan. 17			(−5·5)	(147·6)	(− 4·8)	(124)	(907)	(862)
17·338	11346	·970	278·7	210·5	+ 7·2	159	1232	298*c*
	11348	·465	68·4	110·0	+ 5·4	16	83	
C		·825	74·3					107
		·889	64·2					301
		·969	84·9					26
Jan. 18			(−5·9)	(135·6)	(− 4·9)	(175)	(1315)	(732)
18·351	11346	·997	277·7	206·8	+ 7·2	49	311	132*c*
	11348	·279	48·2	110·3	+ 5·7	32	105	
C	11349	·971	88·0	46·5	+ 0·7	8	35	89*f*
		·818	60·4					163
		·951	79·4					176
Jan. 19			(−6·4)	(122·3)	(− 5·0)	(89)	(451)	(560)
19·340	11348	·189	350·4	111·1	+ 5·6	28	129	
	11349	·875	86·3	48·7	+ 0·7	4	26	138*f*
C		·868	73·6					116
		·901	103·4					43
		·908	80·3					54
Jan. 20			(−6·8)	(109·3)	(− 5·1)	(32)	(155)	(351)
20·335		·875	257·7					152
		·868	268·5					74
		·843	278·9					74
C	11348	·310	304·7	110·9	+ 5·1	25	125	
	11349	·737	83·7	49·2	+ 1·1	3	13	156*f*
		·958	78·5					174
Jan. 21			(−7·3)	(96·1)	(− 5·2)	(28)	(138)	(630)
21·314		·955	258·1					227
		·949	270·7					272
C	11348	·505	289·9	111·6	+ 5·2	24	114	
	11349	·551	79·9	50·6	+ 1·1	2	5	
		·894	77·8					285
Jan. 22			(−7·7)	(83·3)	(− 5·3)	(26)	(119)	(784)
22·124		·834	289·6					68
		·798	258·3					141
		·754	283·6					252
K	11348	·630	285·5	110·0	+ 5·5	53	208	
	11350	·975	76·5	357·2	+11·8	4	19	117*c*
		·860	75·9					127
		·944	74·7					96
Jan. 23			(−8·1)	(72·6)	(−5·3)	(57)	(277)	(801)
23·411		·940	285·6					110
		·918	255·8					114
		·912	276·8					249
G		·760	261·6					321
	11348	·832	280·2	110·8	+ 5·4	22	69	365*c*
	11350	·857	72·4	359·3	+12·0	11	27	161*c*
		·939	72·6					78
Jan. 24			(−8·6)	(55·7)	(− 5·4)	(33)	(96)	(1398)

Group 11348. Jan. 18–25. A moderate-sized spot appearing suddenly on Jan. 18 and accompanied on the following days by companions in *irregular formation. Revival of activity represented by Group 11347.*

Group 11349. Jan. 19–28. Intermittent. A small spot disappearing after Jan. 22. On Jan. 25 there is a pair of small spots near its place, and on Jan. 28 another pair.

Group 11350. Jan. 23–27. A small spot with a companion on Jan. 23, 24 and 27.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
24·402		·983	276·1					128
		·978	258·9					82
		·917	251·3					67
		·885	262·4					181
G		·822	293·1					245
	11348	·941	277·4	111·9	+ 5·0	3	11	474*c*
	11349	·162	309·9	49·7	+ 0·5	2	7	
	11350	·705	67·1	1·2	+11·8	6	10	125*f*
		·815	75·3					112
Jan. 25			(−9·1)	(42·6)	(− 5·5)	(11)	(28)	(1414)
25·492		·992	274·6					164
		·971	262·0					156
		·941	290·0					349
G		·850	300·4					183
		·838	285·8					237
	11350	·530	57·2	1·2	+11·7	4	14	
Jan. 26			(−9·6)	(28·2)	(− 5·6)	(4)	(14)	(1089)
26·501		·969	286·4					193
		·942	266·8					19
		·928	296·8					263
G		·915	245·8					48
		·853	298·0					92
	11350	·371	38·6	1·4	+11·2	2	6	
		·951	79·2					120
Jan. 27			(−10·0)	(15·0)	(− 5·7)	(2)	(6)	(735)
27·308		·948	294·7					157
C	11349	·689	281·3	46·8	+ 3·5	3	9	
Jan. 28			(−10·3)	(4·4)	(− 5·8)	(3)	(9)	(157)
28·385		·891	288·0					184
G		·868	278·0					206
Jan. 29			(−10·8)	(350·2)	(− 5·8)	(0)	(0)	(390)
29·305		·956	284·4					54
		·950	276·8					167
C		·895	295·8					47
		·967	97·6					102
Jan. 30			·(−11·2)	(338·1)	(− 5·9)	(0)	(0)	(370)
1931.			°	°	°			
30·344		·890	283·2					64
C		·923	97·2					88
Jan. 31			(−11·6)	(324·4)	(− 6·0)	(0)	(0)	(152)
31·365		·980	265·3					57
		·960	281·0					120
C		·848	287·1					149
		·932	108·8					64
Feb. 1			(−12·1)	(310·9)	(− 6·1)	(0)	(0)	(390)
32·305		·926	284·8					144
		·920	295·7					74
	11351	·994	80·6	216·2	+ 8·6	35	176	186*c*
C		·875	104·5					207
		·919	73·5					214
		·949	97·8					60
Feb. 2			(−12·4)	(298·6)	(− 6·1)	(35)	(176)	(885)
33·324	11352	·736	102·4	237·7	−13·3	6	25	39*c*
C	11351	·938	78·9	216·9	+ 8·1	66	214	659*c*
		·849	65·9					110
Feb. 3			(−12·8)	(285·1)	(− 6·2)	(72)	(239)	(808)
34·526	*1035a*	·933	284·8	336·0	+11·4	5	18	81*f*
G	11352	·533	106·1	237·6	−13·8	3	11	
	11351	·817	74·9	216·6	+ 8·5	34	204	281*sf*
Feb. 4			(−13·3)	(269·3)	(− 6·3)	(42)	(233)	(362)
35·298		·960	282·6					157
C	11352	·344	117·1	240·7	−15·0	2	9	
	11351	·703	71·0	217·3	+ 8·6	61	314	352*f*
Feb. 5			(−13·6)	(259·1)	(− 6·3)	(63)	(323)	(509)
36·125	11351	·582	64·4	216·3	+ 9·1	96	382	
K		·954	79·0					116
Feb. 6			(−14·0)	(248·3)	(− 6·4)	(96)	(382)	(116)
37·301	11351	·376	47·2	216·7	+ 8·6	59	340	
C		·916	88·0					105
		·916	101·6					308
Feb. 7			(−14·4)	(232·8)	(− 6·4)	(59)	(340)	(413)

Group 11351. Feb. 2–13. A regular spot with a number of companions, one of which, to the north, persists for several days.
Group 11352. Feb. 3–9. One or two small spots not seen on Feb. 6 and 7.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
38·524	11352	·486	250·5	244·9	−15·1	1	5	
	11351	·262	0·9	216·5	+ 8·6	58	301	
G		·852	85·9					23
		·854	113·2					134
		·855	99·1					204
Feb. 8			(−14·9)	(216·7)	(− 6·5)	(59)	(306)	(361)
39·447	11353	·759	259·4	254·1	−12·3	6	24	
	11352	·618	254·4	242·3	−14·8	3	13	
C	11351	·336	321·0	216·8	+ 8·6	38	213	
		·978	85·3					350
Feb. 9			(−15·2)	(204·5)	(− 6·6)	(47)	(250)	(350)
40·551	11353	·904	259·2	255·2	−12·6	37	139	170*c*
	11351	·521	298·9	217·4	+ 8·7	41	186	
G		·896	101·0					49
		·928	80·4					1020
Feb. 10			(−15·6)	(190·0)	(− 6·6)	(78)	(325)	(1239)
41·406		·862	258·4					111
	11353	·965	259·0	254·3	−12·4	11	67	273*c*
G	11351	·665	290·9	217·5	+ 8·5	29	189	
		·810	78·3					361
		·899	79·9					449
Feb. 11			(−15·9)	(178·7)	(− 6·7)	(40)	(256)	(1194)
42·405		·949	259·0					188
		·912	292·4					100
G	11351	·813	285·3	217·8	+ 8·3	22	149	307*c*
	11354	·783	79·4	115·3	+ 4·0	14	75	308*c*
		·946	66·1					106
Feb. 12			(−16·3)	(165·6)	(− 6·7)	(36)	(224)	(1009)
43·574		·823	290·1					34
	11351	·936	281·3	217·9	+ 8·0	18	83	637*f*
G	11354	·570	73·7	117·1	+ 3·5	26	112	
		·900	107·1					50
		·978	92·1					103
Feb. 13			(−16·7)	(150·2)	(− 6·8)	(44)	(195)	(824)
44·511		·961	278·3					455
		·923	290·2					174
	11354	·380	64·3	117·8	+ 3·0	19	45	
	11355	·988	85·0	57·5	+ 3·8	13	41	171*f*
G		·912	89·6					58
		·938	64·3					119
		·951	77·6					98
		·995	94·2					158
Feb. 14			(−17·0)	(137·8)	(− 6·8)	(32)	(86)	(1233)
45·530	11356	·328	332·5	133·2	+10·0	2	12	
	11354	·202	23·0	119·9	+ 3·8	4	16	
	11357	·250	134·0	113·6	−16·7	8	38	
G	11358	·930	92·0	55·9	− 4·4	23	118	200*c*
	11355	·951	82·5	53·5	+ 4·9	35	166	255*c*
		·933	73·2					60
Feb. 15			(−17·4)	(124·4)	(− 6·9)	(72)	(350)	(515)
46·504	11356	·490	306·4	135·1	+10·5	2	5	
	1035b	·369	311·1	127·8	+ 7·4	1	2	
	11354	·197	332·8	116·8	+ 3·2	4	12	
G	11357	·177	200·2	115·2	−16·4	2	5	
	11358	·819	89·9	56·6	− 3·9	31	150	272*c*
	11355	·858	79·9	53·8	+ 5·0	34	154	307*c*
		·868	67·5					179
Feb. 16			(−17·7)	(111·6)	(− 6·9)	(74)	(328)	(758)
47·557		·905	263·7					114
	11356	·662	295·3	135·1	+11·0	25	80	
	11354	·334	299·9	114·5	+ 3·0	1	6	
G	11358	·642	87·5	57·9	− 3·7	30	133	
	11355	·713	75·7	54·0	+ 5·1	43	161	
		·932	93·9					83
		·984	99·6					96
Feb. 17			(−18·1)	(97·7)	(− 6·9)	(99)	(380)	(293)
48·459		·961	264·2					196
		·891	269·2					97
	11356	·788	289·8	134·6	+10·9	26	93	284*c*
C	11358	·461	84·8	58·5	− 3·8	22	123	
	11355	·564	70·0	53·8	+ 5·2	56	296	
		·933	97·2					116
		·955	73·8					148
Feb. 18			(−18·4)	(85·8)	(− 7·0)	(104)	(512)	(841)

Group 11353. Feb. 9–11. A wide pair of spots.
Group 11354. Feb. 12–17. A short-lived stream of small spots.
Group 11355. Feb. 14–27. A group visible to the naked eye. A stream developing between Feb. 18 and 20, from one of minor importance to one of considerable size. The stream is of normal type, its components consisting of a regular spot as leader, a pair of unequal spots as follower, and a cluster of smaller spots intermediate in position. The most interesting development is that of the leader from half a dozen clustered nuclei on Feb. 19 to a large, completely-formed spot on Feb. 20, which has become nearly circular by Feb. 21.
Group 11356. Feb. 15–18. A stream in miniature.
Group 11357. Feb. 15–16. A pair of small spots on Feb. 15 of which one component is left on Feb. 16.
Group 11358. Feb. 15–26. At first a group consisting of a regular spot and a distant small companion; the latter dies out, but is represented on Feb. 20 and 21 by one or two faint spots. The second phase takes place about Feb. 22, when the whole group reforms on a larger scale, but its activity is waning as it passes round the west limb.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
49·412		·964	267·5					89
		·905	286·1					253
		·804	280·3					211
	1035c	·763	289·4	120·0	+ 9·9	3	10	144*c*
G	II359	·287	19·5	67·8	+ 8·6	7	23	
	II358	·264	78·0	58·4	− 3·7	20	99	
	II355	·386	56·7	54·5	+ 5·5	139	856	
		·885	70·1					75
Feb. 19			(−18·7)	(73·3)	(− 7·0)	(169)	(988)	(772)
50·546		·939	285·6					184
		·936	276·0					384
		·851	279·2					376
	II359	·319	326·8	68·4	+ 8·5	17	74	
C	II358	·059	8·6	57·8	− 3·7	14	76	
	II355	·237	9·0	56·2	+ 6·5	358	1631	
		·953	77·0					174
Feb. 20			(−19·0)	(58·3)	(− 7·0)	(389)	(1781)	(1118)
51·422		·990	275·0					189
		·981	282·1					164
		·940	276·3					348
		·923	264·9					43
G	II359	·455	304·3	69·0	+ 8·2	14	39	
	II358	·189	284·7	57·3	− 4·2	13	82	
	II355	·283	326·5	55·8	+ 6·5	328	1828	
		·900	74·5					348
Feb. 21			(−19·3)	(46·8)	(− 7·1)	(355)	(1949)	(1092)
52·403		·945	286·9					83
	1035d	·983	274·0	112·6	+ 2·6	5	19	102*c*
	II359	·622	292·8	69·2	+ 8·1	14	46	174*c*
G	II358	·379	276·4	56·0	− 4·1	77	326	
	II355	·436	301·9	55·7	+ 6·7	351	1831	
	II360	·785	70·2	345·4	+10·7	23	64	
	II361	·996	83·0	310·2	+ 6·2	21	69	125*np*
Feb. 22			(−19·6)	(33·9)	(− 7·1)	(491)	(2355)	(484)
53·485		·955	284·5					128
		·894	297·5					110
	II359	·826	283·7	73·4	+ 7·1	4	18	182*f*
G	II355	·636	290·7	56·3	+ 7·2	379	1882	
	II358	·593	273·1	55·8	− 3·9	122	662	
	II360	·605	62·9	346·6	+10·0	38	206	
	II361	·939	80·5	311·1	+ 6·4	24	66	246*c*
Feb. 23			(−19·9)	(19·6)	(− 7·1)	(567)	(2834)	(666)
54·595		·928	281·5					466
		·880	272·4					119
	II355	·809	284·7	56·9	+ 7·5	270	1660	975*c*
G	II358	·784	270·9	56·6	− 3·7	122	559	398*c*
	II360	·433	47·0	346·3	+10·4	41	121	
	II361	·821	76·0	311·8	+ 7·2	28	77	339*c*
Feb. 24			(−20·2)	(5·0)	(− 7·1)	(461)	(2417)	(2297)
55·363		·979	279·6					230
	II355	·900	282·0	57·3	+ 7·5	283	1801	934*c*
	II358	·880	269·9	56·5	− 3·6	95	517	655*c*
C	II360	·325	24·9	347·0	+ 9·9	28	109	
	II361	·721	72·4	311·2	+ 7·4	15	46	141*c*
		·997	97·6					262
Feb. 25			(−20·4)	(354·9)	(− 7·2)	(421)	(2473)	(2222)
56·436	II355	·980	278·9	57·8	+ 7·1	200	1455	806*c*
	II358	·973	268·1	57·5	− 3·5	44	371	814*c*
	II362	·619	297·7	14·6	+10·7	8	20	
C	II360	·320	338·3	347·7	+10·1	30	99	
	II361	·513	62·6	313·6	+ 7·2	5	19	
	II363	·782	74·8	291·5	+ 7·2	10	41	51*c*
	II364	·952	95·8	268·2	− 7·8	48	155	356*c*
Feb. 26			(−20·7)	(340·8)	(− 7·2)	(345)	(2160)	(2027)
57·441		·992	265·8					210
		·926	284·8					149
	II355	·997	278·7	51·7	+ 8·0	50	267	240*f*
	II362	·763	291·0	13·8	+10·9	13	59	
G	II360	·446	311·7	347·2	+10·4	17	58	
	II363	·627	69·6	291·4	+ 6·8	12	30	
	II364	·839	94·6	270·1	− 7·8	28	149 }	286*c*
	II365	·886	99·6	264·5	−11·8	4	14 }	
		·933	101·7					144
Feb. 27			(−21·0)	(327·5)	(− 7·2)	(124)	(577)	(1029)
58·442		·896	295·9					72
	II362	·888	286·2	14·4	+10·8	11	40	177*c*
	II360	·613	296·8	348·0	+10·0	8	21	
	II361	·284	1·1	314·1	+ 9·2	2	5	
C	II363	·445	58·5	292·0	+ 6·8	3	13	
	II364	·688	93·9	270·7	− 7·9	44	210	
	II365	·747	98·5	265·8	−11·1	3	10	
		·745	97·4					238
		·945	102·1					136
Feb. 28			(−21·3)	(314·4)	(− 7·2)	(71)	(299)	(623)

Group II359. Feb. 19–23. A pair of small spots that separate and become each a double spot.
Group II360. Feb. 22–Mar. 1. A stream of imperfectly-formed spots.
Group II361. Feb. 22–Mar. 1. A group of ephemeral spots; none are seen on Feb. 27.
Group II362. Feb. 26–Mar. 1. A wide pair of spots.
Group II363. Feb. 26–28. A pair of spots separating in longitude.
Group II364. Feb. 26–Mar. 9. A stream led by a regular spot. A cluster of spots in the rear of the stream condenses into a spot by Mar. 5.
Group II365. Feb. 27–28. One or two very small spots *sf* Group II364.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
59·350		·959	290·3					111
		·772	283·1					108
	11362	·965	283·3	15·2	+10·8	11	52	139*c*
	11360	·755	290·7	348·1	+10·4	2	5	263*nf*
	11361	·311	334·6	310·1	+ 9·1	1	5	
C	*1036a*	·215	112·7	290·8	−11·8	2	7	
	11364	·507	92·7	271·8	− 7·6	67	372	
	11366	·991	99·1	219·4	− 9·9	14	47	144*f*
		·865	89·4					102
		·900	99·7					195
		·974	77·5					148
Mar. 1			(−21·5)	(302·4)	(− 7·2)	(97)	(488)	(1210)
60·537		·901	279·2					122
		·876	287·4					518
	11364	·254	93·1	272·0	− 7·8	60	320	
C	11366	·924	97·9	218·7	−10·0	22	96	272*c*
		·907	73·8					197
		·958	81·6					165
		·977	73·2					124
Mar. 2			(−21·8)	(286·8)	(− 7·2)	(82)	(416)	(1398)
61·501		·970	282·7					513
		·937	289·9					93
	11364	·015	129·7	273·4	− 7·7	51	267	
G	11366	·801	97·3	220·5	−10·1	40	159	337*c*
		·795	71·9					144
		·875	80·0					260
		·922	70·6					182
Mar. 3			(−22·1)	(274·1)	(− 7·2)	(91)	(426)	(1529)
62·388		·976	285·3					74
		·808	287·8					202
G	11364	·183	266·9	273·0	− 7·7	57	315	
	11366	·696	97·7	218·0	−10·5	67	335	
		·885	66·9					116
Mar. 4			(−22·3)	(262·4)	(− 7·2)	(124)	(650)	(392)
63·469		·908	282·5					325
G	11364	·431	267·1	273·7	− 7·8	51	279	
	11366	·466	98·2	220·3	−10·2	43	203	
Mar. 5			(−22·5)	(248·1)	(− 7·2)	(94)	(482)	(325)
64·517		·974	281·5					139
		·864	282·1					250
C	11364	·640	266·0	274·3	− 8·2	58	296	
	11366	·242	102·8	220·5	−10·1	36	153	
		·944	81·7					177
Mar. 6			(−22·7)	(234·3)	(− 7·3)	(94)	(449)	(566)
65·451		·952	280·6					171
	11364	·790	265·2	274·5	− 8·2	38	265	
G	11366	·056	159·8	220·9	−10·2	32	140	
		·978	77·2					94
Mar. 7			(−23·0)	(222·0)	(− 7·2)	(70)	(405)	(265)
66·404	11364	·915	264·4	276·1	− 8·0	41	246	475*c*
	11366	·224	255·4	222·2	−10·3	24	87	
G		·922	74·6					192
		·972	86·6					238
Mar. 8			(−23·2)	(209·5)	(− 7·2)	(65)	(333)	(905)
67·394	11364	·981	263·0	275·9	− 8·3	35	220	542*c*
	11366	·448	262·5	223·1	− 9·8	38	103	
	11367	·979	84·0	119·1	+ 4·3	74	396	212*c*
G		·859	70·0					139
		·900	84·1					138
		·963	75·4					101
Mar. 9			(−23·4)	(196·4)	(−. 7·2)	(147)	(719)	(1132)
68·504		·882	310·5					37
	11366	·668	262·8	224·0	−10·2	41	186	
	11367	·900	82·0	118·7	+ 4·0	98	611	268*c*
G	11368	·987	81·6	102·4	+ 7·0	12	27	57*f*
		·766	81·2					110
		·910	72·2					105
Mar. 10			(−23·6)	(181·8)	(− 7·2)	(151)	(824)	(577)
69·498		·851	290·6					153
	11366	·809	262·8	223·1	−10·0	26	118	418*c*
C	11367	·778	79·2	118·9	+ 3·7	198	977	442*f*
	11368	·933	79·2	101·4	+ 7·3	23	75	175*c*
Mar. 11			(−23·8)	(168·7)	(− 7·2)	(247)	(1170)	(1188)

Group 11366. Mar. 1–13. A stream which lengthens out markedly in longitude.
Group 11367. Mar. 9–21. A large group of stream type developing rapidly and consisting of two chief spots that undergo considerable changes between Mar. 12 and 15.
Group 11368. Mar. 10–18. A stream of feeble activity in the wake of Group 11367.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
70·401		·948	286·3					143
		·947	294·8					74
		·865	281·2					149
		·849	260·1					182
		·833	291·6					142
G	11366	·925	262·2	225·0	− 9·9	23	84	356*c*
	11367	·650	74·8	118·0	+ 4·2	170	1022	
	11368	·841	76·2	101·5	+ 7·5	38	128	331*c*
		·966	82·6					59
		·968	184·8					18
Mar. 12			(−24·0)	(156·8)	(− 7·2)	(231)	(1234)	(1454)
71·388		·952	280·7					248
		·949	260·6					236
	11366	·986	261·1	224·9	− 9·9	17	103	333*c*
	11367	·475	67·3	117·9	+ 4·1	130	861	
G	11368	·686	71·1	103·1	+ 7·4	18	58	
	11369	·975	81·6	67·9	+ 6·5	64	389	379*f*
		·892	81·8					165
		·981	75·3					66
		·986	93·7					269
Mar. 13			(−24·1)	(143·8)	(− 7·2)	(229)	(1411)	(1696)
72·436	*1036b*	·209	335·5	135·0	+ 3·7	1	4	
	11367	·286	48·2	117·7	+ 3·9	122	729	
G	11368	·506	61·8	103·4	+ 7·4	12	47	
	11369	·891	79·1	68·6	+ 6·3	52	343	732*f*
		·939	93·4					418
Mar. 14			(−24·3)	(130·0)	(− 7·2)	(187)	(1123)	(1150)
73·455	11367	·198	353·7	117·7	+ 4·1	88	465	
	11368	·325	39·8	104·4	+ 7·4	12	39	
G	11369	·761	75·4	68·9	+ 6·2	51	293	771*f*
		·860	92·1					395
Mar. 15			(−24·5)	(116·5)	(− 7·2)	(151)	(797)	(1166)
74·434		·924	291·6					89
		·917	283·8					94
		·903	276·0					120
		·892	265·4					143
C		·872	255·0					87
	11367	·311	306·6	118·0	+ 3·7	84	510	
	11368	·261	4·6	102·4	+ 7·9	5	18	
	11369	·601	69·9	69·2	+ 6·0	55	304	257*f*
		·745	88·6					178
Mar. 16			(−24·6)	(103·6)	(− 7·1)	(144)	(832)	(968)
1931.			°	°	°			
75·477		·953	261·8					72
	11370	·960	268·4	163·7	− 3·6	40	135	324*c*
	11371	·566	298·0	120·2	+ 9·3	10	27	
	1036c	·504	253·6	119·7	−14·4	1	2	
G	11367	·508	290·7	118·2	+ 4·0	83	372	
	11368	·332	323·8	101·3	+ 8·5	10	39	
	11369	·419	58·2	69·0	+ 6·1	61	304	
		·945	74·2					201
Mar. 17			(−24·8)	(89·9)	(− 7·1)	(205)	(879)	(597)
76·415		·916	269·6					137
		·879	289·1					184
		·850	277·5					218
	11370	·991	266·3	160·0	− 4·6	46	311	170*c*
G	11371	·720	290·8	120·4	+ 9·6	19	55	
	11367	·668	284·1	117·8	+ 4·0	81	393	
	11368	·484	301·8	102·0	+ 8·3	6	27	
	11369	·270	32·7	69·1	+ 6·0	61	301	
		·857	73·5					159
Mar. 18			(−24·9)	(77·5)	(− 7·1)	(213)	(1087)	(868)
77·387		·943	275·7					170
		·940	286·5					112
	11371	·862	284·4	122·1	+ 8·6	4	13	246*c*
	11367	·809	280·1	117·5	+ 3·8	51	255	642*c*
G	*1036d*	·454	319·7	82·2	+13·4	1	4	
	11369	·239	340·9	69·2	+ 5·9	61	264	
	11372	·258	151·1	57·1	−20·0	17	53	
		·946	79·3					252
Mar. 19			(−25·1)	(64·7)	(− 7·1)	(134)	(589)	(1422)
78·386		·797	287·1					340
	11371	·945	281·2	120·8	+ 8·2	14	33	252*c*
	11367	·930	276·8	119·0	+ 3·7	31	102	803*c*
G	11369	·380	305·8	69·5	+ 6·1	45	262	
	11372	·241	203·6	57·4	−19·6	12	35	
	11373	·342	42·0	38·2	+ 7·8	9	20	
		·866	74·3					354
Mar. 20			(−25·2)	(51·5)	(− 7·0)	(111)	(452)	(1749)
79·384		·898	283·9					250
	11367	·985	277·5	117·4	+ 6·1	6	20	601*c*
	11369	·562	291·9	69·9	+ 6·1	50	233	
	11372	·371	234·3	56·9	−19·1	4	10	
G	11373	·243	352·9	40·1	+ 6·9	1	5	
	1036e	·117	347·3	39·9	− 0·5	5	11	
		·751	71·7					116
		·864	67·1					54
		·945	99·2					50
Mar. 21			(−25·3)	(38·4)	(− 7·0)	(66)	(279)	(1071)

Group 11369. Mar. 13–24. Return of Group 11355. A regular spot followed by an extensive area of faculæ. The spot diminishes rather rapidly after about Mar. 18 and is crossed by a bright "bridge."
Group 11370. Mar. 17–18. A group forming near the west limb.
Group 11371. Mar. 17–20. A small stream *n* Group 11367.
Group 11372. Mar. 19–22. A small stream of which one spot remains on Mar. 21 and 22.
Group 11373. Mar. 20–23. A pair of spots on Mar. 20; a single spot on Mar. 21 and 22; a cluster of dots on Mar. 23.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
80·429		·973	282·3					260
		·857	281·6					60
	11369	·739	284·8	70·3	+ 6·0	36	186	
G	11372	·602	243·9	59·9	−21·1	2	6	
	11373	·391	308·5	42·5	+ 7·4	4	5	
		·889	75·1					71
Mar. 22			(−25·5)	(24·6)	(− 7·0)	(42)	(197)	(391)
81·624		·947	274·2					68
		·883	292·3					58
		·839	267·4					268
		·752	286·6					350
G	11369	·891	280·4	70·4	+ 6·0	34	169	356*nf*
	11373	·604	291·6	43·1	+ 7·1	4	9	
	1036f	·620	315·9	36·1	+20·2	1	3	
		·810	72·2					47
		·931	76·1					89
Mar. 23			(−25·6)	(8·8)	(− 6·9)	(39)	(181)	(1236)
82·368		·922	265·5					264
		·824	267·7					296
C	11369	·954	278·5	70·3	+ 5·9	25	185	912*f*
	11374	·975	97·2	281·3	− 8·5	33	188	119*sf*
Mar. 24			(−25·7)	(359·0)	(− 6·9)	(58)	(373)	(1591)
83·498		·954	279·4					418
		·947	250·8					120
		·937	287·6					141
		·935	265·6					284
G		·860	297·4					81
		·847	284·0					154
	11374	·891	95·8	280·7	− 8·3	20	174	176*f*
		·928	108·8					82
Mar. 25			(−25·8)	(344·1)	(− 6·9)	(20)	(174)	(1456)
84·501		·987	285·9					73
		·980	275·9					98
		·971	296·6					37
		·931	281·1					113
G		·752	287·9					152
	1037a	·945	293·1	37·7	+19·2	11	27	151*nf*
	11374	·764	95·0	280·9	− 8·2	32	181	371*f*
		·934	90·1					86
		·982	99·5					104
Mar. 26			(−25·9)	(330·9)	(− 6·8)	(43)	(208)	(1185)
85·416		·988	290·8					211
		·884	285·3					118
G	11374	·613	94·4	280·8	− 8·1	33	176	
		·774	96·8					126
		·951	98·9					320
Mar. 27			(−26·0)	(318·8)	(− 6·8)	(33)	(176)	(775)

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
86·538	11374	·389	94·2	281·1	− 7·8	37	171	
G		·821	99·2					184
		·933	98·4					279
Mar. 28			(−26·0)	(304·0)	(− 6·7)	(37)	(171)	(463)
87·354		·914	279·9					314
		·764	301·9					168
	1037b	·272	151·3	285·3	−20·4	2	6	
	11375	·189	130·5	284·8	−13·7	5	9	
	11374	·208	95·3	281·3	− 7·7	32	157	
C		·866	96·7					428
		·912	109·4					74
		·913	70·6					105
		·949	98·1					212
		·961	79·5					223
Mar. 29			(−26·1)	(293·3)	(− 6·7)	(39)	(172)	(1524)
88·506		·979	276·8					115
		·911	286·2					458
	11374	·056	252·2	281·2	− 7·6	28	160	
C	11376	·802	76·4	226·6	+ 6·8	6	18	54*c*
		·832	98·8					271
		·885	74·0					397
		·952	64·4					122
Mar. 30			(−26·2)	(278·1)	(− 6·6)	(34)	(178)	(1417)
89·410		·964	287·8					67
	11377	·852	255·8	325·0	−15·5	19	68	75*c*
G	11374	·259	266·3	281·2	− 7·4	37	161	
	11376	·673	71·4	226·4	+ 7·3	10	27	
		·831	70·2					162
Mar. 31			(−26·2)	(266·2)	(− 6·6)	(66)	(256)	(304)
90·388	11377	·943	255·9	324·6	−15·4	32	219	75*c*
	11374	·467	266·5	281·2	− 7·4	30	162	
G	11376	·493	62·5	227·3	+ 7·2	12	43	
	11378	·990	91·9	171·4	− 2·8	38	192	103*c*
Apr. 1			(−26·3)	(253·3)	(− 6·5)	(112)	(616)	(178)
91·542		·915	283·0					80
	11377	·990	255·2	320·9	−15·5	24	113	187*c*
C	11374	·687	265·9	281·5	− 7·5	24	116	
	11376	·282	32·5	229·3	+ 7·4	7	16	
	11378	·908	90·4	172·8	− 3·1	24	103	243*f*
Apr. 2			(−26·3)	(238·0)	(− 6·5)	(79)	(348)	(510)

Group 11374. Mar. 24–Apr. 5. Return of Group 11364. A regular spot diminishing as it nears the western limb and breaking into two portions on Apr. 4.
Group 11375. Mar. 29–Apr. 3. A pair of small spots on Mar. 29 and three similar ones on Apr. 3, nothing being seen on the intervening days.
Group 11376. Mar. 30–Apr. 7. A group whose activity is generally represented by a pair of spots of varying importance.
Group 11377. Mar. 31–Apr. 2. A group developing near the west limb.
Group 11378. Apr. 1–13. Probable return of Group 11370. A regular spot followed by faculæ in which small spots make their appearance on and after Apr. 4.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
92·330		·972	281·3					115
	11375	·861	258·0	287·4	−13·5	6	29	69*c*
	11374	·808	265·7	281·7	− 7·2	26	136	161*f*
C	11379	·755	271·7	276·5	− 2·9	5	18	50*c*
	11376	·242	347·7	230·6	+ 7·2	7	15	
	11378	·815	89·1	173·1	− 3·0	17	106	390*f*
Apr. 3			(−26·3)	(227·6)	(− 6·4)	(61)	(304)	(785)
93·370		·932	257·4					167
	11374	·926	264·9	282·0	− 7·1	9	52	299*f*
	11379	·892	270·0	276·9	− 2·8	4	10	80*c*
	1037c	·448	265·8	240·6	− 7·5	1	4	
	11376	·337	331·1	228·2	+ 7·2	2	13	
G	11378	·659	87·4	172·8	− 3·0	26	126	120*f*
		·866	89·6					70
		·930	72·1					211
		·938	93·4					102
		·963	83·8					401
Apr. 4			(−26·4)	(213·9)	(− 6·3)	(42)	(205)	(1450)
94·513	11374	·995	264·4	283·3	− 6·1	19	62	203*sf*
	11379	·969	268·2	274·6	− 3·3	4	14	158*s*
	11376	·523	294·6	227·3	+ 7·0	10	33	
	11378	·442	84·4	172·8	− 3·2	29	139	
C		·852	85·7					104
		·877	73·1					117
		·922	80·5					219
		·964	85·0					252
		·973	76·8					196
Apr. 5			(−26·4)	(198·8)	(− 6·3)	(62)	(248)	(1249)
95·118		·843	261·5					138
	11376	·620	290·4	226·6	+ 7·4	5	21	
	11378	·326	82·0	172·1	− 3·3	25	146	
	11380	·836	80·2	135·4	+ 4·6	7	30	328*f*
K		·791	78·8					261
		·905	84·2					386
		·940	73·8					204
		·951	84·8					293
Apr. 6			(−26·4)	(190·9)	(− 6·2)	(37)	(197)	(1610)
96·116		·889	260·6					303
	11376	·775	285·3	226·5	+ 7·7	3	13	263*p*
	11381	·715	280·2	222·3	+ 2·8	41	197	131*c*
K	11378	·121	69·4	171·2	− 3·7	32	165	

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
96·116	11380	·727	78·4	132·3	+ 4·1	41	126	
K	*1037d*	·829	76·6	123·5	+ 7·4	2	4	380*s*
		·845	68·4					294
		·885	81·4					400
		·962	75·6					225
Apr. 7			(−26·4)	(177·7)	(− 6·2)	(119)	(505)	(1996)
97·630		·951	281·6					173
		·931	260·8					197
	11381	·924	275·8	224·5	+ 3·0	32	210	75*c*
G	11378	·245	279·6	171·6	− 3·6	33	179	
	11380	·459	68·6	132·4	+ 4·1	63	284	
		·822	72·4					113
		·959	79·2					125
Apr. 8			(−26·4)	(157·7)	(− 6·1)	(128)	(673)	(683)
98·540		·976	261·2					124
		·969	281·2					131
		·949	287·4					41
		·916	258·1					95
		·893	293·6					73
	11381	·982	275·0	224·0	+ 3·7	27	130	466*c*
C	11378	·448	273·8	172·2	− 3·7	31	132	
	11380	·290	52·0	132·5	+ 4·4	39	270	
		·900	77·7					113
		·918	88·4					82
		·950	96·0					122
		·960	81·9					201
Apr. 9			(−26·4)	(145·7)	(− 6·0)	(97)	(532)	(1448)
99·382		·915	298·4					96
	11378	·613	272·2	172·3	− 3·4	34	143	
	11380	·183	7·4	133·3	+ 4·4	43	213	
	11382	·996	82·0	50·8	+ 7·4	48	117	
		·861	72·1					110
G		·873	95·6					110
		·884	81·8					214
		·959	86·9					75
		·963	96·3					132
		·964	79·0					166
Apr. 10			(−26·4)	(134·6)	(− 6·0)	(125)	(473)	(903)
100·466	11378	·800	270·5	173·3	− 3·2	25	103	
	11380	·315	305·9	135·1	+ 4·9	33	160	
G	11382	·949	79·6	50·1	+ 7·9	36	194	449*c*

Group 11379. Apr. 3–5. A small spot *n* Group 11374.
Group 11380. Apr. 6–12. A stream of changing spots.
Group 11381. Apr. 7–9. A group of stream-type appearing near the west limb *sf* Group 11376.
Group 11382. Apr. 10–22. A fairly large spot, with double umbra, followed by small companions until Apr. 18 and a single companion on Apr. 21 and 22. The spot apparently comes from the fusion of two spots that are clearly divided on Apr. 11; the resulting double umbra persists until Apr. 20.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

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1931.			°	°	°			
100·466	11383	·996	66·2	38·6	+23·0	21	96	551*s*
G		·748	77·1					302
		·770	94·4					90
		·862	78·8					395
		·885	96·2					187
		·906	69·1					118
Apr. 11			(−26·4)	(120·3)	(− 5·9)	(115)	(553)	(2092)
101·453	11378	·917	269·1	173·6	− 3·2	33	117	328*f*
	11380	·524	289·0	136·9	+ 4·8	5	28	
	1037e	·505	303·5	132·5	+10·9	1	4	
G	11382	·834	77·1	52·4	+ 7·4	44	246	404*c*
	11383	·959	63·8	38·1	+23·1	23	160	785*s*
		·757	72·0					116
Apr. 12			(−26·3)	(107·2)	(− 5·8)	(106)	(555)	(1633)
102·397	11378	·982	268·0	173·8	− 3·0	18	122	313*f*
	11382	·706	73·5	51·9	+ 7·4	59	273	185*f*
G	11383	·885	60·3	38·5	+22·8	19	110	733*s*
	11384	·992	78·7	13·5	+10·4	42	187	192*c*
Apr. 13			(−26·3)	(94·8)	(− 5·7)	(138)	(692)	(1423)
103·375		·925	287·8					148
		·887	271·2					94
		·832	280·4					479
	1037f	·199	37·4	75·0	+ 3·4	2	10	
C	11382	·527	65·5	53·1	+ 7·6	60	290	
	11383	·776	54·3	39·0	+22·7	17	75	766*c*
	11384	·935	76·6	14·5	+10·3	30	179	359*c*
		·861	70·6					75
Apr. 14			(−26·2)	(81·9)	(− 5·7)	(109)	(554)	(1921)
104·534		·930	278·4					975
		·858	290·8					132
		·780	276·0					185
	11382	·316	45·6	53·5	+ 7·2	53	308	
C	*1037g*	·498	39·2	47·4	+17·3	2	4	
	11383	·638	43·0	38·5	+22·8	7	27	
	11384	·828	72·8	13·2	+10·8	60	416	260*c*
		·986	79·6					96
Apr. 15			(−26·2)	(66·6)	(− 5·6)	(122)	(755)	(1648)
105·595		·949	275·7					430
		·948	286·9					192
		·821	289·6					108
G	11382	·221	352·6	54·1	+ 7·1	46	234	
	11384	·677	67·3	13·2	+10·8	69	383	
	1037h	·980	104·3	333·2	−15·1	5	10	173*c*
		·918	75·5					211
Apr. 16			(−26·1)	(52·5)	(− 5·5)	(120)	(627)	(1114)
106·503		·971	274·5					127
		·908	285·7					135
	11382	·315	312·9	54·0	+ 7·1	44	224	
	11385	·258	10·4	37·9	+ 9·3	2	7	
	11383	·479	5·3	37·9	+23·0	5	11	
C	*1037i*	·425	6·8	37·6	+19·4	2	12	
	1037j	·406	18·7	32·8	+17·2	1	5	
	11384	·522	58·7	13·7	+10·9	64	329	
	1037k	·808	74·4	348·8	+ 9·2	2	6	194*f*
		·935	105·1					352
		·952	79·3					64
Apr. 17			(−26·1)	(40·6)	(− 5·4)	(120)	(594)	(872)
107·453		·978	284·3					89
		·888	284·7					60
		·772	284·6					404
G	11382	·496	294·5	54·9	+ 7·1	47	238	
	11384	·367	40·6	14·0	+11·0	50	247	
		·855	104·4					399
Apr. 18			(−26·0)	(28·0)	(− 5·3)	(97)	(485)	(952)
108·397		·961	280·1					74
		·880	279·6					298
		·876	293·5					41
		·841	265·1					81
C		·773	286·6					117
	11382	·666	286·7	55·3	+ 7·0	34	200	
	11384	·282	4·5	14·2	+11·1	46	213	
		·821	110·3					92
Apr. 19			(−25·9)	(15·5)	(− 5·2)	(80)	(413)	(703)
109·369		·969	275·8					211
		·961	284·2					87
		·933	263·6					45
		·925	291·4					46
		·889	282·0					167
C		·836	264·6					90
	11382	·817	282·2	56·0	+ 6·8	38	237	177*nf*
	11384	·340	324·2	14·3	+10·8	39	205	
		·947	104·6					65
		·965	97·0					145
Apr. 20			(−25·8)	(2·7)	(− 5·2)	(77)	(442)	(1033)
110·429		·969	280·5					215
		·936	262·7					174
		·867	292 5					86
G		·799	306·5					187

Group 11383. Apr. 11–22. Intermittent. A regular spot that has disappeared by Apr. 16; on Apr. 17 a faint marking is visible, and on Apr. 22 a tiny spot. The regular spot is accompanied by a large area of faculæ.

Group 11384. Apr. 13–25. A stream of normal type in which the components do not separate in longitude to the usual extent and in which the following portion is of minor importance.

Group 11385. Apr. 17–23. A pair of small, ephemeral spots on Apr. 17; on Apr. 21 a pair of fairly large complex spots have suddenly appeared.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
110·429		·819	298·5					372
G	11382	·930	279·3	56·0	+ 6·7	68	289	431*nf*
	11385	·802	284·8	40·2	+ 8·7	92	293	99*c*
	11384	·498	303·1	13·8	+11·1	43	255	
		·901	95·1					200
Apr. 21			(−25·7)	(348·7)	(− 5·1)	(203)	(837)	(1764)
111·341		·970	181·6					55
		·940	176·5					26
		·917	293·0					424
	11382	·990	277·6	57·6	+ 6·7	53	238	328*nf*
	11385	·919	281·2	42·1	+ 8·2	97	468	319*c*
G	11383	·905	300·7	35·6	+25·0	2	8	162*f*
	11386	·808	288·3	28·1	+11·5	4	6	60*c*
	11384	·653	293·2	14·2	+10·9	46	232	
		·817	94·9					155
		·988	75·4					44
Apr. 22			(−25·6)	(336·7)	(− 5·0)	(202)	(952)	(1573)
112·403		·974	288·5					137
		·964	296·3					176
	11385	·991	279·1	43·8	+ 8·3	75	271	352*c*
G	11386	·927	284·3	28·7	+11·3	9	26	120*c*
	11384	·812	287·1	14·6	+10·8	40	194	343*c*
	11387	·449	42·4	304·4	+14·7	3	8	
		·946	72·4					109
Apr. 23			(−25·5)	(322·6)	(− 4·9)	(127)	(499)	(1237)
113·538		·991	282·6					123
	11384	·933	283·4	14·8	+10·7	37	199	244*f*
	11387	·345	9·2	304·3	+15·0	14	70	
G	11388	·980	84·6	229·8	+ 4·3	17	44	127*f*
		·930	95·2					153
		·955	76·8					75
Apr. 24			(−25·4)	(307·6)	(− 4·8)	(68)	(313)	(722)
114·480	11384	·987	281·2	14·6	+10·2	42	191	285*f*
	11387	·372	333·8	304·9	+14·8	34	90	
G	11388	·917	83·1	229·5	+ 4·4	11	31	269*f*
		·942	75·3					100
Apr. 25			(−25·2)	(295·2)	(− 4·7)	(87)	(312)	(654)
115·432	11387	·492	311·5	304·9	+14·7	28	70	
	11388	·811	81·3	229·3	+ 4·3	9	17	204*f*
G		·870	73·1					132
		·957	70·5					184
Apr. 26			(−25·1)	(282·6)	(− 4·6)	(37)	(87)	(520)

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
116·598		·981	282·0					58
		·880	252·0					136
	11387	·667	299·2	304·2	+15·3	19	53	
G	11388	·630	77·1	229·3	+ 4·5	12	19	
		·763	71·3					113
		·861	66·3					232
		·909	86·3					113
Apr. 27			(−25·0)	(267·2)	(− 4·5)	(31)	(72)	(652)
117·359		·938	254·0					216
	11387	·805	292·7	307·4	+15·2	3	13	279*c*
C	11388	·489	72·0	229·5	+ 4·8	5	11	
		·779	62·4					114
		·973	94·6					151
Apr. 28			(−24·8)	(257·2)	(− 4·4)	(8)	(24)	(760)
118·496		·969	254·3					18
		·903	289·5					369
	11389	·573	301·7	272·1	+13·7	6	15	
G	11388	·267	55·5	229·4	+ 4·5	7	13	
		·915	81·3					62
		·918	104·5					42
		·933	92·5					347
Apr. 29			(−24·7)	(242·1)	(− 4·3)	(13)	(28)	(838)
119·352		·968	287·5					333
		·811	263·9					96
	11389	·711	294·1	272·5	+13·7	20	48	
G	11388	·152	7·5	229·7	+ 4·5	5	12	
		·855	91·8					358
		·957	76·2					70
Apr. 30			(−24·5)	(230·8)	(− 4·2)	(25)	(60)	(857)
120·550		·933	261·1					203
	11389	·856	289·7	271·1	+14·5	32	132	145*c*
G		·936	75·3					428
		·944	89·8					231
May 1			(−24·3)	(215·0)	(− 4·1)	(32)	(132)	(1007)
121·413		·975	261·6					91
	11389	·936	287·6	270·8	+14·9	28	142	244*c*
G		·856	68·4					131
		·870	86·0					160
		·917	78·4					248
May 2			(−24·2)	(203·6)	(− 4·0)	(28)	(142)	(874)

Group 11386. Apr. 22–23. Two small spots.
Group 11387. Apr. 23–28. A stream of small spots.
Group 11388. Apr. 24–30. Return or revival of Group 11381. A small definite spot.
Group 11389. Apr. 29–May 3. A pair of spots of which the following expands into a regular spot.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
122·122	11389	·977	286·6	270·0	+15·2	35	106	277*p*
		·780	73·4					452
		·812	86·8					152
K		·908	79·5					249
		·934	88·2					102
		·958	73·0					79
May 3			(−24·0)	(194·2)	(− 3·9)	(35)	(106)	(1311)
123·453		·919	270·2					57
		·864	285·8					117
		·822	264·6					50
G		·788	277·2					120
	11390	·850	258·9	234·7	−11·4	15	28	110*c*
		·839	69·4					228
		·942	73·0					184
May 4			(−23·8)	(176·6)	(− 3·8)	(15)	(28)	(866)
124·470		·952	274·8					66
		·947	264·3					99
		·902	275·0					209
		·870	286·9					92
G	11390	·946	258·5	234·4	−12·1	3	8	107*c*
	11391	·302	34·8	153·1	+10·6	3	4	
		·862	69·9					146
		·921	79·2					64
		·983	82·2					120
May 5			(−23·6)	(163·2)	(− 3·7)	(6)	(12)	(903)
125·351		·970	275·8					160
		·905	293·4					106
	11391	·260	348·1	154·6	+11·1	12	32	
G	11392	·363	86·8	130·3	− 2·2	0	3	
		·928	81·0					407
		·976	75·8					92
May 6			(−23·4)	(151·5)	(− 3·6)	(12)	(35)	(765)
126·345	11391	·389	311·0	155·8	+11·4	8	16	
	11393	·978	83·2	61·2	+ 5·9	26	85 }	458*c*
	11394	·988	81·4	58·2	+ 7·9	44	180 }	
G		·834	77·2					357
		·928	79·4					126
		·954	94·3					52
May 7			(−23·2)	(138·4)	(− 3·5)	(78)	(281)	(993)
127·480		·912	267·7					60
		·811	269·5					150
	1038a	·450	245·0	148·1	−14·0	3	8	
	11393	·888	81·4	61·6	+ 6·0	25	73 }	585*c*
	11394	·912	79·7	58·7	+ 7·9	33	192 }	
		·813	76·1					235
G		·838	94·7					114
127·480		·927	99·1					54
G		·927	71·7					114
		·971	78·6					303
		·977	85·2					104
May 8			(−22·9)	(123·4)	(− 3·4)	(61)	(273)	(1719)
128·440		·923	269·1					219
		·837	270·1					113
	11392	·356	273·5	131·4	− 1·8	3	17	
	11393	·768	79·1	61·6	+ 6·2	9	56 }	
	11394	·804	77·5	58·5	+ 8·0	34	182 }	577*c*
G	11395	·822	74·7	57·2	+10·5	4	20 }	
		·865	96·9					78
		·907	77·5					821
		·967	66·1					239
		·988	79·5					72
May 9			(−22·7)	(110·7)	(− 3·3)	(50)	(275)	(2119)
129·364		·963	267·6					174
		·847	285·9					128
		·762	292·3					99
	11392	·576	272·9	133·5	− 1·0	23	66	
C	11393	·621	75·3	61·5	+ 6·5	6	16	
	11394	·657	73·9	59·1	+ 8·0	24	164 }	201*f*
	11395	·689	71·9	57·0	+ 9·9	25	83 }	
		·835	75·5					351
		·913	64·3					237
May 10			(−22·5)	(98·5)	(− 3·2)	(78)	(329)	(1190)
130·355		·932	285·0					286
		·842	280·7					210
	11392	·759	271·4	134·5	− 1·0	26	188	135*c*
	11393	·442	67·4	61·1	+ 6·9	0	3	
G	11394	·474	67·1	59·3	+ 7·8	30	152	
	11395	·500	63·8	58·3	+10·0	29	146	
		·794	60·9					149
		·872	54·0					81
		·924	80·1					53
May 11			(−22·2)	(85·3)	(− 3·1)	(85)	(489)	(914)
131·348		·950	269·6					126
		·950	282·0					270
		·843	284·8					164
G	11392	·896	270·8	135·6	− 0·2	24	95	161*c*
	1038b	·211	36·3	65·0	+ 6·8	3	6	
	11395	·302	44·8	59·8	+ 9·4	20	99	
	11394	·286	50·0	59·5	+ 7·7	33	145	
May 12			(−22·0)	(72·2)	(− 3·0)	(80)	(345)	(721)

Group 11390. May 4–5. A pair of small spots on May 4 of which one is left on May 5.
Group 11391. May 5–7. A short-lived spot.
Group 11392. May 6–13. A stream, not very extensive in longitude, with a fair-sized spot as leader on May 11. The first indication of the group is on May 6 when a tiny ephemeral spot is seen.
Group 11393. May 7–16. A spot breaking up into a cluster by May 10 and disappearing the following day; a spot reappears on May 14.
Group 11394. May 7–18. Return of Group 11382. A stable regular spot. Groups 11393 and 11395 are close to it.
Group 11395. May 9–18. A stream of spots developing *n* Group 11394. There is a marked separation in longitude between the leader and follower, the movement of the leader being especially conspicuous in its drift past the regular spot of Group 11394.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
132·343		·951	277·8					165
		·925	289·4					202
	11392	·982	270·5	137·9	− 0·1	23	78	291*f*
G	*1038c*	·778	279·4	109·3	+ 5·5	11	21	
	11395	·218	356·2	59·9	+ 9·6	27	93	
	11394	·186	357·8	59·5	+ 7·8	29	143	
May 13			(−21·8)	(59·1)	(− 2·9)	(90)	(335)	(658)
133·342		·969	292·6					54
		·898	289·5					72
		·888	278·0					98
G	11393	·310	297·9	61·7	+ 5·7	3	10	
	11395	·332	310·7	60·5	+ 9·8	23	115	
	11394	·300	307·5	59·6	+ 7·9	21	133	
		·973	105·0					53
May 14			(−21·5)	(45·8)	(− 2·7)	(47)	(258)	(277)
134·352		·973	285·8					134
		·969	275·8					155
		·829	281·8					156
	11393	·507	285·8	61·7	+ 5·6	2	23	
	11395	·514	296·5	60·3	+10·9	35	126	
C	11394	·488	291·2	59·7	+ 7·8	30	143	
	1038d	·370	283·1	53·5	+ 2·3	2	7	
	11396	·921	106·0	325·9	−15·7	5	23	173*f*
	11397	·976	79·2	316·0	+ 9·9	9	20	237*f*
		·968	85·6					53
May 15			(−21·2)	(32·5)	(− 2·6)	(83)	(342)	(908)
135·304		·884	279·6					385
	11393	·686	281·4	62·3	+ 5·9	5	23	
	11395	·683	288·7	60·9	+10·7	39	188	
C	11394	·661	285·0	59·9	+ 7·9	20	129	
	11396	·827	107·4	325·0	−15·7	45	135	178*c*
	11397	·918	77·6	314·4	+10·4	11	28	325*c*
May 16			(−21·0)	(19·9)	(− 2·5)	(120)	(503)	(888)
136·375		·942	278·3					257
		·928	290·5					113
	11395	·861	282·7	63·9	+ 9·7	15	69 }	837*c*
	11394	·822	281·5	59·9	+ 8·0	23	129 }	
C	11396	·684	110·6	324·2	−15·7	46	152	
	11397	·762	75·1	317·6	+ 9·7	3	5	218*f*
		·901	70·3					89
		·961	99·0					179
May 17			(−20·7)	(5·7)	(− 2·4)	(87)	(355)	(1693)
137·569		·841	284·5					367
		·766	296·7					132
	11395	·971	280·3	65·2	+ 9·4	18	80 }	708*c*
	11394	·946	279·4	60·2	+ 8·1	21	114 }	
G	11398	·211	11·1	347·5	+ 9·6	4	11	
	11396	·484	119·7	324·1	−15·9	49	294	
		·866	99·3					108
		·944	75·5					273
May 18			(−20·3)	(349·9)	(− 2·3)	(92)	(499)	(1588)
138·368		·953	279·3					274
		·881	280·1					188
	11398	·258	324·7	348·1	+10·0	1	9	
C	11396	·346	132·5	324·1	−15·6	50	320	
		·824	100·2					83
		·899	73·0					190
May 19			(−20·1)	(339·4)	(− 2·2)	(51)	(329)	(735)
139·371		·969	283·8					155
		·935	292·4					218
C	11396	·235	171·6	324·1	−15·4	98	525	
		·826	71·0					79
		·962	76·3					315
May 20			(−19·8)	(326·1)	(− 2·0)	(98)	(525)	(767)
140·348	11396	·305	218·1	324·4	−15·7	107	559	
G	11399	·903	75·4	250·0	+12·3	2	12	314*c*
		·974	70·7					46
May 21			(−19·5)	(313·2)	(− 1·9)	(109)	(571)	(360)
141·438	11396	·483	240·2	324·5	−15·5	94	478	
	11397	·344	302·5	315·8	+ 8·9	1	3	
G	11400	·296	43·7	286·8	+10·5	1	3	
	11399	·722	72·2	254·4	+11·4	4	10	189*f*
		·948	84·9					50
May 22			(−19·1)	(298·8)	(− 1·8)	(100)	(494)	(239)
142·367	11396	·646	247·3	324·6	−15·7	84	464	
G	11400	·209	358·5	286·8	+10·3	8	28	
	11399	·599	64·8	252·8	+13·3	8	37	
May 23			(−18·8)	(286·5)	(− 1·7)	(100)	(529)	(0)
143·488		·917	256·1					84
	11396	·811	251·3	324·4	−16·0	57	317	359*c*
G	11400	·331	309·4	286·6	+10·5	7	26	
	11399	·378	52·9	253·8	+11·6	12	38	
May 24			(−18·5)	(271·6)	(− 1·6)	(76)	(381)	(443)

Group 11396. May 15–26. A stream, approximately of normal type, whose development is rather less rapid than usual.
Group 11397. May 15–22. A single small spot on May 15, 17 and 22; a wide pair on May 16.
Group 11398. May 18–19. A pair of small spots.
Group 11399. May 21–31. A rather feeble but persistent stream of small spots.
Group 11400. May 22–27. A few small spots.

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G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
144·299		·980	255·8					52
		·847	286·2					212
G	11396	·913	252·9	326·0	−16·2	54	200	409*c*
	11400	·460	296·3	285·6	+10·4	6	29	
	11399	·247	28·9	253·9	+11·0	12	35	
May 25			(−18·2)	(260·9)	(− 1·5)	(72)	(264)	(673)
145·348		·930	281·9					315
	11396	·986	254·3	327·3	−15·7	45	157	454*c*
G	11400	·670	287·7	287·3	+10·7	1	3	
	11401	·534	278·6	278·8	+ 3·5	1	4	
	11399	·256	325·6	255·4	+10·8	23	53	
May 26			(−17·8)	(247·0)	(− 1·3)	(70)	(217)	(769)
146·350	*1039a*	·971	273·3	309·6	+ 2·9	4	13	127*c*
	11400	·831	284·1	288·8	+11·0	2	4	99*c*
G	11401	·732	277·0	280·4	+ 4·3	24	78	
	11399	·426	299·4	255·9	+10·9	23	79	
		·966	75·5					122
May 27			(−17·5)	(233·8)	(− 1·2)	(53)	(174)	(348)
147·569		·948	282·7					160
		·842	286·5					144
G	11401	·913	275·7	283·1	+ 4·7	17	47	337*f*
	11399	·681	287·7	258·8	+11·1	10	31	
		·933	75·0					251
May 28			(−17·1)	(217·6)	(− 1·1)	(27)	(78)	(892)
148·348		·937	284·0					97
	11401	·974	275·7	283·8	+ 5·3	11	35	398*f*
G	11399	·780	284·8	257·2	+10·8	39	114	273*p*
		·866	72·4					163
		·906	86·4					160
May 29			(−16·8)	(207·3)	(− 1·0)	(50)	(149)	(1091)
149·343	11399	·901	282·9	257·5	+11·2	34	94	457*c*
G	11402	·998	86·2	108·2	+ 3·7	37	169	440*p*
		·933	72·1					163
May 30			(−16·4)	(194·2)	(− 0·9)	(71)	(263)	(1060)
150·341		·834	287·9					196
	11399	·963	282·3	254·6	+11·7	4	20	612*c*
G	11402	·958	84·4	108·1	+ 5·1	71	308	560*c*
		·909	84·3					524
May 31			(−16·1)	(181·0)	(− 0·7)	(75)	(328)	(1892)

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
151·357	11402	·867	83·0	107·9	+ 5·7	74	352	490*c*
		·797	81·9					585
G		·957	89·1					156
		·969	79·6					159
June 1			(−15·7)	(167·5)	(− 0·6)	(74)	(352)	(1390)
152·471	11403	·652	257·3	192·7	− 8·6	4	14	
	11404	·611	77·9	116·0	+ 6·9	14	35	
G	11402	·703	81·5	108·7	+ 5·6	60	279	211*f*
		·873	80·7					276
		·986	82·1					301
June 2			(−15·3)	(152·8)	(− 0·5)	(78)	(328)	(788)
153·405	11403	·804	260·5	193·4	− 7·8	4	8	209*c*
	11404	·420	72·1	116·8	+ 7·1	20	85	
G	11402	·531	79·3	108·9	+ 5·3	61	280	
		·955	82·0					742
		·972	97·3					134
June 3			(−14·9)	(140·4)	(− 0·4)	(85)	(373)	(1085)
154·435		·918	261·2					149
	11404	·201	55·5	117·3	+ 6·3	30	261	
	11402	·324	72·7	108·8	+ 5·3	61	298	
G		·868	80·5					824
		·901	98·1					162
		·973	81·2					302
June 4			(−14·5)	(126·8)	(− 0·2)	(91)	(559)	(1437)
155·378		·984	262·0					137
	11404	·135	328·9	118·3	+ 6·5	35	127	
	11402	·134	45·3	108·8	+ 5·3	53	261	
G		·773	100·6					122
		·799	77 ·8					314
		·923	78·8					547
June 5			(−14·2)	(114·3)	(− 0·1)	(88)	(388)	(1120)
156·363	11404	·340	289·2	120·1	+ 6·4	39	234	
	11402	·168	302·8	109·4	+ 5·2	45	240	
G		·828	75·9					316
		·911	68·4					132
June 6			(−13·8)	(101·3)	(0·0)	(84)	(474)	(448)
157·345		·896	285·8					151
C	11404	·552	280·8	121·2	+ 6·0	38	256	
	11402	·385	282·8	110·3	+ 5·0	40	186	
June 7			(−13·4)	(88·3)	(+ 0·1)	(78)	(442)	(151)

Group 11401. May 26–29. A small group with brief maximum.
Group 11402. May 30–June 11. A group of stream type of the simplest formation, namely two well-defined components, each a regular spot, at the front and rear of the stream respectively. There are usually one or more tiny companions. The leader loses its symmetrical structure after June 5, and the follower has disappeared by June 9. The axis of the stream is inclined at first about 35° to the sun's equator, but this angle diminishes.
Group 11403. June 2–3. A pair of small spots.
Group 11404. June 2–10. A stream of usual type but of unstable components.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
158·361		·972	284·8					215
		·938	273·8					124
		·916	290·6					79
G	11404	·735	277·9	121·7	+ 5·9	50	263	241*p*
	11402	·591	278·4	110·6	+ 5·1	44	198	
	11405	·198	14·8	71·9	+11·2	1	5	
		·961	79·9					223
June 8			(−13·0)	(74·8)	(+ 0·2)	(95)	(466)	(882)
159·573		·871	269·2					144
	11404	·927	276·2	126·5	+ 5·9	30	170	496*f*
G	11402	·794	276·1	111·0	+ 5·0	27	133	363*c*
	11405	·300	308·7	72·5	+11·2	18	63	
		·860	80·3					167
June 9			(−12·5)	(58·8)	(+ 0·4)	(75)	(366)	(1170)
160·537		·965	268·5					169
		·943	284·1					117
	11404	·987	275·7	126·5	+ 5·7	33	136	591*f*
C	11402	·914	274·8	111·8	+ 4·6	28	105	653*nf*
	11405	·480	293·9	72·5	+11·7	14	67	
	1039b	·734	78·6	359·5	+ 8·7	3	7	67*f*
		·959	105·5					205
June 10			(−12·1)	(46·0)	(+ 0·5)	(78)	(315)	(1802)
161·426		·994	277·1					70
		·932	280·1					375
		·842	280·2					156
C	11402	·977	274·5	111·6	+ 4·5	21	74	503*f*
	11405	·641	287·7	72·6	+11·7	15	53	
	1039c	·357	88·7	13·4	+ 1·0	1	3	
		·920	108·0					513
June 11			(−11·7)	(34·2)	(+ 0·6)	(37)	(130)	(1617)
162·461		·991	279·2					289
		·931	278·9					242
G		·805	275·7					266
	11405	·821	285·0	74·7	+12·7	4	12	248*f*
		·828	112·2					379
June 12			(−11·3)	(20·5)	(+ 0·7)	(4)	(12)	(1424)
163·343		·902	275·1					417
		·894	281·9					422
		·854	262·3					284
G		·775	286·6					182
		·774	114·9					264
		·930	100·9					69
June 13			(−10·9)	(8·9)	(+ 0·8)	(0)	(0)	(1638)
164·434		·958	278·5					298
		·835	284·9					315
G	*1040a*	·969	262·1	69·6	− 7·4	31	99	541*c*
		·930	86·7					265
June 14			(−10·5)	(354·4)	(+ 1·0)	(31)	(99)	(1419)
165·346		·934	276·9					215
		·888	288·5					378
G		·865	86·4					307
		·983	77·3					335
June 15			(−10·1)	(342·3)	(+ 1·1)	(0)	(0)	(1235)
166·510		·956	283·0					323
C		·889	76·3					244
		·958	76·8					148
June 16			(−9·6)	(327·0)	(+ 1·2)	(0)	(0)	(715)
167·499		·778	76·0					345
G		·869	76·3					196
June 17			(−9·2)	(313·9)	(+ 1·3)	(0)	(0)	(541)
168·429	*1040b*	·587	246·1	334·7	−12·5	1	3	
G		·909	61·6					52
		·945	84·4					62
June 18			(−8·8)	(301·5)	(+ 1·4)	(1)	(3)	(114)
169·356		·978	283·3					75
G		·847	83·8					90
June 19			(−8·3)	(289·3)	(+ 1·5)	(0)	(0)	(165)
170·424		·874	254·7					51
C		·771	249·9					115
June 20			(−7·9)	(275·2)	(+ 1·7)	(0)	(0)	(166)
171·488		·963	256·6					59
G		·904	247·6					215
June 21			(−7·4)	(261·1)	(+ 1·8)	(0)	(0)	(274)
172·364		·953	248·4					75
G	*1040c*	·341	314·8	264·0	+15·7	1	5	
June 22			(−7·0)	(149·5)	(+ 1·9)	(1)	(5)	(75)
173·645		·824	274·8					260
G		·968	76·4					100
June 23			(−6·4)	(232·5)	(+ 2·0)	(0)	(0)	(360)
174·370		·901	276·6					399
C		·920	74·0					518
June 24			(−6·1)	(222·9)	(+ 2·1)	(0)	(0)	(917)

Group 11405. June 8–12. A small, short-lived stream.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
175·442		·948	276·8					143
		·840	278·2					191
G		·833	290·4					176
		·803	73·5					188
		·981	83·9					396
June 25			(−5·6)	(208·7)	(+ 2·2)	(0)	(0)	(1094)
176·370		·904	285·0					466
G		·923	91·8					194
		·930	82·8					481
June 26			(−5·2)	(196·4)	(+ 2·3)	(0)	(0)	(1141)
177·356		·940	284·0					232
	11406	·569	97·6	149·2	− 2·2	1	4	
		·825	93·3					151
G		·830	82·0					493
		·942	86·2					241
		·963	75·4					335
June 27			(−4·8)	(183·4)	(+ 2·5)	(1)	(4)	(1452)
178·374	11406	·357	101·8	149·5	− 1·8	13	37	
		·815	86·3					188
G		·853	72·5					275
		·934	82·7					382
June 28			(−4·3)	(169·9)	(+ 2·6)	(13)	(37)	(845)
179·362	11406	·172	118·1	148·1	− 2·0	3	7	
	11407	·967	99·0	82·4	− 8·0	23	124	390*f*
	11408	·989	83·1	75·4	+ 7·2	50	380	881*c*
G		·767	84·9					140
		·782	71·4					174
		·874	89·8					146
		·883	79·0					146
June 29			(−3·9)	(156·8)	(+ 2·7)	(76)	(511)	(1877)
180·360		·944	259·8					165
	1040d	·206	62·2	133·0	+ 8·3	4	9	
G	11407	·887	100·2	82·1	− 7·7	17	118	827*f*
	11408	·950	83·2	71·9	+ 7·3	61	364	1163*c*
		·865	84·8					390
June 30			(−3·4)	(143·6)	(+ 2·8)	(82)	(491)	(2545)
181·359	11407	·758	102·8	82·4	− 7·7	23	108	1043*f*
	11408	·847	83·2	72·7	+ 7·3	63	307	954*c*
G		·951	81·1					762
		·955	70·5					115
July 1			(−3·0)	(130·4)	(+ 2·9)	(86)	(415)	(2874)
182·465	11407	·572	108·1	82·7	− 7·7	21	79	
	11409	·564	79·1	81·9	+ 8·6	2	10	
	11408	·672	82·7	73·8	+ 7·1	33	225	
C		·780	106·1					148
		·816	79·9					175
		·899	80·0					472
		·974	71·3					98
July 2			(−2·5)	(115·8)	(+ 3·0)	(56)	(314)	(893)
183·366		·820	286·3					161
	11409	·358	78·6	83·2	+ 6·9	1	5	
	11407	·399	117·5	83·0	− 7·7	17	80	
	11408	·496	81·5	74·3	+ 6·9	35	112	
G		·749	79·8					208
		·834	74·2					162
		·876	74·2					162
		·940	65·7					84
July 3			(−2·0)	(103·8)	(+ 3·1)	(53)	(197)	(777)
184·408		·920	284·2					227
G	11407	·221	146·9	83·0	− 7·5	9	65	
	11408	·277	75·8	74·4	+ 7·0	19	88	
July 4			(−1·6)	(90·0)	(+ 3·2)	(28)	(153)	(227)
185·381		·974	285·3					139
		·912	290·7					117
		·796	265·9					80
G		·788	277·7					220
	11409	·135	298·0	84·1	+ 7·0	4	12	
	11407	·218	211·0	83·7	− 7·4	14	66	
	11408	·093	41·8	73·6	+ 7·4	3	13	
July 5			(−1·1)	(77·2)	(+ 3·4)	(21)	(91)	(556)
186·374		·902	267·7					271
		·900	278·5					356
G	11409	·385	283·1	86·2	+ 8·2	1	5	
	11407	·386	242·1	84·0	− 7·1	10	60	
	11410	·988	111·7	345·2	−20·7	16	44	93*c*
July 6			(−0·7)	(64·0)	(+ 3·5)	(27)	(109)	(720)
187·363		·973	278·2					117
		·969	269·2					82
		·851	283·9					262
		·830	268·8					215
G	11409	·590	278·2	86·9	+ 7·8	4	14	
	11407	·577	252·2	84·4	− 7·1	14	49	
	11411	·688	105·2	9·0	− 7·7	19	54	
	11410	·940	113·8	344·1	−20·9	13	54	277*f*
July 7			(−0·2)	(50·9)	(+ 3·6)	(50)	(171)	(953)

Group 11406. June 27–29. A tiny spot on June 27; a pair of spots on June 28, of which one is left on June 29.
Group 11407. June 29–July 8. A regular spot with a tiny follower on July 1 and 2.
Group 11408. June 29–July 8. A stream of spots, associated with a considerable area of faculæ, dying out rather suddenly. A close pair of tiny spots is seen on July 8.
Group 11409. July 2–8. An area of disturbance, in front of Group 11408, represented by one or two tiny spots.
Group 11410. July 6–16. A small regular spot that disappears on July 11; on July 16 a tiny spot appears near its position.
Group 11411. July 7–15. A smallish stream of which the leader, a double spot, alone remains after July 10.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
188·345		·948	283·2					339
		·856	278·4					322
	11409	·769	276·6	88·1	+ 7·4	2	4	290*c*
	11407	·745	257·5	84·8	− 6·7	7	14	
G	11408	·632	278·4	76·9	+ 8·2	3	6	
	11411	·514	111·6	9·2	− 7·7	46	153	
	11410	·858	117·5	343·4	−21·2	14	53	339*f*
	11412	·991	102·4	316·9	−11·7	32	108	75*c*
July 8			(+0·2)	(37·9)	(+ 3·7)	(104)	(338)	(1365)
189·420		·931	281·3					274
		·891	181·6					10
		·863	259·7					344
		·814	277·1					636
G		·777	256·7					343
	11411	·302	129·1	10·1	− 7·2	20	73	
	11410	·734	123·9	343·1	−21·2	12	32	202*f*
	11412	·933	103·9	316·4	−11·5	23	116	602*sf*
		·982	84·0					65
July 9			(+0·7)	(23·7)	(+ 3·8)	(55)	(221)	(2476)
190·342		·960	276·6					480
		·953	287·3					95
		·945	262·6					216
		·896	276·9					538
		·892	258·7					534
		·780	280·5					253
G	11411	·197	172·0	9·9	− 7·3	16	70	
	11413	·461	144·5	355·2	−18·2	3	3	
	11410	·617	133·7	342·9	−21·7	9	18	
	11412	·840	106·3	316·4	−11·4	22	68	481*sf*
	1040e	·924	85·1	304·0	+ 6·0	3	13	63*c*
		·961	93·1					135
July 10			(+1·1)	(11·5)	(+ 3·9)	(53)	(172)	(2795)
191·362		·971	277·0					246
		·959	259·8					202
		·899	278·4					170
		·775	276·5					182
G	11411	·301	231·5	11·7	− 6·8	7	55	
	11413	·392	179·2	357·7	−19·0	4	15	
	11410	·500	151·0	342·9	−22·0	3	10	
	11412	·696	111·1	316·7	−11·5	20	67	286*sf*
July 11			(+1·6)	(358·0)	(+ 4·0)	(34)	(147)	(1086)
192·642		·970	284·8					71
		·939	273·0					200
		·892	284·5					229
	11411	·569	252·3	14·0	− 6·5	9	27	
	11413	·457	211·6	355·7	−18·8	7	22	
G	11414	·140	80·9	333·2	+ 5·3	2	4	

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
192·642	11412	·484	123·0	316·7	−11·5	9	34	
G		·950	75·6					190
July 12			(+2·2)	(341·1)	(+ 4·1)	(27)	(87)	(690)
193·367		·974	274·3					111
		·960	283·5					130
		·906	296·9					87
		·844	287·2					97
	11411	·708	255·9	15·1	− 6·8	10	21	
G	11413	·571	226·7	357·5	−19·2	5	9	
	11414	·028	316·3	332·6	+ 5·3	2	4	
	11412	·359	138·7	317·6	−11·5	6	14	
		·911	75·1					144
		·962	103·5					92
		·984	71·9					68
July 13			(+2·5)	(331·5)	(+ 4·2)	(23)	(48)	(729)
194·545		·950	291·8					212
	11411	·881	259·0	16·4	− 7·5	5	9	224*f*
	11413	·712	238·8	355·7	−18·3	6	23	
G	11412	·274	186·8	317·8	−11·4	4	9	
		·748	109·2					122
		·871	104·9					152
		·883	72·8					86
July 14			(+3·0)	(315·9)	(+ 4·3)	(15)	(41)	(796)
195·449		·916	270·7					33
	11411	·962	260·4	16·9	− 8·0	0	9	364*f*
C	11413	·849	243·2	357·4	−19·9	0	5	289*f*
	11412	·350	213·8	315·4	−12·5	12	27	
		·805	110·4					143
July 15			(+3·4)	(303·9)	(+ 4·4)	(12)	(41)	(829)
196·395		·972	269·5					63
		·972	261·3					134
		·923	247·2					259
		·887	282·9					110
G	11410	·836	237·1	341·5	−24·1	2	8	210*c*
	11412	·441	223·9	309·7	−14·2	1	4	
		·921	86·3					58
		·963	68·3					42
		·973	75·5					219
July 16			(+3·9)	(291·4)	(+ 4·5)	(3)	(12)	(1095)
197·410		·967	249·7					89
		·965	283·3					43
G		·906	241·8					255
	11415	·074	321·5	280·7	+ 7·9	1	9	
		·907	76·3					320
July 17			(+4·3)	(278·0)	(+ 4·6)	(1)	(9)	(707)

Group 11412. July 8–18. A regular spot usually with a follower; the latter is alone visible on July 16, whilst a tiny spot reappears at the position of the leader on July 18.
Group 11413. July 10–15. One or two spots.
Group 11414. July 12–13. A small spot.
Group 11415. July 17–18. A pair of small spots.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
198·350		·966	243·9					150
	11412	·796	248·7	315·1	−13·8	2	4	269*c*
C	11415	·279	284·7	281·3	+ 8·5	3	7	
		·784	74·7					185
July 18			(+4·7)	(265·5)	(+ 4·6)	(5)	(11)	(604)
199·411		·980	279·0					69
		·911	237·0					83
G		·898	250·2					442
		·887	281·2					49
July 19			(+5·2)	(251·5)	(+ 4·7)	(0)	(0)	(643)
200·387		·968	252·4					486
		·949	294·7					25
G		·959	83·4					64
		·968	74·6					114
July 20			(+5·6)	(238·6)	(+ 4·8)	(0)	(0)	(689)
201·340		·807	276·2					101
	1041a	·126	31·3	222·2	+11·1	1	2	
		·845	86·3					86
G		·910	75·6					131
		·913	93·2					90
		·927	83·5					98
		·947	67·2					71
July 21			(+6·0)	(226·0)	(+ 4·9)	(1)	(2)	(577)
202·432		·915	285·5					57
G	11416	·786	83·3	159·6	+ 8·3	21	61	130*c*
		·954	80·1					95
July 22			(+6·5)	(211·5)	(+ 5·0)	(21)	(61)	(282)
203·338		·951	286·5					166
		·892	255·7					189
	11416	·634	83·2	160·2	+ 8·2	11	25	
		·828	69·5					86
G		·899	84·9					136
		·909	80·6					95
		·913	92·9					111
		·964	70·6					85
July 23			(+6·9)	(199·5)	(+ 5·1)	(11)	(25)	(868)
204·370		·939	257·5					132
		·904	265·3					59
		·836	273·7					84
	11416	·415	82·1	161·5	+ 8·0	3	13	
G		·796	92·1					155
		·803	79·7					95
		·934	70·7					80
		·953	80·0					179
July 24			(+7·3)	(185·9)	(+ 5·2)	(3)	(13)	(784)

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
205·470	11416	·184	70·2	161·3	+ 8·8	2	10	
		·872	83·6					261
G		·888	68·0					162
		·973	83·8					170
July 25			(+7·8)	(171·3)	(+ 5·3)	(2)	(10)	(593)
206·374	11417	·994	83·6	75·3	+ 6·9	22	79	503*sf*
		·779	82·6					232
C		·790	104·0					174
		·933	73·6					118
		·937	99·4					240
July 26			(+8·2)	(159·4)	(+ 5·4)	(22)	(79)	(1267)
207·344		·899	284·4					160
	11417	·932	84·6	77·6	+ 6·9	12	75	304*f*
		·827	102·3					101
G		·847	80·4					374
		·876	92·3					42
		·916	100·9					185
		·966	75·6					78
July 27			(+8·6)	(146·5)	(+ 5·4)	(12)	(75)	(1244)
208·568		·973	282·6					72
	11417	·790	85·9	78·1	+ 6·6	15	70	157*c*
G		·866	84·2					240
		·951	69·4					82
		·976	87·8					68
July 28			(+9·1)	(130·4)	(+ 5·5)	(15)	(70)	(619)
209·349		·889	257·8					44
	1041b	·581	74·0	85·1	+13·8	3	9	
	11417	·660	86·6	78·6	+ 6·5	15	73	
G		·768	84·4					206
		·896	69·7					134
		·897	89·1					129
		·923	79·8					95
July 29			(+9·4)	(120·0)	(+ 5·6)	(18)	(82)	(608)
210·378		·974	259·2					108
		·894	264·2					81
G	11418	·423	115·2	83·9	− 5·0	9	33	
	11417	·472	86·6	78·2	+ 6·7	27	103	
		·873	72·0					168
July 30			(+9·8)	(106·4)	(+ 5·7)	(36)	(136)	(357)
211·148		·907	275·8					71
	11418	·272	133·8	84·9	− 5·2	38	125	
K	11417	·321	86·6	77·5	+ 6·5	31	111	
		·802	73·4					178
		·938	73·6					86
July 31			(+10·2)	(96·2)	(+ 5·7)	(69)	(236)	(335)

Group 11416. July 22–25. A spot with tiny followers on July 22 and 23.
Group 11417. July 26–Aug. 4. A regular spot with small followers on July 28, 30, 31 and Aug. 1.
Group 11418. July 30–Aug. 5. A small short-lived stream of normal type; a single spot represents the group on Aug. 3–5.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
212·348		·968	277·4					80
		·952	288·4					184
		·903	273·0					163
		·863	264·6					72
		·859	289·7					129
G		·813	273·6					133
	11418	·212	207·4	86·0	− 5·0	27	105	
	11417	·034	57·6	78·8	+ 6·8	15	68	
		·818	73·3					122
		·964	77·4					331
Aug. 1			(+10·6)	(80·4)	(+ 5·8)	(42)	(173)	(1214)
213·383		·959	289·3					47
		·935	266·3					88
		·921	276·6					109
	11418	·390	241·7	86·8	− 5·0	9	39	
C	11417	·234	273·3	80·2	+ 6·5	14	31	
	11419	·261	203·7	72·8	− 7·9	8	23	
	11420	·815	87·3	12·0	+ 5·6	14	33	53*c*
		·886	77·4					169
		·986	81·8					409
Aug. 2			(+11·1)	(66·7)	(+ 5·9)	(45)	(126)	(875)
214·457		·980	279·1					101
		·930	279·1					93
		·844	286·1					170
		·841	276·7					152
	11418	·610	252·9	88·2	− 5·5	3	4	
G	11417	·474	272·8	80·8	+ 6·6	9	17	
	11419	·401	235·9	72·0	− 7·3	9	33	
	11420	·643	88·8	12·5	+ 5·3	9	20	
		·784	76·9					150
		·930	83·2					757
Aug. 3			(+11·5)	(52·5)	(+ 6·0)	(30)	(74)	(1423)
215·477		·951	285·9					165
		·941	275·5					83
		·863	254·9					139
		·839	270·5					108
		·799	280·9					171
G	11418	·749	256·3	85·9	− 6·1	2	5	134*c*
	11417	·673	273·5	81·4	+ 6·8	6	14	
	11419	·596	248·5	72·9	− 7·6	23	143	
	11420	·468	90·3	11·1	+ 5·2	4	15	
		·823	83·6					883
		·983	102·5					133
Aug. 4			(+11·9)	(39·0)	(+ 6·0)	(35)	(177)	(1816)
216·561		·949	259·8					53
		·928	270·9					158
G		·925	280·9					224

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
216·561		·811	283·7					59
G		·800	272·4					156
	11418	·889	259·7	86·0	− 6·3	2	10	145*c*
	11419	·775	254·5	73·3	− 7·9	21	149	250*c*
		·926	105·1					144
Aug. 5			(+12·3)	(24·6)	(+ 6·1)	(23)	(159)	(1189)
217·504		·971	276·9					70
		·950	262·1					185
		·934	284·9					149
		·931	254·4					68
		·891	275·6					245
C		·811	283·4					95
	11419	·892	257·8	73·6	− 7·9	30	176	289*c*
	1041c	·095	340·8	14·0	+11·4	4	9	
		·834	111·7					172
		·921	112·3					201
		·968	81·0					71
Aug. 6			(+12·7)	(12·2)	(+ 6·2)	(34)	(185)	(1545)
218·370		·957	276·4					194
		·833	270·5					134
		·804	287·0					139
G	11419	·961	259·6	73·2	− 8·2	12	48	297*c*
		·821	81·8					90
		·928	81·9					146
Aug. 7			(+13·0)	(0·7)	(+ 6·2)	(12)	(48)	(1000)
219·492		·968	283·4					45
G		·876	283·6					90
Aug. 8			(+13·4)	(345·9)	(+ 6·3)	(0)	(0)	(135)
220·367		·955	278·3					106
G		·943	289·4					197
	1042a	·164	289·7	343·3	+ 9·4	1	7	
Aug. 9			(+13·7)	(334·3)	(+ 6·3)	(1)	(7)	(303)
221·374		·815	274·3					212
C		·930	110·4					115
Aug. 10			(+14·1)	(321·0)	(+ 6·4)	(0)	(0)	(327)
222·371		·921	280·5					29
G	*1042b*	·561	268·5	341·9	+ 4·5	5	13	
Aug. 11			(+14·5)	(307·8)	(+ 6·5)	(5)	(13)	(29)
223·342		·889	284·0					94
		·842	239·9					59
G		·792	277·2					266
	1042c	·638	297·4	332·6	+22·2	1	5	
		·913	83·0					45
Aug. 12			(+14·8)	(295·0)	(+ 6·5)	(1)	(5)	(464)

Group 11419. Aug. 2–7. A cluster of small spots that condenses into a moderate-sized composite spot on Aug. 5.
Group 11420. Aug. 2–4. A small definite spot with a companion on Aug. 2 and 3.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
224·550		·952	243·9					60
		·908	276·0					675
		·894	252·1					140
G		·885	287·5					78
		·822	293·3					99
	11421	·219	268·1	291·7	+ 6·0	1	4	
Aug. 13			(+15·3)	(279·0)	(+ 6·6)	(1)	(4)	(1052)
225·522		·974	275·5					263
		·970	240·8					113
		·907	256·2					106
C		·894	284·0					62
		·835	248·0					117
	11421	·434	269·7	292·0	+ 5·9	2	7	
Aug. 14			(+15·6)	(266·2)	(+ 6·6)	(2)	(7)	(661)
226·359		·931	251·5					178
G		·883	259·8					85
Aug. 15			(+15·9)	(255·1)	(+ 6·7)	(0)	(0)	(263)
227·383		·989	257·0					75
G		·979	250·8					82
		·907	245·8					140
Aug. 16			(+16·2)	(241·6)	(+ 6·7)	(0)	(0)	(297)
228·478	11422	·370	216·4	240·0	−10·6	28	63	
G								
Aug. 17			(+16·6)	(227·1)	(+ 6·8)	(28)	(63)	(0)
229·343	11422	·497	234·4	239·9	−10·5	31	140	
G								
Aug. 18			(+16·9)	(215·7)	(+ 6·8)	(31)	(140)	(0)
230·558	11422	·690	247·1	239·7	−10·4	37	124	
G								
Aug. 19			(+17·3)	(199·6)	(+ 6·8)	(37)	(124)	(0)
231·346		·938	255·6					49
G	11422	·798	251·2	239·2	−10·5	32	153	258*c*
		·967	71·4					52
Aug. 20			(+17·6)	(189·2)	(+ 6·9)	(32)	(153)	(359)
232·646	11422	·950	256·2	241·7	−10·8	25	97	431*c*
G		·948	81·9					229
Aug. 21			(+18·0)	(172·0)	(+ 6·9)	(25)	(97)	(660)
233·433	11422	·981	257·5	238·6	−10·8	5	18	133*c*
		·899	83·1					348
G		·924	54·2					74
		·949	75·9					243
		·964	99·5					329
Aug. 22			(+18·2)	(161·6)	(+ 7·0)	(5)	(18)	(1127)
234·311		·776	84·2					225
		·854	72·5					130
G		·911	101·9					301
		·923	82·9					182
Aug. 23			(+18·5)	(150·0)	(+ 7·0)	(0)	(0)	(838)
235·360		·836	106·5					355
C		·892	80·4					282
		·897	98·7					87
Aug. 24			(+18·8)	(136·2)	(+ 7·0)	(0)	(0)	(724)
236·344		·761	85·1					202
G		·951	82·3					200
Aug. 25			(+19·1)	(123·2)	(+ 7·0)	(0)	(0)	(402)
237·331	11423	·522	256·2	140·4	− 1·0	1	5	
	11424	·959	100·9	38·2	− 8·3	3	9	35*n*
G	11425	·998	86·0	23·5	+ 4·4	0	118	
		·865	83·3					305
		·958	117·2					43
Aug. 26			(+19·4)	(110·1)	(+ 7·1)	(4)	(132)	(383)
238·340	11423	·702	260·3	140·4	− 1·7	4	10	115*p*
	11426	·192	98·7	85·9	+ 5·3	8	36	
	1042d	·759	82·9	47·1	+10·0	4	14	144*c*
G	11425	·957	87·5	23·6	+ 4·4	24	85	164*nf*
		·855	103·1					55
		·994	79·9					40
Aug. 27			(+19·7)	(96·8)	(+ 7·1)	(40)	(145)	(518)
239·360	11423	·899	264·3	146·6	− 1·9	6	10	122*f*
	11426	·096	259·3	88·7	+ 6·0	6	24	
G	11424	·699	107·3	41·3	− 6·7	8	23	
	11425	·860	89·0	23·9	+ 4·5	22	111	138*nf*
		·946	79·8					208
Aug. 28			(+20·0)	(83·3)	(+ 7·1)	(42)	(168)	(468)

Group 11421. Aug. 13–14. A pair of spots.
Group 11422. Aug. 17–22. A stream whose primary components are double spots on Aug. 18, separating rather widely in longitude.
Group 11423. Aug. 26–29. A tiny spot.
Group 11424. Aug. 26–30. A single spot on Aug. 26; a fairly wide pair on Aug. 28–30.
Group 11425. Aug. 26–Sept. 7. A stable, regular spot with a double umbra on Sept. 2.
Group 11426. Aug. 27–29. Two or three rather widely separated spots.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
240·347	11423	·958	266·2	143·0	− 1·5	0	3	250*p*
	11426	·304	266·0	88·0	+ 5·6	10	22	
	11424	·514	117·0	42·9	− 7·2	8	27	
G	11425	·720	90·8	24·3	+ 4·4	19	118	274*nf*
		·851	80·0					173
		·972	77·4					190
		·974	85·8					139
Aug. 29			(+20·2)	(70·3)	(+ 7·1)	(37)	(170)	(1026)
241·440	11424	·338	137·5	42·5	− 7·4	2	11	
	11425	·525	93·8	24·3	+ 4·2	14	81	
G	11427	·966	85·7	340·4	+ 6·0	8	28	285*c*
		·887	79·1					141
		·908	87·9					112
Aug. 30			(+20·5)	(55·8)	(+ 7·2)	(24)	(120)	(538)
242·502		·802	279·2					65
	11425	·299	99·4	24·7	+ 4·1	14	92	
	11428	·469	76·2	14·1	+12·8	26	144	
C	11427	·898	86·2	337·6	+ 6·6	5	25	218*c*
		·793	84·4					165
		·970	103·4					81
Aug. 31			(+20·8)	(41·8)	(+ 7·2)	(45)	(261)	(529)
243·390		·923	274·6					58
		·914	281·2					83
		·833	256·4					245
		·829	269·8					121
G		·810	283·6					81
	11425	·108	122·0	24·9	+ 3·9	17	54	
	11428	·285	69·9	14·3	+12·5	19	120	
	11427	·703	90·8	345·5	+ 4·5	1	8	190*f*
		·918	107·5					99
Sept. 1			(+21·0)	(30·1)	(+ 7·2)	(37)	(182)	(877)
244·520		·950	273·1					175
		·942	259·3					245
		·938	281·8					120
		·864	272·7					132
C	11425	182	250·3	25·0	+ 3·6	12	51	
	11428	·092	4·5	14·8	+12·5	22	66	
	11429	·951	96·9	304·6	− 4·2	3	11	317*f*
		·799	113·9					133
Sept. 2			(+21·3)	(15·2)	(+ 7·2)	(37)	(128)	(1122)
245·342		·982	261·3					130
		·982	282·9					148
		·949	273·7					232
		·847	274·7					190
G	11425	·362	261·3	25·2	+ 3·6	10	40	

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
245·342	11428	·213	296·0	15·6	+12·4	11	71	
G	11429	·869	99·5	305·2	− 4·6	5	11	424*f*
		·972	80·4					134
Sept. 3			(+21·5)	(4·3)	(+ 7·2)	(26)	(122)	(1258)
246·495		·969	282·3					28
		·888	276·4					207
		·844	265·2					68
		·827	255·0					184
G	11425	·596	266·4	25·5	+ 3·7	11	42	
	11428	·430	283·2	14·3	+12·1	9	25	
	11429	·704	104·6	306·1	− 4·9	1	4	224*f*
		·883	81·4					91
Sept. 4			(+21·8)	(349·1)	(+ 7·2)	(21)	(71)	(802)
247·363		·947	278·8					177
		·914	259·6					149
	11425	·750	268·7	26·1	+ 3·8	7	29	150*c*
C	11428	·617	280·4	15·8	+12·1	5	13	
		·768	80·4					141
Sept. 5			(+22·0)	(337·6)	(+ 7·2)	(12)	(42)	(617)
248·338	11425	·878	270·2	26·1	+ 3·6	7	17	224*nf*
G	11428	·737	279·8	12·5	+12·1	9	22	264*c*
		·964	103·4					231
Sept. 6			(+22·2)	(324·7)	(+ 7·2)	(16)	(39)	(719)
249·483		·866	270·7					63
	11425	·975	272·1	26·9	+ 3·6	4	24	316*f*
	11428	·855	279·2	8·8	+11·5	5	17	470*p*
G	11429	·215	175·9	308·7	− 5·2	8	21	
		·876	107·1					140
		·946	107·9					120
Sept. 7			(+22·5)	(309·6)	(+ 7·2)	(17)	(62)	(1109)
250·348		·957	281·3					403
		·834	280·6					153
	1043a	·559	227·5	323·4	−15·5	3	5	
G	11429	·292	222·2	309·5	− 5·3	1	8	
		·757	113·6					207
		·878	108·9					153
Sept. 8			(+22·7)	(298·2)	(+7·3)	(4)	(13)	(916)
251·380		·962	358·3					25
		·940	281·5					125
		·915	270·5					111
G		·829	273·7					185

Group 11427. Aug. 30–Sept. 1. One or two spots, differing somewhat in position from day to day, in a moderate area of faculæ.
Group 11428. Aug. 31–Sept. 7. A stream appearing suddenly on Aug. 31 in which the components separate considerably in longitude as they fade out.
Group 11429. Sept. 2–13. One or two small spots on Sept. 2–4 and Sept. 7–8; after Sept. 8 a group of stream-type develops and is led by a fairly large regular spot with double umbra on Sept. 11.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
251·380	11429	·474	243·3	309·6	− 5·6	8	18	
G	11430	·751	108·5	238·6	− 8·7	4	5	145*f*
		·745	119·1					122
Sept. 9			(+22·9)	(284·5)	(+ 7·3)	(12)	(23)	(713)
252·473		·975	282·7					91
		·937	274·1					175
G		·871	252·6					183
	11429	·678	253·3	310·7	− 5·8	22	114	
	11430	·554	116·7	240·2	− 8·1	4	11	
Sept. 10			(+23·1)	(270·1)	(+ 7·2)	(26)	(125)	(449)
253·345		·964	254·1					117
G	11429	·821	257·3	312·0	− 6·1	58	306	276*c*
	11430	·395	131·5	241·3	− 8·3	5	8	
Sept. 11			(+23·3)	(258·6)	(+ 7·2)	(63)	(314)	(393)
254·128	11429	·910	260·2	312·4	− 5·8	73	337	464*c*
K	11430	·292	158·1	241·9	− 8·5	2	4	
	11431	·161	75·9	239·2	+ 9·4	8	18	
Sept. 12			(+23·5)	(248·3)	(+ 7·2)	(83)	(359)	(464)
255·323		·911	259·1					114
	11429	·987	262·9	312·2	− 5·7	63	364	379*c*
G	11431	·137	287·3	240·1	+ 9·4	19	63	
	11432	·953	88·3	160·1	+ 3·8	8	11	130*f*
Sept. 13			(+23·7)	(232·5)	(+ 7·2)	(90)	(438)	(623)
256·353	11431	·364	277·9	240·3	+ 9·6	44	183	
G	11432	·865	89·9	159·1	+ 3·7	15	30	190*c*
		·934	96·1					163
Sept. 14			(+23·9)	(218·9)	(+ 7·2)	(59)	(213)	(353)
257·398		·807	245·7					161
	11431	·564	275·9	239·6	+ 9·3	26	100	
G	11432	·709	91·7	160·0	+ 3·9	6	18	
		·849	96·7					217
Sept. 15			(+24·1)	(205·1)	(+ 7·2)	(32)	(118)	(378)
258·377		·945	256·3					85
		·888	250·7					183
		·799	247·0					97
G	11431	·739	276·3	240·1	+ 9·5	36	121	56*p*
	11432	·518	94·3	161·2	+ 4·0	5	12	
	11433	·960	83·2	117·9	+ 8·6	25	143	324*f*
Sept. 16			(+24·3)	(192·2)	(+ 7·2)	(66)	(276)	(745)
1931.			°	°	°			
259·386		·968	253·5					129
		·886	251·6					129
	11431	·862	276·4	238·8	+ 9·1	13	65	275*c*
C	11432	·329	98·9	159·9	+ 3·9	7	19	
	11433	·873	84·1	117·6	+ 8·7	36	195	357*f*
		·971	81·2					248
Sept. 17			(+24·4)	(178·8)	(+ 7·2)	(56)	(279)	(1138)
260·106		·943	256·8					68
	11431	·935	277·2	239·1	+ 9·2	17	74	349*n*
K	11432	·137	111·7	162·0	+ 4·1	2	9	
	11433	·786	84·7	117·2	+ 8·6	38	177	412*f*
		·916	84·2					257
Sept. 18			(+24·5)	(169·3)	(+ 7·1)	(57)	(260)	(1086)
261·425	11433	·566	85·0	117·3	+ 8·7	31	177	
		·877	103·7					167
G		·881	73·1					83
		·942	86·7					22
Sept. 19			(+24·7)	(151·9)	(+ 7·1)	(31)	(177)	(272)
262·344	11433	·370	85·3	118·0	+ 8·3	27	138	
G		·930	83·3					61
Sept. 20			(+24·9)	(139·8)	(+ 7·1)	(27)	(138)	(61)
263·342		·945	268·0					76
G	11433	·148	83·2	118·1	+ 8·0	28	102	
		·929	78·2					115
Sept. 21			(+25·0)	(126·6)	(+ 7·1)	(28)	(102)	(191)
264·348	11433	·091	280·4	118·5	+ 7·9	15	66	
G	11434	·305	85·8	95·5	+ 7·9	6	33	
Sept. 22			(+25·2)	(113·3)	(+ 7·0)	(21)	(99)	(0)
265·114		·845	271·7					178
	11433	·275	274·5	119·2	+ 7·9	11	34	
K	11434	·132	82·1	95·6	+ 8·0	18	74	
		·959	86·3					127
Sept. 23			(+25·3)	(103·2)	(+ 7·0)	(29)	(108)	(305)
266·119		·950	272·6					149
	11433	·497	274·1	119·9	+ 8·1	7	21	
K	11434	·073	264·9	94·2	+ 6·7	2	15	
		·862	86·1					204
		·959	77·6					235
Sept. 24			(+25·4)	(90·0)	(+ 7·0)	(9)	(36)	(588)
267·402		·968	267·5					108
C	11433	·717	274·3	119·0	+ 7·9	4	13	
		·851	77·9					136
Sept. 25			(+25·5)	(73·0)	(+ 7·0)	(4)	(13)	(244)

Group 11430. Sept. 9–12. A single small spot.
Group 11431. Sept. 12–18. A group of stream-type that declines after a brief maximum on Sept. 14.
Group 11432. Sept. 13–18. A small ephemeral stream.
Group 11433. Sept. 16–25. A regular spot that divides on Sept. 21 into two nearly equal parts which separate in longitude; the following part has disappeared by Sept. 24. Small companions follow the regular spot on Sept. 18 and 19.
Group 11434. Sept. 22–24. A short-lived stream.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
268·344		·924	284·3					34
C		·817	276·0					299
	1043b	·492	312·2	84·3	+25·6	1	3	
Sept. 26			(+25·6)	(60·6)	(+ 6·9)	(1)	(3)	(333)
269·397		·938	276·7					369
		·760	275·1					345
G	II435	·995	71·7	320·5	+18·8	10	34	
		·943	83·9					59
Sept. 27			(+25·7)	(46·7)	(+ 6·9)	(10)	(34)	(773)
270·396		·915	287·3					108
		·890	276·5					187
		·883	255·8					121
C	II435	·978	72·4	314·1	+18·6	42	252	425*c*
		·862	117·0					104
		·892	105·6					121
		·971	98·4					262
Sept. 28			(+25·8)	(33·5)	(+ 6·8)	(42)	(252)	(1328)
271·557		·973	278·7					153
	II436	·887	101·5	317·3	− 6·9	0	2	506*f*
G	II435	·902	72·6	313·2	+18·6	33	217	
		·883	72·1					427
Sept. 29			(+25·9)	(18·2)	(+ 6·8)	(33)	(219)	(1086)
272·351	II435	·809	71·8	313·7	+18·7	51	229	334*n*
G		·814	103·2					404
Sept. 30			(+26·0)	(7·7)	(+ 6·8)	(51)	(229)	(738)
273·357		·976	244·3					29
G	II435	·669	69·4	313·2	+18·7	33	174	
		·950	18·0					40
Oct. 1			(+26·1)	(354·4)	(+ 6·7)	(33)	(174)	(69)
274·609	II435	·475	62·1	311·7	+18·7	32	138	
G		·957	21·5					53
Oct. 2			(+26·1)	(337·9)	(+ 6·6)	(32)	(138)	(53)
275·342		·897	273·8					349
G	II435	·341	50·9	312·0	+18·7	24	103	
		·940	107·2					339
Oct. 3			(+26·2)	(328·2)	(+ 6·6)	(24)	(103)	(688)
276·474	II435	·222	8·8	311·2	+19·1	17	66	
G	II437	·940	101·8	245·0	− 8·7	13	32	280*f*
Oct. 4			(+26·2)	(313·3)	(+ 6·5)	(30)	(98)	(280)
277·388	II435	·257	325·3	310·1	+18·5	10	40	
G	II437	·836	105·1	246·7	− 8·9	2	4	348*f*
Oct. 5			(+26·3)	(301·3)	(+ 6·5)	(12)	(44)	(348)
278·386	II435	·421	300·7	310·4	+18·3	10	46	
G		·759	109·5					204
		·899	115·7					101
Oct. 6			(+26·3)	(288·1)	(+ 6·4)	(10)	(46)	(305)
279·390		·863	254·1					284
G		·746	253·9					242
	II435	·600	292·1	310·5	+18·2	6	13	
Oct. 7			(+26·3)	(274·8)	(+ 6·4)	(6)	(13)	(526)
280·465		·960	256·4					165
		·843	290·8					175
		·809	256·3					212
G		·758	290·6					220
	II436	·884	255·8	320·8	− 9·4	0	4	232*c*
	II438	·491	127·2	237·3	−11·4	4	20	
Oct. 8			(+26·4)	(260·7)	(+ 6·3)	(4)	(24)	(1004)
281·396		·945	260·7					319
G		·887	290·0					471
	II438	·335	154·4	239·9	−11·3	1	5	
Oct. 9			(+26·4)	(248·4)	(+ 6·3)	(1)	(5)	(790)
282·369		·967	258·6					135
C		·956	289·4					301
Oct. 10			(+26·4)	(235·5)	(+ 6·2)	(0)	(0)	(436)
Oct. 11		No spots or faculæ						
284·455		·912	274·2					67
	1044a	·453	194·2	214·8	−20·0	2	5	
G		·915	67·6					260
		·964	90·2					185
		·967	82·9					151
Oct. 12			(+26·4)	(208·0)	(+ 6·0)	(2)	(5)	(663)
285·116		·878	252·5					102
K		·956	85·1					86
Oct. 13			(+26·4)	(199·3)	(+ 6·0)	(0)	(0)	(188)

Group 11435. Sept. 27–Oct. 7. A pair of spots 9° apart in longitude of which the following spot is the larger and longer lived.
Group 11436. Sept. 29–Oct. 8. A single small spot seen only on Sept. 29 and Oct 8. in the preceding part of a fairly large area of faculæ.
Group 11437. Oct. 4–5. One small spot.
Group 11438. Oct. 8–9. A pair of small spots of which one remains on Oct. 9.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
286·421		·971	254·2					127
		·895	254·0					345
	11439	·523	262·8	213·2	+ 1·3	5	28	
G		·817	92·4					191
		·888	79·9					144
		·977	80·0					62
Oct. 14			(+26·4)	(182·1)	(+ 5·9)	(5)	(28)	(869)
287·430		·961	256·4					196
	11439	·706	266·3	213·4	+ 1·5	4	15	
G		·798	81·3					77
		·922	79·9					205
		·955	100·3					81
Oct. 15			(+26·3)	(168·8)	(+ 5·8)	(4)	(15)	(559)
288·440		·851	268·5					128
C		·811	79·7					175
Oct. 16			(+26·3)	(155·5)	(+ 5·8)	(0)	(0)	(303)
289·145		·923	269·3					111
K								
Oct. 17			(+26·3)	(146·2)	(+ 5·7)	(0)	(0)	(111)
290·113		·978	269·8					134
K		·891	281·0					100
Oct. 18			(+26·2)	(133·4)	(+ 5·6)	(0)	(0)	(234)
291·385	11440	·987	105·6	37·9	−14·4	39	239	125*n*
G		·964	84·7					163
Oct. 19			(+26·2)	(116·6)	(+ 5·5)	(39)	(239)	(288)
292·430	11440	·929	107·7	37·1	−14·2	36	220	394*n*
G		·865	85·5					197
Oct. 20			(+26·1)	(102·8)	(+ 5·4)	(36)	(220)	(591)
293·371	11440	·832	111·8	37·6	−14·8	35	179	382*f*
C		·833	96·3					49
Oct. 21			(+26·0)	(90·4)	(+ 5·4)	(35)	(179)	(431)
294·395	11440	·701	117·8	37·1	−15·0	32	186	229*f*
G								
Oct. 22			(+25·9)	(76·9)	(+ 5·3)	(32)	(186)	(229)
295·222		·739	275·7					189
	11441	·599	282·4	102·5	+11·6	5	18	
K	11440	·585	123·9	36·0	−14·5	38	201	
		·978	84·8					96
Oct. 23			(+25·9)	(66·0)	(+ 5·2)	(43)	(219)	(285)
1931.			°	°	°			
296·436		·942	250·1					135
	11441	·772	280·7	100·5	+11·5	9	22	216*p*
G	11440	·413	144·9	35·8	−14·7	34	173	
		·902	86·7					228
Oct. 24			(+25·7)	(50·0)	(+ 5·1)	(43)	(195)	(579)
297·473		·928	286·4					44
	11441	·894	280·9	99·9	+11·9	2	4	194*p*
G	11440	·346	180·0	36·3	−15·1	25	133	
		·933	98·5					175
		·978	67·3					103
Oct. 25			(+25·6)	(36·3)	(+ 5·0)	(27)	(137)	(516)
298·411	11441	·986	280·8	104·8	+11·5	3	12	113*f*
	11440	·406	210·2	36·1	−15·7	29	152	
		·788	109·7					168
G		·862	102·1					167
		·906	67·7					185
		·943	98·4					90
		·968	69·4					112
Oct. 26			(+25·5)	(23·9)	(+ 4·9)	(32)	(164)	(835)
299·444	11440	·546	231·0	36·3	−15·7	35	147	
G		·820	64·3					295
		·908	66·2					219
Oct. 27			(+25·4)	(10·3)	(+ 4·8)	(35)	(147)	(514)
300·589		·972	277·7					38
G	11440	·719	242·5	36·7	−15·8	32	189	
Oct. 28			(+25·3)	(355·3)	(+ 4·7)	(32)	(189)	(38)
301·426	11440	·836	247·3	37·4	−16·1	22	96	496*c*
G								
Oct. 29			(+25·1)	(344·2)	(+ 4·6)	(22)	(96)	(496)
302·395	11440	·930	250·4	37·1	−16·3	38	138	487*c*
G	11442	·725	280·0	17·7	+10·3	1	3	
Oct. 30			(+25·0)	(331·4)	(+ 4·5)	(39)	(141)	(487)
303·493		·888	273·5					83
	11440	·993	253·4	38·3	−15·9	16	73	304*f*
G	11442	·885	279·0	19·2	+10·0	21	51	133*c*
		·881	103·2					74
		·963	101·8					81
Oct. 31			(+24·8)	(316·9)	(+ 4·4)	(37)	(124)	(675)
304·401		·966	274·1					91
	11442	·967	278·9	20·5	+ 9·7	40	98	289*c*
G		·810	109·7					209
		·907	106·6					156
Nov. 1			(+24·7)	(305·0)	(+ 4·3)	(40)	(98)	(745)

Group 11439. Oct. 14–15. Two or three small spots.
Group 11440. Oct. 19–31. A regular spot with a companion following on Oct. 20, 22, 23 and 24 and several companions surrounding it on Oct. 27 and 28.
Group 11441. Oct. 23–26. A pair of spots on Oct. 23 and 24; a single spot on Oct. 25 and 26.
Group 11442. Oct. 30–Nov. 1. A group forming near the west limb.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
305·425		·997	280·3					122
G		·945	92·1					50
Nov. 2			(+24·5)	(291·5)	(+ 4·2)	(0)	(0)	(172)
306·443	11443	·626	279·5	316·5	+ 9·1	0	7	
C	11444	·830	93·5	222·3	− 0·6	5	37	105*c*
Nov. 3			(+24·3)	(278·0)	(+ 4·1)	(5)	(44)	(105)
307·611		·901	259·2					138
G	11443	·806	278·2	316·2	+ 9·0	16	36	138*c*
	11444	·646	95·3	222·7	− 0·3	12	47	
Nov. 4			(+24·1)	(262·6)	(+ 4·0)	(28)	(83)	(276)
308·393		·954	260·1					144
		·913	288·2					67
		·891	296·2					120
G	11443	·905	277·7	317·2	+ 8·6	33	89	286*c*
	11444	·489	97·4	223·4	− 0·2	17	55	
		·973	85·1					164
Nov. 5			(+24·0)	(252·3)	(+ 3·9)	(50)	(144)	(781)
309·473		·884	257·8					111
	11443	·981	277·7	317·2	+ 8·3	77	303	256*c*
G	11444	·251	106·6	224·2	− 0·4	48	187	
		·895	87·3					329
Nov. 6			(+23·8)	(238·1)	(+ 3·8)	(125)	(490)	(696)
310·439		·959	290·7					144
G	11444	·074	163·2	224·2	− 0·3	33	155	
Nov. 7			(+23·6)	(225·4)	(+ 3·7)	(33)	(155)	(144)
311·402	11444	·219	252·3	224·7	− 0·3	22	91	
C		·908	81·3					96
Nov. 8			(+23·3)	(212·7)	(+ 3·6)	(22)	(91)	(96)
312·399	*1045a*	·838	256·3	254·9	− 9·4	4	15	91*f*
C	11444	·433	261·9	224·8	− 0·3	9	40	
		·877	85·3					132
Nov. 9			(+23·1)	(199·5)	(+ 3·5)	(13)	(55)	(223)
313·426		·939	250·3					124
C		·977	76·9					173
Nov. 10			(+22·9)	(186·0)	(+ 3·4)	(0)	(0)	(297)

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole Spots.	Area. Faculæ.
1931.			°	°	°			
314·388		·971	261·9					158
		·960	277·7					155
		·804	266·5					519
G		·912	76·5					198
		·930	107·9					32
		·942	98·5					113
Nov. 11			(+22·7)	(173·3)	(+ 3·3)	(0)	(0)	(1175)
315·392	11444	·910	266·3	225·2	− 2·1	2	5	358*p*
G		·796	74·2					171
		·823	111·2					92
Nov. 12			(+22·4)	(160·1)	(+ 3·1)	(2)	(5)	(621)
316·385		·979	269·0					115
G								
Nov. 13			(+22·2)	(147·0)	(+ 3·0)	(0)	(0)	(115)
Nov. 14			No spots	or faculæ				
Nov. 15			No spots	or faculæ				
319·355		·884	78·7					193
		·941	107·8					156
C		·977	100·6					60
		·991	78·5					347
Nov. 16			(+21·4)	(107·8)	(+ 2·7)	(0)	(0)	(756)
320·415		·974	275·3					65
		·810	111·5					105
C		·836	78·7					39
		·899	108·8					108
		·952	78·9					544
Nov. 17			(+21·1)	(93·8)	(+ 2·6)	(0)	(0)	(861)
321·431	11445	·923	79·7	13·2	+10·4	8	30	104*c*
C		·842	77·4					245
Nov. 18			(+20·8)	(80·4)	(+ 2·4)	(8)	(30)	(349)
322·640	11446	·699	284·0	108·1	+11·4	19	71	
G		·772	77·0					338
Nov. 19			(+20·4)	(64·5)	(+ 2·3)	(19)	(71)	(338)

Group 11443. Nov. 3–6. A stream forming near the west limb.
Group 11444. Nov. 3–12. A stream of unstable spots showing the usual separation in longitude between the leading and following components. The group has disappeared by Nov. 10, but a tiny spot reappears in the accompanying faculæ on Nov. 12.
Group 11445. Nov. 18–23. A wide pair of small ephemeral spots on Nov. 18; a small, short-lived stream appears in the same place on Nov. 21.
Group 11446. Nov. 19–21. A stream of minor importance.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
323·403	11446	·831	282·2	110·1	+11·3	12	36	215*c*
	11447	·529	68·8	24·1	+12·9	2	9	
C	11448	·987	80·6	333·8	+ 9·6	85	324	245*f*
		·877	80·9					153
		·973	75·2					113
Nov. 20			(+20·2)	(54·4)	(+ 2·2)	(99)	(369)	(726)
324·442	11446	·957	281·1	113·8	+11·2	12	41	203*f*
	11447	·257	51·5	29·0	+11·2	2	9	
	11445	·451	68·1	15·6	+11·5	8	41	
G	11448	·946	79·7	329·9	+10·4	180	629	648*c*
		·873	74·6					107
		·908	100·1					218
Nov. 21			(+19·8)	(40·8)	(+ 2·1)	(202)	(720)	(1176)
325·364		·973	281·4					126
	11447	·162	356·4	29·2	+11·2	6	36	
	11445	·271	57·1	15·3	+10·4	3	33	
	11448	·863	79·2	329·3	+10·3	171	778	1039*c*
C		·786	71·3					112
		·842	101·7					195
		·916	68·1					117
		·973	58·8					81
		·983	77·2					112
Nov. 22			(+19·5)	(28·6)	(+ 2·0)	(180)	(847)	(1782)
326·353	11447	·289	304·1	29·6	+11·0	17	37	
	11445	·142	6·4	14·7	+ 9·8	3	15	
	11448	·744	77·8	328·1	+10·3	188	787	918*c*
C		·854	65·6					105
		·904	57·4					99
		·936	77·2					214
		·951	93·6					237
Nov. 23			(+19·2)	(15·6)	(+ 1·8)	(208)	(839)	(1573)
327·395	11447	·495	290·1	30·0	+11·2	6	22	
	11448	·548	73·9	329·6	+10·1	123	618	
G	11449	·960	92·0	288·4	− 1·4	11	35	185*c*
		·833	76·2					207
		·868	92·5					158
Nov. 24			(+18·9)	(1·8)	(+ 1·7)	(140)	(675)	(550)
328·562		·771	253·7					287
C	11448	·326	63·7	329·2	+ 9·8	132	590	
	11449	·842	92·1	289·3	− 0·9	10	37	148*c*
Nov. 25			(+ 18·5)	(346·4)	(+ 1·6)	(142)	(627)	(435)
329·511		·964	281·1					154
		·904	252·8					273
		·843	282·1					250
G	11448	·173	29·7	328·9	+10·0	126	574	

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
329·511	11450	·423	59·7	311·9	+13·5	9	27	
G	11449	·704	92·2	289·4	− 0·6	6	14	
Nov. 26			(+18·1)	(333·9)	(+ 1·4)	(141)	(615)	(677)
330·368		·936	253·9					88
		·920	281·8					132
C		·808	281·8					176
	11448	·190	322·8	329·3	+10·0	117	528	
	11450	·282	42·3	311·4	+13·3	22	65	
Nov. 27			(+17·8)	(322·6)	(+ 1·3)	(139)	(593)	(396)
331·411		·932	282·7					426
	11448	·378	294·2	329·3	+10·0	81	411	
G	11450	·212	351·1	310·8	+13·2	23	88	
		·947	90·9					233
		·968	105·6					118
Nov. 28			(+17·5)	(308·9)	(+ 1·2)	(104)	(499)	(777)
332·379		·973	280·5					158
	11448	·573	286·3	329·9	+10·1	80	407	
C	11450	·312	311·0	310·0	+12·8	20	54	
		·874	90·5					343
Nov. 29			(+17·1)	(296·1)	(+ 1·1)	(100)	(461)	(501)
333·400		·873	254·2					54
	11448	·757	282·9	331·1	+10·3	69	339	462*c*
C	11450	·505	294·4	310·7	+12·8	17	45	
		·742	91·0					295
		·886	92·1					49
Nov. 30			(+16·7)	(282·7)	(+ 0·9)	(86)	(384)	(860)
334·422		·928	252·3					121
		·899	262·9					183
	11448	·892	281·1	331·8	+10·2	64	278	1018*c*
G	11450	·675	289·2	310·0	+13·4	8	24	
	1046a	·473	93·9	241·2	− 1·1	1	2	
		·937	74·6					152
		·991	85·4					79
Dec. 1			(+16·3)	(269·2)	(+ 0·8)	(73)	(304)	(1553)
335·492		·886	274·8					88
		·886	298·3					111
	11448	·978	280·6	332·7	+10·5	49	220	858*c*
G	11450	·856	284·9	313·0	+13·1	0	4	272*c*
		·857	77·9					41
		·934	83·2					172
Dec. 2			(+15·9)	(255·1)	(+ 0·7)	(49)	(224)	(1542)

Group 11447. Nov. 20–24. A small unstable group.
Group 11448. Nov. 20–Dec. 2. A large group of stream type with well-defined leader and follower spots.
Group 11449. Nov. 24–26. A small group.
Group 11450. Nov. 26–Dec. 2. A stream following Group 11448.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	Measures. Dist.	Measures. Pos. Angle.	Position. Long.	Position. Lat.	Area. Umbræ.	Area. Whole. Spots.	Area. Faculæ.
1931.			°	°	°			
336·515		·983	278·3					266
		·934	283·9					246
C		·830	267·5					205
		·792	82·1					157
Dec. 3			(+15·5)	(241·6)	(+ 0·6)	(0)	(0)	(874)
337·523		·965	281·7					98
C		·879	267·1					104
Dec. 4			(+15·1)	(228·3)	(+ 0·4)	(0)	(0)	(202)
338·436		·947	265·2					177
C								
Dec. 5			(+14·7)	(216·3)	(+ 0·3)	(0)	(0)	(177)
339·531		·865	293·8					48
G	11451	·924	77·1	135·0	+11·9	12	48	174*c*
		·987	77·8					67
Dec. 6			(+14·3)	(201·8)	(+ 0·2)	(12)	(48)	(289)
340·414		·852	286·5					86
G	11451	·841	76·0	133·9	+11·8	55	271	228*c*
		·949	76·5					220
Dec. 7			(+13·9)	(190·2)	(+ 0·1)	(55)	(271)	(534)
341·416		·946	284·3					111
		·864	270·4					197
C	11451	·711	73·3	133·1	+11·7	62	292	
		·842	74·7					150
		·930	75·9					169
Dec. 8			(+13·5)	(177·0)	(− 0·1)	(62)	(292)	(627)
342·483		·932	269·9					35
G	11451	·532	66·5	133·2	+12·0	105	402	
		·849	73·1					92
Dec. 9			(+13·1)	(163·0)	(− 0·2)	(105)	(402)	(127)
343·544		·965	291·2					32
	11451	·334	52·8	133·3	+11·3	97	452	
C	*1046b*	·630	67·6	112·3	+13·6	0	5	
	11452	·627	82·7	110·6	+ 4·3	13	40	
Dec. 10			(+12·6)	(149·0)	(− 0·3)	(110)	(497)	(32)
344·413	11451	·213	23·6	132·6	+10·8	124	549	
C	11452	·452	79·0	111·3	+ 4·6	30	139	
Dec. 11			(+12·2)	(137·6)	(− 0·4)	(154)	(688)	(0)
345·338		·924	283·0					54
		·918	273·4					105
C	11451	·236	328·8	132·5	+11·0	96	451	
	11452	·261	69·0	111·3	+ 4·8	24	83	
Dec. 12			(+11·8)	(125·4)	(− 0·6)	(120)	(534)	(159)
346·386	11451	·415	300·8	132·8	+11·6	83	393	
C	11452	·089	355·0	112·0	+ 4·4	21	115	
Dec. 13			(+11·4)	(111·6)	(− 0·7)	(104)	(508)	(0)
347·416	11451	·598	290·9	132·6	+11·7	64	337	
	11452	·277	288·9	113·2	+ 4·4	15	61	
C		·867	72·9					209
		·966	72·1					160
Dec. 14			(+10·9)	(98·0)	(− 0·8)	(79)	(398)	(369)
348·356	11451	·741	286·7	131·8	+11·5	37	196	333*c*
	11452	·473	281·1	113·2	+ 4·4	12	36	
C		·785	73·8					281
		·897	66·3					152
		·918	74·3					156
Dec. 15			(+10·5)	(85·6)	(− 1·0)	(49)	(232)	(922)
349·388	11451	·858	283·4	130·0	+10·8	22	168	679*c*
	11452	·678	276·6	114·3	+ 3·7	10	17	
C		·794	72·3					120
		·897	65·2					65
Dec. 16			(+10·0)	(72·0)	(− 1·1)	(32)	(185)	(864)
350·235		·952	283·0					660
		·869	286·0					110
K	11451	·937	282·2	129·6	+11·0	23	51	
	11452	·813	275·3	114·9	+ 3·6	3	14	134*f*
Dec. 17			(+9·6)	(60·9)	(− 1·2)	(26)	(65)	(904)
351·441		·964	282·5					115
		·958	277·9					36
C		·925	275·4					248
	11453	·949	77·5	334·3	+11·4	27	105	619*c*
		·927	94·4					143
Dec. 18			(+9·1)	(45·0)	(− 1·3)	(27)	(105)	(1161)
352·356		·975	274·2					252
C		·890	285·6					113
	11453	·867	76·1	334·0	+11·2	21	83	998*c*
Dec. 19			(+8·6)	(32·9)	(− 1·5)	(21)	(83)	(1363)

Group 11451. Dec. 6–17. A complex stream in which changes are especially apparent on Dec. 8–10 and on Dec. 13–14, after which the spots rapidly disappear.
Group 11452. Dec. 10–17. A moderate-sized stream.
Group 11453. Dec. 18–24. Return of Group 11448. A regular spot, in a large area of faculæ, diminishing to a tiny spot. A small companion, possibly a disintegrated portion of the spot, south-precedes it on Dec. 20 and 21, and there is another faint companion on Dec. 24.

POSITIONS and AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

G.M.T.	Group No.	MEASURES. Dist.	MEASURES. Pos. Angle.	POSITION. Long.	POSITION. Lat.	AREA. Umbræ.	AREA. Whole Spots.	AREA. Faculæ.
1931.			°	°	°			
353·379	11453	·733	73·3	333·9	+11·0	20	75	552*f*
C								
Dec. 20			(+8·2)	(19·4)	(− 1·6)	(20)	(75)	(552)
354·405	11453	·564	67·9	333·9	+10·7	11	58	
C		·968	88·3					122
Dec. 21			(+7·7)	(5·9)	(− 1·7)	(11)	(58)	(122)
355·454		·908	290·9					79
C	*1047a*	·652	258·5	32·2	− 8·9	1	5	
	11453	·380	55·6	333·6	+10·5	6	26	
Dec. 22			(+7·2)	(352·1)	(− 1·9)	(7)	(31)	(79)
356·451		·811	259·1					80
C	11453	·240	23·3	333·5	+10·1	4	8	
		·986	74·9					117
Dec. 23			(+6·7)	(339·0)	(− 2·0)	(4)	(8)	(197)
357·311		·940	286·9					67
		·874	259·5					169
	11454	·827	288·1	21·4	+13·6	10	29	211*c*
C	11453	·227	340·0	332·1	+10·1	2	5	
	11455	·194	357·0	328·2	+ 9·0	4	17	
		·937	73·3					345
		·982	91·8					109
Dec. 24			(+6·2)	(327·6)	(− 2·1)	(16)	(51)	(901)
358·372	11454	·948	283·8	24·0	+12·4	6	26	248*nf*
	11455	·319	309·0	328·2	+ 9·4	2	14	
C	11456	·904	92·0	249·2	− 2·8	5	13	130*f*
	11457	·947	103·6	242·7	−13·5	18	151	554*f*
		·835	70·4					215
Dec. 25			(+5·8)	(313·7)	(− 2·2)	(31)	(204)	(1147)
359·350		·986	284·5					169
	1047b	·737	105·7	254·2	−13·1	4	19	121*c*
C	11456	·779	91·7	249·8	− 2·8	5	13	134*f*
359·350	11457	·856	104·6	242·6	−13·7	24	156	681*f*
C		·720	66·0					147
Dec. 26			(+5·3)	(300·8)	(− 2·3)	(33)	(188)	(1252)
360·426		·825	284·3					411
		·734	289·5					139
G	11458	·580	293·6	319·3	+11·2	6	32	
	11456	·592	91·0	250·4	− 2·6	2	8	
	11457	·713	107·4	242·2	−14·1	28	148	712*f*
Dec. 27			(+4·8)	(286·6)	(− 2·5)	(36)	(188)	(1262)
361·121		·852	288·1					181
	11458	·708	289·5	320·3	+11·8	10	25	120*p*
K	11456	·450	91·1	250·9	− 2·8	0	2	
	11457	·601	110·1	242·1	−13·9	32	171	146*f*
Dec. 28			(+4·5)	(277·5)	(− 2·5)	(42)	(198)	(447)
362·510		·954	281·8					326
		·950	270·2					55
		·920	291·5					30
G		·867	282·4					98
	11457	·350	124·2	241·9	−13·9	38	171	
		·972	84·0					19
Dec. 29			(+3·8)	(259·2)	(− 2·7)	(38)	(171)	(528)
363·476		·973	280·7					138
		·951	288·0					86
G	11457	·211	157·2	241·6	−13·9	37	170	
		·890	82·9					35
		·959	78·4					75
Dec. 30			(+3·3)	(246·4)	(− 2·8)	(37)	(170)	(334)
364·471		·942	289·4					35
		·884	255·0					34
G	11457	·238	217·6	241·9	−13·7	39	152	
		·865	75·6					153
Dec. 31			(+2·8)	(233·3)	(− 2·9)	(39)	(152)	(222)

Group 11454. Dec. 24–25. An ephemeral group.
Group 11455. Dec. 24–25. An indefinite spot following Group 11453.
Group 11456. Dec. 25–28. A single small spot.
Group 11457. Dec. 25–1932, Jan. 5. A regular spot followed by considerable faculæ. There are small companion spots on Dec. 29, 30, and Jan. 2.
Group 11458. Dec. 27–28. A pair of spots.

ROYAL OBSERVATORY, GREENWICH.

General Catalogue of Groups of Sun Spots

for the Year

1931

GREENWICH PHOTO-HELIOGRAPHIC RESULTS 1931

GENERAL CATALOGUE of GROUPS of SUN SPOTS for the YEAR 1931.

Groups of Sun Spots, lasting for two or more days, are numbered in the *first* column in continuation of the Group-numbers given in 1930 and the previous years. Groups seen only once are not included in this Catalogue,

The *second* column gives the Greenwich Mean Time of the central meridian passage of each group as deduced from its mean longitude (given in the *tenth* column). For those groups, which are in existence at the time of the central meridian passage of their longitude, the time is given to $0^d{\cdot}01$, corresponding to $0°{\cdot}13$ of solar longitude. In other cases, in which groups disappear before or appear after the central meridian, the deduced time is given to $0^d{\cdot}1$.

The *third* 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 interval in days between the extreme limits of observation.

The *fifth* and *seventh* 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 disc at the observation ; longitudes west of the centre being reckoned as positive.

The Mean Areas for Umbræ and Whole Spots entered in the *eighth* and *ninth* columns are corrected for the effect of foreshortening and are expressed in millionths of the Sun's visible hemisphere.

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

The *twelfth* column gives reference to all Groups contained in Ledgers I and 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 $\xi = 14°{\cdot}37 - 2°{\cdot}60 \sin^2\phi$ gives the apparent drift in longitude appropriate to corresponding latitudes after an interval of 27 days.

Latitude.	Drift. *forwards.*	Latitude.	Drift. *backwards.*
0°	5°	20°	3°
5°	4·5	25°	7·5
10°	3	30°	12·5
15°	0·5	35°	18

GENERAL CATALOGUE OF SUN SPOTS.

No. of Group.	Time of Central Meridian Passage.	Duration in Days.	First Seen.		Last Seen.		Mean Area Corrected for Foreshortening.		Mean Position of Group.		Reference to Ledger.
			Date.	Longitude from Central Meridian.	Date.	Longitude from Central Meridian.	Umbræ.	Whole Spots.	Longitude.	Latitude.	
	1930–31		1930–31	°	1931.	°			°	°	
11343	Dec. 30·71	4/9	Dec. 25	−71	Jan. 2	+38	1	5	21·0	+ 8·5	II.*
4	Jan. 8·4	2	Jan. 2	−78	3	−66	2	10	266·8	+13·8	
11345	10·38	12	4	−81	15	+66	16	66	240·4	−18·7	II.
6	12·6	7	13	+11	19	+85	70	536	211·0	+ 7·2	I. 1110 (1)
7	19·9	4	13	−83	16	−48	8	32	115·5	+ 5·5	
8	20·22	8	18	−26	25	+69	25	106	110·8	+ 5·4	II.
9	24·95	6/10	19	−76	28	+42	2	10	48·6	+ 1·3	II.
11350	Jan. 28·6	5	23	−75	27	−14	5	15	0·1	+11·7	II.
1	Feb. 8·49	12	Feb. 2	−82	Feb. 13	+68	47	234	217·1	+ 8·5	I. 1110 (2)
2	6·70	5/7	3	−47	9	+38	2	9	240·6	−14·4	II.
3	5·6	3	9	+50	11	+76	18	77	254·5	−12·4	
4	16·10	6	12	−50	17	+17	11	44	116·9	+ 3·4	II.
11355	20·77	14	14	−80	27	+84	206	1143	55·5	+ 6·2	I. 1111 (1)
6	14·8	4	15	+ 9	18	+49	14	48	134·5	+10·6	
7	16·29	2	15	−11	16	+ 4	5	22	114·4	−16·6	
8	20·64	12	15	−69	26	+77	51	268	57·1	− 3·8	II.
9	19·70	5	19	− 6	23	+54	11	40	69·6	+ 8·1	II.
11360	25·96	8	22	−49	Mar. 1	+46	23	85	347·0	+10·2	II.
1	28·62	7/8	22	−84	1	+ 8	11	31	312·0	+ 7·8	II.
2	Feb. 23·9	4	26	+34	1	+73	11	43	14·5	+10·8	
3	Mar. 2·2	3	26	−49	Feb. 28	−22	8	28	291·6	+ 6·9	
4	3·60	12	26	−73	Mar. 9	+80	48	258	272·8	− 7·9	I. 1112 (1)
11365	4·2	2	27	−63	Feb. 28	−49	4	12	265·2	−11·4	
6	7·49	13	Mar. 1	−83	Mar. 13	+81	36	151	221·5	−10·1	II.
7	15·33	13	9	−77	21	+79	101	558	118·2	+ 4·0	II.
8	16·53	9	10	−79	18	+25	15	51	102·4	+ 7·6	II.
9	19·03	12	13	−76	24	+71	50	269	69·4	+ 6·1	I. 1111 (2)
11370	11·9	2	17	+74	18	+83	40	135	163·7	− 3·6	I. 1113 (1)
1	15·1	4	17	+30	20	+69	12	32	120·9	+ 8·9	
2	19·91	4	19	− 8	22	+35	9	26	57·8	−20·0	
3	21·19	4	20	−13	23	+34	4	10	41·0	+ 7·3	
4	30·27	13	24	−78	Apr. 5	+85	28	153	281·2	− 7·7	I. 1112 (2)
11375	Mar. 30·0	2/6	29	− 9	3	+60	2	6	286·1	−13·6	
6	Apr. 3·31	9	30	−52	7	+49	7	22	227·6	+ 7·2	II.
7	Mar. 27·0	3	31	+59	2	+83	26	144	324·8	−15·4	
8	Apr. 7·50	13	Apr. 1	−82	13	+79	27	132	172·6	− 3·3	I. 1113 (2)
9	Mar. 30·7	3	3	+49	5	+76	4	14	276·0	− 3·0	
11380	Apr. 10·43	7	6	−56	12	+30	33	159	134·0	+ 4·5	II.
1	3·6	3	7	+45	9	+78	33	179	223·6	+ 3·2	I. 1114 (1)
2	16·50	13	10	−84	22	+81	48	248	53·8	+ 7·2	I. 1115 (1)
3	17·70	7/12	11	−82	22	+59	7	36	37·9	+23·2	II.
4	19·50	13	13	−81	25	+79	47	254	14·1	+10·8	II.

* The values given here for Group 11343 supersede those given in the volume for 1930.

GENERAL CATALOGUE OF SUN SPOTS—*continued.*

No. of Group.	Time of Central Meridian Passage.	Duration in Days.	First Seen.		Last Seen.		Mean Area Corrected for Foreshortening.		Mean Position of Group.		Reference to Ledger.
			Date.	Longitude from Central Meridian.	Date.	Longitude from Central Meridian.	Umbræ.	Whole Spots.	Longitude.	Latitude.	
	1931.		1931.	°	1931.	°			°	°	
11385	Apr. 17·54	4/7	Apr. 17	− 3	Apr. 23	+81	32	128	40·1	+ 8·7	II.
6	18·4	2	22	+51	23	+66	6	16	28·4	+11·4	
7	24·74	6	23	−18	28	+50	17	51	305·0	+15·0	II.
8	30·5	7	24	−78	30	− 1	9	21	229·5	+ 4·5	I. 1114 (2)
9	27·3	5	29	+30	May 3	+76	24	89	271·3	+14·4	II.
11390	Apr. 30·1	2	May 4	+58	5	+71	9	18	234·6	−11·8	
1	May 6·05	3	5	−10	7	+17	7	17	154·5	+11·0	
2	7·69	6/8	6	−21	13	+79	12	56	133·9	− 1·0	II.
3	13·15	8/10	7	−77	16	+42	8	29	61·6	+ 6·1	II.
4	13·31	12	7	−80	18	+70	27	148	59·4	+ 7·9	I. 1115 (2)
11395	13·25	10	9	−54	18	+75	24	102	60·3	+10·0	II.
6	20·48	12	15	−67	26	+80	63	315	324·7	−15·8	II.
7	21·14	4/8	15	−77	22	+17	3	7	316·0	+ 9·7	II.
8	18·73	2	18	− 2	19	+ 9	2	10	347·8	+ 9·8	
9	25·75	11	21	−63	31	+74	16	48	254·9	+11·5	II.
11400	23·33	6	22	−12	27	+55	4	16	287·0	+10·6	II.
1	23·7	4	26	+32	29	+77	13	41	281·5	+ 4·4	
2	June 5·73	13	30	−86	June 11	+77	49	226	109·7	+ 5·1	II.
3	May 30·4	2	June 2	+40	3	+53	4	11	193·0	− 8·2	
4	June 4·97	9	2	−37	10	+81	32	179	119·7	+ 6·4	II.
11405	8·51	5	8	− 3	12	+54	10	40	72·8	+11·7	II.
6	30·0	3	27	−34	29	− 9	6	16	148·9	− 2·0	
7	July 4·92	10	29	−74	July 8	+47	16	76	83·2	− 7·5	II.
8	5·62	8/10	29	−81	8	+39	24	124	73·9	+ 7·3	II.
9	4·78	6/7	July 2	−34	8	+50	2	7	85·1	+ 7·6	II.
11410	12·47	7/11	6	−79	16	+50	6	20	343·3	−21·7	II.
1	10·27	9	7	−42	15	+73	15	52	12·5	− 7·3	II.
2	14·55	10/11	8	−81	18	+50	10	34	315·8	−12·1	II.
3	11·47	6	10	−16	15	+54	4	13	356·5	−18·9	II.
4	13·26	2	12	− 8	13	+ 1	2	4	332·9	+ 5·3	
11415	17·2	2	17	+ 3	18	+16	2	8	281·0	+ 8·2	
6	July 26·3	4	22	−52	25	−10	9	27	160·6	+ 8·3	
7	Aug. 1·45	10	26	−84	Aug. 4	+42	16	62	79·0	+ 6·7	II.
8	July 31·92	7	30	−23	5	+61	13	46	86·0	− 5·4	II.
9	Aug. 1·9	6	Aug. 2	+ 6	7	+73	17	95	73·0	− 7·8	II.
11420	6·5	3	2	−55	4	−28	9	23	11·9	+ 5·4	
1	12·6	2	13	+13	14	+26	2	6	291·8	+ 6·0	
2	16·5	6	17	+13	22	+77	26	99	239·8	−10·6	II.
3	23·9	4	26	+30	29	+73	3	7	142·6	− 1·5	
4	Aug. 31·5	4/5	26	−72	30	−13	4	14	41·2	− 7·4	
11425	Sept. 1·77	13	26	−87	Sept 7	+77	13	62	25·0	+ 4·0	II.
6	Aug. 28·04	3	27	−11	Aug. 29	+18	8	27	87·5	+ 5·6	
7	Sept. 5·1	3	30	−75	Sept. 1	−45	5	20	341·1	+ 5·7	
8	2·62	8	31	−28	7	+59	13	60	13·8	+12·2	II.
9	7·52	10/12	Sept. 2	−71	13	+80	20	100	309·1	− 5·3	I. 1116 (1)

GENERAL CATALOGUE OF SUN SPOTS—*continued.*

No. of Group.	Time of Central Meridian Passage.	Duration in Days.	First Seen.		Last Seen.		Mean Area Corrected for Foreshortening.		Mean Position of Group.		Reference to Ledger.
			Date.	Longitude from Central Meridian.	Date.	Longitude from Central Meridian.	Umbræ.	Whole Spots.	Longitude.	Latitude.	
	1931.		1931.	°	1931.	°			°	°	
11430	Sept. 12·7	4	Sept. 9	−46	Sept. 12	− 6	4	7	240·5	− 8·4	
1	12·78	7	12	− 9	18	+70	23	89	239·6	+ 9·4	II.
2	18·8	6	13	−72	18	− 7	7	17	160·4	+ 3·9	II.
3	21·97	10	16	−74	25	+46	22	107	118·3	+ 8·3	II.
4	Sept. 23·73	3	22	−18	24	+ 4	9	41	95·1	+ 7·5	
11435	Oct. 4·57	11	27	−86	Oct. 7	+36	26	128	312·0	+18·6	II.
6	4·04	2/10	29	−61	8	+60	0	1	319·0	− 8·2	I. 1116 (2)
7	9·6	2	Oct. 4	−68	5	−55	8	18	245·8	− 8·8	
8	10·1	2	8	−23	9	− 9	2	12	238·6	−11·4	
9	12·1	2	14	+31	15	+45	4	22	213·3	+ 1·4	
11440	25·44	13	19	−79	31	+81	33	171	36·8	−15·2	II.
1	20·6	4	23	+37	26	+81	5	15	101·0	+11·7	
2	26·8	3	30	+46	Nov. 1	+76	21	51	19·1	+10·0	
3	Oct. 31·5	4	Nov. 3	+39	6	+79	32	109	316·8	+ 8·8	II.
4	Nov. 7·55	10	3	−56	12	+65	15	62	223·9	− 0·6	II.
11445	23·4	4/6	18	−67	23	− 1	4	20	14·7	+10·5	
6	16·1	3	19	+44	21	+73	14	49	110·7	+11·3	
7	22·38	5	20	−30	24	+28	7	23	28·4	+11·5	II.
8	26·82	13	20	−81	Dec. 2	+78	115	513	329·9	+10·2	I. 1117 (1)
9	29·9	3	24	−73	Nov. 26	−45	9	29	289·0	− 1·0	
11450	28·24	7	26	−22	Dec. 2	+58	14	44	311·1	+13·2	II.
1	Dec. 11·79	12	Dec. 6	−67	17	+69	65	301	132·5	+11·4	II.
2	13·31	8	10	−38	17	+54	16	63	112·6	+ 4·3	II.
3	23·86	8	18	−71	24	+ 5	13	51	333·6	+10·7	I. 1117 (2)
4	20·1	2	24	+54	25	+70	8	28	22·7	+13·0	
11455	24·3	2	24	+ 1	25	+15	3	16	328·2	+ 9·2	
6	30·2	4	25	−65	28	−27	3	9	250·1	− 2·8	
7	30·80	12	25	−71	Jan. 5	+70	32	156	242·1	−13·9	I. 1118 (1)
8	25·0	2	27	+33	Dec. 28	+43	8	28	319·8	+11·5	

GENERAL CATALOGUE OF SUN SPOTS—*continued.*

REVIVAL GROUPS of SUN SPOTS, 1931.

Groups of spots occupying the same heliographic position in consecutive rotations of the sun 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 forms part of a "Revival" series, a reference is given in the last column of the table. Groups which are given in detail in Ledger II are also indicated.

Reference No.	Group No.	Central Meridian Passage.	No. of Rotation.	Duration.	First Seen.		Last Seen.		Mean Area.	Mean Position.		Reference to Ledger.
					Date.	Longitude from C.M.	Date.	Longitude from C.M.		Longitude.	Latitude.	
		1930–31.			1930–31.	°	1930–31.	°		°	°	
1	11341	Dec. 23·9	1033	2	Dec. 25	+18	Dec. 26	+35	16	110	+ 5	
	47	Jan. 19·9	34	4	Jan. 13	−83	Jan. 16	−48	32	115	+ 5	
	54	Feb. 16·10	35	6	Feb. 12	−50	Feb. 17	+17	44	117	+ 3	II.
	67	Mar. 15·33	36	13	Mar. 9	−77	Mar. 21	+79	558	118	+ 4	II.
2	11373	Mar. 21·19	1036	4	Mar. 20	−13	Mar. 23	+34	10	41	+ 7	
	85	Apr. 17·54	37	4/7	Apr. 17	− 3	Apr. 23	+81	128	40	+ 9	
3	11377	Mar. 27·0	1037	3	Mar. 31	+59	Apr. 2	+83	144	325	−15	
	96	May 20·48	39	12	May 15	−67	May 26	+80	315	325	−16	II.
4	11407	July 4·92	1040	10	June 29	−74	July 8	+47	76	83	− 7	II.
	18	July 31·92	41	7	July 30	−23	Aug. 5	+61	46	86	− 5	II.
5	11408	July 5·62	1040	8/10	June 29	−81	July 8	+39	124	74	+ 7	II.
	17	Aug. 1·45	41	10	July 26	−84	Aug. 4	+42	62	79	+ 7	II.
	26	Aug. 28·04	42	3	Aug. 27	−11	Aug. 29	+18	27	88	+ 6	
	34	Sept. 23·73	43	3	Sept. 22	−18	Sept. 24	+ 4	41	95	+ 8	
6	11414	July 13·26	1040	2	July 12	− 8	July 13	+ 1	4	333	+ 5	
	27	Sept. 5·1	42	3	Aug. 30	−75	Sept. 1	−45	20	341	+ 6	
7	11422	Aug. 16·5	1042	6	Aug. 17	+13	Aug. 22	+77	99	240	−11	II.
	30	Sept. 12·7	43	4	Sept. 9	−46	Sept. 12	− 6	7	241	− 8	
	37	Oct. 9·6	44	2	Oct. 4	−68	Oct. 5	−55	18	246	− 9	
8	11428	Sept. 2·62	1042	8	Aug. 31	−28	Sept. 7	+59	60	14	+12	II.
	42	Oct. 26·8	44	3	Oct. 30	+46	Nov. 1	+76	51	19	+10	
	47	Nov. 22·38	45	5	Nov. 20	−30	Nov. 24	+28	23	28	+11	
9	11441	Oct. 20·6	1044	4	Oct. 23	+37	Oct. 26	+81	15	101	+12	
	46	Nov. 16·1	45	3	Nov. 19	+44	Nov. 21	+73	49	111	+11	
10	11445	Nov. 23·4	1045	4/6	Nov. 18	−67	Nov. 23	− 1	20	15	+11	
	54	Dec. 20·1	46	2	Dec. 24	+54	Dec. 25	+70	28	23	+13	
11	11450	Nov. 28·24	1046	7	Nov. 26	−22	Dec. 2	+58	44	311	+13	II.
	58	Dec. 25·0	47	2	Dec. 27	+33	Dec. 28	+43	28	320	+12	

ROYAL OBSERVATORY, GREENWICH.

Ledgers of Groups of Sun Spots

for the Year

1931

Ledger I.—Recurrent Groups

GREENWICH PHOTO-HELIOGRAPHIC RESULTS 1931

Ledger I.—Recurrent Groups of Sun Spots for the Year 1931.

The Greenwich Mean Time 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 and Kodaikanal by the letters C and K 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 disc.

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 $14^\circ{\cdot}18$, due to the Sun's rotation, constant at all latitudes; this corresponds to Carrington's assumed rotation period of $25{\cdot}38$ 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, $\xi = 14^\circ{\cdot}37 - 2^\circ{\cdot}60 \sin^2 \phi$.

A *plus* sign 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° or more from the Sun's central meridian, the measures for that day are not included in taking the mean area, 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 SUN SPOTS for the YEAR 1931.

No. 1110. Latitude +8°·1.
Group 11346 in Rotation 1034.
,, 11351 ,, ,, 1035.

Group 11346. January 13–19. A wide pair of spots developing rapidly after January 14 into a large group in which the chief components, *a* and *b*, are two large composite spots.

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
d					°	°	°	°
12·327 C	27	86	14	45	212·3	0·0	+ 6·9	+10·7
13·324 C	24	121	13	68	212·6	+0·2	+ 7·1	+24·1
14·372 C	57	375	36	236	210·0	−2·6	+ 7·1	+35·4
15·313 C	97	937	76	730	210·4	−2·3	+ 7·4	+48·1
16·431 C	107	797	124	907	210·2	−2·7	+ 7·4	+62·6
17·338 C	74	583	159	1232	210·5	−2·5	+ 7·2	+74·9
18·351 C	8	51	(49	311	206·8	..	+ 7·2)	+84·5
Means ..	..	..	70	536	211·0	..	+ 7·2	..

Spot *a*.

15·313 C	51	464	42	385	213·6	0·0	+ 7·8	+51·3
16·431 C	55	344	71	444	213·8	0·0	+ 8·0	+66·2
17·338 C	23	127	67	371	214·9	+1·0	+ 7·6	+79·3

Spot *b*.

15·313 C	46	473	34	345	207·6	0·0	+ 7·1	+45·3
16·431 C	44	407	44	411	207·0	−0·8	+ 7·1	+59·4
17·338 C	38	262	64	440	207·4	−0·5	+ 7·1	+71·8
18·351 C	8	51	49	311	206·8	..	+ 7·2	+84·5

Group 11351. February 2–13. A regular spot, *a*, with a number of companions, one of which, *c*, to the north persists for several days.

32·305 C	8	40	35	176	216·2	..	+ 8·6	−82·4
33·324 C	45	148	66	214	216·9	+1·7	+ 8·1	−68·2
34·526 G	39	238	34	204	216·6	+1·4	+ 8·5	−52·7
35·298 C	86	443	61	314	217·3	+1·8	+ 8·6	−41·8
36·125 K	157	622	96	382	216·3	+0·7	+ 9·1	−32·0
37·301 C	109	628	59	340	216·7	+1·0	+ 8·6	−16·1
38·524 G	110	579	58	301	216·5	+0·6	+ 8·6	− 0·2
39·447 C	72	401	38	213	216·8	+0·8	+ 8·6	+12·3
40·551 G	69	316	41	186	217·4	+1·2	+ 8·7	+27·4
41·406 G	44	281	29	189	217·5	+1·2	+ 8·5	+38·8
42·405 G	26	175	22	149	217·8	+1·3	+ 8·3	+52·2
43·574 G	13	59	18	83	217·9	+1·3	+ 8·0	+67·7
Means ..	..	..	47	234	217·1	..	+ 8·5	..

No. 1110, Group 11351—*continued*.

Spot *a* (*a* of Group 11346).

d					°	°	°	°
32·305 C	8	40	35	176	216·2	..	+ 8·6	−82·4
33·324 C	30	76	42	106	217·3	+1·2	+ 8·6	−67·8
34·526 G	35	208	30	177	217·0	+0·8	+ 8·6	−52·3
35·298 C	42	195	29	137	217·3	+0·9	+ 8·3	−41·8
36·125 K	63	236	38	142	217·4	+0·9	+ 8·3	−30·9
37·301 C	59	369	32	199	217·6	+1·0	+ 8·3	−15·2
38·524 G	65	339	34	176	217·4	+0·6	+ 8·3	+ 0·7
39·447 C	47	294	25	156	217·3	+0·4	+ 8·2	+12·8
40·551 G	52	240	31	142	217·8	+0·7	+ 8·2	+27·8
41·406 G	35	231	23	155	217·6	+0·4	+ 8·0	+38·9
42·405 G	22	153	19	130	217·9	+0·6	+ 8·0	+52·3
43·574 G	11	55	15	77	218·0	+0·5	+ 7·9	+67·8

Spot *c*.

35·298 C	4	15	3	11	216·4	0·0	+10·5	−42·7
36·125 K	44	117	27	73	216·0	−0·5	+10·4	−32·3
37·301 C	25	119	14	65	215·8	−0·9	+10·0	−17·0
38·524 G	26	135	14	70	215·8	−1·0	+10·0	− 0·9
39·447 C	21	77	11	41	216·1	−0·9	+10·0	+11·6
40·551 G	17	63	10	37	216·8	−0·3	+10·4	+26·8
41·406 G	9	50	6	34	216·8	−0·4	+10·3	+38·1
42·405 G	4	22	3	19	217·0	−0·4	+10·3	+51·4
43·574 G	2	4	3	6	217·6	+0·1	+ 9·7	+67·4

No. 1111. Latitude + 6°·2.
Group 11355 in Rotation 1035.
,, 11369 ,, ,, 1036.

Group 11355. February 14–27. A stream developing between February 18 and 20, from one of minor importance to one of considerable size visible to the naked eye. The stream is of normal type, its components consisting of a regular spot, *a*, as leader; a pair of unequal spots, *b*, as follower, and a cluster of smaller spots, *c*, intermediate in position. The most interesting development is that of *a* from half a dozen clustered nuclei on February 19 to a large completely-formed spot on February 20, which has become nearly circular by February 21.

44·511 G	4	13	13	41	57·5	..	+ 3·8	−80·3
45·530 G	22	100	35	166	53·5	0·0	+ 4·9	−70·9
46·504 G	34	156	34	154	53·8	+0·1	+ 5·0	−57·8
47·557 G	61	227	43	161	54·0	+0·2	+ 5·1	−43·7
48·459 C	91	487	56	296	53·8	−0·2	+ 5·2	−32·0
49·412 G	258	1582	139	856	54·5	+0·4	+ 5·5	−18·8
50·546 C	692	3140	358	1631	56·2	+1·9	+ 6·5	− 2·1
51·422 G	627	3514	328	1828	55·8	+1·4	+ 6·5	+ 9·0
52·403 G	621	3240	351	1831	55·7	+1·1	+ 6·7	+21·8
53·485 G	573	2866	379	1882	56·3	+1·5	+ 7·2	+36·7
54·595 G	311	1942	270	1660	56·9	+1·9	+ 7·5	+51·9
55·363 C	243	1541	283	1801	57·3	+2·2	+ 7·5	+62·4
56·436 C	70	514	200	1455	57·8	+2·6	+ 7·1	+77·0
57·441 G	8	46	(50	267	51·7	..	+ 8·0)	+84·2
Means ..	..	..	206	1143	55·5	..	+ 6·2	..

LEDGER I.—RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

No. **1111,** Group 11355—*continued.*

Spot *a.*

Date G.M.T. Place.	Projected Area Whole Umbræ	Projected Area Whole Spots.	Corrected Area Whole Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Latitude.	Long. from C.M.
d					°	°	°	°
49·412 G	140	719	74	381	57·0	0·0	+ 5·7	−16·3
50·546 C	381	1526	198	793	59·3	+2·1	+ 6·9	+ 1·0
51·422 G	318	1417	169	751	61·2	+3·9	+ 7·5	+14·4
52·403 G	275	1391	162	821	61·9	+4·4	+ 7·7	+28·0
53·485 G	276	1215	196	863	62·2	+4·5	+ 7·9	+42·6
54·595 G	162	867	157	841	62·3	+4·5	+ 8·2	+57·3
55·363 C	96	597	137	854	62·9	+4·9	+ 8·0	+68·0
56·436 C	11	79	81	581	65·8	..	+ 7·9	+85·0

Spot *b.*

49·412 G	118	863	65	475	52·1	0·0	+ 5·3	−21·2
50·546 C	193	886	100	461	51·1	−1·2	+ 5·4	− 7·2
51·422 G	183	1238	93	631	51·4	−1·0	+ 5·3	+ 4·6
52·403 G	183	977	99	528	50·9	−1·7	+ 5·3	+17·0
53·485 G	153	795	92	477	51·1	−1·7	+ 5·5	+31·5
54·595 G	88	580	65	429	50·8	−2·1	+ 5·5	+45·8
55·363 C	68	351	63	323	50·8	−2·3	+ 5·4	+55·9
56·436 C	17	175	27	275	51·2	−2·0	+ 5·5	+70·4
57·441 G	4	35	21	186	51·2	..	+ 6·6	+83·7

Spot *c.*

50·546 C	47	321	24	167	52·8	0·0	+ 7·6	− 5·5
51·422 G	61	397	32	206	52·3	−0·6	+ 7·8	+ 5·5
52·403 G	98	562	54	309	52·5	−0·6	+ 7·9	+18·6
53·485 G	105	554	65	343	52·4	−0·9	+ 8·5	+32·8
54·595 G	39	258	30	196	51·4	−2·0	+ 9·2	+46·4
55·363 C	36	201	35	193	51·2	−2·4	+ 9·4	+56·3
56·436 C	15	73	25	123	51·8	−1·9	+ 9·3	+71·0
57·441 G	4	11	29	81	52·1	..	+10·0	+84·6

Group 11369. Mar. 13–24. A regular spot (*a* of Group 11355) followed by an extensive area of faculæ. The spot diminishes rather rapidly after about March 18 and is crossed by a bright "bridge."

71·388 G	29	176	64	389	67·9	+7·4	+ 6·5	−75·9
72·436 G	48	315	52	343	68·6	+7·9	+ 6·3	−61·4
73·455 G	66	381	51	293	68·9	+8·1	+ 6·2	−47·6
74·434 C	89	490	55	304	69·2	+8·2	+ 6·0	−34·4
75·477 G	111	553	61	304	69·0	+7·8	+ 6·1	−20·9
76·415 G	117	579	61	301	69·1	+7·8	+ 6·0	− 8·4
77·387 G	119	517	61	264	69·2	+7·7	+ 5·9	+ 4·5
78·386 G	84	486	45	262	69·5	+7·9	+ 6·1	+18·0
79·384 G	84	389	50	233	69·9	+8·1	+ 6·1	+31·5

No. **1111,** Group 11369—*continued.*

Date G.M.T. Place.	Projected Area Whole Umbræ	Projected Area Whole Spots.	Corrected Area Whole Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Latitude.	Long. from C.M.
d					°	°	°	°
80·429 G	49	252	36	186	70·3	+8·3	+ 6·0	+45·7
81·624 G	31	155	34	169	70·4	+8·2	+ 6·0	+61·6
82·368 C	15	113	25	185	70·3	+8·0	+ 5·9	+71·3
Means ..	..	..	50	269	69·4	..	+ 6·1	..

No. **1112.** Latitude −7°·8.,
Group 11364 in Rotation 1036.
,, 11374 ,, ,, 1037.

Group 11364. February 26–March 9. A stream led by a regular spot, *a*. A cluster of spots, *b*, in the rear of the stream condenses into a spot by March 5.

56·436 C	30	96	48	155	268·2	0·0	− 7·8	−72·6
57·441 G	31	162	28	149	270·1	+1·8	− 7·8	−57·4
58·442 C	64	308	44	210	270·7	+2·2	− 7·9	−43·7
59·350 C	114	638	67	372	271·8	+3·2	− 7·6	−30·6
60·537 C	116	619	60	320	272·0	+3·2	− 7·8	−14·8
61·501 G	101	534	51	267	273·4	+4·5	− 7·7	− 0·7
62·388 G	112	622	57	315	273·0	+4·0	− 7·7	+10·6
63·469 G	92	499	51	279	273·7	+4·5	− 7·8	+25·6
64·517 C	88	454	58	296	274·3	+5·0	− 8·2	+40·0
65·451 G	46	317	38	265	274·5	+5·0	− 8·2	+52·5
66·404 G	35	198	41	246	276·1	+6·5	− 8·0	+66·6
67·394 G	13	84	35	220	275·9	+6·2	− 8·3	+79·5
Means ..	..	..	48	258	272·8	..	− 7·9	..

Spot *a.*

57·441 G	18	101	15	87	272·8	0·0	− 7·4	−54·7
58·442 C	15	103	10	67	274·1	+1·2	− 7·4	−40·3
59·350 C	60	428	34	244	273·8	+0·7	− 7·1	−28·6
60·537 C	77	396	39	202	274·6	+1·4	− 7·2	−12·2
61·501 G	70	420	35	210	275·4	+2·0	− 7·5	+ 1·3
62·388 G	90	434	46	221	275·7	+2·2	− 7·6	+13·3
63·469 G	57	330	32	188	276·1	+2·5	− 7·8	+28·0
64·517 C	56	330	38	221	276·4	+2·6	− 8·3	+42·1
65·451 G	37	264	32	227	276·8	+2·9	− 8·2	+54·8
66·404 G	26	180	33	229	277·0	+2·9	− 8·1	+67·5
67·394 G	11	66	32	193	277·5	..	− 8·3	+81·1

Spot *b.*

59·350 C	54	210	33	128	267·5	0·0	− 8·3	−34·9
60·537 C	39	223	21	118	266·7	−0·9	− 9·1	−20·1
61·501 G	31	114	16	57	266·6	−1·2	− 9·0	− 7·5
62·388 G	18	162	9	81	267·1	−0·8	− 8·8	+ 4·7

LEDGER I.—RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

Date G.M.T. Place.	Projected Area Whole Umbræ	Projected Area Whole Spots.	Corrected Area Whole Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
No. 1112, Group 11364—*continued.*								
Spot *b*—*continued.*								
d					°	°	°	°
63·469 G	35	169	19	91	269·3	+1·2	− 7·7	+21·2
64·517 C	26	90	16	54	268·1	−0·1	− 7·9	+33·8
65·451 G	9	53	6	38	267·6	−0·7	− 7·6	+45·6
66·404 G	9	18	8	17	267·9	−0·6	− 7·5	+58·4
67·394 G	2	18	3	27	268·8	+0·2	− 7·8	+72·4
Group 11374. March 24–April 5. A regular spot (*a* of Group 11364) diminishing as it nears the western limb and breaking into two portions on April 4.								
82·368 C	15	85	33	188	281·3	+5·0	− 8·5	−77·7
83·498 G	18	160	20	174	280·7	+4·2	− 8·3	−63·4
84·501 G	42	235	32	181	280·9	+4·3	− 8·2	−50·0
85·416 G	53	280	33	176	280·8	+4·1	− 8·1	−38·0
86·538 G	69	317	37	171	281·1	+4·2	− 7·8	−22·9
87·354 C	63	307	32	157	281·3	+4·3	− 7·7	−12·0
88·506 C	57	320	28	160	281·2	+4·0	− 7·6	+ 3·1
89·410 G	71	309	37	161	281·2	+3·9	− 7·4	+15·0
90·388 G	54	290	30	162	281·2	+3·8	− 7·4	+27·9
91·542 C	35	168	24	116	281·5	+3·9	− 7·5	+43·5
92·330 C	31	162	26	136	281·7	+4·0	− 7·2	+54·1
93·370 G	7	40	9	52	282·0	+4·1	− 7·1	+68·1
94·513 C	4	13	19	62	283·3	..	− 6·1	+84·5
Means ..	..	..	28	153	281·2	..	− 7·7	..

No. 1113. Latitude −3°·3.
Group 11370 in Rotation 1036.
,, 11378 ,, ,, 1037.

Group 11370. March 17–18. A group forming near the west limb.

75·477 G	22	75	40	135	163·7	0·0	− 3·6	+73·8
76·415 G	13	86	46	311	160·0	..	− 4·6	+82·5
Means ..	..	..	40	135	163·7	..	− 3·6	..

Group 11378. April 1–13. A regular spot, *a*, followed by faculæ in which small spots make their appearance on and after April 4.

90·388 G	11	56	38	192	171·4	..	− 2·8	−81·9
91·542 C	20	87	24	103	172·8	+6·2	− 3·1	−65·2
92·330 C	20	123	17	106	173·1	+6·3	− 3·0	−54·5
93·370 G	38	190	26	126	172·8	+5·8	− 3·0	−41·1
94·513 C	53	250	29	139	172·8	+5·6	− 3·2	−26·0
95·118 K	48	279	25	146	172·1	+4·8	− 3·3	−18·8

No. 1113, Group 11378—*continued.*

d					°	°	°	°
96·116 K	64	329	32	165	171·2	+3·7	− 3·7	− 6·5
97·630 G	63	349	33	179	171·6	+3·9	− 3·6	+13·9
98·540 C	55	236	31	132	172·2	+4·3	− 3·7	+26·5
99·382 G	54	227	34	143	172·3	+4·3	− 3·4	+37·7
100·466 G	31	125	25	103	173·3	+5·1	− 3·2	+53·0
101·453 G	27	94	33	117	173·6	+5·2	− 3·2	+66·4
102·397 G	7	47	18	122	173·8	+5·2	− 3·0	+79·0
Means ..	..	..	27	132	172·6	..	− 3·3	..
Spot *a*.								
90·388 G	11	56	38	192	171·4	..	− 2·8	−81·9
91·542 C	20	87	24	103	172·8	0·0	− 3·1	−65·2
92·330 C	20	123	17	106	173·1	+0·2	− 3·0	−54·5
93·370 G	36	181	24	119	173·1	0·0	− 3·1	−40·8
94·513 C	44	232	24	128	173·2	−0·1	− 3·2	−25·6
95·118 K	42	237	22	123	173·4	−0·1	− 3·2	−17·5
96·116 K	48	237	24	119	173·5	−0·1	− 3·4	− 4·2
97·630 G	36	242	19	126	173·6	−0·3	− 3·3	+15·9
98·540 C	40	185	23	105	173·6	−0·5	− 3·2	+27·9
99·382 G	43	184	28	118	173·7	−0·5	− 3·3	+39·1
100·466 G	29	121	24	100	173·6	−0·8	− 3·2	+53·3
101·453 G	27	94	33	117	173·6	−1·0	− 3·2	+66·4
102·397 G	7	47	18	122	173·8	−1·0	− 3·0	+79·0

No. 1114. Latitude +4°·1.
Group 11381 in Rotation 1037.
,, 11388 ,, ,, 1038.

Group 11381. April 7–9. A group of stream type appearing near the west limb of Group 11376.

96·116 K	58	277	41	197	222·3	0·0	+ 2·8	+44·6
97·630 G	26	163	32	210	224·5	+1·9	+ 3·0	+66·8
98·540 C	11	46	27	130	224·0	+1·3	+ 3·7	+78·3
Means ..	..	..	33	179	223·6	..	+ 3·2	..

Group 11388. April 24–30. A small definite spot.

113·538 G	7	18	17	44	229·8	+4·4	+ 4·3	−77·8
114·480 G	9	25	11	31	229·5	+3·9	+ 4·4	−65·7
115·432 G	11	20	9	17	229·3	+3·6	+ 4·3	−53·3
116·598 G	18	29	12	19	229·3	+3·4	+ 4·5	−37·9
117·359 C	9	20	5	11	229·5	+3·4	+ 4·8	−27·7
118·496 G	14	25	7	13	229·4	+3·1	+ 4·5	−12·7
119·352 G	9	23	5	12	229·7	+3·3	+ 4·5	− 1·1
Means ..	..	..	9	21	229·5	..	+ 4·5	..

LEDGER I.—RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

No. **1115**. Latitude +7°·5.

Group 11382 in Rotation 1037.
,, 11394 ,, ,, 1038.

Group 11382. April 10–22. A fairly large spot, *a*, with double umbra, followed by small companions until April 18 and a single companion on April 21 and 22; *a* apparently comes from the fusion of two spots that are clearly divided on April 11; the resulting double-umbra persists until April 20.

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.	Latitude.	Long. from C.M.
d					°	°	°
99·382 G	9	22	48	117	50·8	..	+ 7·4	−83·8
100·466 G	24	128	36	194	50·1	0·0	+ 7·9	−70·2
101·453 G	48	273	44	246	52·4	+2·2	+ 7·4	−54·8
102·397 G	85	387	59	273	51·9	+1·5	+ 7·4	−42·9
103·375 C	103	490	60	290	53·1	+2·6	+ 7·6	−28·8
104·534 C	101	580	53	308	53·5	+2·8	+ 7·2	−13·1
105·595 G	90	459	46	234	54·1	+3·3	+ 7·1	+ 1·6
106·503 C	83	424	44	224	54·0	+3·0	+ 7·1	+13·4
107·453 G	81	410	47	238	54·9	+3·8	+ 7·1	+26·9
108·397 C	51	298	34	200	55·3	+4·0	+ 7·0	+39·8
109·369 C	44	276	38	237	56·0	+4·6	+ 6·8	+53·3
110·429 G	51	214	68	289	56·0	+4·4	+ 6·7	+67·3
111·341 G	16	71	53	238	57·6	..	+ 6·7	+80·9
Means ..	..	..	48	248	53·8	..	+ 7·2	..

Spot *a*.

100·466 G	22	119	32	174	51·5	0·0	+ 7·4	−68·8
101·453 G	40	253	36	225	52·9	+1·3	+ 7·3	−54·3
102·397 G	74	309	51	213	53·1	+1·3	+ 7·3	−41·7
103·375 C	99	455	58	268	53·3	+1·4	+ 7·5	−28·6
104·534 C	97	554	51	294	53·7	+1·6	+ 7·3	−12·9
105·595 G	90	459	46	234	54·1	+1·9	+ 7·1	+ 1·6
106·503 C	79	400	42	212	54·5	+2·1	+ 6·9	+13·9
107·453 G	81	410	47	238	54·9	+2·4	+ 7·1	+26·9
108·397 C	51	298	34	200	55·3	+2·6	+ 7·0	+39·8
109·369 C	44	276	38	237	56·0	+3·2	+ 6·8	+53·3
110·429 G	40	185	55	255	56·6	+3·6	+ 6·9	+67·9
111·341 G	14	66	48	226	57·6	..	+ 6·7	+80·9

Group 11394. May 7–18. A stable regular spot (*a* of Group 11382). Groups 11393 and 11395 are close to it.

126·345 G	14	57	44	180	58·2	..	+ 7·9	−80·2
127·480 G	27	159	33	192	58·7	+3·3	+ 7·9	−64·7
128·440 G	41	217	34	182	58·5	+2·9	+ 8·0	−52·2
129·364 C	36	248	24	164	59·1	+3·4	+ 8·0	−39·4
130·355 G	52	267	30	152	59·3	+3·4	+ 7·8	−26·0
131·348 G	64	278	33	145	59·5	+3·5	+ 7·7	−12·7
132·343 G	57	280	29	143	59·5	+3·3	+ 7·8	+ 0·4
133·342 G	41	255	21	133	59·6	+3·3	+ 7·9	+13·8
134·352 C	52	251	30	143	59·7	+3·3	+ 7·8	+27·2
135·304 C	31	195	20	129	59·9	+3·3	+ 7·9	+40·0
136·375 C	27	148	23	129	59·9	+3·2	+ 8·0	+54·2
137·569 G	14	75	21	114	60·2	+3·3	+ 8·1	+70·3
Means ..	..	..	27	148	59·4	..	+ 7·9	..

No. **1116**. Latitude −5°·8.

Group 11429 in Rotation 1043.
,, 11436 ,, ,, 1044.

Group 11429. September 2–13. One or two small spots on September 2–4 and September 7–8; after September 8 a group of stream type develops and is led by a fairly large regular spot with a double umbra on September 11.

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.	Latitude.	Long. from C.M.
d					°	°	°	°
244·520 C	2	7	3	11	304·6	0·0	− 4·2	−70·6
245·342 G	5	11	5	11	305·2	+0·5	− 4·6	−59·1
246·495 G	2	5	1	4	306·1	+1·2	− 4·9	−43·0
247·363 C	0	0	0	0	..	..	..	..
248·338 G	0	0	0	0	..	..	..	..
249·483 G	5	14	8	21	308·7	+3·3	− 5·2	− 0·9
250·348 G	2	16	1	8	309·5	+4·0	− 5·3	+11·3
251·380 G	14	32	8	18	309·6	+3·9	− 5·6	+25·1
252·473 G	32	168	22	114	310·7	+4·8	− 5·8	+40·6
253·345 G	66	350	58	306	312·0	+6·0	− 6·1	+53·4
254·128 K	61	280	73	337	312·4	+6·2	− 5·8	+64·1
255·323 G	19	102	63	364	312·2	+5·8	− 5·7	+79·7
Means ..	..	..	20	100	309·1	..	− 5·3	..

Group 11436. September 29–October 8. Possible return of Group 11429. A single small spot seen only on September 29 and October 8 in the preceding part of a fairly large area of faculæ.

271·557 G	0	2	0	2	317·3	+8·3	− 6·9	−60·9
272·351 G	0	0	0	0	..	..	..	..
273·357 G	0	0	0	0	..	..	..	..
274·609 G	0	0	0	0	..	..	..	..
275·342 G	0	0	0	0	..	..	..	..
276·474 G	0	0	0	0	..	..	..	..
277·388 G	0	0	0	0	..	..	..	..
278·386 G	0	0	0	0	..	..	..	..
279·390 G	0	0	0	0	..	..	..	..
280·465 G	0	4	0	4	320·8	+10·4	− 9·4	+60·1
Means ..	..	..	0	1	319·0	..	− 8·2	..

No. **1117**. Latitude +10°·4.

Group 11448 in Rotation 1046.
,, 11453 ,, ,, 1047.

Group 11448. November 20–December 2. A large group of stream type with well-defined leader and follower spots, *a* and *b* respectively.

323·403 C	28	107	(85	324	333·8	..	+ 9·6)	−80·6
324·442 G	105	406	180	629	329·9	0·0	+10·4	−70·9
325·364 C	165	776	171	778	329·3	−0·7	+10·3	−59·3
326·353 C	254	1064	188	787	328·1	−2·0	+10·3	−47·5
327·395 G	204	1025	123	618	329·6	−0·6	+10·1	−32·2
328·562 C	249	1113	132	590	329·2	−1·1	+ 9·8	−17·2
329·511 G	245	1125	126	574	328·9	−1·5	+10·0	− 5·0

LEDGER I.—RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
No. 1117, Group 11448—*continued.*								
d					°	°	°	°
330·368 C	229	1135	117	528	329·3	−1·2	+10·0	+ 6·7
331·411 G	147	752	81	411	329·3	−1·3	+10·0	+20·4
332·379 C	130	662	80	407	329·9	−0·8	+10·1	+33·8
333·400 C	91	444	69	339	331·1	+0·3	+10·3	+48·4
334·422 G	58	250	64	278	331·8	+0·9	+10·2	+62·6
335·492 G	21	91	49	220	332·7	+1·6	+10·5	+77·6
Means ..	..	..	115	513	329·9	..	+10·2	..
Spot *a*.								
323·403 C	28	107	85	324	333·8	..	+ 9·6	−80·6
324·442 G	44	262	57	338	333·5	0·0	+ 9·7	−67·3
325·364 C	57	375	50	330	333·4	−0·2	+ 9·8	−55·2
326·353 C	102	424	69	288	333·7	0·0	+ 9·8	−41·9
327·395 G	94	438	54	250	333·6	−0·2	+10·0	−28·2
328·562 C	105	485	55	252	333·6	−0·3	+ 9·7	−12·8
329·511 G	92	453	47	231	333·4	−0·6	+ 9·8	− 0·5
330·368 C	103	466	53	238	333·5	−0·6	+ 9·9	+10·9
331·411 G	91	389	51	218	333·6	−0·6	+10·2	+24·7
332·379 C	67	336	43	215	333·5	−0·8	+10·1	+37·4
333·400 C	55	294	44	235	333·7	−0·7	+10·2	+51·0
334·422 G	41	181	48	214	333·8	−0·7	+10·3	+64·6
335·492 G	17	82	43	207	333·5	−1·2	+10·5	+78·4
No. 1117, Group 11448—*continued.*								
Spot *b*.								
d					°	°	°	°
324·442 G	61	144	123	291	325·0	0·0	+11·2	−75·8
325·364 C	93	318	106	363	324·8	−0·3	+10·7	−63·8
326·353 C	110	426	88	341	324·5	−0·7	+10·8	−51·1
327·395 G	81	412	52	264	324·2	−1·1	+10·7	−37·6
328·562 C	113	454	61	245	324·9	−0·5	+10·5	−21·5
329·511 G	131	506	67	258	325·3	−0·2	+10·1	− 8·6
330·368 C	95	443	48	226	325·1	−0·5	+10·0	+ 2·5
331·411 G	43	307	23	163	324·9	−0·8	+10·0	+16·0
332·379 C	38	166	22	96	324·6	−1·2	+10·0	+28·5
333·400 C	19	105	13	72	325·1	−0·8	+10·4	+42·4
334·422 G	13	52	12	47	325·4	−0·6	+10·4	+56·2
335·492 G	4	9	6	13	324·9	−1·3	+10·3	+69·8
Group 11453. December 18–24. A regular spot (*a* of Group 11448), diminishing to a tiny spot, in a large area of faculæ. A small companion, possibly a disintegrated portion of the spot, south precedes it on December 20 and 21, and there is another faint companion on December 24.								
351·441 C	17	67	27	105	334·3	−2·0	+11·4	−70·7
352·356 C	21	83	21	83	334·0	−2·4	+11·2	−58·9
353·379 C	27	102	20	75	333·9	−2·6	+11·0	−45·5
354·405 C	19	96	11	58	333·9	−2·7	+10·7	−32·0
355·454 C	12	48	6	26	333·6	−3·2	+10·5	−18·5
356·451 C	8	15	4	8	333·5	−3·4	+10·1	− 5·5
357·311 C	4	10	2	5	332·1	−4·9	+10·1	+ 4·5
Means ..	..	..	13	51	333·6	..	+10·7	..

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ROYAL OBSERVATORY, GREENWICH.

Ledgers of Groups of Sun Spots

for the Year

1931

Ledger II.—Non-Recurrent Groups

GREENWICH PHOTO-HELIOGRAPHIC RESULTS 1931

LEDGER II.—NON-RECURRENT GROUPS OF SUN SPOTS for the YEAR 1931.

The Greenwich Mean Time 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 and Kodaikánal by the letters C and K, 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 disc.

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°·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, $\xi = 14°\cdot37 - 2°\cdot60 \sin^2\phi$.

A *plus* sign 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° or more from the Sun's central meridian, the measures for that day are not included in taking the mean area, 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 II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931.

Group 11343.

1930, December 25–1931, January 2. Intermittent. A small spot on December 25, 26, and 28; a close pair on January 2.

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Latitude.	Long. from C.M.
d					°	°	°	°
7·435 C	2	8	3	13	19·3	0·0	+ 8·7	−71·1
6·449 C	4	11	4	11	19·2	−0·2	+ 9·1	−57·8
5·360 C	0	0	0	0	..	..	..	..
4·404 G	4	15	2	8	23·7	+4·0	+ 8·5	−27·6
3·462 G	0	0	0	0	..	..	..	..
2·411 C	0	0	0	0	..	..	..	..
1·120 K	0	0	0	0	..	..	..	..
0·436 C	0	0	0	0	..	..	..	..
1·502 G	6	26	4	17	21·7	+1·3	+ 7·7	+37·6
Means ..	..	..	1	5	21·0	..	+ 8·5	..

Group 11345.

1931, January 4–15. A composite spot that becomes regular before it dies out. Small companions follow it on January 5 and 6.

3·203 K	6	30	18	91	240·6	..	−18·6	−81·1
4·492 C	21	101	26	125	238·8	0·0	−18·9	−66·0
5·498 G	43	200	36	167	239·4	+0·7	−18·6	−52·1
6·519 G	34	163	22	106	240·4	+1·8	−18·6	−37·7
7·311 C	21	99	12	57	240·4	+1·8	−19·0	−27·2
8·512 G	54	190	29	101	240·6	+2·1	−18·4	−11·2
9·337 C	30	80	16	42	240·8	+2·4	−18·7	− 0·2
10·509 G	13	93	7	50	240·9	+2·6	−18·6	+15·4
11·352 C	17	55	10	32	241·0	+2·7	−18·8	+26·6
12·327 C	17	34	11	22	240·9	+2·7	−18·8	+39·3
13·324 C	4	8	3	7	240·8	+2·7	−18·6	+52·3
14·372 C	2	11	2	13	240·4	+2·4	−18·7	+65·8
Means ..	..	..	16	66	240·4	..	−18·7	..

Group 11348.

January 18–25. A moderate sized spot appearing suddenly on January 18 and accompanied on the following days by companions in irregular formation. A revival of activity represented by Group 11347.

17·338 C	29	146	16	83	110·0	0·0	+ 5·4	−25·6
18·351 C	61	203	32	105	110·3	+0·1	+ 5·7	−12·0
19·340 C	55	255	28	129	111·1	+0·8	+ 5·6	+ 1·8
20·335 C	47	236	25	125	110·9	+0·4	+ 5·1	+14·8
21·314 C	42	199	24	114	111·6	+0·9	+ 5·2	+28·3
22·124 K	82	324	53	208	110·0	−0·8	+ 5·5	+37·4
23·411 G	24	76	22	69	110·8	−0·2	+ 5·4	+55·1
24·402 G	2	8	3	11	111·9	+0·7	+ 5·0	+69·3
Means ..	..	..	25	106	110·8	..	+ 5·4	..

Group 11349.

January 19–28. A small spot disappearing after January 22. On January 25 there is a pair of small spots near its place, and on January 28 another pair.

d					°	°	°	°
18·351 C	4	17	8	35	46·5	0·0	+ 0·7	−75·8
19·340 C	4	25	4	26	48·7	+2·0	+ 0·7	−60·6
20·335 C	4	17	3	13	49·2	+2·3	+ 1·1	−46·9
21·314 C	4	8	2	5	50·6	+3·5	+ 1·1	−32·7
22·124 K	0	0	0	0	..	..	..	..
23·411 G	0	0	0	0	..	..	..	..
24·402 G	4	13	2	7	49·7	+2·1	+ 0·5	+ 7·1
25·492 G	0	0	0	0	..	..	..	..
26·501 G	0	0	0	0	..	..	..	..
27·308 C	4	13	3	9	46·8	−1·4	+ 3·5	+42·4
Means ..	..	..	2	10	48·6	..	+ 1·3	..

Group 11350.

January 23–27. A small spot with a companion on January 23, 24 and 27.

22·124 K	2	8	4	19	357·2	0·0	+11·8	−75·4
23·411 G	12	28	11	27	359·3	+2·0	+12·0	−56·4
24·402 G	9	15	6	10	1·2	+3·8	+11·8	−41·4
25·492 G	7	24	4	14	1·2	+3·7	+11·7	−27·0
26·501 G	4	11	2	6	1·4	+3·8	+11·2	−13·6
Means ..	..	..	5	15	0·1	..	+11·7	..

Group 11352.

February 3–9. One or two small spots not seen on February 6 and 7.

33·324 C	8	34	6	25	237·7	0·0	−13·3	−47·4
34·526 G	6	20	3	11	237·6	−0·1	−13·8	−31·7
35·298 C	4	17	2	9	240·7	+2·9	−15·0	−18·4
36·125 K	0	0	0	0	..	..	..	..
37·301 C	0	0	0	0	..	..	..	..
38·524 G	2	9	1	5	244·9	+7·0	−15·1	+28·2
39·447 C	4	21	3	13	242·3	+4·4	−14·8	+37·8
Means ..	..	..	2	9	240·6	..	−14·4	..

Group 11354.

February 12–17. A short-lived stream of small spots.

42·405 G	17	94	14	75	115·3	0·0	+ 4·0	−50·3
43·574 G	42	183	26	112	117·1	+1·6	+ 3·5	−33·1
44·511 G	35	83	19	45	117·8	+2·1	+ 3·0	−20·0
45·530 G	7	31	4	16	119·9	+4·0	+ 3·8	− 4·5
46·504 G	8	22	4	12	116·8	+0·8	+ 3·2	+ 5·2
47·557 G	2	11	1	6	114·5	−1·7	+ 3·0	+16·8
Means ..	..	..	11	44	116·9	..	+ 3·4	..

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

Group 11358.

February 15–26. At first a group consisting of a regular spot, *a*, and a distant small companion; the latter dies out but is represented on February 20 and 21 by one or two faint spots. The second phase takes place about February 22, when the whole group reforms on a larger scale, but its activity is waning as it passes round the west limb. (a_1 is the new leader spot and *b* the follower.)

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
d					°	°	°	°
45·530 G	17	89	23	118	55·9	0·0	− 4·4	−68·5
46·504 G	35	175	31	150	56·6	+0·5	− 3·9	−55·0
47·557 G	45	203	30	133	57·9	+1·6	− 3·7	−39·8
48·459 C	40	219	22	123	58·5	+2·1	− 3·8	−27·3
49·412 G	39	190	20	99	58·4	+1·8	− 3·7	−14·9
50·546 C	28	144	14	76	57·8	+1·0	− 3·7	− 0·5
51·422 G	25	159	13	82	57·3	+0·3	− 4·2	+10·5
52·403 G	141	600	77	326	56·0	−1·1	− 4·1	+22·1
53·485 G	196	1069	122	662	55·8	−1·5	− 3·9	+36·2
54·595 G	151	697	122	559	56·6	−0·9	− 3·7	+51·6
55·363 C	90	488	95	517	56·5	−1·2	− 3·6	+61·6
56·436 C	20	173	44	371	57·5	−0·4	− 3·5	+76·7
Means ..	..	..	51	268	57·1	..	− 3·8	..

Spot *a* and a_1.

45·530 G	13	76	16	96	57·6	0·0	− 4·0	−66·8
46·504 G	26	153	22	127	58·2	+0·4	− 3·7	−53·4
47·557 G	41	192	27	125	58·5	+0·5	− 3·7	−39·2
48·459 C	40	219	22	123	58·5	+0·4	− 3·8	−27·3
49·412 G	39	190	20	99	58·4	+0·1	− 3·7	−14·9
50·546 C	24	141	12	70	58·2	−0·3	− 3·5	− 0·1
51·422 G	17	74	9	38	58·7	0·0	− 3·6	+11·9
52·403 G	65	290	36	160	58·8	0·0	− 4·1	+24·9
53·485 G	77	359	50	233	59·7	+0·7	− 3·3	+40·1
54·595 G	55	252	48	219	60·0	+0·8	− 3·1	+55·0
55·363 C	43	244	50	285	59·8	+0·4	− 3·1	+64·9
56·436 C	9	77	25	211	60·6	+1·0	− 3·2	+79·8

Spot *b*.

52·403 G	41	166	22	88	52·6	0·0	− 4·5	+18·7
53·485 G	83	548	50	329	53·2	+0·4	− 3·9	+33·6
54·595 G	70	329	53	247	53·0	0·0	− 3·9	+48·0
55·363 C	43	235	41	223	53·2	+0·1	− 4·0	+58·3
56·436 C	9	92	15	153	53·6	+0·3	− 4·0	+72·8

Group 11359.

February 19–23. A pair of small spots that separate and become each a double spot.

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
d					°	°	°	°
49·412 G	13	44	7	23	67·8	0·0	+ 8·6	− 5·5
50·546 C	32	141	17	74	68·4	+0·5	+ 8·5	+10·1
51·422 G	26	70	14	39	69·0	+0·9	+ 8·2	+22·2
52·403 G	21	72	14	46	69·2	+1·0	+ 8·1	+35·3
53·485 G	4	20	4	18	73·4	+5·0	+ 7·1	+53·8
Means ..	..	..	11	40	69·6	..	+ 8·1	..

Group 11360.

February 22–March 1. A stream of imperfectly formed spots.

52·403 G	29	79	23	64	345·4	0·0	+10·7	−48·5
53·485 G	61	328	38	206	346·6	+1·1	+10·0	−33·0
54·595 G	74	219	41	121	346·3	+0·7	+10·4	−18·7
55·363 C	54	209	28	109	347·0	+1·3	+ 9·9	− 7·9
56·436 C	56	186	30	99	347·7	+1·9	+10·1	+ 6·9
57·441 G	31	103	17	58	347·2	+1·3	+10·4	+19·7
58·442 C	13	34	8	21	348·0	+1·9	+10·0	+33·6
59·350 C	2	6	2	5	348·1	+1·9	+10·4	+45·7
Means ..	..	..	23	85	347·0	..	+10·2	..

Group 11361.

February 22–March 1. A group of ephemeral spots; none are seen on February 27.

52·403 G	4	13	21	69	310·2	..	+ 6·2	−83·7
53·485 G	17	46	24	66	311·1	0·0	+ 6·4	−68·5
54·595 G	32	88	28	77	311·8	+0·5	+ 7·2	−53·2
55·363 C	21	64	15	46	311·2	−0·2	+ 7·4	−43·7
56·436 C	10	32	5	19	313·6	+2·1	+ 7·2	−27·2
57·441 G	0	0	0	0	..	..	..	..
58·442 C	4	9	2	5	314·1	+2·1	+ 9·2	− 0·3
59·350 C	2	9	1	5	310·1	−1·8	+ 9·1	+ 7·7
Means ..	..	..	11	31	312·0	..	+ 7·8	..

Group 11366.

March 1–13. A stream which lengthens out markedly in longitude. *a* is the leader spot and *b* the follower.

59·350 C	4	13	14	47	219·4	..	− 9·9	−83·0
60·537 C	17	76	22	96	218·7	0·0	−10·0	−68·1
61·501 G	48	189	40	159	220·5	+1·7	−10·1	−53·6
62·388 G	96	480	67	335	218·0	−0·9	−10·5	−44·4
63·469 G	75	357	43	203	220·3	+1·3	−10·2	−27·8
64·517 C	69	295	36	153	220·5	+1·4	−10·1	−13·8

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued*.

Date G.M.T. Place.	Projected Area Whole Umbræ	Projected Area Whole Spots.	Corrected Area Whole Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
Group 11366—*continued*.								
d					°	°	°	°
65·451 G	61	278	32	140	220·9	+1·7	−10·2	− 1·1
66·404 G	46	169	24	87	222·2	+2·8	−10·3	+12·7
67·394 G	68	185	38	103	223·1	+3·6	− 9·8	+26·7
68·504 G	62	278	41	186	224·0	+4·4	−10·2	+42·2
69·498 C	30	140	26	118	223·1	+3·4	−10·0	+54·4
70·401 G	18	64	23	84	225·0	+5·2	− 9·9	+68·2
71·388 G	6	33	17	103	224·9	..	− 9·9	+81·1
Means ..	..	..	36	151	221·5	..	−10·1	..
Spot *a*.								
59·350 C	4	13	14	47	219·4	..	− 9·9	−83·0
60·537 C	11	55	13	64	221·4	0·0	−10·1	−65·4
61·501 G	28	114	22	89	223·6	+2·1	− 9·9	−50·5
62·388 G	35	171	22	108	224·7	+3·1	− 9·7	−37·7
63·469 G	31	167	17	90	226·0	+4·3	− 9·2	−22·1
64·517 C	32	111	16	56	226·5	+4·7	− 9·1	− 7·8
65·451 G	22	86	11	43	226·9	+5·0	− 9·0	+ 4·9
Spot *b*.								
60·537 C	4	17	6	27	213·9	0·0	−10·4	−72·9
61·501 G	13	57	12	54	215·0	+1·0	−10·8	−59·1
62·388 G	48	263	36	195	214·3	+0·2	−10·9	−48·1
63·469 G	40	172	24	103	214·1	−0·1	−10·9	−34·0
64·517 C	17	98	9	52	213·7	−0·6	−10·9	−20·6
65·451 G	15	73	8	37	214·2	−0·2	−10·7	− 7·8
Group 11367								
March 9–21. A large group of stream type developing rapidly and consisting of two chief spots *a* and *b* that undergo considerable changes between March 12 and 15. The measures of *a* after March 13 relate to the surviving nucleus of the disintegrated spot and do not include the companion cluster.								
67·394 G	31	165	74	396	119·1	0·0	+ 4·3	−77·3
68·504 G	84	526	98	611	118·7	−0·6	+ 4·0	−63·1
69·498 C	247	1221	198	977	118·9	−0·6	+ 3·7	−49·8
70·401 G	259	1553	170	1022	118·0	−1·6	+ 4·2	−38·8
71·388 G	228	1518	130	861	117·9	−1·9	+ 4·1	−25·9
72·436 G	235	1397	122	729	117·7	−2·3	+ 3·9	−12·3
73·455 G	174	912	88	465	117·7	−2·5	+ 4·1	+ 1·2
74·434 C	158	968	84	510	118·0	−2·3	+ 3·7	+14·4
75·477 G	142	644	83	372	118·2	−2·3	+ 4·0	+28·3
76·415 G	118	575	81	393	117·8	−2·9	+ 4·0	+40·3
77·387 G	59	293	51	255	117·5	−3·4	+ 3·8	+52·8
78·386 G	22	73	31	102	119·0	−2·1	+ 3·7	+67·5
79·384 G	2	7	(6	20	117·4	..	+ 6·1)	+79·0
Means ..	..	..	101	558	118·2	..	+ 4·0	..

Date G.M.T. Place.	Projected Area Whole Umbræ	Projected Area Whole Spots.	Corrected Area Whole Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
Group 11367—*continued*.								
Spot *a*								
d					°	°	°	°
68·504 G	44	299	46	314	121·2	0·0	+ 4·0	−60·6
69·498 C	146	692	110	519	121·5	+0·1	+ 3·8	−47·2
70·401 G	132	774	83	488	121·2	−0·3	+ 3·8	−35·6
71·388 G	101	660	56	363	121·4	−0·3	+ 3·6	−22·4
72·436 G	44	220	22	112	122·2	0·0	+ 2·5	− 7·8
73·455 G	44	167	22	85	122·7	+0·3	+ 2·9	+ 6·2
74·434 C	24	134	13	72	122·4	−0·2	+ 2·2	+18·8
75·477 G	29	133	17	80	122·7	0·0	+ 2·2	+32·8
76·415 G	22	111	16	81	123·1	+0·2	+ 2·1	+45·6
77·387 G	13	66	13	65	123·6	+0·5	+ 1·8	+58·9
78·386 G	9	31	15	51	123·2	−0·1	+ 1·8	+71·7
Spot *b*.								
68·504 G	33	207	44	273	114·8	0·0	+ 3·8	−67·0
69·498 C	86	445	75	387	115·0	0·0	+ 4·0	−53·7
70·401 G	101	594	70	410	114·6	−0·5	+ 3·8	−42·2
71·388 G	101	603	59	350	114·7	−0·6	+ 3·8	−29·1
72·436 G	114	572	60	303	114·6	−0·9	+ 3·8	−15·4
73·455 G	77	400	39	204	114·7	−1·0	+ 3·7	− 1·8
74·434 C	80	430	42	224	115·3	−0·5	+ 3·7	+11·7
75·477 G	53	252	30	141	115·3	−0·7	+ 4·0	+25·4
76·415 G	40	190	26	124	115·3	−0·9	+ 3·8	+37·8
77·387 G	22	95	18	77	115·5	−0·9	+ 3·8	+50·8
78·386 G	4	9	5	10	115·2	−1·3	+ 4·6	+63·7
Group 11368.								
March 10–18. A stream of feeble activity in the wake of Group 11307.								
68·504 G	4	9	12	27	102·4	0·0	+ 7·0	−79·4
69·498 C	17	56	23	75	101·4	−1·1	+ 7·3	−67·3
70·401 G	42	141	38	128	101·5	−1·2	+ 7·5	−55·3
71·388 G	26	84	18	58	103·1	+0·3	+ 7·4	−40·7
72·436 G	22	81	12	47	103·4	+0·4	+ 7·4	−26·6
73·455 G	23	73	12	39	104·4	+1·3	+ 7·4	−12·1
74·434 C	10	33	5	18	102·4	−0·9	+ 7·9	− 1·2
75·477 G	18	73	10	39	101·3	−2·1	+ 8·5	+11·4
76·415 G	11	48	6	27	102·0	−1·5	+ 8·3	+24·5
Means ..	..	..	15	51	102·4	..	+ 7·6	..

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

Group 11376.

March 30–April 7. A group whose activity is generally represented by a pair of spots of varying importance.

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
d					°	°	°	°
88·506 C	8	22	6	18	226·6	0·0	+ 6·8	−51·5
89·410 G	14	40	10	27	226·4	−0·3	+ 7·3	−39·8
90·388 G	22	76	12	43	227·3	+0·4	+ 7·2	−26·0
91·542 C	13	31	7	16	229·3	+2·2	+ 7·4	− 8·7
92·330 C	13	28	7	15	230·6	+3·4	+ 7·2	+ 3·0
93·370 G	4	25	2	13	228·2	+0·9	+ 7·2	+14·3
94·513 C	18	57	10	33	227·3	−0·2	+ 7·0	+28·5
95·118 K	8	33	5	21	226·6	−1·1	+ 7·4	+35·7
96·116 K	4	17	3	13	226·5	−1·2	+ 7·7	+48·8
Means ..	..	..	7	22	227·6	..	+ 7·2	..

Group 11380.

April 6–12. A stream of changing spots.

95·118 K	8	33	7	30	135·4	0·0	+ 4·6	−55·5
96·116 K	56	173	41	126	132·3	−3·3	+ 4·1	−45·4
97·630 G	112	506	63	284	132·4	−3·4	+ 4·1	−25·3
98·540 C	75	513	39	270	132·5	−3·5	+ 4·4	−13·2
99·382 G	85	417	43	213	133·3	−2·8	+ 4·4	− 1·3
100·466 G	63	305	33	160	135·1	−1·2	+ 4·9	+14·8
101·453 G	10	47	5	28	136·9	+0·4	+ 4·8	+29·7
Means ..	..	..	33	159	134·0	..	+ 4·5	..

Group 11383.

April 11–22. Intermittent. A regular spot that has disappeared by April 16; on April 17 a faint marking is visible and on April 22 a tiny spot. The regular spot is accompanied by a large area of faculæ.

100·466 G	4	18	21	96	38·6	..	+23·0	−81·7
101·453 G	13	92	23	160	38·1	0·0	+23·1	−69·1
102·397 G	18	103	19	110	38·5	+0·6	+22·8	−56·3
103·375 C	22	95	17	75	39·0	+1·3	+22·7	−42·9
104·534 C	11	42	7	27	38·5	+1·1	+22·8	−28·1
105·595 G	0	0	0	0	..	..	..	..
106·503 C	9	20	5	11	37·9	+0·9	+23·0	− 2·7
107·453 G	0	0	0	0	..	..	..	..
108·397 C	0	0	0	0	..	..	..	..
109·369 C	0	0	0	0	..	..	..	..
110·429 G	0	0	0	0	..	..	..	..
111·341 G	2	7	2	8	35·6	−0·4	+25·0	+58·9
Means ..	..	..	7	36	37·9	..	+23·2	..

Group 11384.

April 13–25. A stream of normal type in which the components do not separate in longitude to the usual extent, and in which the following portion is of minor importance.

d					°	°	°	°
102·397 G	11	49	42	187	13·5	..	+10·4	−81·3
103·375 C	22	130	30	179	14·5	0·0	+10·3	−67·4
104·534 C	68	469	60	416	13·2	−1·4	+10·8	−53·4
105·595 G	101	561	69	383	13·2	−1·5	+10·8	−39·3
106·503 C	110	560	64	329	13·7	−1·1	+10·9	−26·9
107·453 G	92	455	50	247	14·0	−0·9	+11·0	−14·0
108·397 C	87	409	46	213	14·2	−0·8	+11·1	− 1·3
109·369 C	73	387	39	205	14·3	−0·8	+10·8	+11·6
110·429 G	74	441	43	255	13·8	−1·4	+11·1	+25·1
111·341 G	70	352	46	232	14·2	−1·1	+10·9	+37·5
112·403 G	47	228	40	194	14·6	−0·8	+10·8	+52·0
113·538 G	27	145	37	199	14·8	−0·7	+10·7	+67·2
114·480 G	14	63	42	191	14·6	−1·0	+10·2	+79·4
Means ..	..	..	47	254	14·1	..	+10·8	..

Spot *a*

102·397 G	11	49	42	187	13·5	..	+10·4	−81·3
103·375 C	20	121	27	165	14·9	0·0	+10·1	−67·0
104·534 C	48	306	41	263	14·5	−0·5	+10·8	−52·1
105·595 G	72	364	48	240	14·8	−0·3	+10·5	−37·7
106·503 C	81	413	47	240	14·7	−0·5	+10·6	−25·9
107·453 G	83	405	45	219	14·5	−0·8	+10·9	−13·5
108·397 C	80	382	42	199	14·6	−0·8	+11·0	− 0·9
109·369 C	66	356	35	189	14·5	−1·0	+10·9	+11·8
110·429 G	65	360	38	209	14·4	−1·2	+11·0	+25·7
111·341 G	63	316	42	209	14·4	−1·3	+10·8	+37·7
112·403 G	47	228	40	194	14·6	−1·2	+10·8	+52·0
113·538 G	27	145	37	199	14·8	−1·1	+10·7	+67·2
114·480 G	14	63	42	191	14·6	−1·4	+10·2	+79·4

Group 11385.

April 17–23. A pair of small ephemeral spots on April 17; on April 21 a pair of fairly large complex spots have suddenly appeared with *a* as leader and *b* as follower.

106·503 C	4	13	2	7	37·9	0·0	+ 9·3	− 2·7
107·453 G	0	0	0	0	..	..	..	..
108·397 C	0	0	0	0	..	..	..	..
109·369 C	0	0	0	0	..	..	..	..
110·429 G	110	349	92	293	40·2	+1·8	+ 8·7	+51·5
111·341 G	77	368	97	468	42·1	+3·6	+ 8·2	+65·4
112·403 G	18	59	75	271	43·8	..	+ 8·3	+81·2
Means ..	..	..	32	128	40·1	..	+ 8·7	..

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.	Lati-tude.	Long. from C.M.
Group 11385—*continued.*							
Spot *a*.							
d					°	°	°
110·429 G	50	158	44	139	42·5	0·0	+ 8·2	+53·8
111·341 G	43	221	60	307	44·7	+2·1	+ 7·7	+68·0
112·403 G	9	36	55	220	47·1	..	+ 8·2	+84·5
Spot *b*.								
110·429 G	56	182	45	146	38·4	0·0	+ 9·0	+49·7
111·341 G	32	140	35	153	37·9	−0·6	+ 9·3	+61·2
112·403 G	9	23	20	51	38·5	−0·2	+ 9·4	+75·9
Group 11387.								
April 23–28. A stream of small spots.								
112·403 G	5	14	3	8	304·4	0·0	+14·7	−18·2
113·538 G	28	133	14	70	304·3	−0·1	+15·0	− 3·3
114·480 G	63	167	34	90	304·9	+0·5	+14·8	+ 9·7
115·432 G	48	122	28	70	304·9	+0·5	+14·7	+22·3
116·598 G	28	79	19	53	304·2	−0·3	+15·3	+37·0
117·359 C	4	16	3	13	307·4	+2·9	+15·2	+50·2
Means ..	..	..	17	51	305·0	..	+15·0	..
Group 11389.								
April 29–May 3. A pair of spots of which the following expands into a regular spot *b*.								
118·496 G	10	25	6	15	272·1	0·0	+13·7	+30·0
119·352 G	28	68	20	48	272·5	+0·4	+13·7	+41·7
120·550 G	34	138	32	132	271·1	−1·1	+14·5	+56·1
121·413 G	20	100	28	142	270·8	−1·4	+14·9	+67·2
122·122 K	15	46	35	106	270·0	−2·2	+15·2	+75·8
Means ..	..	..	24	89	271·3	..	+14·4	..
Spot *b*.								
118·496 G	5	9	3	5	270·5	0·0	+14·3	+28·4
119·352 G	14	32	10	22	270·8	+0·3	+14·4	+40·0
120·550 G	27	111	25	104	270·1	−0·5	+14·9	+55·1
121·413 G	18	86	24	117	270·0	−0·6	+15·4	+66·4
122·122 K	15	46	35	106	270·0	−0·6	+15·2	+75·8

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.	Lati-tude.	Long. from C.M.
Group 11392							
May 6–13. A stream, not very extensive in longitude, with a fair-sized spot as leader on May 11. The first indication of the group is a tiny ephemeral spot on May 6.							
d					°	°	°	°
125·351 G	0	5	0	3	130·3	0·0	− 2·2	−21·2
126·345 G	0	0	0	0	..	..	..	..
127·480 G	0	0	0	0	..	..	..	..
128·440 G	5	32	3	17	131·4	+0·5	− 1·8	+20·7
129·364 C	38	109	23	66	133·5	+2·4	− 1·0	+35·0
130·355 G	34	244	26	188	134·5	+3·3	− 1·0	+49·2
131·348 G	21	83	24	95	135·6	+4·2	− 0·2	+63·4
132·343 G	9	30	23	78	137·9	+6·3	− 0·1	+78·8
Means ..	..	..	12	56	133·9	..	− 1·0	..
Group 11393.								
May 7–16. A spot breaking up into a cluster by May 10 and disappearing on the following day; a spot reappears on May 14.								
126·345 G	11	36	26	85	61·2	0·0	+ 5·9	−77·2
127·480 G	23	68	25	73	61·6	+0·2	+ 6·0	−61·8
128·440 G	11	72	9	56	61·6	+0·1	+ 6·2	−49·1
129·364 C	9	25	6	16	61·5	−0·2	+ 6·5	−37·0
130·355 G	0	5	0	3	61·1	−0·7	+ 6·9	−24·2
131·348 G	0	0	0	0	..	..	..	..
132·343 G	0	0	0	0	..	..	..	..
133·342 G	5	18	3	10	61·7	−0·6	+ 5·7	+15·9
134·352 C	4	40	2	23	61·7	−0·8	+ 5·6	+29·2
135·304 C	7	34	5	23	62·3	−0·3	+ 5·9	+42·4
Means ..	..	..	8	29	61·6	..	+ 6·1	..
Group 11395.								
May 9–18. A stream of spots developing *n* Group 11394. There is a marked separation in longitude between the leader, *a*, and the follower *b*, the movement of *a* being especially conspicuous in its drift past the regular spot of Group 11394. The follower *b* is represented by a cluster on May 13–15, after which a new train of spots forms behind *a*.								
128·440 G	5	23	4	20	57·2	0·0	+10·5	−53·5
129·364 C	36	120	25	83	57·0	−0·3	+ 9·9	−41·5
130·355 G	50	253	29	146	58·3	+0·9	+10·0	−27·0
131·348 G	37	188	20	99	59·8	+2·3	+ 9·4	−12·4
132·343 G	52	182	27	93	59·9	+2·3	+ 9·6	+ 0·8
133·342 G	43	218	23	115	60·5	+2·8	+ 9·8	+14·7
134·352 C	59	215	35	126	60·3	+2·4	+10·9	+27·8
135·304 C	58	274	39	188	60·9	+2·9	+10·7	+41·0
136·375 C	15	71	15	69	63·9	+5·8	+ 9·7	+58·2
137·569 G	9	39	18	80	65·2	+7·0	+ 9·4	+75·3
Means ..	..	..	24	102	60·3	..	+10·0	..

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.	Lati-tude.	Long. from C.M.
Group 11395—*continued.*							
Spot *a*.							
d					°	°	°
129·364 C	18	49	12	33	58·4	0·0	+10·1	−40·1
130·355 G	27	139	15	79	59·7	+1·2	+ 9·6	−25·6
131·348 G	21	137	11	71	61·1	+2·5	+ 9·1	−11·1
132·343 G	27	123	14	63	61·8	+3·1	+ 9·4	+ 2·7
133·342 G	36	182	19	96	62·1	+3·3	+ 9·6	+16·3
134·352 C	31	121	18	71	62·5	+3·5	+10·1	+30·0
135·304 C	27	112	19	80	63·8	+4·7	+ 9·8	+43·9
136·375 C	13	60	13	59	64·3	+5·1	+ 9·5	+58·6
137·569 G	9	39	18	80	65·2	+5·9	+ 9·4	+75·3
Spot *b*.							
129·364 C	18	71	13	50	55·9	0·0	+ 9·8	−42·6
130·355 G	23	114	14	67	56·1	+0·1	+10·0	−29·2
131·348 G	14	46	8	25	55·7	−0·4	+ 9·8	−16·5
132·343 G	14	36	7	18	54·9	−1·3	+10·0	− 4·2
133·342 G	7	36	4	19	55·2	−1·1	+10·5	+ 9·4
134·352 C	2	9	1	5	54·0	−2·5	+ 9·8	+21·5

Group 11396.

May 15–26. A stream, approximately of normal type, whose development is rather less rapid than usual. A stable leader spot, *a*, does not emerge until May 21, although the follower, *b*, is more or less fully formed by May 18.

134·352 C	4	18	5	23	325·9	0·0	−15·7	−66·6
135·304 C	51	152	45	135	325·0	−0·9	−15·7	−54·9
136·375 C	68	224	46	152	324·2	−1·7	−15·7	−41·5
137·569 G	86	515	49	294	324·1	−1·8	−15·9	−25·8
138·368 C	94	600	50	320	324·1	−1·8	−15·6	−15·3
139·371 C	191	1021	98	525	324·1	−1·8	−15·4	− 2·0
140·348 G	205	1069	107	559	324·4	−1·5	−15·7	+11·2
141·438 G	164	834	94	478	324·5	−1·4	−15·5	+25·7
142·367 G	128	707	84	464	324·6	−1·3	−15·7	+38·1
143·488 G	68	372	57	317	324·4	−1·5	−16·0	+52·8
144·299 G	46	164	54	200	326·0	+0·1	−16·2	+65·1
145·348 G	16	52	45	157	327·3	..	−15·7	+80·3
Means ..	..	..	63	315	324·7	..	−15·8	..
Spot *a*.								
139·371 C	52	255	27	130	327·3	0·0	−14·4	+ 1·2
140·348 G	78	353	41	187	328·0	+0·7	−14·4	+14·8
141·438 G	59	315	35	186	328·6	+1·3	−14·2	+29·8
142·367 G	46	269	32	188	329·2	+1·9	−14·4	+42·7
143·488 G	18	119	17	115	329·9	+2·6	−14·4	+58·3
144·299 G	14	68	20	99	330·6	+3·3	−14·5	+69·7
145·348 G	5	20	24	96	331·0	..	−14·4	+84·0

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.	Lati-tude.	Long. from C.M.
Group 11396—*continued.*							
Spot *b*.							
d					°	°	°	°
135·304 C	22	63	20	59	322·9	0·0	−15·5	−57·0
136·375 C	43	112	30	78	322·3	−0·6	−15·8	−43·4
137·569 G	59	251	34	146	322·3	−0·6	−16·1	−27·6
138·368 C	56	349	30	188	322·7	−0·2	−15·9	−16·7
139·371 C	99	468	51	243	321·9	−1·0	−16·1	− 4·2
140·348 G	109	597	57	310	321·8	−1·1	−16·2	+ 8·6
141·438 G	96	467	54	262	321·8	−1·1	−16·3	+23·0
142·367 G	82	438	52	276	321·8	−1·1	−16·6	+35·3
143·488 G	50	253	40	202	321·4	−1·5	−16·9	+49·8

Group 11397.

May 15–22. A single small spot on May 15, 17 and 22; a wide pair on May 19.

134·352 C	4	9	9	20	316·0	0·0	+ 9·9	−76·5
135·304 C	8	22	11	28	314·4	−1·7	+10·4	−65·5
136·375 C	4	7	3	5	317·6	+1·4	+ 9·7	−48·1
137·569 G	0	0	0	0	..	..	..	..
138·368 C	0	0	0	0	..	..	..	..
139·371 C	0	0	0	0	..	..	..	..
140·348 G	0	0	0	0	..	..	..	..
141·438 G	2	5	1	3	315·8	−1·0	+ 8·9	+17·0
Means ..	..	..	3	7	316·0	..	+ 9·7	..

Group 11399.

May 21–31. A rather feeble but persistent stream of small spots.

140·348 G	2	10	2	12	250·0	0·0	+12·3	−63·2
141·438 G	5	14	4	10	254·4	+4·3	+11·4	−44·4
142·367 G	12	59	8	37	252·8	+2·6	+13·3	−33·7
143·488 G	21	71	12	38	253·8	+3·5	+11·6	−17·8
144·299 G	23	68	12	35	253·9	+3·6	+11·0	− 7·0
145·348 G	43	103	23	53	255·4	+5·0	+10·8	+ 8·4
146·350 G	41	142	23	79	255·9	+5·4	+10·9	+22·1
147·569 G	15	46	10	31	258·8	+8·2	+11·1	+41·2
148·348 G	48	142	39	114	257·2	+6·5	+10·8	+49·9
149·343 G	30	82	34	94	257·5	+6·7	+11·2	+63·3
150·341 G	2	11	4	20	254·6	+3·7	+11·7	+73·6
Means ..	..	..	16	48	254·9	..	+11·5	..

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.	Lati-tude.	Long. from C.M.
Group 11400.							
May 22–27. A few small spots.							
d					°	°	°
141·438 G	2	5	1	3	286·8	0·0	+10·5	−12·0
142·367 G	16	55	8	28	286·8	−0·1	+10·3	+ 0·3
143·488 G	14	50	7	26	286·6	−0·4	+10·5	+15·0
144·299 G	11	52	6	29	285·6	−1·5	+10·4	+24·7
145·348 G	2	5	1	3	287·3	+0·1	+10·7	+40·3
146·350 G	2	5	2	4	288·8	+1·5	+11·0	+55·0
Means ..	..	..	4	16	287·0	..	+10·6	..
Group 11402.							
May 30–June 11. A group of stream type of the simplest formation, namely two well-defined components, each a regular spot, at the front and rear of the stream. There are usually one or more tiny companions. The leader, *a*, loses its symmetrical structure after June 5, and the follower, *b*, has disappeared by June 9. The axis of the stream is at first inclined about 35° to the sun's equator, but this angle diminishes.							
149·343 G	5	23	(37	169	108·2	..	+ 3·7)	−86·0
150·341 G	41	179	71	308	108·1	0·0	+ 5·1	−72·9
151·357 G	74	351	74	352	107·9	−0·4	+ 5·7	−59·6
152·471 G	84	398	60	279	108·7	+0·2	+ 5·6	−44·1
153·405 G	103	475	61	280	108·9	+0·3	+ 5·3	−31·5
154·435 G	115	568	61	298	108·8	0·0	+ 5·3	−18·0
155·378 G	107	520	53	261	108·8	−0·2	+ 5·3	− 5·5
156·363 G	89	469	45	240	109·4	+0·3	+ 5·2	+ 8·1
157·345 C	74	347	40	186	110·3	+1·0	+ 5·0	+22·0
158·361 G	72	322	44	198	110·6	+1·1	+ 5·1	+35·8
159·573 G	33	161	27	133	111·0	+1·3	+ 5·0	+52·2
160·537 C	23	86	28	105	111·8	+2·0	+ 4·6	+65·8
161·426 C	9	32	21	74	111·6	+1·6	+ 4·5	+77·4
Means ..	..	..	49	226	109·7	..	+ 5·1	..
Spot *a*.							
149·343 G	5	23	37	169	108·2	..	+ 3·7	−86·0
150·341 G	32	142	52	229	109·2	0·0	+ 4·4	−71·8
151·357 G	50	245	48	233	109·6	+0·2	+ 4·6	−57·9
152·471 G	50	284	34	193	110·1	+0·5	+ 4·5	−42·7
153·405 G	69	352	40	204	110·1	+0·4	+ 4·4	−30·3
154·435 G	76	389	40	202	110·1	+0·2	+ 4·4	−16·7
155·378 G	66	350	33	175	110·3	+0·2	+ 4·5	− 4·0
156·363 G	71	403	36	206	110·4	+0·2	+ 4·7	+ 9·1
157·345 C	61	297	33	160	110·8	+0·4	+ 4·8	+22·5
158·361 G	46	227	29	141	111·1	+0·5	+ 4·9	+36·3
159·573 G	28	138	23	115	111·4	+0·6	+ 4·8	+52·6
160·537 C	23	86	28	105	111·8	+0·9	+ 4·6	+65·8
161·426 C	9	32	21	74	111·6	+0·5	+ 4·5	+77·4

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.	Lati-tude.	Long. from C.M.
Group 11402—*continued.*							
Spot *b*.							
d					°	°	°
150·341 G	9	37	19	79	104·9	0·0	+ 7·7	−76·1
151·357 G	14	76	15	84	105·0	−0·1	+ 8·0	−62·5
152·471 G	32	105	24	79	104·9	−0·4	+ 7·8	−47·9
153·405 G	32	105	20	65	104·7	−0·7	+ 7·8	−35·7
154·435 G	32	133	17	72	104·8	−0·8	+ 7·6	−22·0
155·378 G	32	110	16	56	104·9	−0·9	+ 7·9	− 9·4
156·363 G	18	66	9	34	105·0	−0·9	+ 7·9	+ 3·7
157·345 C	9	27	5	14	105·1	−1·0	+ 8·1	+16·8
158·361 G	5	14	3	8	104·8	−1·5	+ 8·2	+30·0
Group 11404.							
June 2–10. A stream of usual type, but of unstable components; *a* is the leader.							
152·471 G	23	55	14	35	116·0	0·0	+ 6·9	−36·8
153·405 G	36	156	20	85	116·8	+0·6	+ 7·1	−23·6
154·435 G	60	511	30	261	117·3	+1·0	+ 6·3	− 9·5
155·378 G	71	251	35	127	118·3	+1·8	+ 6·5	+ 4·0
156·363 G	73	439	39	234	120·1	+3·5	+ 6·4	+18·8
157·345 C	64	426	38	256	121·2	+4·4	+ 6·0	+32·9
158·361 G	68	353	50	263	121·7	+4·8	+ 5·9	+46·9
159·573 G	23	129	30	170	126·5	+9·4	+ 5·9	+67·7
160·537 C	11	45	33	136	126·5	..	+ 5·7	+80·5
Means ..	..	..	32	179	119·7	..	+ 6·4	..
Spot *a*.							
152·471 G	18	41	11	26	116·4	0·0	+ 7·1	−36·4
153·405 G	27	110	15	60	117·3	+0·7	+ 7·1	−23·1
154·435 G	30	252	15	129	118·7	+2·0	+ 6·2	− 8·1
155·378 G	32	119	16	61	120·5	+3·6	+ 6·0	+ 6·2
156·363 G	50	270	27	146	121·9	+4·9	+ 6·1	+20·6
157·345 C	41	293	25	179	123·1	+5·9	+ 5·9	+34·8
158·361 G	32	179	25	140	124·9	+7·6	+ 5·6	+50·1
159·573 G	23	129	30	170	126·5	+9·0	+ 5·9	+67·7
160·537 C	11	45	33	136	126·5	..	+ 5·7	+80·5
Group 11405.							
June 8–12. A small short-lived stream.							
158·361 G	2	9	1	5	71·9	0·0	+11·2	− 2·9
159·573 G	33	120	18	63	72·5	+0·5	+11·2	+13·7
160·537 C	25	118	14	67	72·5	+0·4	+11·7	+26·5
161·426 C	23	81	15	53	72·6	+0·4	+11·7	+38·4
162·461 G	5	14	4	12	74·7	+2·5	+12·7	+54·2
Means ..	..	..	10	40	72·8	..	+11·7	..

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

Group 11407.

June 29–July 8. A regular spot with a tiny follower on July 1 and 2.

Date G.M.T. Place.	Projected Area. Umbræ	Projected Area. Whole Spots.	Corrected Area. Umbræ	Corrected Area. Whole Spots.	Longitude and Proper Motion.	Latitude.	Long. from C.M.
d					°	°	°
179·362 G	12	64	23	124	82·4	0·0	− 8·0	−74·4
180·360 G	16	110	17	118	82·1	−0·4	− 7·7	−61·5
181·359 G	29	143	23	108	82·4	−0·3	− 7·7	−48·0
182·465 C	34	129	21	79	82·7	−0·2	− 7·7	−33·1
183·366 G	32	148	17	80	83·0	0·0	− 7·7	−20·8
184·408 G	18	127	9	65	83·0	−0·1	− 7·5	− 7·0
185·381 G	28	129	14	66	83·7	+0·4	− 7·4	+ 6·5
186·374 G	18	111	10	60	84·0	+0·6	− 7·1	+20·0
187·363 G	23	80	14	49	84·4	+0·8	− 7·1	+33·5
188·345 G	9	18	7	14	84·8	+1·1	− 6·7	+46·9
Means ..	..	..	16	76	83·2	..	− 7·5	..

Group 11408.

June 29–July 8. A stream of spots, associated with a considerable area of faculæ, dying out rather suddenly. A close pair of tiny spots is seen on July 8.

179·362 G	16	115	50	380	75·4	..	+ 7·2	−81·4
180·360 G	41	233	61	364	71·9	0·0	+ 7·3	−71·7
181·359 G	66	328	63	307	72·7	+0·7	+ 7·3	−57·7
182·465 C	48	333	33	225	73·8	+1·6	+ 7·1	−42·0
183·366 G	60	194	35	112	74·3	+2·0	+ 6·9	−29·5
184·408 G	37	171	19	88	74·4	+1·9	+ 7·0	−15·6
185·381 G	7	25	3	13	73·6	+1·0	+ 7·4	− 3·6
186·374 G	0	0	0	0	..	..	..	..
187·363 G	0	0	0	0	..	..	..	..
188·345 G	5	9	3	6	76·9	+3·8	+ 8·2	+39·0
Means ..	..	..	24	124	73·9	..	+ 7·3	..

Group 11409.

July 2–8. An area of disturbance, in front of Group 11408, represented by one or two tiny spots.

182·465 C	4	16	2	10	81·9	0·0	+ 8·6	−33·9
183·366 G	2	9	1	5	83·2	+1·2	+ 6·9	−20·6
184·408 G	0	0	0	0	..	..	..	..
185·381 G	7	25	4	12	84·1	+1·8	+ 7·0	+ 6·9
186·374 G	2	9	1	5	86·2	+3·7	+ 8·2	+22·2
187·363 G	7	23	4	14	86·9	+4·3	+ 7·8	+36·0
188·345 G	2	5	2	4	88·1	+5·4	+ 7·4	+50·2
Means ..	..	..	2	7	85·1	..	+ 7·6	..

Group 11410.

July 6–16. A small regular spot that disappears on July 11; on July 16 a tiny spot appears near its position.

d					°	°	°	°
186·374 G	5	14	16	44	345·2	0·0	−20·7	−78·8
187·363 G	9	37	13	54	344·1	−0·9	−20·9	−66·8
188·345 G	14	55	14	53	343·4	−1·5	−21·2	−54·5
189·420 G	16	44	12	32	343·1	−1·6	−21·2	−40·6
190·342 G	14	28	9	18	342·9	−1·6	−21·7	−28·6
191·362 G	5	18	3	10	342·9	−1·5	−22·0	−15·1
192·642 G	0	0	0	0	..	..	..	..
193·367 G	0	0	0	0	..	..	..	..
194·545 G	0	0	0	0	..	..	..	..
195·449 C	0	0	0	0	..	..	..	..
196·395 G	2	9	2	8	341·5	−2·0	−24·1	+50·1
Means ..	..	..	6	20	343·3	..	−21·7	..

Group 11411.

July 7–15. A smallish stream of which the leader, a double spot, alone remains after July 10.

187·363 G	29	78	19	54	9·0	0·0	− 7·7	−41·9
188·345 G	78	263	46	153	9·2	+0·1	− 7·7	−28·7
189·420 G	37	139	20	73	10·1	+0·8	− 7·2	−13·6
190·342 G	30	138	16	70	9·9	+0·5	− 7·3	− 1·6
191·362 G	14	106	7	55	11·7	+2·1	− 6·8	+13·7
192·642 G	14	44	9	27	14·0	+4·2	− 6·5	+32·9
193·367 G	14	30	10	21	15·1	+5·2	− 6·8	+43·6
194·545 G	5	9	5	9	16·4	+6·3	− 7·5	+60·5
195·449 C	0	5	0	9	16·9	+6·7	− 8·0	+73·0
Means ..	..	..	15	52	12·5	..	− 7·3	..

Group 11412.

July 8–18. A regular spot, *a*, usually with a follower; the latter is alone visible on July 16, whilst a tiny spot re-appears near the position of the leader on July 18.

188·345 G	9	30	32	108	316·9	..	−11·7	−81·0
189·420 G	17	85	23	116	316·4	0·0	−11·5	−67·3
190·342 G	23	74	22	68	316·4	−0·1	−11·4	−55·1
191·362 G	28	95	20	67	316·7	+0·2	−11·5	−41·3
192·642 G	16	60	9	34	316·7	+0·1	−11·5	−24·4
193·367 G	12	25	6	14	317·6	+0·9	−11·5	−13·9
194·545 G	7	18	4	9	317·8	+1·0	−11·4	+ 1·9
195·449 C	21	52	12	27	315·4	−1·5	−12·5	+11·5
196·395 G	2	7	1	4	309·7	−7·2	−14·2	+18·3
197·410 G	0	0	0	0	..	..	..	..
198·350 C	2	5	2	4	315·1	−2·0	−13·8	+49·6
Means ..	..	..	10	34	315·8	..	−12·1	..

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

Group 11412—*continued.*

Spot *a.*

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
d					°	°	°	°
188·345 G	9	30	32	108	316·9	..	−11·7	−81·0
189·420 G	12	69	16	93	316·9	0·0	−11·5	−66·8
190·342 G	16	65	15	59	316·9	−0·1	−11·4	−54·6
191·362 G	23	79	16	55	317·2	+0·2	−11·5	−40·8
192·642 G	14	51	8	29	317·4	+0·3	−11·4	−23·7
193·367 G	12	25	6	14	317·6	+0·4	−11·5	−13·9
194·545 G	7	18	4	9	317·8	+0·5	−11·4	+ 1·9
195·449 C	14	23	8	12	318·0	+0·6	−11·4	+14·1

Group 11413.

July 10–15. One or two spots.

190·342 G	5	5	3	3	355·2	0·0	−18·2	−16·3
191·362 G	7	28	4	15	357·7	+2·6	−19·0	− 0·3
192·642 G	12	39	7	22	355·7	+0·7	−18·8	+14·6
193·367 G	9	14	5	9	357·5	+2·6	−19·2	+26·0
194·545 G	9	32	6	23	355·7	+0·8	−18·3	+39·8
195·449 C	0	5	0	5	357·4	+2·6	−19·9	+53·5
Means ..	..	..	4	13	356·5	..	−18·9	..

Group 11417.

July 26–August 4. A regular spot, *a*, with small followers on July 28, 30, 31, and August 1.

206·374 C	5	18	22	79	75·3	..	+ 6·9	−84·1
207·344 G	9	55	12	75	77·6	0·0	+ 6·9	−68·9
208·568 G	19	87	15	70	78·1	+0·3	+ 6·6	−52·3
209·349 G	23	111	15	73	78·6	+0·7	+ 6·5	−41·4
210·378 G	48	181	27	103	78·2	+0·1	+ 6·7	−28·2
211·148 K	58	209	31	111	77·5	−0·7	+ 6·5	−18·7
212·348 G	32	135	15	68	78·8	+0·4	+ 6·8	− 1·6
213·383 C	27	61	14	31	80·2	+1·7	+ 6·5	+13·5
214·457 G	16	30	9	17	80·8	+2·1	+ 6·6	+28·3
215·477 G	9	21	6	14	81·4	+2·5	+ 6·8	+42·4
Means ..	..	..	16	62	79·0	..	+ 6·7	..

Spot *a.*

206·374 C	5	18	22	79	75·3	..	+ 6·9	−84·1
207·344 G	9	55	12	75	77·6	0·0	+ 6·9	−68·9
208·568 G	14	78	11	62	78·8	+1·0	+ 6·7	−51·6
209·349 G	23	111	15	73	78·6	+0·7	+ 6·5	−41·4
210·378 G	32	137	18	77	79·0	+0·9	+ 6·5	−27·4
211·148 K	17	90	9	47	79·0	+0·8	+ 6·3	−17·2
212·348 G	18	103	9	52	79·7	+1·3	+ 6·5	− 0·7
213·383 C	27	61	14	31	80·2	+1·7	+ 6·5	+13·5
214·457 G	16	30	9	17	80·8	+2·1	+ 6·6	+28·3
215·477 G	9	21	6	14	81·4	+2·5	+ 6·8	+42·4

Group 11418.

July 30–August 5. A small short-lived stream of normal type; a single spot represents the group on August 3–5.

d					°	°	°	°
210·378 G	16	62	9	33	83·9	0·0	− 5·0	−22·5
211·148 K	73	240	38	125	84·9	+0·9	− 5·2	−11·3
212 348 G	53	206	27	105	86·0	+1·8	− 5·0	+ 5·6
213·383 C	16	72	9	39	86·8	+2·4	− 5·0	+20·1
214·457 G	5	7	3	4	88·2	+3·6	− 5·5	+35·7
215·477 G	2	7	2	5	85·9	+1·1	− 6·1	+46·9
216·561 G	2	9	2	10	86·0	+1·1	− 6·3	+61·4
Means ..	..	..	13	46	86·0	..	− 5·4	..

Group 11419.

August 2–7. A cluster of small spots that condenses into a moderate-sized composite spot on August 5.

213·383 C	16	45	8	23	72·8	0·0	− 7·9	+ 6·1
214·457 G	16	60	9	33	72·0	−1·0	− 7·3	+19·5
215·477 G	37	231	23	143	72·9	−0·2	− 7·6	+33·9
216·561 G	27	188	21	149	73·3	+0·1	− 7·9	+48·7
217·504 C	27	160	30	176	73·6	+0·2	− 7·9	+61·4
218·370 G	7	27	12	48	73·2	−0·3	− 8·2	+72·5
Means ..	..	..	17	95	73·0	..	− 7·8	..

Group 11422.

August 17–22. A stream whose primary components are double spots on August 18, separating rather widely in longitude.

228·478 G	51	117	28	63	240·0	0·0	−10·6	+12·9
229·343 G	55	244	31	140	239·9	−0·2	−10·5	+24·2
230·558 G	54	180	37	124	239·7	−0·5	−10·4	+40·1
231·346 G	37	182	32	153	239·2	−1·1	−10·5	+50·0
232·646 G	14	60	25	97	241·7	+1·3	−10·8	+69·7
233·433 G	2	7	5	18	238·6	−1·9	−10·8	+77·0
Means ..	..	..	26	99	239·8	..	−10·6	..

Group 11425.

August 26–September 7. A stable, regular spot with a double umbra on September 2.

237·331 G	0	16	0	118	23·5	..	+ 4·4	−86·6
238·340 G	14	50	24	85	23·6	0·0	+ 4·4	−73·2
239·360 G	23	114	22	111	23·9	+0·1	+ 4·5	−59·4
240·347 G	27	164	19	118	24·3	+0·3	+ 4·4	−46·0
241·440 G	23	138	14	81	24·3	+0·2	+ 4·2	−31·5

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931.—*continued.*

Group 11425—*continued.*

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
d					°	°	°	°
242·502 C	27	176	14	92	24·7	+0·4	+ 4·1	−17·1
243·390 G	34	109	17	54	24·9	+0·4	+ 3·9	− 5·2
244·520 C	24	100	12	51	25·0	+0·3	+ 3·6	+ 9·8
245·342 G	18	75	10	40	25·2	+0·4	+ 3·6	+20·9
246·495 G	18	68	11	42	25·5	+0·5	+ 3·7	+36·4
247·363 C	9	38	7	29	26·1	+0·9	+ 3·8	+48·5
248·338 G	7	16	7	17	26·1	+0·7	+ 3·6	+61·4
249·483 G	2	11	4	24	26·9	+1·3	+ 3·6	+77·3
Means ..	..	..	13	62	25·0	..	+ 4·0	..

Group 11428.

August 31–September 7. A stream appearing suddenly on August 31 in which the components separate considerably in longitude as they fade out.

242·502 C	47	256	26	144	14·1	0·0	+12·8	−27·7
243·390 G	36	229	19	120	14·3	+0·1	+12·5	−15·8
244·520 C	42	131	22	66	14·8	+0·6	+12·5	− 0·4
245·342 G	20	139	11	71	15·6	+1·3	+12·4	+11·3
246·495 G	16	45	9	25	14·3	−0·1	+12·1	+25·2
247·363 C	8	22	5	13	15·8	+1·3	+12·1	+38·2
248·338 G	12	29	9	22	12·5	−2·0	+12·1	+47·8
249·483 G	5	18	5	17	8·8	−5·8	+11·5	+59·2
Means ..	..	..	13	60	13·8	..	+12·2	..

Group 11431.

September 12–18. A group of stream type that declines after a brief maximum on September 14.

254·128 K	15	35	8	18	239·2	0·0	+ 9·4	− 9·1
255·323 G	37	124	19	63	240·1	+0·8	+ 9·4	+ 7·6
256·353 G	82	343	44	183	240·3	+0·8	+ 9·6	+21·4
257·398 G	44	165	26	100	239·6	0·0	+ 9·3	+34·5
258·377 G	49	164	36	121	240·1	+0·4	+ 9·5	+47·9
259·386 C	13	66	13	65	238·8	−1·0	+ 9·1	+60·0
260·106 K	12	53	17	74	239·1	−0·8	+ 9·2	+69·8
Means ..	..	..	23	89	239·6	..	+ 9·4	..

Group 11432.

September 13–18. A small ephemeral stream.

255·323 G	5	7	8	11	160·1	0·0	+ 3·8	−72·4
256·353 G	15	30	15	30	159·1	−1·2	+ 3·7	−59·8
257·398 G	9	25	6	18	160·0	−0·5	+ 3·9	−45·1
258·377 G	9	20	5	12	161·2	+0·6	+ 4·0	−31·0
259·386 C	13	36	7	19	159·9	−0·9	+ 3·9	−18·9
260·106 K	4	17	2	9	162·0	+1·0	+ 4·1	− 7·3
Means ..	..	..	7	17	160·4	..	+ 3·9	..

Group 11433.

September 16–25. A regular spot that divides on September 21 into two nearly equal parts which separate in longitude; the following part has disappeared by September 24. Small companions follow the regular spot on September 18 and 19.

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
d					°	°	°	°
258·377 G	14	81	25	143	117·9	0·0	+ 8·6	−74·3
259·386 C	35	191	36	195	117·6	−0·4	+ 8·7	−61·2
260·106 K	46	220	38	177	117·2	−0·9	+ 8·6	−52·1
261·425 G	51	293	31	177	117·3	−1·0	+ 8·7	−34·6
262·344 G	50	256	27	138	118·0	−0·4	+ 8·3	−21·8
263·342 G	54	200	28	102	118·1	−0·5	+ 8·0	− 8·5
264·348 G	29	132	15	66	118·5	−0·2	+ 7·9	+ 5·2
265·114 K	21	66	11	34	119·2	+0·4	+ 7·9	+16·0
266·119 K	12	37	7	21	119·9	+0·9	+ 8·1	+29·9
267·402 C	6	18	4	13	119·0	−0·1	+ 7·9	+46·0
Means ..	..	..	22	107	118·3	..	+ 8·3	..

Group 11435.

September 27–October 7. A pair of spots, *a* and *b*, 9° apart in longitude of which the following spot, *b*, is the larger and longer lived.

269·397 G	2	7	(10	34	320·5	..	+18·8)	−86·2
270·396 C	18	106	42	252	314·1	0·0	+18·6	−79·4
271·557 G	29	188	33	217	313·2	−0·8	+18·6	−65·0
272·351 G	58	267	51	229	313·7	−0·3	+18·7	−54·0
273·357 G	49	256	33	174	313·2	−0·7	+18·7	−41·2
274·609 G	56	243	32	138	311·7	−2·1	+18·7	−26·2
275·342 G	44	192	24	103	312·0	−1·7	+18·7	−16·2
276·474 G	33	129	17	66	311·2	−2·4	+19·1	− 2·1
277·388 G	20	76	10	40	310·1	−3·5	+18·5	+ 8·8
278·386 G	18	83	10	46	310·4	−2·5	+18·3	+22·9
279·390 G	9	22	6	13	310·5	−2·9	+18·2	+35·7
Means ..	..	..	26	128	312·0	..	+18·6	..

Spot *a*.

269·397 G	2	7	10	34	320·5	..	+18·8	−86·2
270·396 C	9	53	14	85	320·5	0·0	+18·6	−73·0
271·557 G	9	56	8	53	320·0	−0·4	+18·5	−58·2
272·351 G	18	81	14	61	319·7	−0·7	+18·7	−48·0
273·357 G	18	62	11	38	319·5	−0·8	+18·8	−34·9
274·609 G	16	31	9	17	319·3	−0·9	+19·2	−18·6
275·342 G	13	31	7	16	319·1	−1·0	+19·6	− 9·1
276·474 G	4	18	2	9	319·1	−0·9	+19·8	+ 5·8

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued*.

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.	Lati-tude.	Long. from C.M.
Group 11435—*continued*.							
Spot *b*.							
d					°	°	°
270·396 C	9	53	28	167	310·9	..	+18·6	−82·6
271·557 G	20	132	25	164	311·0	0·0	+18·5	−67·2
272·351 G	34	175	31	159	310·8	−0·1	+18·7	−56·9
273·357 G	31	194	22	136	310·5	−0·4	+18·5	−43·9
274·609 G	36	203	21	116	310·1	−0·7	+18·2	−27·8
275·342 G	31	161	17	87	310·3	−0·4	+18·2	−17·9
276·474 G	25	100	13	51	310·0	−0·6	+18·7	− 3·3
277·388 G	20	76	10	40	310·1	−0·5	+18·5	+ 8·8
278·386 G	18	83	10	46	310·4	−0·1	+18·3	+22·3
279·390 G	9	22	6	13	310·5	+0·1	+18·2	+35·7
Group 11440.							
October 19–31. A regular spot, *a*, with a companion following on October 20, 22, 23 and 24, and several companions surrounding it on October 27 and 28.							
291·385 G	13	79	39	239	37·9	0·0	−14·4	−78·7
292·430 G	27	163	36	220	37·1	−0·8	−14·2	−65·7
293·371 C	39	199	35	179	37·6	−0·3	−14·8	−52·8
294·395 G	46	265	32	186	37·1	−0·8	−15·0	−39·8
295·222 K	61	326	38	201	36·0	−1·9	−14·5	−30·0
296·436 G	62	315	34	173	35·8	−2·2	−14·7	−14·2
297·473 G	48	251	25	133	36·3	−1·7	−15·1	0·0
298·411 G	53	276	29	152	36·1	−1·9	−15·7	+12·2
299·444 G	60	245	35	147	36·3	−1·7	−15·7	+26·0
300·589 G	44	262	32	189	36·7	−1·3	−15·8	+41·4
301·426 G	24	105	22	96	37·4	−0·6	−16·1	+53·2
302·395 G	28	103	38	138	37·1	−0·9	−16·3	+65·7
303·493 G	4	18	16	73	38·3	..	−15·9	+81·4
Means ..	..	..	33	171	36·8	..	−15·2	..
Spot *a*.							
291·385 G	13	79	39	239	37·9	0·0	−14·4	−78·7
292·430 G	27	150	36	198	37·5	−0·4	−14·4	−65·3
293·371 C	39	199	35	179	37·6	−0·3	−14·8	−52·8
294·395 G	44	261	31	183	37·1	−0·8	−15·0	−39·8
295·222 K	49	252	30	154	36·8	−1·1	−15·1	−29·2
296·436 G	51	246	28	135	36·5	−1·5	−15·1	−13·5
297·473 G	48	251	25	133	36·3	−1·7	−15·1	0·0
298·411 G	53	276	29	152	36·1	−1·9	−15·7	+12·2
299·444 G	44	197	26	118	36·2	−1·8	−15·8	+25·9
300·589 G	40	189	29	136	36·7	−1·3	−15·8	+41·4
301·426 G	24	105	22	96	37·4	−0·6	−16·1	+53·2
302·395 G	24	90	33	122	37·5	−0·5	−16·0	+66·1
303·493 G	4	18	16	73	38·3	..	−15·9	+81·4

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.	Lati-tude.	Long. from C.M.
Group 11443.							
November 3–6. A stream forming near the west limb.							
d					°	°	°
306·443 C	0	11	0	7	316·5	0·0	+ 9·1	+38·5
307·611 G	18	42	16	36	316·2	−0·5	+ 9·0	+53·6
308·393 G	28	77	33	89	317·2	+0·4	+ 8·6	+64·9
309·473 G	31	118	77	303	317·2	+0·2	+ 8·3	+79·1
Means ..	..	..	32	109	316·8	..	+ 8·8	..
Group 11444.							
November 3–12. A stream of unstable spots showing the usual separation in longitude between the leading and following components. The group has disappeared by November 10, but a tiny spot re-appears in the accompanying faculæ on November 12.							
306·443 C	6	41	5	37	222·3	0·0	− 0·6	−55·7
307·611 G	18	72	12	47	222·7	+0·2	− 0·3	−39·9
308·393 G	31	97	17	55	223·4	+0·7	− 0·2	−28·9
309·473 G	94	361	48	187	224·2	+1·3	− 0·4	−13·9
310·439 G	65	311	33	155	224·2	+1·1	− 0·3	− 1·2
311·402 C	42	176	22	91	224·7	+1·5	− 0·3	+12·0
312·399 C	17	73	9	40	224·8	+1·4	− 0·3	+25·3
313·426 C	0	0	0	0	..	..	..	..
314·388 G	0	0	0	0	..	..	..	..
315·392 G	2	4	2	5	225·2	+1·2	− 2·1	+65·1
Means ..	..	..	15	62	223·9	..	− 0·6	..
Group 11447.							
November 20–24. A small unstable group.							
323·403 C	4	17	2	9	24·1	0·0	+12·9	−30·3
324·442 G	4	17	2	9	29·0	+4·8	+11·2	−11·8
325·364 C	11	70	6	36	29·2	+4·9	+11·2	+ 0·6
326·353 C	33	72	17	37	29·6	+5·2	+11·0	+14·0
327·395 G	12	38	6	22	30·0	+5·6	+11·2	+28·2
Means ..	..	..	7	23	28·4	..	+11·5	..
Group 11450.							
November 26–December 2. A stream following group 11448.							
329·511 G	17	48	9	27	311·9	0·0	+13·5	−22·0
330·368 C	42	124	22	65	311·4	−0·5	+13·3	−11·2
331·411 G	44	173	23	88	310·8	−1·2	+13·2	+ 1·9
332·379 C	38	103	20	54	310·0	−2·1	+12·8	+13·9
333·400 C	29	78	17	45	310·7	−1·4	+12·8	+28·0
334·422 G	12	36	8	24	310·0	−2·2	+13·4	+40·8
335·492 G	0	4	0	4	313·0	+0·8	+13·1	+57·9
Means ..	..	..	14	44	311·1	..	+13·2	..

LEDGER II.—NON-RECURRENT GROUPS of SUN SPOTS for the YEAR 1931—*continued.*

Date G.M.T. Place.	Projected Area Umbræ	Projected Area Whole Spots.	Corrected Area Umbræ	Corrected Area Whole Spots.	Longitude and Proper Motion.		Lati-tude.	Long. from C.M.
Group 11451.								
December 6–17. A complex stream in which changes are especially apparent on December 8–10, and on December 13–14, after which the spots rapidly disappear. *a* represents the leader, a single spot on December 6, 7, 8 and 15, and a double spot on December 9–14. *c* is a fairly conspicuous spot in the middle of the group.								
d					°	°	°	°
339·531 G	9	37	12	48	135·0	0·0	+11·9	−66·8
340·414 G	60	293	55	271	133·9	−1·2	+11·8	−56·3
341·416 C	88	411	62	292	133·1	−2·1	+11·7	−43·9
342·483 G	178	681	105	402	133·2	−2·1	+12·0	−29·8
343·544 C	184	859	97	452	133·3	−2·1	+11·3	−15·7
344·413 C	243	1077	124	549	132·6	−2·8	+10·8	− 5·0
345·338 C	188	881	96	451	132·5	−3·0	+11·0	+ 7·1
346·386 C	151	717	83	393	132·8	−2·8	+11·6	+21·2
347·416 C	103	543	64	337	132·6	−3·1	+11·7	+34·6
348·356 C	50	264	37	196	131·8	−4·0	+11·5	+46·2
349·388 C	23	174	22	168	130·0	−5·9	+10·8	+58·0
350·235 K	16	36	23	51	129·6	−6·3	+11·0	+68·7
Means ..	..	..	65	301	132·5		+11·4	..
Spot *a*.								
339·531 G	9	35	12	45	135·4	0·0	+12·1	−66·4
340·414 G	43	177	38	156	135·6	+0·1	+11·9	−54·6
341·416 C	38	180	25	121	136·3	+0·7	+11·9	−40·7
342·483 G	85	339	49	195	136·1	+0·4	+11·9	−26·9
343·544 C	50	291	26	151	136·5	+0·7	+12·0	−12·5
344·413 C	69	349	35	178	136·5	+0·7	+11·9	− 1·1
Group 11451—*continued.*								
Spot *a*—*continued.*								
d					°	°	°	°
345·338 C	38	217	20	113	136·4	+0·5	+12·2	+11·0
346·386 C	36	150	20	84	135·9	−0·1	+11·9	+24·3
347·416 C	17	63	11	41	135·5	−0·6	+11·8	+37·5
348·356 C	8	21	6	17	135·2	−1·0	+11·8	+49·6
Spot *c*.								
344·413 C	88	318	45	162	132·1	0·0	+11·1	− 5·5
345·338 C	75	330	38	168	132·6	+0·4	+11·2	+ 7·2
346·386 C	61	247	34	136	133·1	+0·8	+11·7	+21·5
347·416 C	40	288	25	181	133·1	+0·7	+11·8	+35·1
348·356 C	25	134	19	102	132·9	+0·5	+12·1	+47·3
Group 11452.								
December 10–17. A moderate-sized stream.								
343·544 C	21	63	13	40	110·6	0·0	+ 4·3	−38·4
344·413 C	53	249	30	139	111·3	+0·5	+ 4·6	−26·3
345·338 C	46	161	24	83	111·3	+0·4	+ 4·8	−14·1
346·386 C	42	230	21	115	112·0	+0·9	+ 4·4	+ 0·4
347·416 C	29	117	15	61	113·2	+1·9	+ 4·4	+15·2
348·356 C	21	63	12	36	113·2	+1·9	+ 4·4	+27·6
349·388 C	15	25	10	17	114·3	+2·7	+ 3·7	+42·3
350·235 K	4	16	3	14	114·9	+3·1	+ 3·6	+54·0
Means ..	..	..	16	63	112·6	..	+ 4·3	..

ROYAL OBSERVATORY, GREENWICH.

Total Areas of Sun Spots and Faculæ

Projected and Corrected for Foreshortening
for each Day, and

Mean Areas and Mean Heliographic
Latitude of Sun Spots and Faculæ
for each Rotation of the Sun
and for the Year

1931

TOTAL AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931.

The Greenwich Mean Time 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 Kodaikánal, by the letters C and K respectively.

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 disc.

The Area Corrected for Foreshortening is expressed in millionths of the Sun's visible hemisphere.

Greenwich Mean Time.		Place.	Projected Area.			Area Corrected for Foreshortening.			Greenwich Mean Time.		Place.	Projected Area.			Area Corrected for Foreshortening.		
			Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.				Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.
1931.	d								1931.	d							
January	1·436	C	0	0	490	0	0	488	February	9·447	C	84	452	149	47	250	350
	2·502	G	8	30	626	9	27	792		10·551	G	101	434	959	78	325	1239
	3·368	C	0	8	936	0	10	1124		11·406	G	51	318	1070	40	256	1194
	4·203	K	10	38	618	24	104	882		12·405	G	43	269	1018	36	224	1009
	5·492	C	21	101	637	26	125	835		13·574	G	55	242	711	44	195	824
	6·498	G	43	200	1656	36	167	1912		14·511	G	39	96	656	32	86	1233
	7·519	G	34	163	1252	22	106	1353		15·530	G	65	316	349	72	350	515
	8·311	C	21	99	373	12	57	349		16·504	G	87	375	778	74	328	758
	9·512	G	54	190	0	29	101	0		17·557	G	145	561	194	99	380	293
	10·337	C	30	80	34	16	42	88		18·459	C	163	821	725	104	512	841
	11·509	G	13	93	237	7	50	296		19·412	G	314	1829	772	169	988	772
	12·352	C	17	55	680	10	32	712		20·546	C	752	3435	905	389	1781	1118
	13·327	C	46	126	369	33	91	466		21·422	G	678	3743	698	355	1949	1092
	14·324	C	42	192	1518	32	143	1773		22·403	G	818	4011	334	491	2355	484
	15·372	C	71	441	1495	51	308	1647		23·485	G	851	4329	559	567	2834	666
	16·313	C	105	953	2348	82	743	2430		24·595	G	568	2946	2497	461	2417	2297
	17·431	C	107	797	660	124	907	862		25·363	C	408	2302	1873	421	2473	2222
	18·338	C	103	729	566	175	1315	732		26·436	C	212	1084	1158	345	2160	2027
	19·351	C	73	271	368	89	451	560		27·441	G	110	447	651	124	577	1029
	20·340	C	59	280	322	32	155	351		28·442	C	101	424	638	71	299	623
	21·335	C	51	253	589	28	138	630									
	22·314	C	46	207	567	26	119	784	March	1·350	C	132	707	1010	97	488	1210
	23·124	K	84	332	826	57	227	801		2·537	C	133	695	1124	82	416	1398
	24·411	G	36	104	1437	33	96	1398		3·501	G	149	723	1272	91	426	1529
	25·402	G	15	36	1223	11	28	1414		4·388	G	208	1102	384	124	650	392
	26·492	G	7	24	813	4	14	1089		5·469	G	167	856	275	94	482	325
	27·501	G	4	11	519	2	6	735		6·517	C	157	749	435	94	449	566
	28·308	C	4	13	101	3	9	157		7·451	G	107	595	146	70	405	265
	29·385	G	0	0	375	0	0	390		8·404	G	81	367	730	65	333	905
	30·305	C	0	0	233	0	0	370		9·394	G	112	434	711	147	719	1132
	31·344	C	0	0	127	0	0	152		10·504	G	150	813	512	151	824	577
										11·498	C	294	1417	1315	247	1170	1188
February	1·365	C	0	0	297	0	0	390		12·401	G	319	1758	1298	231	1234	1454
	2·305	C	8	40	637	35	176	885		13·388	G	289	1811	840	229	1411	1696
	3·324	C	53	182	590	72	239	808		14·436	G	307	1800	836	187	1123	1150
	4·526	G	49	271	362	42	233	362		15·455	G	263	1366	1181	151	797	1166
	5·298	C	90	460	524	63	323	509		16·434	C	257	1491	1016	144	832	968
	6·125	K	157	622	71	96	382	116		17·477	G	313	1394	376	205	879	597
	7·301	C	109	628	335	59	340	413		18·415	G	285	1364	748	213	1087	868
	8·524	G	112	588	378	59	306	361		19·387	G	217	931	1359	134	589	1422

TOTAL AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931—*continued.*

Greenwich Mean Time.		Place.	Projected Area.			Area Corrected for Foreshortening.			Greenwich Mean Time.		Place.	Projected Area.			Area Corrected for Foreshortening.		
			Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.				Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.
1931.	d								1931.	d							
March	20·386	G	153	686	1562	111	452	1749	May	10·364	C	119	502	1228	78	329	1190
	21·384	G	104	445	696	66	279	1071		11·355	G	136	769	919	85	489	914
	22·429	G	60	270	250	42	197	391		12·348	G	127	560	584	80	345	721
	23·624	G	40	174	1310	39	181	1236		13·343	G	122	519	413	90	335	658
	24·368	C	30	198	1421	58	373	1591		14·342	G	89	491	207	47	258	277
	25·498	G	18	160	1082	20	174	1456		15·352	C	127	546	560	83	342	908
	26·501	G	49	253	1001	43	208	1185		16·304	C	155	677	823	120	503	888
	27·416	G	53	280	538	33	176	775		17·375	C	114	450	1638	87	355	1693
	28·538	G	69	317	415	37	171	463		18·569	G	116	650	1336	92	499	1588
	29·354	C	76	335	1316	39	172	1524		19·368	C	96	618	609	51	329	735
	30·506	C	65	342	1243	34	178	1417		20·371	C	191	1021	500	98	525	767
	31·410	G	105	421	296	66	256	304		21·348	G	207	1079	299	109	571	360
										22·438	G	173	858	278	100	494	239
										23·367	G	156	821	0	100	529	0
										24·488	G	103	493	470	76	381	443
April	1·388	G	109	567	76	112	616	178		25·299	G	180	284	602	72	264	673
	2·542	C	75	319	268	79	348	510		26·348	G	63	167	461	70	217	769
	3·330	C	77	366	782	61	304	785		27·350	G	77	261	242	53	174	348
	4·370	G	55	271	1160	42	205	1450		28·569	G	29	85	751	27	78	892
	5·513	C	77	327	805	62	248	1249		29·348	G	53	158	925	50	149	1091
	6·118	K	64	345	1478	37	197	1610		30·343	G	35	105	710	71	263	1060
	7·116	K	184	800	2032	119	505	1996		31·341	G	43	190	1300	75	328	1892
	8·630	G	201	1018	519	128	673	683									
	9·540	C	141	795	840	97	532	1448									
	10·382	G	148	666	705	125	473	903									
	11·466	G	122	576	1630	115	553	2092									
	12·453	G	100	513	1359	106	555	1633	June	1·357	G	74	351	1344	74	352	1390
	13·397	G	121	586	1186	138	692	1423		2·471	G	114	475	643	78	328	788
	14·375	C	151	835	1995	109	554	1921		3·405	G	143	641	763	85	373	1085
	15·534	C	184	1098	1408	122	755	1648		4·435	G	175	1079	1227	91	559	1437
	16·595	G	193	1029	756	120	627	1114		5·378	G	178	771	1008	88	388	1120
	17·503	C	214	1055	663	120	594	872		6·363	G	162	908	465	84	474	448
	18·453	G	173	865	1028	97	485	952		7·345	C	138	773	135	78	442	151
	19·397	C	138	707	713	80	413	703		8·361	G	142	684	689	95	466	882
	20·369	C	117	663	817	77	442	1033		9·573	G	89	410	1218	75	366	1170
	21·429	G	235	1004	1628	203	837	1764		10·537	C	63	258	1278	78	315	1802
	22·341	G	170	805	1204	202	952	1573		11·426	C	34	118	1122	37	130	1617
	23·403	G	77	321	874	127	499	1237		12·461	G	5	14	1301	4	12	1424
	24·538	G	62	296	429	68	313	722		13·343	G	0	0	1657	0	0	1638
	25·480	G	86	255	373	87	312	654		14·434	G	16	51	995	31	99	1419
	26·432	G	59	142	454	37	87	520		15·346	G	0	0	942	0	0	1235
	27·598	G	46	108	633	31	72	652		16·510	C	0	0	504	0	0	715
	28·359	C	13	36	710	8	24	760		17·499	G	0	0	633	0	0	541
	29·496	G	24	50	667	13	28	838		18·429	G	2	5	85	1	3	114
	30·352	G	37	91	697	25	60	857		19·356	G	0	0	129	0	0	165
										20·424	C	0	0	197	0	0	166
										21·488	G	0	0	217	0	0	274
May	1·550	G	34	138	756	32	132	1007		22·364	G	2	9	46	1	5	75
	2·413	G	20	100	699	28	142	874		23·645	G	0	0	347	0	0	360
	3·122	K	15	46	1176	35	106	1311		24·370	C	0	0	761	0	0	917
	4·453	G	16	29	852	15	28	866		25·442	G	0	0	879	0	0	1094
	5·470	G	7	12	689	6	12	903		26·370	G	0	0	908	0	0	1141
	6·351	G	23	66	517	12	35	765		27·356	G	2	7	1233	1	4	1452
	7·345	G	39	123	710	78	281	993		28·374	G	23	69	785	13	37	845
	8·480	G	55	241	1471	61	273	1719		29·362	G	33	193	1184	76	511	1877
	9·440	G	62	344	1928	50	275	2119		30·360	G	64	361	1958	82	491	2545

TOTAL AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931—*continued.*

Greenwich Mean Time.		Place.	Projected Area.			Area Corrected for Foreshortening.		
			Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.
1931.	d							
July	1·359	G	95	471	2705	86	415	2874
	2·465	C	86	478	851	56	314	893
	3·366	G	94	351	857	53	197	777
	4·408	G	55	298	180	28	153	227
	5·381	G	42	179	529	21	91	556
	6·374	G	25	134	583	27	109	720
	7·363	G	68	218	775	50	171	953
	8·345	G	117	380	1281	104	338	1365
	9·420	G	70	268	2385	55	221	2476
	10·342	G	74	255	2349	53	172	2795
	11·362	G	54	247	975	34	147	1086
	12·642	G	47	152	502	27	87	690
	13·367	G	40	78	499	23	48	729
	14·545	G	21	59	781	15	41	796
	15·449	C	21	62	778	12	41	829
	16·395	G	4	16	809	3	12	1095
	17·410	G	2	18	558	1	9	707
	18·350	C	7	19	638	5	11	604
	19·411	G	0	0	534	0	0	643
	20·387	G	0	0	359	0	0	689
	21·340	G	2	5	516	1	2	577
	22·432	G	25	76	265	21	61	282
	23·338	G	17	39	711	11	25	868
	24·370	G	5	23	707	3	13	784
	25·470	G	4	18	488	2	10	593
	26·374	C	5	18	1122	22	79	1267
	27·344	G	9	55	1080	12	75	1244
	28·568	G	19	87	546	15	70	619
	29·349	G	28	125	614	18	82	608
	30·378	G	64	243	288	36	136	357
	31·148	K	131	449	334	69	236	335
August	1·348	G	85	341	980	42	173	1214
	2·383	C	75	216	537	45	126	875
	3·457	G	51	127	1207	30	74	1423
	4·477	G	55	286	1859	35	177	1816
	5·561	G	29	197	1146	23	159	1189
	6·504	C	34	178	1373	34	185	1545
	7·370	G	7	27	806	12	48	1000
	8·492	G	0	0	110	0	0	135
	9·367	G	2	14	197	1	7	303
	10·374	C	0	0	331	0	0	327
	11·371	G	9	21	23	5	13	29
	12·342	G	2	7	513	1	5	464
	13·550	G	2	7	922	1	4	1052
	14·522	C	4	13	511	2	7	661
	15·359	G	0	0	212	0	0	263
	16·383	G	0	0	176	0	0	297
	17·478	G	51	117	0	28	63	0
	18·343	G	55	244	0	31	140	0
	19·558	G	54	180	0	37	124	0
	20·346	G	37	182	357	32	153	359
	21·646	G	14	60	456	25	97	660
	22·433	G	2	7	748	5	18	1127
	23·311	G	0	0	814	0	0	838
August	24·360	C	0	0	724	0	0	724
	25·344	G	0	0	387	0	0	402
	26·331	G	4	30	354	4	132	383
	27·340	G	39	153	493	40	145	518
	28·360	G	53	203	381	42	168	468
	29·347	G	58	252	820	37	170	1026
	30·440	G	31	172	381	24	120	538
	31·502	C	78	454	515	45	261	529
September	1·390	G	72	349	945	37	182	877
	2·520	C	70	238	828	37	128	1122
	3·342	G	43	225	882	26	122	1258
	4·495	G	36	118	865	21	71	802
	5·363	C	17	60	619	12	42	617
	6·338	G	19	45	715	16	39	719
	7·483	G	12	43	892	17	62	1109
	8·348	G	7	25	826	4	13	916
	9·380	G	19	39	742	12	23	713
	10·473	G	39	185	346	26	125	449
	11·345	G	75	364	391	63	314	393
	12·128	K	80	323	414	83	359	464
	13·323	G	61	233	323	90	438	623
	14·353	G	97	373	310	59	213	353
	15·398	G	53	190	423	32	118	378
	16·377	G	72	265	572	66	276	745
	17·386	C	61	293	902	56	279	1138
	18·106	K	62	290	991	57	260	1086
	19·425	G	51	293	255	31	177	272
	20·344	G	50	256	45	27	138	61
	21·342	G	54	200	136	28	102	191
	22·348	G	40	195	0	21	99	0
	23·114	K	56	212	264	29	108	305
	24·119	K	16	66	437	9	36	588
	25·402	C	6	18	198	4	13	244
	26·344	C	2	7	374	1	3	333
	27·397	G	2	7	746	10	34	773
	28·396	C	18	106	938	42	252	1328
	29·557	G	29	190	923	33	219	1086
	30·351	G	58	267	873	51	229	738
October	1·357	G	49	256	37	33	174	69
	2·609	G	56	243	31	32	138	53
	3·342	G	44	192	546	24	103	688
	4·474	G	42	151	174	30	98	280
	5·388	G	22	80	352	12	44	348
	6·386	G	18	83	357	10	46	305
	7·390	G	9	22	613	6	13	526
	8·465	G	8	39	1047	4	24	1004
	9·396	G	2	9	651	1	5	790
	10·369	C	0	0	249	0	0	436
	11·367	C	0	0	0	0	0	0
	12·455	G	4	9	445	2	5	663
	13·116	K	0	0	149	0	0	188
	14·421	G	9	47	755	5	28	869

TOTAL AREAS of SUN SPOTS and FACULÆ for EACH DAY in the YEAR 1931—*continued.*

Greenwich Mean Time.		Place.	Projected Area.			Area Corrected for Foreshortening.			Greenwich Mean Time.		Place.	Projected Area.			Area Corrected for Foreshortening.		
			Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.				Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.
1931.	d								1931.	d							
October	15·430	G	6	20	413	4	15	559	November	23·353	C	293	1166	1704	208	839	1573
	16·440	C	0	0	341	0	0	303		24·395	G	222	1083	498	140	675	550
	17·145	K	0	0	86	0	0	111		25·562	C	260	1153	532	142	627	435
	18·113	K	0	0	149	0	0	234		26·511	G	270	1193	590	141	615	677
	19·385	G	13	79	154	39	239	288		27·368	C	271	1159	378	139	593	396
	20·430	G	27	163	469	36	220	591		28·411	G	191	925	524	104	499	777
	21·371	C	39	199	460	35	179	431		29·379	C	168	765	410	100	461	501
	22·395	G	46	265	309	32	186	229		30·400	C	120	522	1076	86	384	860
	23·222	K	69	355	297	43	219	285									
	24·436	G	73	343	554	43	195	579									
	25·473	G	50	255	363	27	137	516	December	1·422	G	72	290	1415	73	304	1553
	26·411	G	54	280	703	32	164	835		2·492	G	21	95	1228	49	224	1542
	27·444	G	60	245	525	35	147	514		3·515	C	0	0	700	0	0	874
	28·589	G	44	262	18	32	189	38		4·523	C	0	0	152	0	0	202
	29·426	G	24	105	591	22	96	496		5·436	C	0	0	115	0	0	177
	30·395	G	30	107	409	39	141	487		6·531	G	9	37	196	12	48	289
	31·493	G	24	66	455	37	124	675		7·414	G	60	293	479	55	271	534
										8·416	C	88	411	560	62	292	627
										9·483	G	178	681	124	105	402	127
November	1·401	G	22	52	602	40	98	745		10·544	C	205	930	17	110	497	32
	2·425	G	0	0	53	0	0	172		11·413	C	296	1326	0	154	688	0
	3·443	C	6	52	118	5	44	105		12·338	C	234	1042	126	120	534	159
	4·611	G	36	114	286	28	83	276		13·386	C	193	947	0	104	508	0
	5·393	G	59	174	583	50	144	781		14·416	C	132	660	293	79	398	369
	6·473	G	125	479	515	125	490	696		15·356	C	71	327	1055	49	232	922
	7·439	G	65	311	83	33	155	144		16·388	C	38	199	870	32	185	864
	8·402	C	42	176	81	22	91	96		17·235	K	20	52	690	26	65	904
	9·399	C	21	90	231	13	55	223		18·441	C	17	67	815	27	105	1161
	10·426	C	0	0	161	0	0	297		19·356	C	21	83	1141	21	83	1363
	11·388	G	0	0	1048	0	0	1175		20·379	C	27	102	645	20	75	552
	12·392	G	2	4	602	2	5	621		21·405	C	19	96	62	11	58	122
	13·385	G	0	0	48	0	0	115		22·454	C	14	56	67	7	31	79
	14·440	G	0	0	0	0	0	0		23·451	C	8	15	134	4	8	197
	15·388	C	0	0	0	0	0	0		24·311	C	24	76	744	16	51	901
	16·355	C	0	0	411	0	0	756		25·372	C	24	153	825	31	204	1147
	17·415	C	0	0	631	0	0	861		26·350	C	37	204	1193	33	188	1252
	18·431	C	6	24	347	8	30	349		27·426	G	54	273	1548	36	188	1262
	19·640	G	27	102	433	19	71	338		28·121	K	66	316	550	42	198	447
	20·403	C	45	164	526	99	369	726		29·510	G	71	323	365	38	171	528
	21·442	G	131	521	864	202	720	1176		30·476	G	73	333	194	37	170	334
	22·364	C	182	910	1555	180	847	1782		31·471	G	77	299	211	39	152	222

MEAN AREAS of SUN SPOTS and FACULÆ for each ROTATION of the SUN, from 1931, January 1 to December 21.

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 disc, 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 1873-1930 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 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 Greenwich Mean Time, reckoning from midnight.

No. of Rotation.	Date of Commencement of each Rotation.		No. of Days on which Photographs were taken.	Mean of Daily Areas.					
				Projected.			Corrected for Foreshortening.		
				Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.
1034	January	1·30	28	39	208	759	35	199	881
1035	January	28·64	27	200	999	604	129	638	720
1036	February	24·98	27	190	971	878	147	775	1080
1037	March	24·30	28	111	561	983	81	410	1176
1038	April	20·57	27	77	323	846	66	275	1014
1039	May	17·81	27	105	492	790	71	334	956
1040	June	14·01	27	32	138	900	27	123	1058
1041	July	11·21	28	30	113	750	20	76	874
1042	August	7·42	27	25	108	447	17	76	532
1043	September	3·67	27	40	173	538	33	150	608
1044	September	30·94	27	26	124	379	18	88	433
1045	October	28·23	28	50	213	459	47	188	545
1046	November	24·53	27	110	495	526	67	302	593

MEAN AREAS of SUN SPOTS and FACULÆ for the YEAR 1931.

The Mean Projected Areas are expressed in millionths of the Sun's apparent disc.

The Mean Areas Corrected for Foreshortening are expressed in millionths of the Sun's visible hemisphere.

Year.	No. of Days on which Photographs were taken.	Mean of Daily Areas.					
		Projected.			Corrected for Foreshortening.		
		Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.
1931	365	79	372	679	57	275	801

MEAN HELIOGRAPHIC LATITUDE of SUN SPOTS for each ROTATION of the SUN, from 1931 January 1 to December 21.

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 Mean Heliographic Latitude of Spotted Area North of 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 for 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. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Photographs were taken.	Spots North of the Equator.		Spots South of the Equator.		Mean Heliographic Latitude of entire Spotted Area.	Mean Distance from Equator of all Spots.
			Mean of Daily Areas.	Mean Heliographic Latitude.	Mean of Daily Areas.	Mean Heliographic Latitude.		
				°		°	°	°
1034	January 1·30	28	169	6·89	30	18·30	+ 3·08	8·62
1035	January 28·64	27	539	7·10	99	5·09	+ 5·21	6·79
1036	February 24·98	27	539	5·68	237	7·91	+ 1·53	6·36
1037	March 24·30	28	261	8·64	149	6·65	+ 3·09	7·92
1038	April 20·57	27	245	9·35	30	7·13	+ 7·57	9·11
1039	May 17·81	27	210	6·46	124	15·65	— 1·73	9·86
1040	June 14·01	27	58	7·24	65	9·65	— 1·68	8·51
1041	July 11·21	28	31	6·95	45	8·39	— 2·17	7·81
1042	August 7·42	27	50	7·04	26	9·64	+ 1·25	7·95
1043	September 3·67	27	105	11·04	45	5·90	+ 5·98	9·50
1044	September 30·94	27	25	17·02	63	14·62	— 5·59	15·31
1045	October 28·23	28	147	10·08	42	7·20	+ 6·26	9·44
1046	November 24·53	27	300	10·49	2	0·81	+10·41	10·42

MEAN HELIOGRAPHIC LATITUDE of SUN SPOTS for the YEAR 1931.

Year.	No. of Days on which Photographs were taken.	Spots North of the Equator.		Spots South of the Equator.		Mean Heliographic Latitude of entire Spotted Area.	Mean Distance from Equator of all Spots.
		Mean of Daily Areas.	Mean Heliographic Latitude.	Mean of Daily Areas.	Mean Heliographic Latitude.		
			°		°	°	°
1931	365	200	7·91	75	9·39	+ 3·21	8·31

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ROYAL OBSERVATORY, GREENWICH.

Observations of Solar Flocculi

Made with the

Spectrohelioscope

In the Year

1931

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OBSERVATIONS OF SOLAR FLOCCULI MADE WITH THE SPECTROHELIOSCOPE IN THE YEAR 1931.

The following observations* relate to dark filaments or flocculi visible on the sun's disc in the light of $H\alpha$ in the immediate vicinity of sunspots, the object of the measures being to determine the motion of these hydrogen flocculi in the line of sight.

The observations were made at the Royal Observatory, Greenwich with a spectrohelioscope lent by the Mount Wilson Observatory and described by Dr. Hale in the *Astrophysical Journal*, **70**, 265–311, 1929. The spectrum is formed by a Rowland grating ruled with 14,438 lines to the inch, the observations being made in the light of $H\alpha$. The first order spectrum was used throughout the year, the scale being approximately 1 mm. = 4 A. The width of the second slit was usually 0·1 mm., *i.e.*, about one-third of the width of the $H\alpha$ line in the first order spectrum. The diameter of the monochromatic image of the sun's disc at the second slit is about 50 mm., of which a strip 6 mm. wide and 28 mm. long is rendered visible by the rotating rectangular prisms. The eyepiece used magnifies twice.

Measures of radial 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 disc. The purpose of the observations being to locate large radial velocities, measured displacements are interpreted as being due to Doppler effects.

The probable error of a single measure of radial 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 flocculus, 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.

*Summaries of observations made at Greenwich during 1931 of bright and dark flocculi in the central part of the sun's disc are published in *Monthly Notices*, **92**, 438–442, 1932.

There is the possibility of a relatively small systematic error in the measures of the order of 1 or 2 km./sec.

In the following Table, the headings of which are self-explanatory, particulars are given of each dark flocculus as follows—

(1) The measured component of the radial velocity in km./sec., + indicating motion inwards to the sun and − outwards from the sun.

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 flocculus, 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 flocculus, showing progressive velocities along its length, appeared to touch a sunspot, the radial velocity observed at that extremity of the flocculus is printed in heavy type.

(2) (*a*) The apparent length of the flocculus in minutes of arc, read by means of a scale inserted in the field. An asterisk denotes that the marking was small and roughly circular in shape; several appeared as dense black dots about 20″ in diameter.

(*b*) The apparent least distance in minutes of arc from the centre of the nearest sunspot or group of spots. In several cases, the position of the associated group was not located in the field, on account of the smallness of the spots or poor definition.

(*c*) The position of the flocculus relative to the group of associated sunspots or to a single component of the group. In cases where a sunspot has been designated in the *Ledgers* in the preceding *Results*, the letter *a* (the leader of the group) or *b* (the follower) has been appropriately 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 distance of the group from the sun's central meridian at the time of observing the flocculus.

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

OBSERVATIONS OF SOLAR FLOCCULI made with the SPECTROHELIOSCOPE in the YEAR 1931.

Dark Hα Flocculi.							Associated Group of Sunspots.					
Reference Number.	Date and Time.		Measured Radial Velocity km/sec.	Length.	Least Distance from Sunspot.	Position relative to Sunspot or Group.	Number of Group.	Distance from Central Meridian.	Central Meridian. Passage.		Latitude.	Area.
	d	h		′	′			°			°	
1	Feb. 19	15·3	−20 to +**33**	0·8	0·3	*sp b*	11355	−15	Feb.	20·77	+ 6	1143
2	19	15·3	−6	0·5	0·6	*n*	55	−15				
3	21	12·6	−1 to +**32**	0·7	0·5	*nf a*	55	+10				
4	21	12·8	−2 to +29	2·0	0·6	*f a*	58	+12		20·64	− 4	268
5	Feb. 22	11·5	+24	0·7	0·5	*f a*	11355	+23	Feb.	20·77	+ 6	1143
6	22	11·8	+ 2	1·1	0·2	*c*	58	+24		20·64	− 4	268
7	22	11·8	+25 to +**55**	1·0	0·3	*s*	58	+24				
8	24	14·8	−32	2·0	0·5	*s a*	55	+51	Feb.	20·77	+ 6	1143
9	24	14·8	+34	2·0	0·5	*s a*	55	+51				
10	Mar. 13	10·2	+17 to +**36**	0·5	0·5	*s b*	11367	−25	Mar.	15·33	+ 4	558
11	13	10·4	+34	*	0·8	*n b*	67	−25				
12	13	10·4	−46	*	0·8	*n b*	67	−25				
13	15	12·1	0 to +20	1·0	1·0	*f*	69	−46		19·03	+ 6	269
14	17	10·2	+27	1·0	0·2	*c*	67	+28		15·33	+ 4	558
15	Mar. 17	10·3	−10 to +37	0·8	..	*c*	11371	+30	Mar.	15·1	+ 9	32
16	17	10·5	+ 7	1·5	1·0	*n*	68	+12		16·53	+ 8	51
17	17	10·7	0	1·2	1·5	*f*	69	−21		19·03	+ 6	269
18	17	10·9	+34	1·0	..	*p*	70	+74		11·9	− 4	135
19	17	14·7	−25	0·7	..	*f*	70	+76				
20	Mar. 17	14·7	+40	0·8	..	*p*	11370	+76	Mar.	11·9	− 4	135
21	18	10·7	+34	*	1·0	*c*	67	+41		15·33	+ 4	558
22	18	10·7	+10 to +75	2·0	1·0	*n*	68	+25		16·53	+ 8	51
23	20	9·9	−3 to +20	2·0	..	*np*	72	+ 7		19·91	−20	26
24	20	10·5	+ 2	2·2	0·9	*nf*	69	+18		19·03	+ 6	269
25	Mar. 26	11·2	−25	0·9	0·9	*np*	11374	−50	Mar.	30·27	− 8	153
26	26	11·5	+31	0·4	0·8	*np*	74	−50				
27	26	15·0	−22	1·0	0·5	*sp*	74	−48				
28	31	12·5	− 2	*	0·4	*p b*	77	+60	Mar.	27·0	−15	144
29	31	12·7	+40	0·5	..	*p*	77	+60				
30	April 12	12·2	−35 to +49	1·7	0·5	*f*	11383	−69	April	17·70	+23	36
31	12	12·2	+38	0·7	1·0	*f a*	82	−53		16·50	+ 7	248
32	12	12·7	−41 to +34	*	1·4	*f a*	82	−52				
33	13	10·5	− 8	0·5	0·4	*nf*	83	−56		17·70	+23	36
34	13	11·1	+50	*	1·0	*f a*	82	−40		16·50	+ 7	248
34	13	11·2	+33									
35	April 22	9·2	+29	0·4	..	*c*	11386	+52	April	18·4	+11	16
36	23	14·3	−55 to +29	1·0	..	*f*	87	−15	April	24·74	+15	51
37	May 5	11·4	−24	0·7	..	*f*	91	− 9	May	6·05	+11	17
38	5	11·4	+42	*	..	*sp*	91	− 9				
39	5	11·6	−21 to +35	1·0	..	*c*	91	− 9				
40	May 5	14·0	−9 to +44	0·8	0·2	*f*	11391	− 7	May	6·05	+11	17
41	9	10·8	− 2	2·2	0·5	*p*	94	−51		13·31	+ 8	148
42	9	10·8	0	1·2	0·4	*n*	94	−51				
43	9	11·0	− 3	*	..	*p*	92	+24		7·69	− 1	56
44	10	10·3	−15 to +**95**	1·0	0·3	*np a*	94	−38		13·31	+ 8	148

OBSERVATIONS OF SOLAR FLOCCULI made with the SPECTROHELIOSCOPE in the YEAR 1931.

Dark Hα Flocculi.							Associated Group of Sunspots.					
Reference Number.	Date and Time.		Measured Radial Velocity km/sec.	Length.	Least Distance from Sunspot.	Position relative to Sunspot or Group.	Number of Group.	Distance from Central Meridian.	Central Meridian. Passage.		Latitude.	Area.
	d	h		′	′			°			°	
45	May 10	10·4	+13	0·7	1·3	*np a*	11394	−38	May	13·31	+ 8	148
46	10	10·5	−36	0·6	2·0	*np a*	94	−38				
47	10	10·6	−34 to +55	0·5	0·2	*c*	95	−37		13·25	+10	102
48	10	10·7	−28	0·5	0·5	*nf b*	95	−37				
49	10	10·7	−28	1·0	0·5	*sp a*	94	−38		13·31	+ 8	148
50	May 10	10·8	+29	1·3	2·0	*np a*	11394	−38	May	13·31	+ 8	148
51	13	8·6	− 4	1·0	0·7	*np a*	95	+ 2		13·25	+10	102
51	13	13·8	+ 4				95	+ 4				
52	25	15·2	+27	0·4	..	*np*	96	+68	May	20·48	−16	315
53	26	9·7	− 5	1·1	..	*f*	96	+78				
54	June 5	9·8	−3 to −16	1·2	0·7	*np*	11404	+ 6	June	4·97	+ 6	179
55	June 27	9·5	+ 4	*	..	*c*	11406	−34	June	30·0	− 2	16
56	27	9·7	−17 to +29	0·3	..	*c*	06	−34				
57	July 1	9·3	−23 to +38	2·0	2·0	*s b*	08	−56	July	5·62	+ 7	124
58	3	9·1	0	2·2	0·7	*s*	08	−30				
59	3	9·2	−33 to +35	0·5	0·8	*s a*	07	−20		4·92	− 8	76
59	3	9·9	+17 to +50									
60	July 3	9·4	+18 to +**39**	0·4	0·3	*np a*	11407	−20	July	4·92	− 8	76
61	6	9·0	+ 2	2·5	1·3	*n*	07	+19				
62	6	9·8	−29 to +39	*	..	..	09	+22		4·78	+ 8	7
63	7	10·0	−13 to +35	1·0	0·5	*c*	11	−38		10·27	− 7	52
64	12	15·8	+49	*	0·5	*np*	11	+32				
65	July 12	16·1	−35	0·8	1·0	*n*	11411	+32	July	10·27	− 7	52
66	12	16·1	−35	0·8	1·0	*f*	11	+32				
67	12	16·2	+39	0·8	0·9	*f*	11	+32				
68	23	8·8	0	2·0	1·5	*f*	16	−39	July	26·3	+ 8	27
69	27	9·0	−32	0·3	0·8	*f*	17	−67	Aug.	1·45	+ 7	62
70	Aug. 1	10·2	+ 4	1·3	1·2	*nf*	11417	0	Aug.	1·45	+ 7	62
71	7	9·3	−33	*	0·6	*np*	19	+73		1·9	− 8	95
72	7	9·3	+10 to +42	0·7	0·3	*n*	19	+73				
73	9	9·3	+ 2	2·0	..	*f*	*1042a*	+ 9		8·7	+ 9	7
74	11	9·0	+ 3	0·7	..	*f*	*1042b*	+34		8·8	+ 4	13
75	Aug. 17	13·8	+29	0·6	<0·2	*f*	11422	+14	Aug.	16·5	−11	99
76	17	13·8	−10	1·4	0·8	*f*	22	+14				
77	17	13·9	+ 2	1·1	<0·2	*n*	22	+14				
78	17	14·0	−16 to −43	1·4	0·8	*f*	22	+14				
79	18	9·0	−12 to +**50**	2·0	0·3	*c*	22	+25				
80	Aug. 18	9·4	+40	*	0·4	*n*	11422	+25	Aug.	16·5	−11	99
81	18	9·7	−70 to +50	0·5	0·3	*n*	22	+25				
82	18	10·0	+29	0·7	0·4	*n*	22	+25				
83	18	14·1	−9 to +**33**	0·6	0·1	*c*	22	+27				
84	18	14·2	+37	0·9	0·3	*sp*	22	+28				
85	Aug. 19	13·6	+25 to +43	0·9	0·5	*p*	11422	+40	Aug.	16·5	−11	99
86	20	9·6	−34	0·4	0·2	*f*	22	+51				
87	20	9·7	−10	0·9	0·7	*nf*	22	+51				
88	26	9·6	+31	*	..	*s*	24	−68		31·5	− 7	14
89	27	8·9	+33 to +**75**	0·3	0·0	*f*	26	− 9		28·04	+ 6	27

OBSERVATIONS OF SOLAR FLOCCULI made with the SPECTROHELIOSCOPE in the YEAR 1931.

Dark Hα Flocculi.							Associated Group of Sunspots.					
Reference Number.	Date and Time.		Measured Radial Velocity km/sec.	Length.	Least Distance from Sunspot.	Position relative to Sunspot or Group.	Number of Group.	Distance from Central Meridian.	Central Meridian. Passage.		Latitude.	Area.
	d	h		′	′			°			°	
90	Aug. 27	9·0	− 2	1·5	..	*c*	*1042d*	−49	Aug.	31·1	+10	14
91	29	8·6	+42	*	0·7	*c*	11426	+17		28·04	+ 6	27
92	29	8·6	+ 5 to +**34**	0·4	0·3	*np*	24	−29		31·5	− 7	14
93	29	8·9	+43 to +65	*	..	*p*	23	+73		23·9	− 2	7
94	29	9·0	+42	0·2	0·2	*sp*	26	+18		28·04	+ 6	27
95	Aug. 29	9·2	+19 to +**34**	0·3	0·2	*sp*	11424	−29	Aug.	31·5	− 7	14
96	29	9·3	−36 to +24	*	..	*f*	26	+18	Aug.	28·04	+ 6	27
97	29	9·9	− 3 to +33	1·0	..	*c*	26	+18				
98	Sept. 3	10·8	+ 8 to +27	1·0	0·8	*nf*	28	+11	Sept.	2·62	+12	60
99	6	11·1	+23	0·7	..	*n*	28	+51				
100	Sept. 10	13·7	− 8	0·4	0·9	*f*	11429	+40	Sept.	7·52	− 5	100
101	11	11·5	−15	0·8	0·2	*f*	29	+52				
102	13	11·2	+14	0·5	..	*f*	32	−70		18·8	+ 4	17
103	13	11·4	+ 1	0·5	0·4	*n*	31	+ 9		12·78	+ 9	89
104	14	9·7	+24	*	0·5	*f*	32	−58		18·8	+ 4	17
105	Sept. 14	9·9	−24	0·4	0·5	*f*	11431	+22	Sept.	12·78	+ 9	89
106	15	10·9	+ 3	0·5	0·6	*n*	31	+35				
107	16	9·6	+17	1·0	0·3	*s*	31	+48				
108	16	9·9	− 2	1·0	0·6	*s*	32	−31		18·8	+ 4	17
109	20	11·3	0	1·5	1·0	*s*	33	−20	Sept.	21·97	+ 8	107
110	Sept. 29	14·0	+ 1	0·8	1·0	*nf a*	11435	−66	Oct.	4·57	+19	128
111	Oct. 2	14·8	− 3	0·7	1·0	*c*	35	−26				
112	7	10·3	− 2	0·6	..	*n*	35	+38				
113	8	15·3	− 1	1·0	..	*c*	38	−20		10·1	−11	12
114	9	11·3	− 1	1·0	..	*p*	38	− 9				
115	Oct. 9	11·4	− 1	0·5	..	*f*	11438	− 9	Oct.	10·1	−11	12
116	14	9·9	+20	0·2	..	*s*	39	+31		12·1	+ 1	22
116	14	10·1	+13 to +55	1·0	..	*s*	39	+31				
117	14	10·8	−38	0·5	..	*s*	39	+32				
118	14	11·1	+17	0·5	..	*s*	39	+32				
119	22	10·3	0	0·9	0·8	*sf a*	40	−40		25·44	−15	171
120	Oct. 22	12·1	+22	0·4	1·0	*sf a*	11440	−39	Oct.	25·44	−15	171
121	24	10·4	+32	*	1·0	*p*	41	+51		20·6	+12	15
122	24	10·7	−30	*	1·7	*p*	41	+51				
123	24	11·0	−35	0·2	1·0	*p a*	40	−13		25·44	−15	171
124	26	11·1	−35	0·2	1·0	*p a*	40	+14				
125	Oct. 26	11·2	− 7 to +**30**	0·8	0·5	*p a*	11440	+14	Oct.	25·44	−15	171
125	26	11·3	+27	0·8	0·8	*p a*	40	+14				
126	26	11·4	−22 to +29	0·3	0·7	*sp a*	40	+14				
127	27	12·1	−12 to +**29**	0·5	0·0	*n a*	40	+27				
128	Nov. 5	10·1	−40	0·2	0·6	*p*	43	+65		31·5	+ 9	109
129	5	10·2	−23	*	0·5	*f*	43	+65				

OBSERVATIONS OF SOLAR FLOCCULI made with the SPECTROHELIOSCOPE in the YEAR 1931.

Dark Hα Flocculi.							Associated Group of Sunspots.					
Reference Number.	Date and Time.		Measured Radial Velocity km/sec.	Length.	Least Distance from Sunspot.	Position relative to Sunspot or Group.	Number of Group.	Distance from Central Meridian.	Central Meridian. Passage.		Latitude.	Area.
	d	h		′	′			°			°	
130	Nov. 6	11·8	−38	0·2	1·0	*n*	11443	+79	Oct.	31·5	+ 9	109
131	6	11·9	+24	*	..	*f*	43	+79				
132	6	12·2	−28 to +29	0·8	0·2	*nf*	44	−14	Nov.	7·55	− 1	62
133	6	12·5	−31 to +65	1·0	0·2	*nf*	44	−14				
134	7	11·0	+ 3	0·9	1·0	*s*	44	− 1				
135	Nov. 21	11·0	−28	0·8	..	*f*	11447	−12	Nov.	22·38	+12	23
135	21	11·1	+ 7				47	−12				
136	21	11·0	− 6	1·5	0·5	*n b*	48	−71		26·82	+10	513
137	21	11·5	−13 to +30	0·5	..	*nf*	47	−12		22·38	+12	23
138	21	11·6	−27	0·3	..	*n*	47	−12				
139	24	12·3	−32	0·2	1·2	*np b*	48	−30		26·82	+10	513
139	24	12·5	+20				48	−30				
140	Nov. 24	12·5	+29	*	0·5	*p b*	11448	−30	Nov.	26·82	+10	513
141	Dec. 2	12·2	−34	0·3	0·2	*f a*	48	+75				
142	7	12·6	+32	0·4	0·1	*f*	51	−56	Dec.	11·79	+11	301
143	9	11·3	−4 to +46	0·3	0·2	*f*	51	−31				
143	9	11·6	+30				51	−31				

NOTES.

Reference Number

4. A dark marking apparently representing an arch seen in projection, the middle portion being visible at a setting of the line-shifter, −2 km./sec. and the two extremities at a setting, +29 km./sec.

8. 9. A conspicuous flocculus visible at settings of the line-shifter on both sides of the *Hα* line. The flocculus is most definite at a setting, −32 km./sec.

10. Flocculus shows slight curvature, inwards clockwise to sunspot.

11. 12. Two small circular markings almost identical in position.

15. A small circular marking at setting, −10 km./sec. becomes two markings 0′·8 apart at setting, +37 km./sec.

18. This marking was associated with an eruption of brilliant *Hα* flocculi first seen at 10h 55m and fading an hour later.

22. The tabulated values are the measured maximum velocities of a quiescent flocculus that became eruptive between 10h 27m and 10h 45m.

30. The tabulated values are the maximum velocities of an active flocculus observed between 11h 45m and 12h 58m.

31. 32. Associated with a bright eruption of *Hα* flocculi lasting from 12h 0m to about 12h 50m.

34. Observations were made at 11h 6m and 11h 14m; at 11h 20m the flocculus has disappeared.

36. Maximum recorded velocities between 14h 2m and 14h 33m of a rapidly changing flocculus.

39. A single marking at the setting, −21 km./sec., appearing as two markings ¾′ apart at +35 km./sec.

40. A single dot at −9 km./sec., appearing as two markings about 1′ apart at 44 km./sec., the preceding one almost touching the sunspot.

44. Direction of curvature with respect to the sunspot, inwards clockwise.

62. A small circular marking at the setting, −29 km./sec., becoming two dots about ¾′ apart at +39 km./sec.

65. 66. 67. Dark flocculi associated with a bright eruption commencing suddenly between 15h 48m and 16h 1m and fading at 16h 17m.

80. At one time the flocculus is larger and denser than the umbræ of the leading sunspots.

81. An active flocculus near the place of No. 80 observed from 9h 39m to 9h 50m. The extreme measured radial velocities are tabulated.

85. At 13h 45m a dense marking formed over the leading sunspot, but no measures of radial velocity could be made owing to cloud.

116. Measures taken at 9h 56m and 10h 5m; marking has practically disappeared by 10h 15m.

117. The flocculus has disappeared 17m after the measures tabulated were made.

118. The flocculus lasted for about 10m.

124. 125. 126. A series of flocculi seen between 11h 5m and 11h 22m with changes so rapid that at times they were apparent within 1m.

127. A flocculus with progressive radial velocity directed into a small sunspot *p*, the regular spot, *a*, of Group 11440. Direction of curvature of the flocculus with respect to the sun spot—inwards, clockwise.

128. 129. Flocculi associated with very bright *Hα* flocculi. Active prominences were seen on November 7 11h to 11½h when this region was passing over the sun's west limb.

132. 133. These flocculi were nearly in the same position, but the slight curvature each showed was in the opposite direction—No. 132 inwards, clockwise with respect to the sunspot and No. 133 inwards counterclockwise. Small brilliant patches of *Hα* flocculi, appeared very suddenly between the leading and following sunspots at about 12h 10m.

141. Measures taken at 12h 11m: marking has disappeared by 12h 20m.

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1931.