GREENWICH

SPECTROSCOPIC AND PHOTOGRAPHIC RESULTS.

1898.

1898

RESULTS

OF THE

SPECTROSCOPIC AND PHOTOGRAPHIC OBSERVATIONS

MADE AT THE

ROYAL OBSERVATORY, GREENWICH,

IN THE YEAR

1898:

UNDER THE DIRECTION OF

W. H. M. CHRISTIE, C.B., M.A., F.R.S.,
ASTRONOMER ROYAL.

(EXTRACTED FROM THE GREENWICH OBSERVATIONS, 1898.)

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1899.

ERRATA.

SPECTROSCOPIC AND PHOTOGRAPHIC RESULTS, 1898.

MEASURES OF POSITIONS AND AREAS OF SUN SPOTS AND FACULÆ, 1898.

Page.	Column.	Line.	
13	2	34	Area for Umbra, *for* 22, *read* 18.
13	2	35	Area for Umbra, *for* 11, *read* 9.
14	1	5	Total Area for Umbra, *for* 44, *read* 38.
21	2	36	Area for Whole Spot, *for* 10, *read* 20.
22	1	3	Total Area for Whole Spot, *for* 299, *read* 309.
37	2	28	Area for Whole Spot, *for* 1120, *read* 1200.
38	1	11	Total Area for Whole Spot, *for* 1444, *read* 1524.

GREENWICH SPECTROSCOPIC AND PHOTOGRAPHIC RESULTS, 1898.

INTRODUCTION.

§ 1. *Measures of Positions and Areas of Sun Spots and Faculæ on Photographs taken at the Royal Observatory, Greenwich, at Dehra Dûn in India, and at the Royal Alfred Observatory, Mauritius, in the year* 1898; *with the deduced Heliographic Longitudes and Latitudes.*

The photographs from which these measures were made were taken either at Greenwich; at Dehra Dûn, North-West Provinces, India; or at the Royal Alfred Observatory, Mauritius.

The photographs of the Greenwich series were taken either with the Dallmeyer or with the Thompson Photoheliograph. The Dallmeyer, which was in regular use up to 1898 July 27, is an instrument used in the Transit of Venus expedition to New Zealand, which, as now adapted, gives a solar image of 8 inches diameter on the photographic plate. The Thompson Photoheliograph, which was substituted for the Dallmeyer as the instrument in regular use on 1898 July 27, is a photographic refractor of 9 inches aperture, presented to the Royal Observatory by Sir Henry Thompson, which has been fitted with an enlarging doublet by Ross, and with a camera and shutter for rapid exposure so as to take photographs of the Sun on a scale of about 7·5 inches to the solar diameter.

The photographs have been taken throughout the year on gelatine dry plates, "Lantern" plates supplied by R. W. Thomas and Co. being used, with hydroquinone development.

The Indian photographs, which have been forwarded by the Solar Physics Committee to fill the gaps in the Greenwich series, were taken under the superintendence of the Deputy Surveyor-General, Trigonometrical Survey of India, with a Dallmeyer Photoheliograph giving an image of the Sun nearly 8 inches in diameter. In the process adopted at Dehra Dûn bromo-iodized collodion has been used in connexion with iron development.

The Mauritius photographs were taken under the superintendence of Mr. T. F. Claxton, Director of the Royal Alfred Observatory, Mauritius, with a Dallmeyer Photoheliograph, giving an image of the Sun about 8 inches in diameter. At the Mauritius Observatory bromo-iodized gelatine dry plates have been used with alkaline development.

Photographs of the Sun were taken at Greenwich on 165 days, and Indian photographs on 172 days with Mauritius photographs on 26 days have been received from the Solar Physics Committee to complete the total of 363 days for which there are either Greenwich, Indian, or Mauritius photographs of the Sun available for measurement in 1898.

The *first* column on each page contains the Greenwich Civil Time at which each photograph was taken, expressed by the day of the year and decimals of a day, reckoning from Greenwich mean midnight January 1d. 0h., and also by the day of the month (civil reckoning), which latter is placed opposite the total area of Spots and Faculæ for the day. The photographs taken in India are distinguished by the letter I, and those taken in Mauritius by the letter M.

The *second* column contains the initials of the two persons measuring the photograph; the initial on the left being that of the person who measured the photograph on the left of the centre of the measuring instrument, and that on the right being that of the person who measured on the right of the centre.

The following are the signatures of those persons who measured the photographs for the year 1898:—

E. W. Maunder	M	A. J. Wilkin	AW
C. C. Lacey	CL		

The *third* column gives the No. of the group, and the letter for the spot. The groups are numbered in order of their appearance.

The *next two* columns give the Distance from the Centre of the Sun in terms of the Sun's Radius, and the Position-Angle from the Sun's Axis, reckoned from the Sun's North Pole in the direction *n, f, s, p*, both results being corrected for the effects of astronomical refraction.

The measures of the photographs were made with a large position-micrometer specially 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 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 Sun 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 a 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.

The following is the process of measurement of a photograph:—By means of the screws attached to the circular plates carrying the pillars which hold the photograph, the image of the Sun is centred as accurately as possible by rotation. The position-circle is then set to the readings 0°, 90°, 180°, and 270° in succession, and the scale readings taken for the two limbs. The scale being so adjusted that its zero coincides with the centre of rotation of the position-circle, the mean of the eight readings for the limb gives the mean radius of the Sun directly.

At the principal focus of the photoheliograph are two cross-spider-lines which serve to determine the zero of position-angles on the photograph.

The zero of position-angles for the Dallmeyer and Thompson Photoheliographs, employed at Greenwich, has been determined by the measurement of a plate which has been exposed to the Sun's rays 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 plate, and the exposures having been so given that the line joining the cusps passed approximately through the centre of the plate, the inclination of the wires of the photoheliograph to this line was measured with the position-micrometer, and a small correction for the inclination of the Sun's path was

then applied. The following tables give the correction for zero of position for the mean of the two wires as thus determined :—

Dallmeyer Photoheliograph.

Date, Greenwich Civil Time.		Correction for Zero.
	d h	° ′
1897 December	2. 12	+ 2. 53
1898 February	21. 14	+ 3. 5
March	10. 12	+ 2. 59
April	5. 11	+ 2. 57
May	13. 11	+ 3. 2
June	11. 11	+ 3. 5
July	14. 12	+ 3. 4
	27. 13	+ 3. 1

Thompson Photoheliograph.

Date, Greenwich Civil Time.		Correction for Zero.
	d h	° ′
1898 August	11. 11	+ 0. 20
September	9. 11	+ 0. 22
	21. 15	+ 0. 30
October	24. 12	+ 0. 24
November	14. 11	+ 0. 20
1899 January	7. 11	+ 0. 31

The Dallmeyer Photoheliograph was mounted on the terrace roof of the South wing of the new Physical Observatory, up till 1898 October 13, when it was dismounted and placed in the upper floor of the Museum.

In the use at Greenwich of the Dallmeyer Photoheliograph the position-circle has usually been set to some convenient reading near that for zero, so that the wires are respectively very nearly parallel and perpendicular to the circle of declination, and a correction for zero of position of the photoheliograph for the mean of the two wires has been applied to the zero of the position-circle of the micrometer. The position-circle was set to the reading 354°·0 throughout 1898.

The Thompson Photoheliograph was mounted on the tube of the 26-inch Thompson Photographic refractor on 1898 May 26. The Thompson Photoheliograph is not fitted with a position-circle, and the position-angle of the wires, which, as in the Dallmeyer, are approximately parallel and perpendicular to the circle of declination, cannot be altered.

The zero of the position-circle of the micrometer has been determined from the readings of the position-circle for the four extremities of the two wires. The resulting combined correction is applied to all position-circle readings for spots and faculæ, so as to give true position-angles.

In the use of the Photoheliographs at Dehra Dûn and in Mauritius the position-circle has always been set to the zero as determined by allowing the diurnal motion to carry a spot or the Sun's limb along the horizontal wire, and the accuracy of the adjustment has been tested at short intervals. No correction for zero of position of the wires has therefore been applied for the reduction of the photographs taken in India or in Mauritius.

The uncorrected distance from the Sun's centre for spots and faculæ is read off directly to 1-250th of an inch by means of a scale and vernier, the zero of the scale of the new micrometer being adjusted to coincide with the centre of the instrument.

Two sets of measures of the Sun's limb and of spots and faculæ on each photograph have been taken, and the mean of the two sets adopted.

No correction has been applied to the photographs on account of distortion.

The correction for the effect of refraction has been thus found, the Sun's image being assumed to be sensibly an ellipse. The refraction being sensibly $c \tan z$ where $c = \sin 57''\cdot5 = \frac{1}{3600}$ nearly, and z is the apparent zenith-distance, we shall have—

$$\frac{\text{Vertical Diameter}}{\text{Horizontal Diameter}} = \frac{1 - c \sec^2 z}{1 - c} = 1 - c \tan^2 z;$$

and thus the effect of refraction will be to diminish any vertical ordinate y by the quantity $c \tan^2 z$. Resolving this along and perpendicular to the radius vector r, and putting v for the position-angle of the vertex, we have for δr and $\delta \theta$, the corrections to radius vector and position-angle for the effect of refraction—

$$\delta r = + c \,.\, \tan^2 z \times r \,.\, \cos^2 (\theta - v) = + c \,.\, \tan^2 z \times r \times \frac{1 + \cos 2 (\theta - v)}{2},$$

$$\delta \theta = - c \,.\, \tan^2 z \,.\, \sin (\theta - v) \,.\, \cos (\theta - v) = - c \,.\, \tan^2 z \, \frac{\sin 2 (\theta - v)}{2}.$$

The quantity δr thus found is the correction, on the supposition that a horizontal diameter of the Sun is taken as the scale. But, as the mean of two diameters at right angles has been used, the scale itself requires the correction $\delta \mathrm{R} = + c \,.\, \tan^2 z \times \mathrm{R} \times \frac{1}{2} \left\{ \frac{1 + \cos 2 (\theta_0 - v)}{2} + \frac{1 + \cos 2 (\theta_0 + 90^\circ - v)}{2} \right\} = + \frac{1}{2} c \,\mathrm{R} \,.\, \tan^2 z$, where R is the Sun's mean radius and θ_0, $\theta_0 + 90^\circ$ the position-angles of the two diameters measured. Thus the final correction to r becomes—

$$\delta r = + c \,.\, \tan^2 z \times r \times \frac{\cos 2 (\theta - v)}{2}.$$

The quantities $c \tan^2 z$, $- \frac{\sin 2 (\theta - v)}{2}$, and $\frac{\cos 2 (\theta - v)}{2}$ have been tabulated for use

as follows, $c \tan^2 z$ being expressed in circular measure and in arc for application to distances and position-angles respectively :—

$c \tan^2 z$.

z.	In Circular Measure.	In Arc.	z.	In Circular Measure.	In Arc.	z.	In Circular Measure.	In Arc.
°		′	°		′	°		′
80	·0089	31	70	·0021	7	60	·0008	3
79	·0073	25	69	·0019	6½	58	·0007	2
78	·0061	21	68	·0017	6	56	·0006	2
77	·0052	18	67	·0015	5½	54	·0005	2
76	·0045	15	66	·0014	5	52	·0005	2
75	·0039	13	65	·0013	4½	50	·0004	1
74	·0034	11½	64	·0012	4	45	·0003	1
73	·0030	10	63	·0011	4	40	·0002	1
72	·0026	9	62	·0010	3	30	·0001	0
71	·0023	8	61	·0009	3			

Factors for Refraction.

$\theta - v$	$\theta - v$	$-\frac{\text{Sin } 2(\theta - v)}{2}$	$\frac{\text{Cos } 2(\theta - v)}{2}$	$\theta - v$	$\theta - v$	$-\frac{\text{Sin } 2(\theta - v)}{2}$	$\frac{\text{Cos } 2(\theta - v)}{2}$
°	°			°	°		
0	180	·00	+ ·50	95	275	+ ·09	− ·49
5	185	− ·09	+ ·49	100	280	+ ·17	− ·47
10	190	− ·17	+ ·47	105	285	+ ·25	− ·43
15	195	− ·25	+ ·43	110	290	+ ·32	− ·38
20	200	− ·32	+ ·38	115	295	+ ·38	− ·32
25	205	− ·38	+ ·32	120	300	+ ·43	− ·25
30	210	− ·43	+ ·25	125	305	+ ·47	− ·17
35	215	− ·47	+ ·17	130	310	+ ·49	− ·09
40	220	− ·49	+ ·09	135	315	+ ·50	·00
45	225	− ·50	·00	140	320	+ ·49	+ ·09
50	230	− ·49	− ·09	145	325	+ ·47	+ ·17
55	235	− ·47	− ·17	150	330	+ ·43	+ ·25
60	240	− ·43	− ·25	155	335	+ ·38	+ ·32
65	245	− ·38	− ·32	160	340	+ ·32	+ ·38
70	250	− ·32	− ·38	165	345	+ ·25	+ ·43
75	255	− ·25	− ·43	170	350	+ ·17	+ ·47
80	260	− ·17	− ·47	175	355	+ ·09	+ ·49
85	265	− ·09	− ·49	180	360	·00	+ ·50
90	270	·00	− ·50				

The Position-Angle of the Vertex v is readily taken from a globe.

The distance from centre in terms of the Sun's radius given in the *fourth* column is then readily found by dividing the measured distance r_0, as corrected for refraction, by the measured mean radius of the Sun, R; and the Position-Angle from the Sun's Axis given in the *fifth* column is obtained by applying to the Position-Angle (from the N. point) corrected for refraction the Position-Angle of the Sun's Axis derived from the "Auxiliary Tables for determining the Angle of Position of the Sun's Axis, and the Latitude and Longitude of the Earth referred to the Sun's Equator," by Warren De La Rue, F.R.S.

The *sixth* and *seventh* columns give the heliographic longitude and latitude of the spot, which are thus computed.* Let r be the measured distance of a spot from the centre of the Sun's apparent disk, R the measured radius of the Sun on the photograph, (R) the tabular semidiameter of the Sun in arc, and ρ, ρ' the angular distances of a spot from the centre of the apparent disk as viewed from the Sun's centre and from the Earth respectively. Then we have—

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

$$\text{whence } \rho = \sin^{-1}\frac{r}{R} - \rho'.$$

Log. sin ρ and log. cos ρ, as computed from this formula, are given in "Tables for the Reduction of Solar Observations No. 2," by Warren De La Rue, F.R.S. Then, if D, λ are the heliographic latitudes of the Earth and the Spot respectively, referred to the Sun's Equator, and L, l the heliographic longitudes reckoned from the ascending node of the Sun's Equator on the ecliptic, and χ the position-angle from the Sun's axis, we have by the ordinary equations of spherical trigonometry—

$$\sin\lambda = \cos\rho \sin D + \sin\rho \cos D \cos\chi$$
$$\sin(L - l) = \sin\chi \sin\rho \sec\lambda.$$

The quantities L and D are derived from Warren De La Rue's Auxiliary Tables before referred to, in the computation of which the following formulæ have been used—

$$\tan L = \cos I \tan(\odot - N)$$
$$\sin D = \sin I \sin(\odot - N)$$

where I is the inclination of the Sun's Equator to the ecliptic, N the longitude of the ascending node, and $\odot$ the longitude of the Sun.

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* "Researches on Solar Physics: Heliographical Positions and Areas of Sun Spots observed with the Kew Photoheliograph during the years 1862 and 1863," by W. De La Rue, B. Stewart, and B. Loewy. *Phil. Trans.*, 1869.

The position-angle χ is given by the formula—

$$\chi = P + G + H$$

where P is the position-angle from the north point of the Sun, and G and H two auxiliary angles given by the formulæ—

$$\tan G = \tan \omega \cos \odot$$
$$\tan H = \tan I \cos (\odot - N)$$

where ω is the obliquity of the ecliptic.

It will be seen that G is the inclination of two planes through the line joining the centres of the Earth and Sun passing through the poles of the Earth and of the ecliptic respectively, and that H is the inclination of two planes through the same line and the poles of the Sun and of the ecliptic. The values assumed for I, N, ω in the computation of the tables are 7° 15′, 74° 23′, and 23° 27′·5 respectively.

The Heliographic Longitude of the Spot is found from l, the Heliographic Longitude from Node, by subtracting the Reduction to the Prime Meridian, which is the Longitude of the Node at the epoch of the photograph, referred to the assumed Prime Meridian, the latter being the meridian which passed through the ascending node at mean noon, 1854 Jan. 1. The period of rotation assumed is 25·38 days.

The Heliographic Longitude and Latitude of the Centre of the Sun's Disk at the time of the exposure of each photograph are also given (in brackets) in the *sixth* and *seventh* columns respectively. The Longitude of the Centre of the Disk is found by subtracting the Reduction to the Prime Meridian from L, the Longitude of the Centre from the Node. The Latitude of the Centre is of course the same as D, the Heliographic Latitude of the Earth.

The measures of areas given in the *last three* columns were made with a glass diaphragm ruled into squares, with sides of one-hundredth of an inch, and placed as nearly as possible in contact with the photographic film. The integral number of squares and parts of a square contained in the area of a spot or facula was estimated by the observer, two independent sets of measures being made by two observers. The mean of the two sets of measures has been taken for each photograph. The factor for converting the areas, as measured in ten-thousandths of a square inch, into millionths of the Sun's visible hemisphere, allowing for the effect of foreshortening, has been inferred by means of a table of double entry, giving the equivalent of one square for different values of the Sun's radius, and for different distances of the spot or facula from the Sun's centre as measured by means of the position-micrometer.

The individual spots in a group have in some cases not been measured separately, but combined into a cluster of two or three small spots close together, the position of the centre of gravity and the aggregate area of the cluster being given. The actual number of individual spots is usually stated in the notes.

§ 2. *Ledgers of Areas and Heliographic Positions of Groups of Sun Spots deduced from the measurement of the Solar photographs for each day in the year* 1898.

In these Ledgers the daily results for each group are collected together from the measures of the individual spots and given in a condensed form. The first column gives, for each day on which the group was observed, the Greenwich civil time at which each photograph was taken, expressed by the day of the month (civil reckoning) and the decimals of a day reckoning from Greenwich mean midnight. The second and third columns give the sums, for each day, of the projected areas of all the umbræ and whole spots comprised in the group, the projected area being the area as it is measured upon the photograph, uncorrected for foreshortening, and expressed in millionths of the Sun's apparent disk. The fourth and fifth columns give the sums for each day of the areas of all the umbræ and whole spots comprised in the group, corrected for foreshortening, and expressed in millionths of the Sun's visible hemisphere. The sixth and seventh columns give the mean longitude and latitude of the group, found by multiplying the longitude and latitude of each separately measured component of the group by its area, and dividing the sum of the products by the sum of the areas. The last column gives the mean longitude of the group from the central meridian, and is found by subtracting the longitude of the centre of the disk from the mean longitude of the group. At the foot of these daily results for each group are given the mean areas of umbræ and whole spots and the mean longitude and latitude for the period of observation.

§ 3. *Total Projected 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* 1898.

This section requires no further explanation.

W. H. M. CHRISTIE.

Royal Observatory, Greenwich,
1899, *November* 28.

ROYAL OBSERVATORY, GREENWICH.

MEASURES OF POSITIONS AND AREAS

OF

SUN SPOTS AND FACULÆ

ON

PHOTOGRAPHS

TAKEN WITH THE

PHOTOHELIOGRAPHS

AT GREENWICH, IN INDIA, AND IN MAURITIUS,

WITH THE DEDUCED

HELIOGRAPHIC LONGITUDES AND LATITUDES.

1898.

MEASURES of POSITIONS and AREAS of SUN SPOTS and FACULÆ on PHOTOGRAPHS taken at the ROYAL OBSERVATORY, GREENWICH, at DEHRA DÛN in INDIA, and at the ROYAL ALFRED OBSERVATORY, MAURITIUS, in the Year 1898.

NOTE.—The Greenwich Civil Time at which the Photograph was taken is expressed by the Day of the Year and decimals of a day, reckoning from Midnight, January 1d. 0h. For convenience of reference the Month and Day of the Month (Civil Reckoning) are added.
The letter I. signifies that the photograph was taken in India; the letter M. that the photograph was taken in Mauritius; the time given is Greenwich Civil Time.
The position-angles are reckoned from the North Pole of the Sun's Axis in the direction N., E., S., W., N.

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
0d.243	AW,M	4672	0·866	261·2	12·5	− 9·3	3	14	
		4672	0·853	260·5	11·0	− 9·8	0	7	259c
		4672	0·830	258·9	8·5	−11·0	0	15	
		4671a	0·284	2·1	312·0	+13·1	28	130	
I.		4671	0·281	5·8	310·9	+12·9	0	2	
		4673a	0·707	76·6	268·9	+ 7·0	30	139	
		4673	0·717	73·9	268·5	+ 9·1	0	3	403f
		4673	0·722	76·9	267·7	+ 7·1	2	10	
			0·907	74·8	249·2	+12·3			105
Jan. 1		Centre			(312·6)	(− 3·3)	(63)	(320)	(767)
1·242	AW, CL	4671a	0·360	324·3	311·8	+13·7	22	110	
M.		4673a	0·530	73·2	269·0	+ 6·4	24	121	
Jan. 2		Centre			(299·4)	(− 3·4)	(46)	(231)	(0)
2·193	CL, M		0·936	262·2	356·4	− 8·6			75
			0·922	281·1	352·9	+ 8·8			642
			0·820	292·7	338·7	+16·3			47
		4671a	0·507	303·8	312·4	+13·1	21	112	
		4671	0·488	299·8	312·3	+10·9	0	2	
I.		4673a	0·352	60·8	269·0	+ 6·6	21	120	
		4673	0·383	59·6	267·5	+ 7·9	0	3	
		4674a	0·982	78·3	208·9	+10·8	23	133	291f
			0·867	92·6	226·9	− 4·0			122
			0·937	83·7	218·0	+ 4·6			76
			0·953	67·9	217·3	+19·8			78
			0·956	83·7	214·6	+ 5·0			224
Jan. 3		Centre			(286·9)	(− 3·5)	(65)	(370)	(1555)
3·186	AW, M		0·962	278·5	347·0	+ 7·2			239
		4671a	0·671	294·3	312·5	+13·2	22	117	
		4675a	0·312	230·4	288·0	−15·0	2	9	
		4675	0·299	228·6	287·1	−14·9	0	6	
I.		4675	0·284	226·1	285·9	−14·9	0	12	
		4675	0·261	224·3	284·5	−14·3	0	6	
		4675	0·290	217·3	284·2	−16·8	0	4	

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
3d.186	AW,M	4675	0·256	220·6	283·6	−14·7	0	1	
I.		4673a	0·192	25·3	269·0	+ 6·3	21	106	
		4673	0·259	34·2	265·3	+ 8·8	0	4	
		4674a	0·912	76·6	209·4	+10·7	26	154	740sf
		4674	0·930	72·3	207·4	+15·0	1	17	541np
Jan. 4		Centre			(273·7)	(− 3·6)	(72)	(436)	(1520)
4·196	CL, M		0·871	255·0	320·8	−14·9			140
		4671	0·835	286·8	315·1	+11·8	1	4	315c
		4671a	0·816	289·0	312·7	+13·1	19	118	
I.		4675a	0·497	245·7	288·3	−15·0	0	14	
		4673a	0·230	318·3	269·3	+ 6·2	20	98	
		4674a	0·797	74·1	209·5	+10·3	27	149	406c
		4674	0·825	69·2	207·8	+14·8	0	13	
			0·843	64·0	207·2	+19·5			168
			0·880	80·4	199·9	+ 6·6			196
			0·934	69·4	194·1	+17·7			888
			0·934	95·1	191·4	− 6·1			104
Jan. 5		Centre			(260·5)	(− 3·7)	(67)	(396)	(2217)
5·518	AW, CL	4671a	0·945	286·4	312·0	+14·1	16	94	635f
		4673a	0·474	291·9	269·3	+ 6·7	21	104	
		4674a	0·597	67·4	209·2	+10·0	26	142	197f
		4674	0·617	68·9	207·5	+ 9·6	0	4	
			0·744	61·7	199·8	+17·8			224
			0·842	80·3	186·8	+ 6·0			205
			0·872	63·9	186·7	+20·4			345
Jan. 6		Centre			(243·1)	(− 3·9)	(63)	(344)	(1606)
6·182	AW,CL		0·809	253·8	287·8	−15·4			253
		4671a	0·981	284·2	311·6	+13·1	16	102	499nf
I.		4673a	0·598	285·6	269·5	+ 6·0	25	118	
		4674a	0·485	60·6	209·0	+10·2	27	145	
			0·848	58·2	182·3	+24·1			226
Jan. 7		Centre			(234·3)	(−4·0)	(68)	(365)	(978)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4671, 1897 December 26–1898 January 7. A large regular spot, *a*, with occasionally one or two followers.
Group 4672, 1897 December 30–1898 January 1. A few very small spots in a straight stream.
Group 4673, 1897 December 30–1898 January 10. A large regular spot, *a*, with occasionally a small companion.
Group 4674, 1898 January 3–15. A large regular spot, *a*, often with one or two small companions.
Group 4675, January 4–5. A few small spots in an almost continuous straight stream. The leader, *a*, alone remains by January 5.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic. Longitude.	Heliographic. Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
7d·489	AW, CL		0·946	256·6	288·4	−14·0			356
			0·886	279·3	278·6	+ 6·5			84
			0·855	252·9	275·5	−16·7			112
		4673a	0·806	281·7	269·7	+ 6·9	16	121	152c
		4674a	0·281	30·1	209·0	+ 9·9	26	135	
Jan. 8		Centre			(217·2)	(−4·1)	(42)	(256)	(704)
8·184	CL, M		0·948	279·6	278·4	+ 7·7			90
			0·922	251·7	275·1	−18·5			244
I.		4673a	0·888	279·0	269·7	+ 6·0	22	95	418f
		4674a	0·244	355·4	209·1	+ 9·8	27	138	
Jan. 9		Centre			(208·0)	(−4·2)	(49)	(233)	(752)
9·245	AW, M		0·857	284·8	251·1	+10·3			74
		4673a	0·975	277·3	270·4	+ 6·1	19	90	323nf
I.		4674a	0·355	313·3	209·1	+ 9·9	26	124	
		4674	0·296	315·2	206·1	+ 7·9	0	2	
		4674	0·283	312·7	206·0	+ 6·9	0	4	
Jan. 10		Centre			(194·0)	(−4·3)	(45)	(220)	(397)
10·279	CL, M		0·961	282·5	252·9	+10·7			183
			0·881	279·6	241·1	+ 6·3			215
		4674a	0·532	295·9	209·3	+ 9·6	27	113	
I.		4674	0·521	292·4	209·3	+ 7·5	0	2	
		4674	0·511	298·2	207·5	+10·0	0	3	
		4674	0·478	291·5	206·9	+ 6·2	0	1	
		4674	0·478	293·6	206·5	+ 7·1	0	7	
Jan. 11		Centre			(180·4)	(−4·4)	(27)	(126)	(398)
11·213	CL, M		0·957	278·4	240·3	+ 6·7			200
			0·804	289·9	218·8	+13·0			170
I.		4674a	0·687	289·0	209·1	+ 9·5	31	119	382c
		4674	0·662	292·4	206·5	+11·1	0	7	
Jan. 12		Centre			(168·1)	(−4·5)	(31)	(126)	(752)
12·209	M, CL		0·708	298·6	195·1	+16·3			132
			0·576	297·5	186·2	+11·4			75
			0·645	312·0	185·8	+21·6			118
I.		4674a	0·827	284·5	208·9	+ 9·3	25	108	1179c
		4676	0·843	103·8	97·6	−14·1	0	4	22c
			0·918	95·2	88·2	− 6·6			163
Jan. 13		Centre			(154·9)	(−4·6)	(25)	(112)	(1689)
1898.				°	°	°			
13d·324	CL, M		0·932	289·7	206·2	+16·5			453
			0·847	292·2	194·6	+15·9			420
			0·793	300·9	186·7	+20·8			144
I.		4674a	0·939	281·4	208·7	+ 9·0	21	103	436f
		4676	0·665	106·6	99·2	−14·5	2	6	
		4676	0·703	106·9	96·2	−15·1	0	5	
		4677a	0·974	96·9	63·1	− 7·8	53	255	
		4677	0·991	99·6	57·4	−10·2	0	29	404c
		4677	0·995	98·9	55·7	− 9·3	0	36	
			0·915	75·3	75·9	+11·4			98
Jan. 14		Centre			(140·2)	(−4·7)	(76)	(434)	(1955)
14·147	CL, M		0·979	288·1	205·5	+16·6			450
			0·929	289·3	195·1	+16·0			362
			0·881	297·6	186·3	+21·5			193
I.		4674a	0·987	279·9	209·1	+ 8·9	16	71	347f
		4676	0·493	111·1	101·3	−14·4	0	5	
		4677a	0·905	96·3	64·5	− 7·8	57	238	
		4677	0·919	97·2	62·5	− 8·5	0	13	742c
		4677b	0·947	98·6	57·9	− 9·7	7	196	
		4677	0·958	99·0	55·9	−10·0	0	26	
Jan. 15		Centre			(129·5)	(−4·8)	(80)	(549)	(2094)
15·155	AW, M		0·955	292·4	185·5	+19·7			266
		4676a	0·268	126·4	103·3	−13·9	4	15	
		4676	0·293	122·7	101·5	−13·8	0	2	
		4676b	0·317	124·9	100·5	−15·1	0	6	
I.		4677a	0·770	96·0	65·7	− 7·8	33	178	
		4677	0·790	96·2	63·8	− 8·0	0	17	
		4677	0·829	96·9	60·0	− 8·5	2	14	695c
		4677	0·840	97·3	58·9	− 8·8	0	4	
		4677b	0·851	98·6	57·7	− 9·9	36	213	
		4678	0·995	78·0	33·3	+11·4	0	195	
			0·938	100·4	46·1	−11·4			145
Jan. 16		Centre			(116·1)	(−4·9)	(75)	(644)	(1106)
16·197	CL, AW	4676a	0·168	200·0	105·9	−14·1	3	17	
		4676	0·159	192·9	104·6	−13·9	2	24	
		4676	0·170	189·2	104·1	−14·6	0	4	
I.		4676	0·189	187·9	104·0	−15·8	0	1	
		4676	0·145	188·3	103·7	−13·2	1	10	
		4676	0·183	181·5	102·8	−15·5	0	4	
		4676	0·145	178·4	102·3	−13·3	0	21	
		4676	0·165	173·2	101·3	−14·4	0	9	

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4676, January 13–21. A very small faint spot on January 13, and a pair of such spots on January 14. The group has increased greatly by January 17, and consists of a number of small spots nearly enclosing a diamond-shaped area. By the following day the group has lengthened out into a straight stream, of which *a* and *b*, the leader and the last, are the principal members. The group continues to lengthen out, but the spots in the centre of the group die out, and only *a* and *b* remain by January 21.
Group 4677, January 14–25. A straight stream of spots, of which *a* and *b*, two large regular spots are the chief. *b* and the smaller spots diminish and disappear, and *a* alone remains by January 23.
Group 4678, January 16–26. A regular spot slowly diminishing from day to day. It has divided into two by January 26.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
16d·197	CL, AW	4676	0·172	170·9	100·9	−14·7	0	3	
		4676	0·183	169·9	100·6	−15·4	0	13	
		4676*b*	0·189	167·0	100·0	−15·6	0	5	
		4677*a*	0·603	96·1	65·4	− 7·7	33	177	
I.		4677	0·624	95·5	63·9	− 7·3	0	6	
		4677	0·668	98·1	60·6	− 9·1	0	3	
		4677	0·695	98·0	58·5	− 9·2	6	44	
		4677*b*	0·708	99·4	57·5	−10·2	26	128	277*c*
		4678	0·938	76·4	34·6	+10·9	26	128	362*f*
Jan. 17		Centre			(102·5)	(− 5·0)	(97)	(597)	(639)
17·192	CL, M	4676*a*	0·338	241·2	107·1	−14·2	12	37	
		4676	0·342	238·2	106·9	−15·3	0	2	
		4676	0·314	242·6	106·0	−13·1	0	3	
		4676	0·303	237·3	104·6	−14·3	0	2	
I.		4676	0·309	234·1	104·4	−15·4	1	4	
		4676	0·277	238·3	103·3	−13·3	0	3	
		4676	0·272	236·6	102·9	−13·6	0	5	
		4676	0·272	228·5	101·5	−15·4	1	9	
		4676	0·254	231·0	101·1	−14·2	1	5	
		4676*b*	0·260	225·8	100·5	−15·4	22	76	
		4679*a*	0·041	149·9	88·2	− 7·1	0	6	
		4679	0·067	120·6	86·1	− 7·1	0	9	
		4677*a*	0·399	97·3	66·0	− 7·6	24	132	
		4677	0·420	96·2	64·6	− 7·3	4	13	
		4677	0·519	101·5	58·4	−10·3	6	59	
		4677	0·531	100·6	57·5	− 9·9	0	9	
		4677*b*	0·540	101·3	57·0	−10·4	2	20	
		4678	0·838	74·7	34·5	+ 9·9	18	112	262*c*
			0·910	74·6	26·0	+11·7			294
Jan. 18		Centre			(89·4)	(− 5·1)	(91)	(506)	(556)
18·201	AW, CL	4680	0·793	257·5	128·4	−13·0	0	3	} 73*c*
		4680	0·778	256·0	126·9	−14·1	0	3	
I.		4676*a*	0·543	252·3	108·1	−13·9	9	27	
		4676	0·479	247·0	103·1	−15·4	0	3	
		4676	0·467	245·6	102·1	−15·7	1	4	
		4676	0·455	244·7	101·2	−15·9	1	4	
		4676*b*	0·443	243·9	100·3	−15·9	21	74	
		4676	0·421	244·3	99·1	−15·3	0	2	
		4679*a*	0·245	259·8	90·0	− 7·5	22	62	
		4679	0·232	261·1	89·3	− 7·1	0	7	
1898.				°	°	°			
18d·201	AW, CL	4679	0·212	252·3	87·7	− 8·8	0	10	
		4679	0·202	259·5	87·5	− 7·3	0	1	
		4679	0·191	259·9	86·9	− 7·0	2	9	
I.		4679	0·178	258·3	86·1	− 7·2	0	2	
		4679	0·179	255·8	86·0	− 7·7	3	15	
		4677*a*	0·175	104·6	66·2	− 7·7	22	108	
		4677	0·303	108·4	59·1	−10·4	1	7	
		4677	0·319	109·7	58·3	−11·1	0	5	
		4677	0·317	106·2	58·1	−10·0	0	4	
		4677	0·329	107·9	57·5	−10·7	1	7	
		4678	0·698	68·6	34·7	+10·7	20	98	242*f*
		4681*a*	0·993	84·4	353·6	+ 4·9	0	331	293*p*
			0·838	70·7	21·9	+13·0			117
			0·968	76·1	2·3	+12·0			157
Jan. 19		Centre			(76·0)	(− 5·2)	(103)	(786)	(882)
19·186	AW, M		0·919	264·3	130·0	− 7·3			94
			0·916	258·1	129·8	−13·0			125
		4676*a*	0·716	255·9	108·5	−13·7	4	17	
I.		4676	0·700	255·0	107·1	−14·2	0	4	
		4676	0·658	252·6	103·5	−15·3	0	1	
		4676	0·648	251·6	102·6	−15·8	0	2	
		4676	0·638	249·7	101·7	−16·9	0	1	
		4676*b*	0·622	250·2	100·5	−16·3	23	84	
		4676	0·617	251·2	100·3	−15·6	0	1	
		4676	0·601	251·2	99·1	−15·4	0	2	
		4679*a*	0·480	263·2	91·7	− 7·8	22	87	
		4679	0·461	261·9	90·5	− 8·4	0	1	
		4679	0·455	263·0	90·1	− 7·8	0	2	
		4679	0·431	263·3	88·6	− 7·6	0	4	
		4679	0·421	263·3	87·9	− 7·5	2	5	
		4679	0·415	262·1	87·5	− 8·1	0	4	
		4679	0·407	263·7	87·1	− 7·3	0	2	
		4679	0·393	263·4	86·2	− 7·4	5	31	
		4677*a*	0·079	234·9	66·8	− 7·8	22	126	
		4677	0·058	191·1	63·7	− 8·4	0	1	
		4678	0·532	60·3	35·2	+10·6	20	102	
		4681*a*	0·934	82·3	355·0	+ 5·2	68	317	} 1065*f*
		4681	0·956	81·2	351·2	+ 6·8	0	12	
			0·877	79·5	3·1	+ 6·6			232
			0·935	71·6	356·6	+15·1			209
Jan. 20		Centre			(63·1)	(− 5·3)	(166)	(806)	(1725)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4679, January 18–24. A group first appearing near the centre of the disk as two very small spots. The group increases in size on the succeeding days and has become by January 20 a straight stream of spots, of which the leader, *a*, is the principal. The group diminishes after January 20, but recovers again later. It lies *nf* Group 4676.
Group 4680, January 19. A pair of very small spots.
Group 4681, January 19–31. A large composite spot, *a*, from which two streams of small spots proceed, so as to enclose a considerable area, *f, a*. *a* is frequently measured in two parts; the spot being divided into two distinct regions, the more diffused preceding, and the more regular and sharply defined following. The smaller spots have all disappeared by January 30, leaving *a* alone.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
20d·255	CL, M		0·898	262·0	113·2	− 9·5			84
		4676a	0·857	257·6	108·1	−13·4	4	19	448c
		4676b	0·780	253·9	100·0	−15·9	15	59	
		4679a	0·693	264·1	92·9	− 8·0	12	46	
		4679	0·678	262·2	91·7	− 9·1	0	5	
I.		4679	0·670	264·2	91·1	− 7·8	1	13	204c
		4679	0·654	265·8	89·9	− 6·8	0	12	
		4679	0·623	263·3	87·5	− 8·3	0	10	
		4679	0·610	264·9	86·6	− 7·3	6	40	
		4677a	0·315	260·8	67·2	− 8·0	16	94	
		4677	0·300	254·8	66·0	− 9·6	0	7	
		4677	0·263	259·8	64·1	− 7·8	0	3	
		4678	0·362	40·8	35·1	+10·7	24	92	
		4681a	0·821	79·8	355·0	+ 5·2	67	331	693c
		4681	0·839	78·8	353·3	+ 6·4	0	4	
		4681	0·858	79·4	351·2	+ 6·3	0	9	
			0·939	82·1	340·1	+ 5·5			599
Jan. 21		Centre			(49·0)	(− 5·3)	(145)	(744)	(2028)
21·481	CL, M	4679a	0·872	264·6	93·8	− 7·4	7	37	235f
		4679	0·861	263·3	92·5	− 8·5	2	16	
		4677a	0·573	264·1	67·9	− 7·8	17	71	
		4677	0·556	264·6	66·7	− 7·5	0	8	
		4677	0·542	264·0	65·7	− 7·8	0	5	
		4677	0·470	258·1	60·7	−10·3	0	3	
		4678	0·280	351·6	35·3	+10·7	21	94	
		4681a	0·619	75·1	356·2	+ 4·8	67	374	253c
		4681	0·655	75·1	353·6	+ 5·5	0	5	
Jan. 22		Centre			(32·9)	(− 5·4)	(114)	(613)	(488)
22·185	AW, M		0·974	254·9	101·3	−15·9			347
		4679	0·946	262·9	95·1	− 8·5	10	54	653f
		4679	0·939	263·1	93·9	− 8·4	0	20	
		4679	0·923	265·4	91·2	− 6·4	0	5	
I.		4679	0·908	262·8	89·2	− 8·9	0	8	
		4677a	0·701	263·5	68·3	− 8·5	14	70	
		4678	0·343	322·4	35·9	+10·3	15	79	
		4681	0·462	72·0	357·7	+ 3·3	0	10	
		4681a	0·482	69·5	356·9	+ 4·8	59	333	
		4681	0·490	66·7	356·9	+ 6·2	0	12	
		4681	0·478	74·3	356·4	+ 2·5	0	5	
1898.				°	°	°			
22d·185	AW, M	4681	0·503	74·3	354·8	+ 3·0	0	8	
I.		4681	0·511	76·0	354·1	+ 2·3	0	2	
			0·960	71·4	312·6	+16·1			301
Jan. 23		Centre			(23·7)	(−5·5)	(98)	(606)	(1301)
23·275	CL, AW		0·801	258·3	62·6	−12·7			133
		4679	0·988	263·3	90·7	− 7·5	0	37	1026c
I.		4679	0·984	262·3	89·5	− 8·6	21	123	
		4677a	0·858	263·3	68·6	− 8·6	12	60	238f
		4678	0·517	299·9	36·3	+ 9·9	14	64	
		4681a	0·249	46·5	358·9	+ 4·3	14	93	
		4681	0·242	54·1	358·0	+ 2·7	0	4	
		4681	0·245	57·1	357·5	+ 2·1	0	4	
		4681a	0·275	49·7	357·2	+ 4·7	46	179	
		4681	0·255	60·1	356·6	+ 1·9	4	17	
		4681	0·310	48·4	355·9	+ 6·4	0	6	
		4681	0·264	62·3	355·8	+ 1·6	0	3	
		4681	0·296	60·9	354·4	+ 2·9	1	17	
		4681	0·316	57·3	353·9	+ 4·4	0	11	
		4681	0·319	60·5	353·2	+ 3·6	4	20	
		4681	0·311	64·4	353·1	+ 2·3	0	3	
		4681	0·350	55·4	352·5	+ 6·1	3	19	
			0·872	68·9	312·0	+15·3			304
			0·964	103·7	294·0	−14·7			257
Jan. 24		Centre			(9·3)	(−5·6)	(119)	(660)	(1958)
24·193	AW, M	4677a	0·946	262·7	68·5	− 8·8	15	62	570f
		4678	0·662	290·7	35·8	+ 9·1	3	23	
		4681a	0·177	345·6	359·6	+ 4·2	10	148	
I.		4681	0·139	348·5	358·7	+ 2·1	1	12	
		4681	0·199	354·2	358·3	+ 5·7	2	12	
		4681	0·131	353·9	357·9	+ 1·8	4	25	
		4681a	0·175	356·2	357·8	+ 4·3	46	192	
		4681	0·199	357·4	357·6	+ 5·8	0	3	
		4681	0·207	6·0	355·9	+ 6·2	0	10	
		4681	0·152	20·7	354·0	+ 2·5	0	10	
		4681	0·163	23·0	353·5	+ 2·9	3	12	
		4681	0·178	21·3	353·4	+ 3·8	1	9	
		4681	0·179	26·6	352·5	+ 3·5	0	8	
		4681	0·216	21·6	352·5	+ 5·9	3	23	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.

The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
24d·193	AW,M	4682	0·251	56·4	345·1	+ 2·4	0	9	
			0·848	63·4	304·0	+18·9			131
I.			0·880	103·9	295·2	−15·0			167
Jan. 25		Centre			(357·1)	(−5·7)	(88)	(558)	(868)
25·175	CL, M		0·977	258·9	62·7	−12·1			394
		4678	0·810	285·7	36·3	+ 9·1	0	13	
I.		4678	0·797	285·2	35·1	+ 8·4	0	6	258c
		4683	0·799	289·8	34·3	+12·0	2	9	
		4681a	0·321	300·7	0·3	+ 3·8	20	137	
		4681	0·302	296·2	0·0	+ 2·1	0	9	
		4681	0·323	307·2	359·2	+ 5·6	0	4	
		4681	0·285	296·8	359·0	+ 1·7	4	31	
		4681a	0·302	304·1	358·8	+ 4·2	37	148	
		4681	0·317	309·5	358·5	+ 6·0	0	12	
		4681	0·307	310·5	357·8	+ 5·8	0	8	
		4681	0·267	298·9	357·8	+ 1·8	0	2	
		4681	0·298	308·9	357·7	+ 5·1	0	9	
		4681	0·300	312·6	357·1	+ 6·0	0	5	
		4681	0·293	313·7	356·5	+ 6·0	0	4	
		4681	0·221	313·9	353·4	+ 3·1	0	12	
		4681	0·258	325·8	352·7	+ 6·5	0	4	
		4682	0·152	356·2	344·9	+ 2·9	0	6	
			0·938	78·3	276·2	+ 8·9			130
Jan. 26		Centre			(344·3)	(−5·8)	(63)	(419)	(782)
26·197	CL, M		0·821	287·4	23·5	+10·7			79
		4683	0·920	286·4	35·3	+12·6	0	4	430s
I.		4681a	0·509	287·4	359·8	+ 3·7	48	377	
		4681	0·496	283·5	359·5	+ 1·6	2	33	
		4681	0·509	290·9	359·2	+ 5·4	0	4	
		4681	0·492	291·3	358·1	+ 5·1	2	18	
		4681	0·476	291·8	357·0	+ 5·0	0	4	
		4681	0·474	293·6	356·6	+ 5·7	5	13	
		4682	0·296	296·0	346·2	+ 1·9	0	3	
			0·899	75·5	268·8	+10·3			188
Jan. 27		Centre			(330·8)	(−5·8)	(57)	(456)	(697)
1898.				°	°	°			
27d·224	AW, CL		0·959	283·0	28·9	+10·6			279
		4681a	0·712	281·5	1·4	+ 4·0	8	96	
I.		4681	0·693	279·3	0·2	+ 2·1	0	3	
		4681	0·698	283·0	0·1	+ 4·7	4	38	
		4681a	0·686	281·3	359·4	+ 3·3	45	126	
		4681	0·657	286·2	356·4	+ 6·0	2	13	
			0·949	79·1	247·0	+ 8·4			285
Jan. 28		Centre			(317·2)	(−5·9)	(59)	(276)	(564)
28·187	AW, CL		0·909	283·4	8·3	+10·1			184
		4681a	0·854	278·2	2·3	+ 3·8	10	72	
		4681	0·843	278·2	1·1	+ 3·6	0	6	
I.		4681	0·840	279·3	0·6	+ 4·5	4	41	372c
		4681a	0·831	278·0	359·9	+ 3·3	41	157	
		4681	0·802	282·2	356·4	+ 6·0	0	3	
			0·890	75·9	243·7	+ 9·6			186
Jan. 29		Centre			(304·6)	(−6·0)	(55)	(279)	(742)
29·237	AW, M		0·884	290·8	349·5	+15·1			78
			0·813	279·8	344·0	+ 4·3			465
		4681a	0·952	277·0	2·1	+ 4·7	0	34	407c
M.		4681a	0·938	276·7	359·6	+ 4·2	24	120	
			0·764	71·3	243·7	+10·0			149
			0·925	70·8	226·2	+15·1			205
			0·953	75·8	220·5	+11·5			196
Jan. 30		Centre			(290·8)	(−6·1)	(24)	(154)	(1500)
30·246	AW, CL		0·922	278·0	343·6	+ 4·9			549
		4681a	0·992	274·9	359·4	+ 4·0	0	120	455c
M.			0·856	70·3	221·7	+13·4			146
			0·939	74·7	209·8	+12·1			203
			0·962	67·2	206·9	+20·0			284
Jan. 31		Centre			(277·4)	(−6·1)	(0)	(120)	(1637)
31·205	AW, CL		0·976	274·5	341·7	+ 3·0			289
			0·739	66·6	221·0	+12·6			182
			0·860	67·9	209·3	+15·4			437
I.			0·930	59·1	202·8	+25·7			108

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4682, January 25–27. A very small spot.
Group 4683, January 26–27. A very small spot, *n*, Group 4678.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
31d.205	AW, CL		0·948	71·5	196·3	+15·3			116
I.			0·961	65·9	195·0	+21·1			229
Feb. 1		Centre			(264·9)	(−6·2)	(0)	(0)	(1361)
32·479	AW, CL		0·946	288·4	312·3	+15·1			258
			0·897	294·1	307·5	+18·3			173
			0·789	54·6	204·1	+22·7			255
			0·852	71·0	192·7	+12·6			274
			0·851	81·3	190·8	+ 4·0			118
			0·902	61·6	189·3	+22·2			536
Feb. 2		Centre			(248·1)	(−6·3)	(0)	(0)	(1614)
33·175	AW, M		0·943	289·3	306·3	+15·8			101
			0·867	251·9	299·2	−18·8			43
I.			0·806	67·2	189·0	+14·2			76
			0·915	58·4	179·4	+25·5			144
Feb. 3		Centre			(238·9)	(−6·3)	(0)	(0)	(364)
34·164	AW, M		0·955	253·3	299·4	−17·8			153
		4684	0·797	95·1	172·7	− 8·0	0	12	118*c*
		4684	0·818	95·2	170·7	− 7·9	0	6	
I.		4685*a*	0·991	101·2	142·7	−11·9	15	62	234*f*
			0·773	51·8	184·4	+23·8			50
			0·880	52·8	173·2	+28·4			78
			0·945	94·9	154·6	− 6·7			168
Feb. 4		Centre			(225·8)	(−6·4)	(15)	(80)	(801)
35·513	AW, CL		0·950	287·4	277·2	+14·3			314
			0·898	281·5	270·4	+ 7·4			269
		4684	0·566	95·2	173·5	− 8·3	5	29	
		4684	0·581	94·1	172·5	− 7·7	2	10	
		4684	0·595	96·7	171·5	− 9·2	8	33	
		4684	0·625	93·7	169·3	− 7·4	6	20	
		4684	0·631	94·0	168·8	− 7·6	0	4	
		4685*a*	0·901	100·9	143·3	−12·7	7	37	590*f*
		4685	0·927	100·8	139·6	−12·4	0	10	
			0·785	95·8	156·1	− 8·6			203
Feb. 5		Centre			(208·1)	(−6·5)	(28)	(143)	(1376)
1898.				°	°	°			
36d.199	AW, M	4684	0·415	94·6	174·5	− 7·8	2	9	
		4684	0·439	95·3	173·0	− 8·2	0	15	
		4684	0·450	97·6	172·4	− 9·2	0	8	
M.		4684	0·458	98·4	171·9	− 9·6	4	32	
		4684	0·482	95·2	170·2	− 8·2	1	5	
		4684	0·488	93·9	169·8	− 7·6	0	13	
		4685*a*	0·819	101·0	143·8	−12·7	7	31	406*f*
		4685	0·852	101·2	140·3	−13·0	0	8	
			0·962	101·8	124·2	−13·1			102
Feb. 6		Centre			(199·1)	(−6·5)	(14)	(121)	(508)
37·475	AW, M	4686*a*	0·777	291·0	229·8	+11·7	3	31	134*c*
		4686	0·760	289·8	228·7	+10·4	0	5	
		4686*b*	0·735	292·3	226·0	+11·4	12	46	
		4686	0·725	291·7	225·3	+10·8	0	4	
		4684	0·114	95·9	175·7	− 7·3	1	5	
		4684	0·143	96·9	174·0	− 7·5	0	3	
		4684	0·148	106·4	174·0	− 8·9	0	5	
		4684	0·150	100·6	173·7	− 8·1	0	2	
		4684	0·182	109·0	172·2	− 9·9	2	6	
		4684	0·187	107·2	171·8	− 9·7	0	4	
		4684	0·188	104·7	171·6	− 9·2	0	7	
		4684	0·196	96·2	170·9	− 7·7	2	5	
		4684	0·211	108·0	170·5	−10·2	0	5	
		4684	0·211	100·9	170·2	− 8·7	0	3	
		4685*a*	0·620	101·3	143·9	−12·1	8	25	
		4685	0·649	98·8	141·6	−10·7	0	4	
		4687*a*	0·994	106·7	98·0	− 7·4	22	192	344*c*
			0·721	101·2	135·9	−12·7			148
			0·807	101·1	128·1	−12·8			67
			0·884	83·3	120·7	+ 2·8			164
			0·934	102·9	112·4	−14·4			261
Feb. 7		Centre			(182·2)	(−6·6)	(50)	(352)	(1118)
38·161	AW, M	4686*a*	0·869	286·8	231·0	+11·1	2	12	272*c*
		4686*b*	0·827	288·3	226·3	+11·1	13	64	
		4684	0·038	218·8	174·7	− 8·3	0	1	
I.		4684	0·034	176·0	173·2	− 8·6	0	1	
		4684	0·065	167·5	172·5	−10·3	0	1	
		4684	0·022	132·4	172·4	− 7·5	0	2	
		4684	0·048	159·3	172·3	− 9·2	0	4	

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Group 4684, February 4–13. A number of spots, mostly unstable and small, in an irregular stream. The spots undergo frequent changes.
Group 4685, February 4–11. A regular spot, *a*, which rapidly diminishes in size. *a* is followed by one or two small companions, February 6–8.
Group 4686, February 7–8. Two spots, *a* and *b*, suddenly appearing near the west limb. Both *a* and *b* have a very small companion on February 7.
Group 4687, February 7–19. A large regular spot, *a*, with a very small companion on February 15, *p* Group 4688.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
38d·161	AW, M	4685a	0·488	102·4	144·3	−11·8	2	9	
		4685	0·532	98·5	141·1	−10·1	0	2	
I.		4685	0·556	97·4	139·4	− 9·6	0	3	
		4687a	0·961	95·0	99·0	− 6·6	34	160	933nf
			0·812	80·9	120·1	+ 3·5			115
			0·866	102·7	112·9	−14·3			138
			0·947	106·3	101·2	−17·5			82
			0·969	100·1	96·9	−11·4			253
Feb. 8		Centre			(173·3)	(−6·6)	(51)	(259)	(1793)
39·216	AW, M		0·925	285·4	224·6	+11·5			311
			0·872	291·7	216·2	+15·2			105
M.			0·798	298·5	206·6	+17·8			209
		4684	0·278	264·3	175·4	− 8·0	0	8	
		4684	0·273	267·6	175·2	− 7·1	0	39	
		4684	0·240	259·8	173·1	− 8·9	0	11	
		4684	0·231	265·5	172·7	− 7·6	1	14	
		4685a	0·273	110·6	144·2	−12·0	0	11	
		4687a	0·858	94·4	100·0	− 7·2	35	170	725c
		4688	0·950	96·4	87·0	− 8·2	0	54	
			0·878	100·4	97·4	−12·3			255
Feb. 9		Centre			(159·3)	(−6·7)	(36)	(307)	(1605)
40·210	AW, M		0·906	294·3	206·7	+18·7			331
			0·828	298·5	196·3	+19·0			212
M.		4684	0·519	265·7	177·6	− 8·0	3	16	
		4684	0·506	267·7	176·7	− 7·0	5	34	
		4684	0·499	265·1	176·2	− 8·2	7	30	
		4684	0·471	262·0	174·3	− 9·7	0	4	
		4684	0·466	266·1	174·1	− 7·7	0	8	
		4684	0·465	263·6	174·0	− 8·9	0	4	
		4684	0·451	266·2	173·1	− 7·7	0	8	
		4685a	0·097	163·0	144·5	−12·0	2	12	
		4687a	0·723	93·6	99·7	− 7·3	33	166	
		4688	0·836	96·1	89·2	− 8·8	6	37	
		4688	0·852	95·6	87·5	− 8·2	10	59	1305c
		4688	0·890	95·6	83·0	− 8·1	0	11	
		4688	0·896	95·9	82·2	− 8·2	0	26	
			0·970	97·7	69·6	− 9·1			212
Feb. 10		Centre			(146·2)	(−6·7)	(66)	(415)	(2060)
1898.				°	°	°			
41d·210	CL, M		0·938	292·4	198·8	+18·2			232
			0·855	299·4	185·7	+20·8			75
		4684	0·721	265·6	179·4	− 7·9	5	13	
		4684	0·708	265·3	178·4	− 8·1	9	35	
		4684	0·655	265·8	174·2	− 7·9	1	7	
		4684	0·654	265·0	174·1	− 8·4	0	3	418c
		4684	0·646	264·1	173·5	− 9·1	0	4	
		4684	0·641	263·6	173·1	− 9·3	0	5	
		4685a	0·227	244·1	145·1	−12·3	0	5	
M.		4687a	0·546	92·3	99·9	− 7·0	30	140	
		4688	0·670	94·5	90·8	− 8·1	6	13	
		4688	0·675	95·1	90·4	− 8·5	0	7	
		4688	0·677	96·0	90·3	− 9·1	0	3	
		4688	0·685	96·1	89·7	− 9·2	0	1	
		4688	0·693	96·4	89·0	− 9·3	1	4	
		4688	0·702	95·9	88·3	− 9·0	0	6	
		4688	0·702	94·7	88·3	− 8·2	11	48	260c
		4688	0·717	96·6	87·1	− 9·5	0	2	
		4688	0·717	97·6	87·1	−10·2	0	2	
		4688	0·736	96·3	85·5	− 9·2	2	8	
		4688	0·739	97·5	85·2	−10·1	0	5	
		4688	0·744	95·8	84·8	− 8·8	0	3	
		4688	0·778	95·1	81·8	− 8·2	3	13	
			0·807	78·5	80·7	+ 5·1			89
			0·853	93·1	74·4	− 6·2			40
			0·896	100·2	68·9	−12·1			176
Feb. 11		Centre			(133·1)	(−6·8)	(68)	(327)	(1290)
42·377	CL, AW		0·922	302·1	177·9	+26·1			150
			0·805	263·0	171·7	− 9·7			72
		4684	0·894	263·5	181·4	− 8·8	7	37	
		4684	0·881	264·2	179·8	− 8·3	2	8	234c
		4687a	0·301	90·3	100·1	− 6·6	34	138	
I.		4688	0·415	93·8	93·1	− 7·8	4	43	
		4688	0·419	88·6	92·9	− 5·6	0	1	
		4688	0·426	97·1	92·5	− 9·2	0	6	
		4688	0·432	94·0	92·0	− 7·9	15	60	
		4688	0·440	92·9	91·5	− 7·4	3	11	
		4688	0·442	92·1	91·4	− 7·0	0	1	
		4688	0·452	92·1	90·8	− 7·0	0	4	
		4688	0·469	92·6	89·6	− 7·3	0	5	
		4688	0·471	95·7	89·3	−11·4	1	5	
		4688	0·483	96·7	88·8	− 9·2	2	5	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4688, February 9–20. A few spots, mostly small, in an irregular stream on February 9. The group rapidly increases in size and complexity and has become a fine straight stream by February 13, two large regular spots, *a* and *b*, having formed at the two extremities of the stream. The stream becomes very complex in character during the succeeding days, undergoing continual change. Two large composite spots, *c* and *d*, have formed in advance of *b*, which has then become composite, by February 15, and have joined it by February 17. *d* is measured in two parts on that day.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
42d.377	CL, AW	4688	0·484	94·8	88·7	− 8·3	9	57	
		4688	0·489	92·8	88·3	− 7·3	9	33	
I.		4688	0·497	96·1	87·8	− 8·9	0	15	
		4688	0·511	93·0	86·9	− 7·4	0	2	
		4688	0·513	94·1	86·7	− 8·0	0	2	
		4688	0·517	98·1	86·5	−10·0	2	6	
		4688	0·522	96·6	86·2	− 9·2	1	8	
		4688	0·529	93·9	85·6	− 7·9	0	6	
		4688	0·547	95·0	84·4	− 8·4	57	241	
		4688	0·580	93·4	82·1	− 7·5	1	5	
			0·956	100·4	44·0	−11·9			108
Feb. 12		Centre			(117·7)	(−6·8)	(147)	(699)	(564)
43·182	AW, CL	4684	0·967	262·3	183·0	− 9·2	0	13	663*f*
I.		4689	0·159	57·1	99·5	− 1·9	2	7	
		4689	0·203	66·3	96·4	− 2·1	0	1	
		4689	0·211	65·1	96·1	− 1·7	1	6	
		4687*a*	0·112	91·1	100·7	− 7·0	24	147	
		4688	0·194	99·3	96·0	− 8·6	0	1	
		4688	0·199	88·4	95·6	− 6·5	0	2	
		4688*a*	0·216	96·0	94·6	− 8·0	33	143	
		4688	0·236	95·5	93·4	− 8·0	0	1	
		4688	0·263	92·4	91·8	− 7·3	0	3	
		4688	0·270	94·3	91·4	− 7·8	3	18	
		4688	0·278	91·6	90·9	− 7·1	0	2	
		4688	0·282	94·5	90·7	− 7·9	2	9	
		4688	0·289	93·2	90·3	− 7·5	2	8	
		4688	0·297	94·3	89·8	− 7·9	0	4	
		4688	0·298	96·8	89·8	− 8·6	8	37	
		4688	0·300	92·8	89·6	− 7·4	0	4	
		4688	0·316	96·8	88·7	− 8·7	0	4	
		4688	0·326	93·1	88·0	− 7·5	11	48	
		4688	0·336	101·0	87·6	−10·2	0	1	
		4688	0·340	98·9	87·2	− 9·2	0	7	
		4688	0·342	92·2	87·0	− 7·3	0	2	
		4688	0·356	99·1	86·3	− 9·7	4	13	
		4688	0·361	104·0	86·3	−11·4	0	2	
		4688	0·356	94·4	86·2	− 8·0	5	35	
		4688	0·365	98·1	85·7	− 9·4	0	3	
		4688*b*	0·387	95·9	84·3	− 8·6	67	320	
		4688	0·393	90·8	83·9	− 6·7	0	2	
		4688	0·404	89·4	83·2	− 6·1	0	2	
1898.				°	°	°			
43d.182	AW, CL	4690	0·428	66·1	84·1	+ 3·6	1	4	
			0·865	93·6	47·0	− 6·6			58
I.			0·911	100·3	40·9	−12·2			122
			0·944	74·1	38·9	+12·5			152
Feb. 13		Centre			(107·1)	(−6·9)	(163)	(849)	(995)
44·225	AW, M		0·987	260·9	175·0	−10·1			534
		4689	0·160	306·9	100·7	− 1·4	0	1	
I.		4689	0·069	280·6	96·5	+ 0·3	0	6	
		4689	0·112	336·3	96·0	− 1·1	0	2	
		4687*a*	0·132	269·5	101·0	− 6·9	25	133	
		4688*a*	0·045	251·9	95·9	− 7·7	41	177	
		4688	0·038	321·0	94·8	− 5·2	0	3	
		4688	0·030	221·8	94·6	− 8·2	1	5	
		4688	0·027	191·0	93·7	− 8·4	4	25	
		4688	0·026	127·2	92·2	− 7·8	3	29	
		4688	0·039	115·4	91·4	− 7·9	0	2	
		4688	0·049	130·4	91·2	− 8·7	1	5	
		4688	0·041	101·4	91·1	− 7·4	2	7	
		4688	0·047	92·4	90·7	− 7·0	0	2	
		4688	0·063	108·7	90·0	− 8·1	0	2	
		4688	0·085	111·8	88·8	− 8·7	1	7	
		4688	0·084	94·3	88·6	− 7·3	3	37	
		4688	0·092	97·4	88·1	− 7·6	0	3	
		4688	0·098	104·3	87·9	− 8·3	2	16	
		4688	0·108	105·9	87·4	− 8·5	0	5	
		4688	0·109	98·4	87·2	− 7·8	1	16	
		4688	0·120	107·4	86·8	− 8·9	0	4	
		4688	0·138	111·4	85·9	− 9·8	2	22	
		4688	0·155	85·9	84·5	− 6·2	0	5	
		4688*b*	0·159	100·9	84·4	− 8·6	89	415	
			0·809	100·4	39·0	−12·5			127
			0·987	102·2	11·5	−13·1			398
Feb. 14		Centre			(93·4)	(−6·9)	(175)	(929)	(1059)
45·188	AW, CL		0·858	259·3	140·3	−12·7			244
		4687	0·380	273·1	103·0	− 5·3	0	4	
M.		4687*a*	0·349	269·3	101·2	− 6·7	20	139	
		4688*a*	0·272	267·2	96·5	− 7·4	45	260	
		4688	0·236	264·4	94·4	− 8·1	2	8	
		4688	0·206	266·2	92·6	− 7·5	0	5	
		4688	0·199	260·2	92·1	− 8·7	1	5	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4689, February 13–14. A few very small spots in a straight stream *n* of Group 4687.
Group 4690, February 13. A small spot *n* of Group 4688 *b*.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
45d·188	AW, CL	4688	0·163	262·5	90·1	− 8·1	11	48	
		4688	0·145	255·0	88·8	− 9·0	3	17	
M.		4688c	0·128	264·4	88·0	− 7·5	32	163	
		4688d	0·113	248·1	86·8	− 9·3	18	127	
		4688	0·097	255·7	86·1	− 8·3	0	4	
		4688	0·090	264·6	85·9	− 7·4	0	5	
		4688	0·104	224·1	84·9	−11·1	0	2	
		4688b	0·067	248·0	84·3	− 7·2	70	405	
		4691	0·900	102·3	15·9	−14·1	0	18	
		4691a	0·910	102·4	14·6	−14·1	5	61	407c
		4691	0·926	103·0	12·2	−14·6	0	15	
		4691	0·937	102·7	10·4	−14·3	0	10	
		4692a	0·980	83·9	3·1	+ 4·6	15	109	285np
			0·953	90·0	8·4	− 2·1			298
Feb. 15		Centre			(80·7)	(−6·9)	(222)	(1405)	(1234)
46·538	CL, AW		0·965	258·3	138·7	−13·1			298
		4693a	0·868	261·7	123·7	−10·7	6	44	
		4693b	0·847	259·5	121·4	−12·6	0	16	259c
		4693c	0·838	261·4	120·4	−11·0	1	14	
		4687a	0·618	268·1	101·3	− 6·7	25	157	
		4688	0·581	271·4	98·5	− 4·9	0	5	
		4688a	0·559	267·2	97·1	− 7·4	49	302	
		4688	0·531	268·8	95·2	− 6·6	0	4	
		4688	0·502	265·8	93·3	− 8·2	3	12	
		4688	0·484	266·2	92·1	− 8·0	14	50	
		4688	0·473	267·3	91·3	− 7·5	1	6	
		4688	0·467	265·8	91·0	− 8·2	3	11	
		4688	0·467	264·7	90·9	− 8·7	0	9	
		4688	0·454	266·9	90·1	− 7·7	0	4	
		4688c	0·425	267·2	88·2	− 7·5	13	141	
		4688	0·423	263·6	88·1	− 9·1	0	9	
		4688d	0·399	263·5	86·6	− 9·1	29	142	
		4688	0·382	260·7	85·4	−10·1	0	5	
		4688b	0·357	264·6	84·0	− 8·5	64	363	
		4691a	0·741	103·7	15·0	−14·9	14	67	
		4691	0·761	102·6	13·2	−14·3	0	14	335c
		4691	0·770	102·0	12·4	−13·7	0	6	
		4691	0·803	102·8	9·3	−14·4	0	8	
		4692a	0·885	80·9	2·0	+ 4·7	32	176	370np
			0·857	88·1	4·2	− 2·0			202
			0·958	86·0	350·3	+ 1·8			222
Feb. 16		Centre			(63·0)	(−7·0)	(254)	(1565)	(1686)
1898.				°	°	°			
47d·175	AW, M		0·851	256·4	113·4	−15·2			92
		4693a	0·944	259·7	126·0	−12·0	13	45	
I.		4693c	0·913	260·5	121·1	−11·5	0	5	398c
		4693b	0·908	259·7	120·4	−12·3	2	7	
		4687a	0·734	266·4	102·0	− 7·4	29	131	
		4688a	0·687	265·9	98·2	− 8·0	56	292	
		4688	0·665	268·3	96·4	− 6·4	0	6	
		4688	0·619	265·5	93·0	− 8·3	15	67	
		4688	0·581	264·8	90·3	− 8·7	3	24	
		4688	0·563	264·6	89·0	− 8·8	4	38	
		4688c	0·557	267·1	88·6	− 7·4	5	52	
		4688d	0·542	263·4	87·5	− 9·5	13	84	
		4688	0·527	262·3	86·5	−10·0	3	34	
		4688d	0·507	262·5	85·1	− 9·8	18	82	
		4688b	0·496	265·3	84·4	− 8·4	21	135	
		4694a	0·368	280·0	75·8	− 2·9	3	16	
		4694	0·353	282·1	74·7	− 2·4	0	2	
		4694b	0·321	282·1	72·8	− 2·8	3	15	
		4691a	0·622	104·7	16·3	−14·7	12	51	
		4691	0·632	103·7	15·5	−14·1	0	3	
		4691	0·642	103·4	14·7	−14·0	0	4	
		4695	0·741	83·3	7·4	+ 0·3	3	10	
		4695	0·764	84·7	5·3	− 0·5	5	17	
		4695	0·773	82·7	4·7	+ 1·1	0	2	134c
		4695	0·779	84·4	4·0	− 0·1	1	14	
		4695	0·782	85·9	3·5	− 1·2	2	13	
		4695	0·790	84·4	3·0	+ 0·1	3	21	
		4692a	0·801	77·8	2·9	+ 5·5	28	161	186np
			0·937	73·8	350·6	− 1·0			137
			0·915	83·7	349·2	+ 2·8			398
Feb. 17		Centre			(54·6)	(−7·0)	(242)	(1331)	(1345)
48·180	AW, CL		0·950	257·2	114·1	−14·4			392
		4696	0·873	271·3	101·9	− 2·3	6	30	
I.		4696	0·831	271·0	97·4	− 3·1	0	12	
		4687a	0·868	265·1	101·8	− 7·7	25	132	
		4688a	0·839	264·8	98·7	− 8·2	92	318	
		4688	0·826	267·0	97·2	− 6·5	0	29	
		4688	0·818	265·0	96·5	− 8·1	1	6	
		4688	0·817	266·2	96·3	− 7·2	0	5	
		4688	0·787	266·0	93·4	− 7·5	10	75	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4691, February 15–21. A few spots, mostly small and unstable, in an irregular stream. *a*, the leader, on February 16, is the largest and most stable. The group is not seen on February 20, but a small spot is seen near its place on February 21.
Group 4692, February 15–26. A large regular spot, *a*, with a pair of very small companions on February 23.
Group 4693, February 16–17. Three spots, *a*, *b*, and *c*, forming near the west limb *sp* Group 4687.
Group 4694, February 17–19. A few small spots in a short straight stream *nf* Group 4688. *a* and *b*, the first and last spots, are the largest and most stable.
Group 4695, February 17–26. A number of small spots, irregularly scattered, which have formed suddenly by February 17, *s* of Group 4692. The group rapidly increases, and has become a fine straight stream by February 18; *a*, the last spot, being large and regular and the chief member of the group. *a* alone remains by February 25.
Group 4696, February 18–19. Two small faint spots *n* of Group 4687, and of Group 4688 *a*.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
48d.180	AW, CL	4688	0·782	264·6	93·0	− 8·6	0	13	655c
		4688	0·777	263·6	92·6	− 9·4	0	2	
I.		4688	0·768	264·0	91·8	− 9·1	0	3	
		4688	0·758	264·7	90·8	− 8·6	2	7	
		4688	0·737	264·0	89·0	− 9·2	4	39	
		4688c	0·734	265·9	88·7	− 7·8	3	50	
		4688	0·713	266·2	87·0	− 7·7	0	3	
		4688d	0·708	263·5	86·6	− 9·5	30	200	
		4688	0·686	266·1	84·8	− 7·8	1	9	
		4688b	0·683	264·3	84·6	− 9·0	20	69	
		4694a	0·587	272·7	77·2	− 4·2	6	20	
		4694b	0·523	276·1	72·5	− 2·8	1	6	
		4691a	0·419	110·3	17·4	−14·8	8	37	
		4691	0·442	107·8	15·7	−14·1	0	19	
		4691	0·484	104·8	12·7	−13·3	0	18	
		4691	0·515	103·9	10·5	−13·1	6	20	
		4695	0·563	79·2	7·9	+ 0·2	20	114	
		4695	0·571	81·6	7·0	− 1·1	0	7	
		4695	0·589	78·9	6·1	+ 0·8	0	4	
		4695	0·593	80·2	5·7	+ 0·1	0	10	
		4695	0·610	84·0	4·1	− 2·0	0	3	
		4695a	0·636	81·8	2·5	− 0·3	66	209	
		4692a	0·645	73·1	3·2	+ 5·4	36	156	
			0·807	81·5	348·5	+ 2·7			264
			0·856	71·8	345·4	+11·7			171
			0·957	78·0	330·0	+ 9·3			110
Feb. 18		Centre			(41·3)	(−7·0)	(337)	(1625)	(1592)
49·190	CL, AW		0·952	257·3	101·1	−14·2			157
			0·874	277·1	88·0	+ 2·7			99
I.			0·819	257·9	83·4	−14·0			94
		4696	0·969	268·8	103·7	− 2·9	0	12	322n
		4696	0·940	268·3	98·1	− 4·1	0	2	
		4687a	0·961	264·1	102·5	− 7·7	23	142	
		4688a	0·945	264·0	99·4	− 8·0	104	380	
		4688	0·943	265·9	98·9	− 6·3	0	6	
		4688	0·930	264·9	96·8	− 7·4	0	3	
		4688	0·916	264·6	94·7	− 7·8	0	9	
		4688	0·913	263·3	94·4	− 9·1	0	12	
		4688	0·902	264·5	92·8	− 8·1	12	52	
		4688	0·872	263·6	89·1	− 9·1	2	37	774c
		4688c	0·871	265·7	88·9	− 7·3	5	21	
		4688	0·867	264·5	88·5	− 8·3	0	7	
1898.				°	°	°			
49d.190	CL, AW	4688	0·859	262·0	87·7	−10·5	0	4	
		4688b	0·851	263·3	86·7	− 9·4	12	190	
I.		4688	0·840	265·3	85·4	− 7·8	3	11	
		4688	0·839	263·7	85·4	− 9·2	3	23	
		4688	0·832	263·0	84·7	− 9·8	2	9	
		4694a	0·767	269·6	78·1	− 4·9	2	9	
		4694	0·747	272·2	76·2	− 3·1	0	6	
		4694	0·715	272·1	73·5	− 3·5	0	3	
		4694b	0·714	273·0	73·4	− 2·9	0	5	
		4691a	0·230	127·3	17·1	−15·0	0	6	
		4691	0·246	123·6	15·8	−14·8	0	4	
		4691	0·242	121·4	15·8	−14·2	1	6	
		4691	0·314	115·0	11·0	−14·4	0	1	
		4691	0·325	110·1	9·8	−13·1	0	4	
		4695	0·332	72·1	9·7	− 0·9	4	21	
		4695	0·350	71·6	8·7	− 0·4	6	40	
		4695	0·359	69·3	8·5	+ 0·6	4	11	
		4695	0·376	73·7	6·9	− 0·7	1	8	
		4695	0·404	71·3	5·6	+ 0·9	0	2	
		4695	0·425	70·1	4·5	+ 1·8	2	8	
		4695	0·437	73·9	3·3	+ 0·5	2	14	
		4695	0·439	75·5	3·0	− 0·1	1	5	
		4695	0·447	73·0	2·8	− 1·1	1	6	
		4695a	0·450	77·7	2·0	− 0·9	38	174	
		4692a	0·466	64·4	3·1	+ 5·2	33	135	
Feb. 19		Centre			(28·0)	(−7·1)	(261)	(1388)	(1446)
50·268	AW, CL		0·946	277·3	83·9	+ 4·5			238
			0·890	269·9	76·8	− 3·4			206
I.		4688	0·984	262·8	94·3	− 8·4	0	53	1188c
		4688	0·978	262·2	92·6	− 9·1	0	25	
		4688	0·967	261·3	89·9	−10·2	0	42	
		4695	0·118	22·4	11·3	− 0·9	0	8	
		4695	0·121	28·2	10·6	− 1·1	0	17	
		4695	0·127	32·8	10·0	− 1·1	0	3	
		4695	0·154	32·7	9·1	+ 0·4	1	5	
		4695	0·143	37·8	8·9	− 0·6	0	1	
		4695	0·167	35·5	8·4	+ 0·7	0	2	
		4695a	0·227	63·1	2·3	− 1·1	20	148	
		4692a	0·280	40·2	3·5	+ 5·3	31	121	
Feb. 20		Centre			(13·9)	(−7·1)	(52)	(425)	(1632)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
51d·148	AW,CL		0·983	257·4	82·8	−13·7			215
			0·983	263·1	82·2	− 8·1			458
I.			0·958	269·0	75·5	− 3·1			288
			0·912	259·3	68·7	−12·7			137
		4691	0·207	303·2	12·4	−13·5	5	18	
		4695	0·205	310·9	11·1	+ 0·7	0	3	
		4695	0·202	319·7	9·7	+ 1·8	0	1	
		4695	0·177	314·4	9·4	0·0	0	1	
		4695	0·168	325·1	7·7	+ 0·8	0	2	
		4695	0·151	325·7	7·1	+ 0·1	0	4	
		4695	0·134	337·4	5·1	0·0	0	2	
		4695	0·146	342·7	4·7	+ 0·9	2	4	
		4695	0·109	341·3	4·2	− 1·2	0	1	
		4695*a*	0·103	358·0	2·4	− 1·2	29	140	
		4692*a*	0·211	353·9	3·5	+ 5·0	21	136	
Feb. 21		Centre			(2·2)	(−7·1)	(57)	(312)	(1098)
52·157	AW,CL	4695	0·425	284·5	13·1	− 0·4	1	11	
		4695	0·413	286·2	12·2	+ 0·1	0	3	
I.		4695	0·403	288·7	11·2	+ 0·9	0	5	
		4695	0·312	295·0	5·3	+ 0·7	0	7	
		4695	0·281	290·4	4·1	− 1·3	0	5	
		4695	0·265	288·2	3·4	− 2·1	0	4	
		4695*a*	0·260	292·7	2·7	− 1·2	34	107	
		4692*a*	0·327	308·6	3·7	+ 4·9	19	95	
		4697	0·982	94·9	269·4	− 6·2	0	25	} 410*c*
		4697	0·988	96·1	267·4	− 7·1	0	61	
Feb. 22		Centre			(348·9)	(−7·1)	(54)	(323)	(410)
53·465	CL, AW		0·942	259·2	43·0	−12·6			117
			0·892	265·1	35·3	− 7·6			22
		4695	0·569	279·5	5·8	− 0·6	0	5	
		4695	0·567	280·6	5·5	0·0	0	13	
		4695	0·561	279·3	5·3	− 0·8	1	4	
		4695	0·556	280·1	4·8	− 0·5	4	11	
		4695	0·547	279·2	4·4	− 1·1	1	5	
		4695	0·547	280·3	4·2	− 0·5	2	9	
		4695*a*	0·525	280·5	2·7	− 0·7	15	102	
		4692*a*	0·559	290·4	3·4	+ 5·1	23	129	
		4692	0·531	293·3	1·0	+ 5·9	0	2	
		4692	0·527	288·6	1·7	+ 3·4	0	2	
1898.				°	°	°			
53d·465	CL, AW	4697	0·902	96·2	266·9	− 8·7	0	7	} 211*np*
		4697*a*	0·908	96·4	266·1	− 8·8	0	26	
			0·913	82·8	266·9	+ 3·5			289
Feb. 23		Centre			(331·8)	(−7·2)	(46)	(315)	(639)
54·460	AW, CL		0·847	275·2	15·9	+ 0·5			228
			0·820	259·1	14·1	−13·1			290
			0·841	286·2	13·4	+ 9·5			201
		4695	0·742	277·1	5·8	+ 0·4	0	1	} 144*c*
		4695	0·740	276·5	5·7	− 0·1	0	3	
		4695*a*	0·705	276·6	2·9	− 0·5	11	77	
		4692*a*	0·726	284·4	3·3	+ 5·3	17	119	153*c*
		4697	0·783	95·3	266·8	− 8·6	0	3	} 150*np*
		4697*a*	0·797	95·7	265·4	− 8·9	7	21	
			0·807	79·8	266·0	+ 3·9			399
Feb. 24		Centre			(318·6)	(−7·2)	(35)	(224)	(1565)
55·644	AW,CL		0·950	282·0	13·0	+ 9·0			212
			0·924	258·2	11·3	−13·6			245
			0·788	274·1	354·6	− 1·3			137
		4695*a*	0·866	273·6	2·6	− 0·5	8	50	410*p*
		4692*a*	0·880	280·2	3·2	+ 5·4	18	83	154*c*
		4697*a*	0·602	95·7	265·8	− 9·2	5	27	
Feb. 25		Centre			(303·0)	(−7·2)	(31)	(160)	(1158)
56·455	AW,CL		0·978	257·8	11·4	−13·4			245
			0·870	274·3	352·3	+ 0·2			270
			0·862	267·6	352·0	− 5·8			73
			0·843	284·0	347·7	+ 7·7			189
		4695*a*	0·945	271·9	2·9	− 0·7	9	56	429*p*
		4692*a*	0·950	278·2	2·9	+ 5·4	9	99	233*n*
		4697*a*	0·442	97·2	266·0	− 9·7	6	30	
		4697*b*	0·475	98·1	263·9	−10·2	10	41	
		4697	0·517	96·5	261·0	− 9·5	0	1	
		4697	0·524	95·9	260·6	− 9·2	0	3	
		4697	0·530	97·4	260·2	−10·0	0	1	
		4697*c*	0·545	98·4	259·2	−10·6	25	80	
Feb. 26		Centre			(292·3)	(−7·2)	(59)	(311)	(1439)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4697, February 22–March 5. A small spot, *a*, sometimes with a very small companion. A number of spots have formed *f*, *a* by February 26, forming with it a straight stream ; *b* and *c*, the first and last of the new spots, being the largest. *a* and *b* have united to form a large regular spot, *d*, by February 27. The group diminishes after this date, and *d* and *c* alone remain after March 3.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
57d·643	AW, M		0·964	271·6	350·9	− 0·4			350
			0·946	282·1	345·9	+ 8·9			295
		4697*d*	0·202	106·8	265·4	−10·4	33	131	
		4697	0·224	104·8	264·0	−10·3	0	6	
		4697	0·248	103·0	262·6	−10·2	0	4	
		4697	0·262	102·8	261·7	−10·3	7	24	
		4697	0·291	102·6	260·0	−10·6	0	4	
		4697*c*	0·314	103·0	258·6	−10·9	34	154	
			0·898	68·8	216·6	+15·4			175
			0·964	81·9	203·4	+ 5·8			258
Feb. 27		Centre			(276·7)	(−7·2)	(74)	(323)	(1078)
58·452	AW, M	4697	0·028	217·3	267·0	− 8·5	0	2	
		4697*d*	0·056	176·8	265·8	−10·4	22	105	
		4697	0·039	160·4	265·3	− 9·3	5	12	
		4697	0·060	159·6	264·8	−10·4	0	3	
		4697	0·082	129·3	262·3	−10·2	0	1	
		4697	0·091	122·5	261·6	−10·0	0	4	
		4697	0·111	121·7	260·5	−10·6	2	15	
		4697*c*	0·140	118·7	258·8	−11·0	32	170	
		4698*a*	0·969	96·7	189·7	− 8·3	15	119	402*c*
		4698*b*	0·976	96·1	188·1	− 7·5	10	52	
			0·904	80·1	202·7	+ 5·8			283
			0·978	102·1	187·0	−13·3			126
Feb. 28		Centre			(266·0)	(−7·2)	(86)	(483)	(811)
59·219	CL, M	4697*d*	0·185	251·5	266·1	−10·4	17	85	
		4697	0·164	258·8	265·2	− 8·9	0	8	
M.		4697	0·161	250·2	264·7	−10·3	0	4	
		4697	0·146	255·7	264·1	− 9·2	0	3	
		4697	0·115	247·5	262·1	− 9·7	0	1	
		4697	0·099	239·4	260·8	−10·1	0	4	
		4697*c*	0·078	218·7	258·7	−10·7	25	145	
		4698*a*	0·910	96·1	190·0	− 8·5	17	92	850*sf*
		4698*b*	0·921	95·5	188·4	− 7·8	9	49	
			0·816	77·6	202·9	+ 5·8			177
			0·942	66·3	190·0	+19·4			109
Mar. 1		Centre			(255·9)	(−7·2)	(68)	(391)	(1136)
1898.				°	°	°			
60d·232	CL, M	4697*d*	0·398	260·3	266·0	−10·6	14	79	
		4697	0·381	264·6	265·1	− 8·8	0	2	
M.		4697	0·375	258·8	264·5	−11·0	0	1	
		4697*c*	0·279	257·0	258·6	−10·6	9	89	
		4698*a*	0·791	95·5	190·0	− 8·8	17	83	1097*sf*
		4698*b*	0·805	94·3	188·7	− 7·8	16	51	
		4698	0·827	97·4	186·4	−10·2	0	2	
Mar. 2		Centre			(242·6)	(−7·3)	(56)	(307)	(1097)
61·281	AW, CL	4699	0·821	284·5	281·9	+ 7·5	2	11	91*c*
		4699	0·800	287·6	279·2	+ 9·3	0	7	
I.		4697*d*	0·605	261·5	266·2	−10·9	8	57	
		4697	0·510	259·5	259·5	−11·6	4	10	
		4697	0·503	262·1	259·1	−10·3	0	1	
		4697*c*	0·500	260·5	258·8	−11·1	7	22	
		4698*a*	0·623	94·2	190·1	− 8·4	17	83	
		4698*b*	0·642	92·9	188·7	− 7·5	8	31	
			0·791	91·8	176·4	− 5·9			298
			0·805	101·3	174·8	−13·4			127
			0·965	100·1	153·1	−11·7			425
Mar. 3		Centre			(228·8)	(−7·3)	(46)	(222)	(941)
62·630	AW, M		0·947	281·7	280·5	+ 8·6			147
			0·876	264·5	272·6	− 8·4			109
			0·843	281·8	266·8	+ 5·9			167
		4697*d*	0·811	262·7	265·6	−10·2	6	31	356*s*
		4697*c*	0·739	262·5	259·0	−10·4	3	12	
		4698*a*	0·358	94·6	189·9	− 8·5	17	80	
		4698*b*	0·379	92·6	188·6	− 7·8	9	38	
		4700*a*	0·867	99·4	150·3	−11·8	6	21	687*c*
			0·973	99·7	133·5	−11·1			171
Mar. 4		Centre			(211·0)	(−7·3)	(41)	(182)	(1637)
63·270	AW, C		0·925	277·4	269·2	+ 4·0			310
		4697*d*	0·889	261·7	265·8	−10·7	2	19	543*c*
I.		4697*c*	0·833	261·7	259·4	−11·0	0	12	
		4698*a*	0·215	95·7	190·1	− 8·4	22	67	
		4698*b*	0·234	92·5	188·9	− 7·7	11	32	
		4698	0·240	88·1	188·6	− 6·6	0	3	
		4698	0·255	89·0	187·7	− 6·9	0	5	
		4698	0·370	88·7	180·8	− 6·3	0	10	

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4698, February 28–March 12. Two regular spots, *a* and *b*, close together. *b*, the following spot, is the smaller, and has disappeared by March 5. A few small spots are seen following *a* and *b* on March 5.
Group 4699, March 3. Two small spots.
Group 4700, March 4–10. A few small spots in a short straight stream. The leader, *a*, alone remains by March 7.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
63d·270	AW, C	4700*a*	0·783	98·7	150·6	−11·3	7	21	
		4700	0·800	98·6	148·9	−11·3	2	9	
I.		4700	0·826	99·0	146·4	−11·6	0	9	356*c*
			0·944	98·8	131·1	−10·7			258
Mar. 5		Centre			(202·5)	(−7·3)	(44)	(187)	(1467)
64·312	CL, AW		0·958	260·8	262·9	−10·9			288
		4698*a*	0·030	232·4	190·2	− 8·4	15	61	
I.		4698*b*	0·009	236·1	189·2	− 7·6	4	24	
		4701	0·497	101·9	159·1	−12·2	0	2	
		4700*a*	0·617	98·8	150·5	−11·1	8	40	
		4700	0·633	99·0	149·4	−11·4	0	3	133*c*
		4700	0·675	99·6	146·1	−11·9	0	15	
		4702	0·931	101·3	119·4	−13·2	29	119	
		4702	0·946	100·8	116·9	−12·6	0	8	810*c*
		4702	0·977	101·6	110·0	−12·9	50	213	
		4703*a*	0·965	75·9	116·3	+11·5	73	446	
		4703	0·992	76·8	108·1	+12·0	0	99	747*c*
Mar. 6		Centre			(188·8)	(−7·3)	(179)	(1030)	(1978)
65·451	CL, AW	4698*a*	0·287	265·9	190·5	− 8·1	12	61	
		4698*b*	0·273	268·4	189·7	− 7·4	2	11	
		4701	0·252	114·0	160·2	−12·8	0	7	
		4700*a*	0·395	101·9	150·7	−11·3	3	15	
		4702	0·794	100·5	120·8	−12·7	31	196	
		4702	0·782	101·9	120·3	−13·8	10	39	
		4702	0·839	100·5	116·2	−12·8	5	27	498*c*
		4702	0·882	103·2	111·3	−15·0	10	57	
		4702	0·888	101·3	110·6	−13·3	28	209	
		4703*a*	0·865	72·9	116·7	+10·9	52	281	
		4703	0·901	74·4	112·0	+10·7	0	7	
		4703	0·904	73·7	111·7	+11·4	7	79	600*c*
		4703	0·909	74·9	110·8	+10·5	6	26	
		4704*a*	0·938	95·8	103·6	− 8·0	37	217	
		4704	0·956	95·3	100·3	− 7·2	0	17	557*c*
Mar. 7		Centre			(173·8)	(−7·2)	(203)	(1249)	(1655)
66·130	CL, AW		0·918	285·3	229·1	+11·0			270
		4698*a*	0·435	265·9	190·8	− 8·3	16	51	
I.		4698*b*	0·421	267·7	189·9	− 7·5	1	8	
		4701	0·160	132·9	158·0	−13·4	0	6	
1898.				°	°	°			
66d·130	CL, AW	4700*a*	0·249	106·8	150·9	−11·1	4	16	
		4702	0·662	101·4	123·4	−12·9	0	19	
I.		4702	0·680	98·6	121·8	−11·1	23	110	
		4702	0·696	99·5	120·5	−11·8	0	17	
		4702	0·700	101·6	120·3	−13·3	4	23	
		4702	0·714	100·6	119·1	−12·6	0	17	
		4702	0·728	102·6	118·0	−14·1	4	16	
		4702	0·735	99·8	117·3	−12·1	0	5	
		4702	0·743	102·3	116·7	−14·0	7	22	
		4702	0·747	101·0	116·3	−13·0	0	3	493*c*
		4702	0·770	101·3	114·2	−13·3	3	13	
		4702	0·776	103·9	113·8	−15·3	0	9	
		4702	0·784	99·7	112·9	−12·1	6	44	
		4702	0·787	102·8	112·6	−14·6	6	49	
		4702	0·790	98·5	112·3	−11·1	0	14	
		4702	0·800	101·8	111·4	−13·8	32	110	
		4702	0·807	99·9	110·7	−12·2	10	64	
		4703	0·749	67·8	120·1	+11·4	0	4	
		4703*a*	0·787	69·0	116·5	+11·6	52	285	348*c*
		4703	0·834	70·7	111·6	+11·7	12	95	
		4704*a*	0·872	94·0	103·9	− 7·0	54	247	
		4704	0·897	93·5	100·9	− 6·3	0	27	431*c*
			0·969	95·3	88·8	− 7·0			559
Mar. 8		Centre			(164·9)	(−7·2)	(234)	(1274)	(2101)
67·377	CL, AW		0·958	288·6	218·6	+15·5			167
			0·849	280·7	205·1	+ 5·1			152
I.		4698*a*	0·668	265·2	190·5	− 8·6	12	60	
		4701	0·277	246·2	163·4	−13·3	2	11	
		4701	0·252	240·4	161·4	−14·1	0	4	
		4701	0·237	245·0	161·1	−12·8	2	7	
		4700*a*	0·089	211·9	151·1	−11·6	5	12	
		4702	0·413	108·2	124·7	−14·0	0	2	
		4702	0·413	103·4	124·3	−12·1	0	3	
		4702	0·427	106·5	123·6	−13·5	30	90	
		4702	0·434	101·3	122·8	−11·4	9	35	
		4702	0·453	103·9	121·7	−12·7	0	28	
		4702	0·457	100·5	121·3	−11·2	19	131	
		4702	0·467	106·7	121·1	−14·1	4	12	
		4702	0·470	102·8	120·5	−12·4	4	15	
		4702	0·483	106·1	120·0	−14·0	0	2	
		4702	0·492	101·6	119·0	−12·0	1	8	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4701, March 6–10. A disturbed area *p* Group 4700, in which very small unstable spots form and disappear.
Group 4702, March 6–17. A very fine straight stream, composed of a great number of spots which undergo continual change as to their number, shape, size, and relationship. Four large spots, *a, b, c,* and *d,* have attained some stability by March 15.
Group 4703, March 6–16. A large regular spot, *a,* followed by a short stream of spots. The following spots rapidly diminish, and *a* slowly disintegrates, throwing off small spots. It has divided up into a close cluster of small spots by March 14, when it is measured in two divisions.
Group 4704, March 7–18. A large regular spot, *a,* usually with a number of small unstable companions.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
67d.377	CL, AW	4702	0·509	102·9	118·0	−12·7	3	29	
		4702	0·520	105·3	117·4	−14·1	6	29	
I.		4702	0·526	102·7	116·8	−12·8	8	44	
		4702	0·541	102·4	115·7	−12·8	0	4	
		4702	0·544	104·1	115·7	−13·7	0	1	
		4702	0·567	105·8	114·2	−14·9	0	1	
		4702	0·566	104·7	114·2	−14·3	1	7	
		4702	0·573	107·3	113·9	−15·8	0	7	
		4702	0·571	100·9	113·6	−12·1	1	8	
		4702	0·571	102·5	113·6	−13·0	7	37	
		4702	0·587	107·7	113·0	−16·2	0	2	
		4702	0·585	100·9	112·6	−12·2	3	45	
		4702	0·587	102·5	112·5	−13·2	0	2	
		4702	0·597	105·1	112·0	−14·8	5	72	
		4702	0·613	102·9	110·6	−13·6	47	250	
		4703*a*	0·611	60·0	115·8	+11·7	37	256	
		4703	0·657	60·0	112·8	+13·3	0	3	
		4703	0·649	62·9	112·4	+11·3	1	7	
		4703	0·660	64·8	111·1	+10·6	0	3	
		4703	0·664	64·4	111·0	+11·0	0	4	
		4703	0·683	63·8	109·8	+11·9	0	2	
		4704*a*	0·700	93·7	103·7	− 7·8	51	222	} 175*f*
		4704	0·749	92·4	99·7	− 6·6	0	2	
			0·882	97·3	86·0	− 9·9			409
			0·958	90·4	75·1	− 2·5			121
			0·963	99·7	73·2	−11·3			99
			0·972	95·2	71·6	− 6·7			92
Mar. 9		Centre			(148·4)	(−7·2)	(258)	(1457)	(1215)
68·493	AW, M		0·971	258·2	210·9	−13·2			330
		4698*a*	0·833	265·6	190·4	− 7·7	13	68	298*f*
		4701	0·469	257·6	161·5	−12·2	0	8	
		4700*a*	0·316	256·5	151·9	−11·1	2	11	
		4705	0·210	176·1	132·8	−19·3	2	8	
		4702	0·148	124·0	126·5	−11·9	12	40	
		4702	0·162	126·3	126·0	−12·7	0	3	
		4702	0·158	120·3	125·7	−11·7	0	5	
		4702	0·169	115·3	124·8	−11·3	2	12	
		4702	0·194	124·4	124·3	−13·4	29	200	
		4702	0·232	121·8	122·0	−14·1	0	24	
		4702	0·226	113·2	121·5	−12·1	52	298	
		4702	0·278	116·1	118·9	−14·0	8	35	
1898.				°	°	°			
68d.493	AW, M	4702	0·280	109·7	118·1	−12·3	0	6	
		4702	0·293	110·8	117·5	−12·9	0	12	
		4702	0·320	117·2	116·6	−15·3	0	3	
		4702	0·343	107·2	114·2	−12·6	0	45	
		4702	0·356	105·1	113·2	−12·1	0	10	
		4702	0·399	107·9	110·8	−13·7	41	253	
		4702	0·412	104·3	109·7	−12·4	0	20	
		4703*a*	0·442	44·3	115·4	+11·6	34	255	
		4703	0·449	48·6	113·8	+10·4	3	29	
		4703	0·471	48·9	112·6	+11·3	0	5	
		4704*a*	0·494	93·5	104·0	− 8·0	37	214	
		4704	0·508	90·2	103·1	− 6·3	0	6	
		4704	0·527	89·1	101·9	− 5·7	0	4	
Mar. 10		Centre			(133·7)	(−7·2)	(235)	(1574)	(628)
69·176	CL, AW		0·895	305·1	179·8	+27·0			114
			0·764	257·9	174·8	−13·8			100
I.		4698*a*	0·912	263·9	190·9	− 8·5	14	40	701*f*
		4705	0·264	215·0	133·9	−19·6	0	5	
		4702	0·109	210·4	127·9	−12·6	13	56	
		4702	0·094	204·2	126·9	−12·1	11	61	
		4702	0·073	200·4	126·2	−11·1	1	6	
		4702	0·105	188·6	125·6	−13·2	4	22	
		4702	0·112	184·4	125·2	−13·6	0	4	
		4702	0·080	166·2	123·6	−11·7	22	141	
		4702	0·108	169·6	123·6	−13·3	26	184	
		4702	0·128	156·3	121·7	−13·9	0	1	
		4702	0·104	146·4	121·3	−12·2	56	292	
		4702	0·133	141·8	119·9	−13·1	0	2	
		4702	0·148	142·9	119·4	−14·0	7	24	
		4702	0·124	132·0	119·3	−11·9	0	3	
		4702	0·137	137·8	119·3	−13·0	0	2	
		4702	0·175	123·6	116·1	−12·7	2	9	
		4702	0·228	116·4	112·7	−12·8	0	1	
		4702	0·225	111·9	112·4	−11·9	0	7	
		4702	0·260	115·3	110·8	−13·4	29	200	
		4702	0·266	108·4	109·8	−11·8	1	7	
		4703*a*	0·356	25·0	115·9	+11·7	37	217	
		4703	0·351	29·9	114·5	+10·6	2	12	
		4703	0·363	33·6	113·0	+10·5	0	2	
		4704*a*	0·347	92·4	104·3	− 7·6	41	194	
Mar. 11		Centre			(124·7)	(−7·2)	(266)	(~~1492~~) (1531)	(915)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4705, March 10–12. A very small faint spot *sp* Group 4702.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
70d·123	CL, AW	4698a	0·980	262·9	191·5	− 8·4	11	70	848f
		4705	0·414	236·2	133·7	−20·0	1	6	
I.		4702	0·301	250·7	129·1	−12·6	31	158	
		4702	0·272	250·6	127·4	−12·1	0	7	
		4702	0·261	246·8	126·5	−12·9	19	121	
		4702	0·248	253·3	126·2	−11·0	0	7	
		4702	0·234	241·3	124·4	−13·5	14	155	
		4702	0·218	231·1	122·4	−14·9	2	13	
		4702	0·189	238·7	121·8	−12·7	91	521	
		4702	0·127	220·7	117·1	−12·7	0	3	
		4702	0·130	215·3	116·7	−13·3	0	1	
		4702	0·099	197·0	114·0	−12·7	5	41	
		4702	0·103	187·5	113·1	−13·1	0	9	
		4702	0·076	188·0	112·9	−11·5	0	2	
		4702	0·089	186·1	112·9	−12·3	0	2	
		4702	0·112	170·5	111·2	−13·6	33	220	
		4703	0·319	345·4	117·0	+10·7	8	36	
		4703a	0·324	349·6	115·7	+11·3	29	150	
		4703	0·303	352·5	114·6	+10·2	1	6	
		4704a	0·138	95·1	104·3	− 7·8	38	185	
		4706	0·347	80·2	92·4	− 3·5	0	5	
		4706	0·364	83·0	91·2	− 4·2	0	3	
Mar. 12		Centre			(112·3)	(−7·2)	(283)	(1721)	(848)
71·163	CL, AW		0·931	258·4	167·8	−13·4			488
		4702	0·530	258·4	130·4	−12·2	25	144	
I.		4702	0·497	256·7	128·1	−12·8	20	147	
		4702	0·475	252·3	126·3	−14·7	0	3	
		4702	0·471	254·6	126·2	−13·6	3	41	
		4702	0·460	257·2	125·7	−12·3	0	2	
		4702	0·471	249·1	125·6	−16·1	0	1	
		4702	0·447	252·6	124·5	−14·1	22	132	
		4702	0·432	257·1	123·9	−12·0	26	169	
		4702	0·442	247·7	123·6	−16·2	0	4	
		4702	0·426	249·0	122·7	−15·4	6	30	
		4702	0·408	255·8	122·3	−12·4	0	7	
		4702	0·399	248·6	121·0	−15·0	0	5	
		4702	0·390	252·6	120·9	−13·4	116	408	
		4702	0·355	249·1	118·4	−14·0	0	6	
		4702	0·312	250·3	116·0	−12·9	1	11	
		4702	0·300	241·9	114·3	−15·1	0	2	
		4702	0·272	251·8	113·7	−11·9	1	6	
		4702	0·259	243·9	112·3	−13·6	0	3	
1898.				°	°	°			
71d·163	CL, AW	4702	0·251	247·3	112·2	−12·6	0	5	
		4702	0·246	249·4	112·1	−12·0	1	7	
I.		4702	0·251	239·5	111·3	−14·3	28	125	
		4702	0·230	243·7	110·7	−12·9	7	35	
		4703	0·418	312·7	116·6	+ 9·6	0	3	
		4703a	0·426	315·9	116·0	+10·9	33	191	
		4704	0·170	280·7	108·1	− 5·4	3	8	
		4704	0·161	284·2	107·5	− 4·9	0	2	
		4704	0·149	287·2	106·7	− 4·6	0	6	
		4704	0·126	285·0	105·5	− 5·3	2	7	
		4704a	0·099	262·3	104·2	− 8·0	36	185	
		4704	0·085	244·6	102·9	− 5·9	0	4	
			0·957	90·7	23·2	− 8·8			223
Mar. 13		Centre			(98·5)	(−7·2)	(330)	(1699)	(711)
72·218	CL, AW		0·922	257·7	152·5	−14·1			502
		4702	0·717	259·7	130·6	−12·3	67	279	
I.		4702	0·701	258·5	129·3	−13·1	5	19	
		4702	0·676	257·6	127·2	−13·6	28	121	
		4702	0·674	259·9	127·2	−12·1	1	6	
		4702	0·659	258·3	125·9	−13·0	1	9	
		4702	0·646	256·6	124·8	−14·1	20	128	
		4702	0·637	259·2	124·3	−12·3	25	161	
		4702	0·626	253·4	123·0	−15·9	2	6	
		4702	0·596	256·6	121·1	−13·7	136	532	
		4702	0·561	256·7	118·6	−13·3	0	11	
		4702	0·548	255·0	117·5	−14·1	1	7	
		4702	0·521	257·2	115·9	−12·7	7	19	
		4702	0·516	254·9	115·3	−13·8	2	5	
		4702	0·508	257·4	115·0	−12·6	0	2	
		4702	0·498	255·0	114·1	−13·6	1	6	
		4702	0·474	258·8	112·8	−11·6	4	27	
		4702	0·472	256·9	112·6	−12·4	0	2	
		4702	0·476	253·1	112·5	−14·3	0	27	
		4702	0·459	252·7	111·4	−14·2	26	149	
		4702	0·448	256·6	111·0	−12·4	1	10	
		4702	0·442	258·9	110·7	−11·3	0	4	
		4702	0·441	254·2	110·3	−13·3	5	14	
		4702	0·435	257·8	110·2	−11·7	1	8	
		4703	0·628	299·9	118·3	+12·4	0	6	
		4703a	0·596	298·5	116·7	+10·5	23	87	
		4703a	0·584	300·2	115·4	+11·0	8	55	
		4704	0·420	271·5	109·5	− 5·8	0	4	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4706, March 12–16. A pair of very small faint spots on March 12. The group is not seen on March 13 or 14. A single very small spot is seen on March 15 and 16.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
72d.218	CL, AW	4704	0·400	271·5	108·2	− 5·9	0	5	
		4704	0·391	273·5	107·6	− 5·2	1	7	
I.		4704	0·362	274·1	105·8	− 5·1	2	6	
		4704*a*	0·336	265·5	104·3	− 8·2	41	184	
			0·911	88·9	19·1	− 2·0			367
			0·928	75·6	18·8	+10·5			363
			0·918	103·5	17·3	−15·1			204
Mar. 14		Centre			(84·6)	(−7·1)	(408)	(1906)	(1436)
73·372	CL, AW	4702*a*	0·887	260·5	132·6	−11·7	51	200	
		4702	0·868	259·7	130·3	−12·5	12	63	
I.		4702	0·856	259·0	128·9	−13·1	0	2	
		4702	0·842	258·1	127·3	−13·8	4	13	
		4702	0·828	257·8	125·8	−14·1	4	30	
		4702*b*	0·818	259·5	124·8	−12·7	19	159	
		4702	0·811	257·7	124·1	−14·1	7	60	765*c*
		4702*c*	0·778	257·9	120·9	−13·8	150	497	
		4702	0·750	257·0	118·3	−14·4	1	13	
		4702	0·748	258·6	118·2	−13·2	10	40	
		4702	0·701	260·0	114·2	−12·0	5	25	
		4702*d*	0·673	256·4	111·8	−14·4	21	140	
		4702	0·649	257·2	110·0	−13·7	2	14	
		4703*a*	0·768	290·7	116·4	+11·0	17	95	
		4703	0·757	291·9	115·1	+11·4	0	7	127*c*
		4704	0·626	270·3	108·3	− 5·4	0	3	
		4704	0·612	270·6	107·3	− 5·3	0	3	
		4704*a*	0·568	265·7	104·3	− 8·3	44	189	
		4704	0·552	264·4	103·2	− 9·0	0	2	
		4706	0·421	276·5	94·2	− 3·7	1	4	
			0·811	75·3	17·4	+ 7·5			148
			0·922	83·8	3·1	+ 2·9			265
			0·938	76·3	1·9	+10·2			179
			0·948	91·2	358·0	− 3·5			220
Mar. 15		Centre			(69·5)	(−7·1)	(348)	(1559)	(1704)
74·259	CL, AW	4702*a*	0·960	259·2	132·4	−12·3	77	311	
		4702	0·925	257·4	126·2	−14·3	0	20	
I.		4702	0·921	258·1	125·6	−13·7	1	29	
		4702*b*	0·916	259·2	124·8	−12·7	16	79	
		4702*c*	0·888	257·7	121·0	−14·1	153	616	1853*c*
		4702	0·863	257·3	118·0	−14·6	0	9	
1898.				°	°	°			
74d.259	CL, AW	4702	0·806	258·0	111·9	−13·9	5	42	
		4702*d*	0·806	256·6	111·8	−15·0	14	70	
I.		4702	0·781	257·6	109·4	−14·1	0	4	
		4703*a*	0·871	286·7	115·7	+10·8	9	41	408*f*
		4704*a*	0·719	265·1	104·0	− 8·5	47	212	
		4706	0·574	274·1	92·7	− 3·5	0	5	
			0·855	75·8	1·1	+ 8·2			178
			0·887	86·7	355·7	− 0·4			199
Mar. 16		Centre			(57·8)	(−7·1)	(322)	(1438)	(2638)
75·181	CL, AW		0·932	283·4	112·3	+ 9·8			373
		4702	0·991	257·0	129·0	−13·8	0	28	
I.		4702*b*	0·984	258·2	126·4	−12·9	12	77	
		4702*c*	0·967	257·2	121·8	−14·1	168	653	
		4702*d*	0·913	257·2	112·3	−14·6	9	86	
		4704*a*	0·854	264·2	104·6	− 8·6	44	181	960*c*
			0·847	72·2	350·6	+11·0			117
			0·946	75·4	336·9	+11·3			199
Mar. 17		Centre			(45·6)	(−7·1)	(233)	(1025)	(1649)
76·463	AW, CL		0·939	274·0	98·0	+ 1·3			189
			0·871	264·9	89·6	− 7·9			365
			0·964	257·9	104·2	−13·5			510
		4704*a*	0·966	264·0	104·2	− 7·6	34	171	309*c*
		4707	0·454	89·3	1·7	− 6·0	0	2	
		4707	0·462	89·7	1·1	− 6·1	0	5	
		4707	0·474	89·7	0·4	− 6·0	0	5	
		4707	0·493	92·3	359·1	− 7·3	0	3	
		4707	0·494	93·0	359·0	− 7·6	0	2	
		4707	0·501	90·7	358·3	− 9·6	0	4	
		4708	0·784	71·1	340·0	+10·1	2	10	
		4708	0·830	72·0	335·5	+10·7	1	9	
		4708	0·851	73·2	333·0	+10·4	0	2	263*c*
		4708	0·852	73·6	332·8	+10·0	2	10	
Mar. 18		Centre			(28·7)	(−7·0)	(39)	(223)	(1636)
77·174	CL, AW		0·946	266·6	90·6	− 5·5			365
			0·935	257·8	89·3	−13·9			380
I.		4708	0·682	65·5	340·2	+11·0	4	9	
Mar. 19		Centre			(19·3)	(−7·0)	(4)	(9)	(745)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4707, March 18. A number of very small faint spots closely following each other in a curved stream
Group 4708, March 18–19. A number of spots, mostly very small, in a straggling group.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
78d.546							°	°	°
Mar. 20		Centre			(1·2)	(−7·0)	(0)	(0)	(0)
79·539							°	°	°
Mar. 21		Centre			(348·2)	(−6·9)	(0)	(0)	(0)
80·184	C W		0·929	192·8	17·9	−70·6			
I.		4709	0·530	276·1	11·4	− 2·7	2	11	131
			0·862	91·9	280·0	− 5·1			128
			0·919	82·2	274·0	+ 4·4			110
			0·939	103·1	269·0	−14·7			71
Mar. 22		Centre			(339·7)	(−6·9)	(2)	(11)	(440)
81·217	CL, AW		0·842	283·2	21·5	+ 7·2			
I.			0·872	73·2	268·0	+11·1			141
Mar. 23		Centre			(326·0)	(−6·9)	(0)	(0)	100 (241)
82·455	CL, M		0·938	270·8	19·2	− 1·7			
			0·945	283·2	18·6	+10·1			187
			0·840	278·0	5·9	+ 2·9			223
			0·856	287·7	5·7	+11·3			118
Mar. 24		Centre			(309·7)	(−6·8)	(0)	(0)	107 (635)
83·339	CL, AW		0·907	271·1	2·9	− 1·9			
I.									218
Mar. 25		Centre			(298·0)	(−6·8)	(0)	(0)	(218)
84·157			0·949	270·8	358·6	− 1·4			
			0·910	282·9	350·8	+ 8·8			410
I.		4710	0·949	255·4	359·6	−15·9	0	10	235
		4711*a*	0·946	100·8	215·4	−12·4	3	23	219*sp*
		4711*b*	0·950	101·8	214·6	−13·3	0	19	} 516*s*
			0·923	69·1	223·5	+16·3			204
			0·907	92·0	222·0	− 4·7			129
Mar. 26		Centre			(287·2)	(−6·7)	(3)	(52)	(1713)
1898.				°	°	°			
85d.187	CL, AW		0·943	281·2	342·5	+ 8·2			211
I.		4711*ab*	0·849	100·0	215·1	−12·0	7	32	271*f*
			0·960	172·1	236·4	−77·4			77
			0·984	105·3	192·7	−16·2			283
Mar. 27		Centre			(273·6)	(−6·7)	(7)	(32)	(842)
86·182	CL, AW	4711*a*	0·704	99·9	215·6	−11·7	3	17	
I.		4711*b*	0·712	100·6	215·0	−12·2	2	10	
			0·930	104·8	191·3	−16·2			243
			0·951	95·4	188·1	− 7·2			314
Mar. 28		Centre			(260·5)	(−6·6)	(5)	(27)	(557)
87·189	CL, AW	4711*a*	0·526	101·6	215·6	−11·7	1	10	
I.		4711*b*	0·539	102·3	214·7	−12·2	0	6	
			0·879	101·1	185·2	−12·9			533
Mar. 29		Centre			(247·2)	(−6·6)	(1)	(16)	(533)
88·529	AW, CL		0·764	96·8	180·2	− 9·4			126
			0·819	103·7	175·1	−14·9			202
Mar. 30		Centre			(230·3)	(−6·5)	(0)	(0)	(328)
89·427	AW, M		0·835	284·8	272·2	+ 8·5			105
		4712	0·699	106·1	173·6	−15·9	1	6	160*f*
		4713*a*	0·997	100·6	131·3	−11·0	37	272	351*p*
Mar. 31		Centre			(217·7)	(−6·5)	(38)	(278)	(616)
90·212	CL, AW	4713*a*	0·969	98·9	131·1	−10·2	85	307	} 445*n*
I.		4713*b*	0·991	100·0	124·2	−10·7	0	103	
			0·965	105·7	131·5	−16·8			330
April 1		Centre			(207·3)	(−6·4)	(85)	(410)	(775)
91·164	CL, AW	4713*a*	0·889	98·5	131·7	−10·4	57	302	} 1135*c*
I.		4713*b*	0·941	98·9	124·1	−10·5	32	104	
April 2		Centre			(194·8)	(−6·4)	(89)	(406)	(1135)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4709, March 22. A small spot.
Group 4710, March 26. A small spot.
Group 4711, March 26–29. Two small spots, *a* and *b*, close together. They are measured as a single spot on March 27.
Group 4712, March 31. A very small spot.
Group 4713, March 31–April 13. Two large spots, *a* and *b*. *a* is irregular in form, and speedily breaks up and diminishes. *b* is regular and stable. A number of small spots, many of them formed by the disintegration of *a*, are seen near *a* and *b* from time to time, making with them an irregular stream.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
92d·481	CL, M	4713*a*	0·716	99·8	131·6	−11·4	53	304	
		4713	0·775	97·1	126·4	− 9·5	0	2	721*c*
		4713	0·783	99·2	125·6	−11·1	0	3	
		4713*b*	0·796	99·8	124·4	−11·6	23	130	
			0·883	104·1	115·0	−15·4			1204
			0·894	92·2	113·9	− 4·8			383
			0·953	99·8	104·4	−11·3			356
			0·973	91·2	100·8	− 2·7			108
April 3		Centre			(177·4)	(−6·3)	(76)	(439)	(2772)
93·553	AW, M		0·909	291·4	226·2	+18·4			169
			0·811	262·7	217·8	− 9·6			172
			0·777	253·0	214·1	−17·1			362
		4713*a*	0·528	102·4	131·6	−11·9	48	184	
		4713	0·525	99·3	131·7	−10·2	7	41	
		4713*b*	0·625	100·8	124·7	−11·6	20	120	
			0·753	104·1	114·5	−14·7			431
			0·754	89·8	114·5	− 2·6			193
			0·856	101·4	104·1	−13·0			451
			0·918	94·0	96·5	− 6·2			277
April 4		Centre			(163·3)	(−6·2)	(75)	(345)	(2055)
94·431	AW, M		0·898	264·8	215·9	− 7·4			103
			0·871	254·9	212·5	−16·2			242
			0·699	253·3	195·7	−16·0			107
		4713	0·335	102·7	132·4	−10·1	4	41	
		4713*a*	0·351	107·2	131·8	−11·8	28	166	
		4713	0·373	108·9	130·6	−12·7	2	23	
		4713	0·388	103·3	129·2	−10·9	0	2	
		4713*b*	0·457	103·6	124·9	−11·7	26	135	
			0·814	93·2	97·1	− 6·2			213
			0·901	91·9	87·4	− 4·4			186
April 5		Centre			(151·7)	(−6·2)	(60)	(367)	(851)
95·435	AW, M		0·956	254·9	212·1	−16·2			274
		4713	0·114	124·9	133·0	− 9·9	2	12	
		4713	0·121	124·4	132·6	−10·0	0	1	
		4713*a*	0·153	130·6	131·6	−11·8	29	136	
		4713	0·179	132·0	130·6	−13·0	2	8	
		4713	0·176	127·1	130·2	−12·1	2	8	
		4713*b*	0·247	113·5	125·1	−11·6	23	129	
1898.				°	°	°			
95d·435	AW, M	4713	0·255	101·0	123·8	− 8·7	0	5	
		4714	0·406	114·9	116·0	−15·4	0	8	
		4714	0·398	110·2	115·9	−13·6	0	8	
April 6		Centre			(138·4)	(−6·1)	(58)	(315)	(274)
96·184	CL, AW		0·911	253·9	194·7	−17·2			278
		4713	0·111	236·2	133·9	− 9·5	2	11	
I.		4713*a*	0·114	212·3	132·1	−11·5	24	137	
		4713	0·126	197·5	130·8	−12·9	1	5	
		4713	0·107	195·7	130·3	−11·9	0	8	
		4713*b*	0·104	150·7	125·6	−11·2	26	120	
		4714	0·197	129·4	119·6	−13·1	0	7	
		4714	0·212	123·4	118·2	−12·6	0	3	
April 7		Centre			(128·6)	(−6·0)	(53)	(291)	(278)
97·410	AW, M		0·983	253·1	193·0	−17·7			230
			0·947	261·4	184·1	−10·1			281
			0·884	254·9	174·9	−16·2			227
			0·885	307·5	165·7	+29·1			173
		4713*a*	0·351	253·7	132·4	−11·3	9	28	
		4713	0·338	253·0	131·6	−11·3	0	2	
		4713	0·336	251·6	131·3	−11·8	2	7	
		4713	0·334	250·4	131·1	−12·1	0	3	
		4713	0·333	248·7	130·9	−12·7	1	10	
		4713	0·323	256·9	130·9	− 9·9	0	4	
		4713	0·287	254·0	128·6	−10·3	0	8	
		4713	0·262	259·9	127·4	− 8·4	0	2	
		4713*b*	0·247	247·4	125·8	−11·3	23	122	
		4713	0·230	254·2	125·3	− 9·5	0	1	
		4714	0·162	212·7	117·5	−13·8	0	3	
		4715	0·377	125·8	93·7	−18·4	0	5	
April 8		Centre			(112·4)	(−6·0)	(35)	(195)	(911)
98·423	CL, M	4713*a*	0·553	257·8	132·3	−11·7	4	16	
		4713	0·538	258·3	131·4	−11·3	0	2	
		4713	0·536	256·5	131·1	−12·2	0	3	
		4713	0·514	261·2	129·9	− 9·6	0	3	
		4713*b*	0·457	256·2	125·8	−11·6	25	131	
		4714	0·366	247·9	119·3	−13·4	0	3	
		4714	0·361	246·6	118·9	−13·8	0	2	
		4714	0·351	246·3	118·2	−13·6	0	4	

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4714, April 6–9. A few faint unstable spots *f* Group 4713, and forming a continuation of its stream.
Group 4715, April 8–14. A few spots, mostly small, in a straight but broken stream.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
98d.423	CL, M	4715	0·227	159·7	94·3	−18·1	4	15	
		4715	0·230	156·6	93·5	−18·0	0	2	
		4715	0·241	155·9	93·1	−18·6	0	2	
		4715	0·257	150·3	91·3	−18·7	0	5	
		4715	0·256	145·7	90·3	−18·0	4	13	
		4716	0·872	104·8	38·1	−15·8	0	5	117*f*
			0·949	186·0	123·0	−75·9			63
			0·967	83·9	24·6	+ 4·3			235
April 9		Centre			(99·0)	(−5·9)	(37)	(206)	(415)
99·671	AW, M		0·887	261·0	145·4	−10·7			198
		4713*a*	0·764	259·6	132·5	−11·7	1	4	} 260*p*
		4713*b*	0·688	259·5	126·1	−11·4	22	128	
		4715	0·297	224·4	95·2	−17·9	7	53	
		4715	0·257	216·8	91·9	−17·6	0	3	
		4715	0·266	211·9	91·1	−18·7	2	13	
		4715	0·246	211·7	90·4	−17·8	0	5	
			0·837	86·9	26·1	− 0·7			74
			0·888	78·2	21·5	+ 7·7			215
			0·938	89·1	13·1	− 1·2			212
April 10		Centre			(82·6)	(−5·8)	(32)	(206)	(959)
100·131	CL, AW		0·932	260·3	145·7	−11·1			180
			0·845	248·9	133·8	−20·8			154
I.		4713	0·834	258·2	133·2	−13·0	2	8	} 286*c*
		4713*b*	0·766	258·4	126·5	−12·6	22	115	
		4715	0·387	233·7	95·6	−18·6	7	26	
		4715	0·353	232·7	93·6	−17·8	0	4	
		4715	0·331	227·5	91·3	−18·4	1	6	
		4715	0·339	225·3	91·2	−19·2	0	5	
		4715	0·331	223·3	90·4	−19·5	0	5	
			0·934	88·2	7·8	− 0·4			168
			0·939	104·4	6·0	−15·5			182
April 11		Centre			(76·5)	(−5·7)	(32)	(169)	(970)
101·230	CL, AW		0·942	250·4	132·9	−20·4			170
			0·814	251·7	116·2	−18·2			907
I.		4713*b*	0·905	259·8	127·2	−11·7	27	120	677*c*
		4715	0·585	246·8	96·3	−18·0	4	23	
		4715	0·534	242·4	91·9	−19·2	0	5	
1898.				°	°	°			
101d.230	CL, AW		0·863	89·1	2·5	− 2·2			97
I.			0·884	107·3	359·7	−18·0			88
April 12		Centre			(62·0)	(−5·7)	(31)	(148)	(1939)
102·612	AW, CL		0·954	263·0	116·6	− 8·4			253
			0·949	270·4	115·1	− 1·4			128
			0·865	258·6	103·8	−12·7			345
			0·826	266·6	99·5	− 6·0			357
		4713*b*	0·991	259·0	126·8	−11·7	22	118	776*sf*
		4715	0·803	252·3	96·8	−17·5	0	9	298*f*
April 13		Centre			(43·7)	(−5·6)	(22)	(127)	(2157)
103·200	CL, M		0·954	250·1	102·1	−20·6			182
			0·912	268·0	101·8	− 4·2			173
I.			0·900	260·4	100·5	−11·0			263
		4715	0·876	253·2	97·2	−17·4	0	7	} 197*f*
		4715	0·870	253·5	96·5	−17·1	0	2	
April 14		Centre			(36·0)	(−5·5)	(0)	(9)	(815)
104·491	AW, CL		0·965	264·5	94·0	− 6·7			289
			0·950	252·9	91·3	−18·0			428
		4717	0·302	235·6	33·8	−15·0	1	5	
		4717	0·281	228·2	31·4	−16·0	0	4	
April 15		Centre			(18·9)	(−5·4)	(1)	(9)	(717)
105·178	CL, M		0·960	250·6	84·2	−20·1			242
I.									
April 16		Centre			(9·9)	(−5·3)	(0)	(0)	(242)
106·424	AW, CL		0·983	74·6	275·8	+14·1			232
April 17		Centre			(353·3)	(−5·3)	(0)	(0)	(232)
107·495	AW, CL		0·934	72·5	272·7	+14·3			432
April 18		Centre			(339·2)	(−5·2)	(0)	(0)	(432)
108·590	CL, AW		0·811	67·5	274·1	+14·9			200
April 19		Centre			(324·7)	(−5·1)	(0)	(0)	(200)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4716, April 9. A very small spot.
Group 4717, April 15. A pair of very small spots, forming near the place of Group 4716.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
109d.501	CL, AW		0·951	275·2	24·1	+ 3·4			179
			0·943	283·1	21·6	+10·6			168
			0·878	267·7	14·1	− 4·4			234
April 20		Centre			(312·7)	(− 5·0)	(0)	(0)	(581)
110·439	AW, M		0·933	269·5	9·1	− 2·3			148
			0·863	255·0	359·9	−15·4			103
			0·955	72·5	229·9	+15·1			153
			0·971	101·7	223·6	−12·6			180
April 21		Centre			(300·3)	(− 4·9)	(0)	(0)	(584)
111·589	AW, M		0·959	254·5	359·1	−16·2			80
			0·924	272·6	352·3	+ 0·6			128
			0·806	255·2	338·6	−14·8			65
		4718	0·988	78·5	205·3	+10·6	0	28	1035*f*
			0·882	68·9	226·4	+16·0			84
			0·879	102·0	223·5	−12·8			153
			0·953	108·3	212·3	−18·9			117
April 22		Centre			(285·1)	(− 4·8)	(0)	(28)	(1662)
112·434	AW, M	4718	0·940	77·0	205·6	+10·5	0	20	784*f*
			0·957	106·7	200·5	−17·4			191
April 23		Centre			(274·0)	(− 4·7)	(0)	(20)	(975)
113·430	AW, CL	4718	0·848	74·9	204·7	+10·2	0	14	410*f*
			0·900	109·2	196·8	−19·2			151
April 24		Centre			(260·8)	(− 4·6)	(0)	(14)	(561)
114·644	AW, M	4718	0·693	69·3	203·6	+10·7	0	4	381*f*
		4718	0·698	68·5	203·4	+11·4	0	6	
			0·858	99·5	185·6	−10·5			313
			0·915	106·6	178·5	−17·0			189
April 25		Centre			(244·7)	(− 4·5)	(0)	(10)	(883)
115·631	AW, M	4719	0·435	19·7	222·8	+19·8	0	3	
		4719	0·445	20·2	222·3	+20·3	0	2	
		4719	0·438	21·3	222·0	+19·7	0	3	
		4719	0·445	23·1	221·0	+19·7	0	3	
1898.				°	°	°			
115d.631	AW, M	4719	0·471	25·0	219·5	+20·9	0	7	
		4719	0·463	25·6	219·4	+20·3	0	4	
		4720*a*	0·954	102·5	158·9	−13·3	0	9	238*c*
		4720*b*	0·971	103·2	155·1	−13·9	0	16	
April 26		Centre			(231·7)	(−4·4)	(0)	(47)	(238)
116·269	AW, M	4721	0·594	304·3	253·7	+15·9	0	4	
		4721*a*	0·571	304·7	252·2	+15·1	1	10	
I.		4720*a*	0·901	102·4	158·9	−13·1	6	30	195*c*
		4720*b*	0·932	102·9	154·3	−13·6	0	12	
April 27		Centre			(223·2)	(−4·3)	(7)	(56)	(195)
117·123	AW, M		0·912	292·0	274·6	+18·1			161
		4721*a*	0·702	296·5	252·4	+15·0	1	7	
I.		4722	0·439	253·8	237·3	−10·9	0	4	
		4722	0·432	249·6	236·4	−12·5	0	2	
		4722	0·421	247·6	235·4	−13·0	0	5	
		4720*a*	0·792	103·6	159·9	−13·3	5	21	352*c*
		4720	0·820	101·7	157·0	−12·0	6	16	
		4720	0·838	103·3	155·3	−13·4	0	4	
		4720*b*	0·846	103·9	154·4	−14·0	0	7	
			0·924	103·0	144·4	−13·6			208
			0·962	97·0	137·7	− 7·9			309
April 28		Centre			(212·0)	(−4·2)	(12)	(66)	(1030)
118·659	CL, M	4722*a*	0·756	259·3	240·6	−10·8	23	98	355*c*
		4722	0·744	258·3	239·5	−11·4	0	10	
		4722	0·740	260·1	239·3	−10·1	0	7	
		4722	0·741	257·1	239·2	−12·3	0	2	
		4722	0·717	257·1	237·2	−11·9	0	5	
		4722	0·706	259·0	236·4	−10·7	0	9	
		4722*b*	0·702	256·7	235·9	−12·3	21	80	
		4722	0·687	256·8	234·7	−12·0	0	4	
		4720*a*	0·532	108·3	160·6	−13·1	7	24	
		4720	0·547	107·7	159·5	−13·0	0	3	
		4720*c*	0·547	103·5	159·1	−10·8	6	26	
		4720	0·568	107·4	158·0	−13·2	0	3	
		4720	0·581	105·0	156·9	−12·0	0	10	
		4720*b*	0·620	105·7	154·1	−12·9	0	10	
		4723	0·879	100·8	130·2	−11·4	1	8	431*c*
			0·801	92·7	138·5	− 4·7			119

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4718, April 22–25. A small very faint spot. A pair of very faint spots on April 25.
Group 4719, April 26. A number of very small faint spots in an irregular stream.
Group 4720, April 26–May 4. Two small spots, *a* and *b*, on April 26 and 27. Small spots appear between them on the succeeding days, making up with them a straggling stream. One of these spots, *c*, forms a close pair with *a*. *b* has disappeared by April 30, and the group has generally diminished. The group is not seen on May 3, but is represented by a single very small spot on May 4.
Group 4721, April 27–28. A small spot, *a*, with a very small companion on April 27.
Group 4722, April 28–May 2. A few very small spots forming two days past the central meridian. The group rapidly increases in size, and has become a straight stream by April 29; *a* and *b*, the first and last spots, being much the largest. A third spot, *c*, forms close to *a*, and the group consists on May 1 of the three spots, *a*, *b*, and *c*, now all large and regular. Several smaller spots are seen near *b* and *c* on the following day.
Group 4723, April 29–May 1. A small spot.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
118d.659	CL, M		0·841	112·4	135·5	−21·0			77
			0·967	108·9	116·2	−19·3			347
April 29		Centre			(191·7)	(−4·1)	(58)	(~~299~~)	(1329)
119·220	AW, M		0·941	287·9	252·3	+15·3			130
		4722*a*	0·843	259·3	241·7	−11·2	55	256	
I.		4722	0·825	257·9	239·7	−12·3	0	6	
		4722	0·813	259·9	238·6	−10·6	0	9	413*c*
		4722	0·808	259·0	238·0	−11·2	0	4	
		4722*c*	0·793	259·4	236·6	−10·9	7	50	
		4722*b*	0·787	257·1	235·9	−12·6	26	186	
		4720*a*	0·423	112·7	160·8	−13·0	5	26	
		4720*c*	0·436	106·5	159·2	−10·7	5	30	
		4720	0·473	107·4	157·0	−11·7	0	3	
		4723	0·812	100·9	130·1	−11·2	1	10	329*f*
			0·831	108·5	128·8	−17·5			337
April 30		Centre			(184·3)	(−4·0)	(99)	(580)	(1209)
120·303	AW, M	4722*a*	0·955	259·4	242·9	−11·3	96	375	
		4722*c*	0·914	259·6	236·1	−11·1	35	169	730*c*
I.		4722*b*	0·911	257·1	235·6	−13·4	37	146	
		4720*a*	0·222	136·4	161·0	−13·1	4	20	
		4720	0·237	134·0	160·0	−13·3	0	2	
		4720*c*	0·212	125·2	159·9	−10·8	2	11	
		4720	0·231	130·0	159·6	−12·3	0	3	
		4720	0·237	125·8	158·7	−11·8	1	5	
		4720	0·295	123·7	155·5	−13·2	1	9	
		4723	0·642	102·8	130·5	−11·2	2	12	
			0·759	105·7	121·2	−14·4			137
			0·845	114·3	113·7	−22·5			103
			0·920	96·0	103·0	− 7·1			211
			0·932	106·0	101·3	−16·3			152
May 1		Centre			(170·0)	(−3·9)	(178)	(752)	(1333)
121·203	AW, M		0·979	279·1	235·3	+ 8·1			200
			0·753	288·1	204·6	+10·9			101
I.		4722	0·986	257·8	238·7	−12·7	0	42	
		4722	0·983	256·0	237·8	−14·4	3	38	
		4722*c*	0·982	259·1	237·4	−11·4	20	170	610*c*
		4722	0·982	260·2	237·4	−10·3	0	46	
		4722*b*	0·980	257·1	236·8	−13·4	22	161	
1898.				°	°	°			
121d.203	AW, M	4720*a*	0·168	202·4	161·7	−12·7	1	4	
		4720*c*	0·128	197·6	160·2	−10·8	0	6	
I.		4720	0·167	150·7	153·2	−12·1	1	12	
		4720	0·178	150·7	152·9	−12·7	0	7	
			0·931	108·6	152·7	−18·7			271
May 2		Centre			(158·0)	(−3·8)	(47)	(486)	(1182)
122·395	AW, M		0·901	284·0	205·0	+10·9			332
			0·896	253·5	205·6	−16·4			197
			0·790	246·9	192·9	−20·4			96
		4724	0·851	71·3	86·4	+13·8	0	11	293*c*
		4724	0·893	71·0	81·5	+15·1	0	3	
			0·781	114·5	92·8	−21·2			182
			0·860	102·7	83·2	−12·8			192
			0·984	81·0	63·5	+ 8·1			207
May 3		Centre			(142·3)	(−3·7)	(0)	(14)	(1499)
123·218	AW, M		0·962	282·5	204·3	+11·0			295
		4720	0·434	243·0	154·9	−14·7	0	6	
I.			0·785	68·2	82·7	+14·6			72
			0·950	80·6	60·6	+ 7·8			120
May 4		Centre			(131·4)	(−3·6)	(0)	(6)	(487)
124·145	AW, M		0·938	259·9	189·0	−10·7			80
			0·879	254·1	180·3	−15·6			117
I.			0·880	78·0	58·9	+ 8·8			153
May 5		Centre			(119·2)	(−3·5)	(0)	(0)	(350)
125·492	CL, AW		0·835	255·9	157·6	−13·7			423
		4724	0·428	43·0	83·9	+14·9	0	5	
		4724	0·421	45·4	83·5	+13·9	0	7	
		4724	0·434	44·3	83·2	+14·9	0	3	
		4724	0·450	45·2	82·2	+15·2	0	5	
		4725*a*	0·916	102·5	35·1	−12·8	10	58	
		4725	0·918	103·1	34·9	−13·4	0	5	336*c*
		4725*b*	0·934	102·6	32·4	−13·0	7	55	
		4726	0·990	96·8	19·4	− 7·3	46	266	471*c*
			0·926	77·1	35·0	+10·6			204
May 6		Centre			(101·4)	(−3·4)	(63)	(404)	(1434)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4724, May 3–8. A few very small unstable spots irregularly scattered. The group is not seen on May 4 and 5.
Group 4725, May 6–9. A pair of spots, *a* and *b*, that rapidly diminish in size. They are occasionally accompanied by one or two very small companions.
Group 4726, May 6–18. A stream of spots, mostly small, except for a pair of large regular spots, *a* and *b*, at the head of the stream. Two considerable portions, *c* and *d*, have broken off by May 12 from *b*, which is no longer regular in shape, and *a* has elongated in the direction of *b*, its umbra being remarkably long, narrow, and straight. The smaller spots undergo a good deal of change.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
126d.412	AW, M		0·938	257·2	158·9	−13·1			451
			0·814	254·6	143·1	−14·4			240
		4724	0·305	13·3	85·1	+13·9	1	8	
		4727	0·688	70·6	48·0	+10·7	2	14	
		4727	0·705	73·3	46·2	+ 9·3	3	20	
		4727	0·716	72·4	45·5	+10·1	0	12	
		4725*a*	0·811	103·2	35·4	−12·6	4	16	
		4725	0·816	103·7	35·0	−13·0	1	10	375*c*
		4725*b*	0·839	103·1	32·5	−12·8	5	20	
		4726*a*	0·934	96·0	20·1	− 6·8	42	193	
		4726*b*	0·950	95·3	17·4	− 6·0	31	220	1173*c*
		4726	0·967	95·3	13·9	− 6·0	0	84	
			0·883	73·2	29·2	+13·1			166
May 7		Centre			(89·2)	(−3·3)	(89)	(597)	(2405)
127·209	AW, M		0·963	255·0	153·0	−15·3			297
			0·864	265·5	138·3	− 5·5			222
I.			0·808	255·0	131·9	−14·0			371
		4724	0·322	335·9	86·3	+13·8	2	7	
		4724	0·322	338·9	85·4	+14·3	0	3	
		4724	0·324	345·7	83·3	+15·0	0	4	
		4727	0·549	63·9	48·6	+11·1	1	9	
		4727	0·571	68·6	46·1	+ 9·3	0	3	
		4727	0·582	67·6	45·6	+10·2	0	5	
		4725*a*	0·699	105·1	35·0	−12·8	4	17	130*c*
		4725*b*	0·731	104·6	32·3	−12·8	3	12	
		4726*a*	0·852	95·5	20·3	− 6·3	43	194	
		4726	0·868	96·1	18·4	− 6·9	0	6	
		4726	0·878	96·3	17·3	− 7·1	0	13	
		4726*b*	0·878	94·8	17·3	− 5·8	48	206	969*c*
		4726	0·902	94·5	14·2	− 5·5	3	40	
		4726	0·919	94·8	11·9	− 5·7	0	9	
		4726	0·933	95·9	9·7	− 6·7	0	19	
May 8		Centre			(78·6)	(−3·2)	(104)	(547)	(1989)
128·660	AW, M		0·959	262·4	133·1	− 8·2			309
			0·952	247·8	131·3	−22·1			114
			0·899	255·3	123·2	−14·6			204
			0·834	246·8	114·4	−20·9			168
		4728*a*	0·139	196·8	61·8	−10·7	6	19	
1898.				°	°	°			
128d.660	AW, M	4728	0·163	180·0	59·5	−12·4	0	1	
		4728	0·143	177·0	59·1	−11·3	0	2	
		4728	0·138	173·4	58·6	−11·0	0	5	
		4728	0·150	172·0	58·3	−11·6	1	7	
		4727	0·300	31·7	50·3	+11·7	0	2	
		4727	0·305	33·7	49·6	+11·6	1	6	
		4725*a*	0·439	113·2	35·2	−12·8	0	4	
		4725	0·441	114·3	35·2	−13·2	0	1	
		4725*b*	0·481	111·5	32·3	−12·8	0	2	
		4725	0·491	112·7	31·8	−13·6	0	7	
		4726*a*	0·619	96·4	21·4	− 6·5	38	181	
		4726	0·638	96·4	20·0	− 6·5	0	2	
		4726*b*	0·663	95·4	18·1	− 5·9	39	248	
		4726	0·678	97·6	17·0	− 7·4	0	3	
		4726	0·681	94·8	16·7	− 5·5	0	4	
		4726	0·691	96·2	15·9	− 6·5	0	3	332*f*
		4726	0·693	94·9	15·7	− 5·6	1	8	
		4726	0·717	93·9	13·8	− 5·0	0	4	
		4726	0·737	97·0	12·2	− 7·3	0	12	
		4726	0·740	95·1	11·9	− 5·9	0	4	
		4726	0·742	96·2	11·7	− 6·7	0	2	
May 9		Centre			(59·5)	(−3·1)	(86)	(527)	(1127)
129·168	AW, M		0·954	264·5	125·3	− 6·2			148
			0·945	256·8	123·6	−13·4			340
I.			0·896	248·0	115·4	−21·0			353
		4728*a*	0·204	232·8	62·3	−10·0	8	39	
		4728	0·201	228·2	61·5	−10·6	0	3	
		4728	0·206	222·5	60·9	−11·7	0	2	
		4728	0·202	217·3	60·0	−12·2	0	1	
		4728	0·191	219·6	59·9	−11·4	2	7	
		4728	0·168	217·9	58·8	−10·6	0	5	
		4728	0·167	213·6	58·2	−11·0	0	6	
		4726	0·489	94·6	23·6	− 4·9	0	2	
		4726*a*	0·521	96·8	21·6	− 6·1	46	192	
		4726*b*	0·568	95·5	18·3	− 5·6	49	282	
		4726	0·606	95·1	15·6	− 5·5	0	3	
		4726	0·653	97·2	12·2	− 7·0	2	11	
		4726	0·653	96·3	12·2	− 6·4	0	4	
		4726	0·668	94·8	11·0	− 5·5	0	2	
May 10		Centre			(52·8)	(−3·0)	(107)	(559)	(841)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4727, May 7–9. A few small unstable spots irregularly scattered.
Group 4728, May 9–11. A number of spots, mostly very small, in an irregular stream. The leader, *a*, is the largest, and alone remains by May 11.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
130d·489	CL, M		0·965	258·1	110·2	−12·3			101
			0·966	248·5	110·1	−21·5			483
			0·950	264·6	107·1	− 6·0			125
			0·827	288·5	88·8	+13·4			290
		4728*a*	0·480	254·5	63·2	− 9·9	3	8	
		4726*a*	0·238	104·4	22·0	− 6·2	31	175	
		4726	0·290	111·6	19·5	− 8·9	0	5	
		4726*b*	0·287	99·7	18·9	− 5·5	37	227	
		4726	0·318	104·6	17·3	− 7·4	0	2	
		4726	0·339	103·3	16·0	− 7·3	0	4	
		4726	0·356	94·9	14·6	− 4·4	0	2	
		4726	0·397	98·8	12·2	− 6·1	0	10	
May 11		Centre			(35·3)	(−2·9)	(71)	(433)	(999)
131·474	AW, M		0·899	289·1	84·0	+15·8			223
I.		4726*a*	0·062	183·2	22·4	− 6·3	33	165	
		4726*b*	0·074	141·0	19·5	− 6·0	27	126	
		4726*c*	0·108	142·6	18·4	− 7·6	8	36	
		4726*d*	0·079	121·7	18·3	− 5·1	5	37	
		4726	0·175	109·8	12·7	− 6·0	0	2	
May 12		Centre			(22·2)	(−2·7)	(73)	(366)	(223)
132·447	AW, M		0·960	288·4	81·2	+16·8			201
			0·769	259·1	59·3	−10·0			138
		4726*a*	0·244	255·6	23·1	− 6·0	27	157	
		4726	0·229	248·4	21·7	− 7·4	0	4	
		4726	0·215	246·8	20·8	− 7·4	0	6	
		4726*b*	0·189	253·1	19·8	− 5·8	16	99	
		4726*c*	0·184	243·5	18·9	− 7·3	4	35	
		4726*d*	0·164	255·0	18·5	− 5·0	0	48	
			0·989	97·8	287·8	− 8·1			340
May 13		Centre			(9·4)	(−2·6)	(47)	(349)	(679)
133·455	AW, M		0·908	259·5	61·1	−10·6			184
		4726*a*	0·473	261·9	24·1	− 6·0	20	109	
		4726	0·447	261·5	22·4	− 6·0	0	7	
		4726*b*	0·416	261·5	20·4	− 5·8	13	64	
		4726	0·415	258·2	20·2	− 7·1	0	2	
		4726	0·402	257·6	19·3	− 7·3	0	17	
		4726	0·398	261·8	19·3	− 5·5	0	11	
		4726	0·394	264·2	19·2	− 4·6	0	4	
1898.				°	°	°			
133d·455	AW, M	4726	0·387	265·6	18·8	− 4·0	0	1	
		4726	0·260	270·3	11·1	− 2·4	0	1	
		4729	0·194	355·4	357·0	+ 8·6	0	4	
		4729	0·179	2·7	355·6	+ 7·8	0	1	
		4730	0·888	96·3	293·6	− 6·7	2	8	
		4730	0·894	96·8	292·9	− 7·3	0	6	
		4730	0·902	96·9	291·8	− 7·3	0	4	503*c*
		4730	0·935	97·4	287·0	− 7·8	0	10	
		4731	0·939	101·4	286·4	−11·6	0	6	
May 14		Centre			(356·1)	(−2·5)	(35)	(255)	(687)
134·180	AW, M		0·965	259·9	61·2	−10·4			368
		4726*a*	0·623	263·6	24·7	− 5·9	11	88	
I.		4726	0·607	261·3	23·4	− 7·1	0	4	
		4726	0·588	261·1	22·1	− 7·2	0	3	
		4726*b*	0·563	262·2	20·4	− 6·4	24	116	
		4726	0·550	263·5	19·6	− 5·6	0	4	
		4730	0·796	96·6	293·8	− 6·7	2	8	
		4730	0·804	96·7	293·1	− 6·8	0	6	105*c*
		4730	0·813	97·2	292·2	− 7·3	0	9	
			0·871	99·9	286·1	− 9·8			217
May 15		Centre			(346·4)	(−2·4)	(37)	(238)	(690)
135·429	AW, M		0·861	255·5	28·7	−13·6			132
		4726	0·831	260·9	25·8	− 8·8	0	4	
		4726*a*	0·823	264·9	25·1	− 5·5	11	49	
		4726	0·820	260·1	24·7	− 9·5	0	9	
		4726	0·813	264·4	24·1	− 5·9	0	3	604*c*
		4726	0·781	262·2	21·0	− 7·4	0	4	
		4726*b*	0·779	264·5	20·9	− 5·7	17	86	
May 16		Centre			(329·9)	(−2·3)	(28)	(155)	(736)
136·225	AW, M		0·961	255·8	33·2	−14·3			250
			0·949	280·1	30·1	+ 8·9			176
I.		4726*a*	0·920	264·7	26·2	− 5·8	0	20	649*c*
		4726*b*	0·886	264·8	21·6	− 5·6	13	39	
		4732*a*	0·967	103·5	244·3	−13·6	24	202	682*c*
			0·979	81·4	241·8	+ 8·0			365
May 17		Centre			(319·4)	(−2·2)	(37)	(261)	(2122)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4729, May 14. Two very small faint spots.
Group 4730, May 14–18. A few small unstable spots irregularly scattered. The group is not seen on May 16 and 17.
Group 4731, May 14. A very small spot *s* of Group 4730.
Group 4732, May 17–28. A large spot, *a*, divided by a bridge into two unequal portions, which have separated into distinct spots, *b* and *c*, by May 21. A few very small spots are seen near the chief spot on May 19 and 22. *b* alone remains by May 25.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
137d·475	AW, CL	4726*b*	0·978	264·9	20·7	− 5·5	5	56	993*c*
		4726	0·939	265·8	12·6	− 4·7	0	9	
		4730	0·159	120·8	294·9	− 6·7	0	2	
		4733	0·744	68·1	257·5	+14·6	0	5	154*c*
		4733	0·746	67·5	257·4	+15·1	2	3	
		4733	0·763	69·0	255·6	+14·4	0	14	
		4733	0·772	68·9	254·9	+14·7	0	3	
		4732*a*	0·863	105·0	243·8	−14·0	30	204	482*c*
			0·901	81·0	239·3	+ 7·2			504
			0·930	98·9	234·6	− 9·1			245
May 18		Centre			(302·8)	(−2·1)	(37)	(296)	(2378)
138·239	AW, M		0·985	262·2	12·7	− 8·1			493
		4732*a*	0·763	106·2	244·0	−13·6	33	164	340*f*
I.		4732	0·764	104·4	243·7	−12·3	0	4	
			0·796	78·9	240·9	+ 7·6			241
			0·978	103·8	214·9	−13·9			423
May 19		Centre			(292·7)	(−2·0)	(33)	(168)	(1497)
139·287	AW, M	4733	0·427	48·0	259·8	+14·9	0	10	
		4732*a*	0·594	110·5	244·2	−13·4	28	135	
I.			0·931	104·8	210·8	−14·4			524
May 20		Centre			(278·9)	(−1·8)	(28)	(145)	(524)
140·174	AW, M	4733	0·305	19·8	261·1	+15·0	0	2	
		4732*b*	0·432	119·1	244·4	−13·7	24	90	
I.		4732*c*	0·447	117·5	243·3	−13·4	6	26	
			0·803	105·7	214·7	−13·6			273
			0·909	107·3	202·7	−16·4			221
May 21		Centre			(267·2)	(−1·7)	(30)	(118)	(494)
141·518	AW, M	4732	0·202	173·4	248·0	−13·1	0	3	
		4732	0·252	165·9	245·8	−15·7	0	4	
		4732*b*	0·225	159·3	244·7	−13·7	16	89	
		4732	0·277	161·3	244·1	−16·8	0	6	
		4732*c*	0·234	153·9	243·3	−13·7	2	6	
		4734	0·229	59·7	238·0	+ 5·1	0	4	
May 22		Centre			(249·4)	(−1·6)	(18)	(112)	(0)
1898.				°	°	°			
142d·498	CL, M		0·850	263·2	294·4	− 6·6			172
		4732*b*	0·259	213·7	244·9	−13·8	15	68	
		4732*c*	0·245	208·8	243·4	−13·8	3	14	
			0·948	102·3	165·3	−12·1			177
May 23		Centre			(236·4)	(−1·5)	(18)	(82)	(349)
143·497	AW, M		0·926	262·2	290·7	− 7·7			292
		4732*b*	0·422	239·5	245·1	−13·6	15	78	
		4732*c*	0·397	237·1	243·2	−13·7	0	4	
		4735	0·374	127·1	205·3	−14·4	1	12	
		4735	0·394	123·3	203·5	−13·7	0	2	
			0·878	105·2	162·6	−14·0			226
May 24		Centre			(223·2)	(−1·4)	(16)	(96)	(518)
144·120	AW, M		0·967	261·5	290·0	− 8·6			336
		4732*b*	0·537	246·0	245·1	−13·7	11	67	
I.		4736	0·965	83·8	140·5	+ 5·6	0	15	219*f*
			0·939	100·9	145·4	−10·7			258
			0·951	108·9	143·7	−18·4			126
May 25		Centre			(214·9)	(−1·3)	(11)	(82)	(939)
145·448	AW, M	4732*b*	0·757	253·2	245·4	−13·4	7	53	152*c*
		4735	0·301	219·1	208·7	−14·6	5	33	
		4735	0·268	212·0	205·8	−14·1	0	2	
I.		4735	0·279	208·4	205·3	−15·2	3	25	
		4737	0·513	113·1	168·6	−12·5	0	8	
		4736	0·838	82·6	141·0	+ 5·6	0	11	321*f*
			0·852	103·7	139·7	−12·2			170
			0·909	114·5	134·0	−22·6			194
May 26		Centre			(197·4)	(−1·1)	(15)	(132)	(837)
146·467	CL, M		0·885	281·5	245·3	+ 9·7			128
			0·780	275·1	234·8	+ 3·3			71
		4732*b*	0·882	255·2	245·0	−13·5	11	44	148*c*
		4735	0·490	240·6	210·0	−14·8	3	15	
		4735	0·469	239·4	208·5	−14·7	0	8	
		4735	0·465	237·4	207·8	−15·4	0	5	
		4735	0·437	237·0	206·1	−14·7	0	7	
		4735	0·433	235·3	205·4	−15·1	2	12	

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4733, May 18–21. A few very small unstable spots irregularly scattered. The group is not seen on May 19.
Group 4734, May 22. A very small faint spot.
Group 4735, May 24–29. A few unstable spots in a straggling stream. The group is not seen on May 25.
Group 4736, May 25–27. A small spot.
Group 4737, May 26–June 3. A very small spot on May 26. The group is not seen on the three succeeding days, but has reappeared by May 30 as a very small spot. One or two more appear on the next two days.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
146d·467	CL, M	4735	0·423	235·0	204·8	−15·0	0	5	
		4735	0·410	234·7	204·0	−14·6	0	7	
		4738	0·460	110·1	158·0	−10·0	0	3	
		4738	0·488	109·8	156·2	−10·4	0	8	
		4736	0·682	80·1	141·6	+ 6·0	0	2	
			0·819	118·5	132·3	−23·6			118
May 27		Centre			(183·9)	(−1·0)	(16)	(116)	(465)
147·131	AW, M		0·915	277·4	240·9	+ 6·5			145
		4732b	0·945	256·0	245·5	−13·5	0	41	321f
I.		4735	0·613	246·9	210·7	−14·6	2	11	
		4735	0·557	244·6	206·4	−14·6	0	11	
		4735	0·545	243·3	205·3	−14·9	1	9	
		4735	0·529	243·3	204·3	−14·5	1	12	
			0·870	114·7	117·1	−21·8			187
May 28		Centre			(175·2)	(−0·9)	(4)	(84)	(653)
148·121	AW, M		0·842	252·1	218·0	−15·4			186
		4735	0·785	252·6	212·4	−14·1	0	5	
I.		4735	0·721	250·1	206·4	−14·8	0	6	167c
		4735	0·708	249·4	205·1	−15·0	0	9	
		4739	0·920	110·0	96·4	−18·7	0	16	196f
			0·774	119·3	115·1	−22·8			160
May 29		Centre			(162·0)	(−0·8)	(0)	(36)	(709)
149·487	AW, M		0·914	253·3	209·0	−15·4			410
		4737	0·446	241·2	167·5	−12·9	0	6	
		4740a	0·344	223·9	158·2	−14·9	0	5	
		4740b	0·343	221·6	157·6	−15·4	3	16	
		4740c	0·317	214·6	154·7	−15·7	6	39	
		4739	0·748	114·0	98·2	−18·1	3	13	
		4739	0·761	113·7	97·0	−18·2	0	3	
			0·843	321·2	100·1	+40·5			272
May 30		Centre			(144·0)	(−0·6)	(12)	(82)	(682)
150·091	AW, M		0·952	253·8	207·4	−15·6			417
		4737	0·592	249·5	170·4	−12·4	0	7	
		4737	0·548	247·6	167·1	−12·4	1	9	
I.		4740a	0·445	235·1	158·1	−15·2	8	23	
1898.				°	°	°			
150d·091	AW, M	4740b	0·426	235·0	157·0	−14·6	10	28	
		4740	0·397	234·9	155·4	−13·6	1	12	
I.		4740c	0·406	229·8	154·7	−15·6	16	79	
		4739	0·651	117·6	98·8	−18·0	0	10	
		4739	0·709	116·1	94·0	−18·5	0	7	
			0·987	79·2	55·7	+10·6			358
May 31		Centre			(136·0)	(−0·5)	(36)	(175)	(775)
151·650	CL, M	4737	0·820	255·7	169·4	−11·9	0	8	
		4737	0·797	253·8	166·9	−13·1	0	4	215c
		4737	0·789	254·0	166·1	−12·8	0	3	
		4740a	0·712	248·8	158·6	−15·2	1	5	
		4740b	0·702	248·5	157·7	−15·1	7	52	
		4740c	0·669	246·1	154·6	−16·0	15	76	
		4740	0·659	246·1	153·9	−15·7	3	11	327c
		4740	0·649	246·6	153·3	−15·2	4	16	
		4740	0·649	245·7	153·0	−15·7	0	2	
		4741	0·161	71·4	106·6	+ 2·5	2	4	
		4741	0·204	69·4	104·3	+ 3·7	0	2	
		4741	0·213	73·1	103·6	+ 3·2	0	3	
		4739	0·404	139·4	99·3	−18·1	0	1	
		4739	0·416	138·6	98·5	−18·5	0	2	
		4739	0·427	138·7	98·0	−19·0	0	3	
		4739	0·436	136·1	96·8	−18·6	0	2	
		4739	0·446	136·3	96·3	−19·1	0	1	
		4742	0·852	78·2	57·7	+ 9·8	5	14	212c
		4742	0·878	76·7	54·8	+11·5	0	6	
June 1		Centre			(115·3)	(−0·4)	(37)	(215)	(754)
152·607	AW, M	4737	0·931	257·4	170·6	−11·9	0	4	259c
		4737	0·908	255·5	167·0	−13·3	0	16	
		4740b	0·837	252·0	158·0	−15·1	9	27	
		4740c	0·810	250·3	155·0	−16·0	7	60	
		4740	0·797	248·6	153·4	−17·1	0	5	343c
		4740	0·792	250·5	153·3	−15·5	0	9	
		4741	0·079	303·4	106·5	+ 2·2	0	2	
		4741	0·068	305·9	105·8	+ 2·0	0	2	
		4741	0·064	346·2	103·6	+ 3·3	1	5	
		4739	0·302	171·3	100·0	−17·6	0	4	
		4742	0·719	75·9	57·8	+10·1	0	9	
			0·928	77·4	35·4	+11·6			126

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4738, May 27. A pair of very small spots.
Group 4739, May 29–June 2. One or two small faint unstable spots.
Group 4740, May 30–June 4. Three spots, *a, b,* and *c,* suddenly appearing *f* Group 4737. The group increases rapidly up to June 1, and diminishes afterwards.
Group 4741, June 1–8. A few very small faint unstable spots. The group is not seen on June 4, 5, and 7.
Group 4742, June 1–4. One or two small faint unstable spots.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
152d·607	AW, M		0·956	97·8	30·1	− 7·6			387
June 2		Centre			(102·7)	(−0·3)	(17)	(143)	(1115)
153·403	AW, M	4737	0·965	256·8	166·4	−12·7	0	4	294*np*
		4737	0·963	256·3	165·9	−13·2	0	13	
		4740*b*	0·920	253·8	158·1	−14·9	0	9	
		4740	0·907	253·3	156·1	−15·1	0	3	685*c*
		4740*c*	0·901	252·2	155·2	−16·0	4	24	
		4743	0·782	289·3	141·8	+14·9	2	6	
		4743	0·778	289·0	141·5	+14·6	2	11	
		4743	0·753	290·7	138·9	+15·4	0	10	
		4741	0·246	282·7	106·0	+ 3·0	0	2	
		4741	0·243	286·2	105·7	+ 3·7	0	4	
		4742	0·640	73·1	53·8	+10·6	0	8	
			0·883	98·6	30·7	− 7·7			311
			0·955	94·5	19·7	− 4·4			226
June 3		Centre			(92·2)	(−0·1)	(8)	(94)	(1516)
154·143	AW, M		0·868	254·2	141·4	+13·7			146
			0·829	279·0	137·7	+ 7·4			241
I.		4740	0·966	254·4	156·6	−15·1	0	28	365*c*
		4740*c*	0·958	253·1	154·7	−16·2	0	10	
		4743	0·881	286·1	142·9	+14·1	0	15	89*c*
		4742	0·473	66·7	56·2	+10·7	0	8	
			0·805	101·1	29·4	− 8·9			151
			0·882	93·7	20·7	− 3·3			130
			0·922	101·5	15·7	−10·6			158
June 4		Centre			(82·3)	(0·0)	(0)	(61)	(1280)
155·184	AW, M		0·953	286·3	140·1	+15·6			147
			0·935	255·7	136·9	−13·3			164
I.			0·916	278·3	134·5	+ 7·7			368
			0·906	247·0	131·4	−20·6			129
			0·741	93·2	21·0	− 2·3			113
			0·949	107·8	358·1	−16·8			222
June 5		Centre			(68·6)	(+0·1)	(0)	0)	(1143)
156·118	AW, M		0·963	278·8	130·1	+ 8·5			259
			0·935	245·1	123·1	−23·1			190
I.			0·844	242·5	110·2	−22·8			127
1898.				°	°	°			
156d·118	AW, M	4741	0·815	277·1	110·3	+ 5·9	19	44	150*c*
I.		4741	0·784	276·0	107·4	+ 4·8	4	17	
		4741	0·772	276·5	106·3	+ 5·1	0	8	
			0·874	119·2	357·1	−17·4			204
June 6		Centre			(56·1)	(+0·2)	(23)	(69)	(930)
157·492	CL, AW		0·937	274·8	107·3	+ 4·6			267
			0·926	94·6	330·5	− 4·2			138
June 7		Centre			(38·0)	(+0·3)	(0)	(0)	(405)
158·275	AW, M	4741	0·980	274·4	106·0	+ 4·4	0	8	378*p*
I.			0·945	249·6	97·0	−19·0			154
			0·852	249·2	83·4	−19·8			92
			0·846	95·2	330·3	− 4·1			107
June 8		Centre			(27·7)	(+0·5)	(0)	(8)	(731)
159·289	CL, M		0·931	247·5	80·7	−20·6			96
I.			0·831	254·9	69·1	−12·1			91
June 9		Centre			(14·2)	(+0·6)	(0)	(0)	(187)
160·310	M, CL		0·939	263·7	70·2	− 5·7			170
I.									
June 10		Centre			(0·7)	(+0·7)	(0)	(0)	(170)
161·446	AW, M		0·946	281·3	56·3	+11·0			199
			0·763	259·9	34·7	− 7·1			122
		4744	0·529	256·3	16·7	− 6·5	1	4	
June 11		Centre			(345·7)	(+0·8)	(1)	(4)	(321)
162·157	CL, M		0·861	261·3	35·0	− 7·0			176
			0·761	268·1	25·5	− 0·9			52
I.			0·951	102·4	265·0	−11·5			72
June 12		Centre			(336·2)	(+0·9)	(0)	(0)	(300)
163·350	CL, M		0·911	262·9	25·7	− 6·0			219
I.			0·943	101·5	250·7	−10·5			152
June 13		Centre			(320·5)	(+1·1)	(0)	(0)	(371)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4743, June 3–4. A few small spots in a short straight stream. The leader only remains by June 4.
Group 4744, June 11. A very small spot.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
164d.328	M, CL		0·984	267·6	26·9	− 2·1			265
			0·935	260·0	16·0	− 8·9			206
			0·819	247·0	359·7	−17·9			246
I.		4745a	0·458	294·6	332·6	+12·1	7	26	
		4745	0·446	298·3	331·2	+13·3	0	2	
		4745	0·418	301·0	329·0	+13·5	0	5	
		4745b	0·422	302·7	328·9	+14·3	6	23	
			0·875	104·0	247·6	−11·6			386
			0·920	84·3	240·8	+ 5·7			187
June 14		Centre			(307·5)	(+1·2)	(13)	(56)	(1290)
165·599	CL, M		0·939	250·2	358·7	−18·1			211
		4745a	0·699	285·1	334·0	+11·4	1	12	
		4745	0·682	286·5	332·5	+12·1	0	1	
		4745	0·664	285·7	331·2	+11·3	0	3	
		4745	0·658	289·4	330·2	+13·6	0	7	
		4745	0·639	289·8	328·7	+13·5	0	1	
		4745b	0·633	292·1	327·9	+14·8	6	20	
		4745c	0·635	293·1	327·8	+15·4	2	9	
			0·938	105·1	222·2	−13·7			164
June 15		Centre			(290·7)	(+1·3)	(9)	(53)	(375)
166·511	AW, M	4745a	0·839	282·4	335·1	+11·1	0	16	
		4745	0·806	286·3	331·4	+14·0	0	4	277c
		4745c	0·770	288·9	327·6	+15·4	7	29	
		4746	0·728	67·8	234·1	+16·9	0	16	
		4746	0·736	68·9	233·2	+16·3	0	9	
		4746	0·755	67·8	231·8	+17·5	2	13	
		4746	0·759	67·2	231·5	+18·0	1	5	
			0·879	108·8	219·1	−15·7			589
June 16		Centre			(278·7)	(+1·4)	(10)	(92)	(866)
167·631	CL, M	4745a	0·953	281·0	335·9	+11·0	0	18	
		4745	0·931	282·9	331·9	+12·6	0	10	
		4745	0·918	285·4	329·7	+14·7	0	4	437c
		4745c	0·907	286·3	328·1	+15·4	0	4	
		4746	0·507	58·0	237·2	+16·9	5	12	
		4746	0·517	57·5	236·7	+17·4	0	3	
		4746	0·523	58·7	236·0	+17·1	0	2	
		4746	0·533	60·2	235·1	+16·6	3	14	
		4746	0·540	59·2	234·9	+17·3	0	3	
1898.				°	°	°			
167d.631	CL, M	4746	0·549	57·6	234·7	+18·4	0	1	
		4746	0·586	60·8	231·4	+17·8	14	69	
			0·880	110·8	204·5	−17·4			110
June 17		Centre			(263·8)	(+1·5)	(22)	(140)	(547)
168·498	AW, M		0·977	284·5	329·8	+14·5			361
		4747	0·923	280·4	319·4	+10·3	0	4	203c
		4747	0·918	282·3	318·5	+12·0	0	4	
		4746	0·350	41·9	238·2	+16·7	3	29	
		4746	0·378	43·7	236·5	+17·4	0	6	
		4746	0·373	47·2	235·8	+16·3	0	4	
		4746	0·391	45·1	235·5	+17·6	0	2	
		4746	0·402	44·6	235·1	+18·2	0	2	
		4746	0·426	44·6	233·9	+19·2	0	2	
		4746	0·437	51·0	231·5	+17·5	7	46	
		4748	0·450	66·5	227·5	+11·9	1	5	
June 18		Centre			(252·3)	(+1·7)	(11)	(104)	(564)
169·475	CL, M	4746	0·258	1·8	238·9	+16·7	0	8	
		4746	0·274	23·1	233·0	+16·3	0	4	
		4746	0·277	26·0	232·2	+16·2	0	1	
		4746	0·295	25·4	231·8	+17·2	0	1	
		4746	0·290	29·0	231·0	+16·4	0	3	
		4746	0·302	28·4	230·8	+17·1	0	4	
		4748	0·244	46·1	229·1	+11·4	0	2	
		4748	0·257	50·3	227·8	+11·1	0	6	
		4748	0·284	57·5	225·5	+10·5	0	4	
June 19		Centre			(239·4)	(+1·8)	(0)	(33)	(0)
170·172	CL, M	4748	0·123	11·7	228·7	+ 8·8	0	2	
I.		4748	0·174	9·6	228·4	+11·8	0	2	
		4749a	0·922	101·7	163·9	−10·0	9	30	771s
June 20		Centre			(230·1)	(+1·9)	(9)	(34)	(771)
171·528	AW, M	4749a	0·736	106·3	166·5	−10·5	13	92	
		4749	0·747	107·8	165·8	−11·9	0	3	316c
		4749	0·771	108·3	163·8	−12·7	1	5	
		4749	0·780	108·3	163·0	−12·8	2	13	
			0·879	113·3	153·6	−19·2			178
			0·900	105·3	149·5	−12·8			313

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4745, June 14–17. A pair of small regular spots, *a* and *b*, with a few very small spots between them, forming together a sparse straight stream, considerably inclined to the equator. *b* has thrown off a small companion by June 15. *a* moves forward rapidly in longitude.
Group 4746, June 16–23. A few spots, mostly small and unstable, in an irregular group, which changes rapidly from day to day. The group is not seen on June 20, 21, or 22; but a small spot marks its place on June 23.
Group 4747, June 18. A wide pair of very small spots, only seen close to the W. limb.
Group 4748, June 18–20. A few very small unstable spots *sf* Group 4746.
Group 4749, June 20–30. A regular spot, *a*, with a rapid forward motion in longitude. It is followed by several small companions on June 21, 25, 26, and 27.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
171d·528	AW, M		0·933	80·8	143·5	+ 9·3			172
June 21		Centre			(212·2)	(+2·0)	(16)	(113)	(979)
172·192	CL, M	4749a	0·620	110·0	167·3	−10·5	19	86	99c
I.			0·900	78·9	139·6	+10·9			78
			0·939	108·5	135·5	−16·5			187
June 22		Centre			(203·5)	(+2·1)	(19)	(86)	(364)
173·198	CL, M	4746	0·713	291·9	233·7	+17·0	0	9	144p
M.		4749a	0·421	121·1	168·7	−10·4	12	91	
			0·839	111·7	135·8	−16·8			111
			0·953	109·3	119·6	−17·6			145
			0·967	85·2	114·9	+ 5·2			215
June 23		Centre			(190·1)	(+2·2)	(12)	(100)	(615)
174·322	CL, M		0·853	288·2	232·9	+16·8			364
			0·790	251·0	225·2	−13·3			149
M.		4749a	0·240	159·4	170·4	−10·6	13	87	
			0·885	115·4	116·6	−21·0			154
			0·876	85·6	114·3	+ 5·0			206
June 24		Centre			(175·3)	(+2·4)	(13)	(87)	(873)
175·334	M, CL		0·955	286·9	234·3	+16·9			284
			0·921	255·9	227·5	−12·0			108
			0·751	251·5	208·4	−12·1			73
		4749a	0·279	214·9	171·1	−10·7	14	65	
I.		4749	0·261	210·5	169·5	−10·5	0	3	
		4749	0·249	210·0	169·0	− 9·9	0	4	
		4749	0·234	210·2	168·6	− 9·2	0	5	
		4750	0·222	65·1	150·1	+ 7·8	0	12	
		4750	0·250	70·9	148·1	+ 7·1	0	4	
June 25		Centre			(161·8)	(+2·5)	(14)	(93)	(465)
176·328	CL, M		0·978	284·0	226·7	+14·3			227
			0·954	252·1	219·4	−16·2			188
I.		4749a	0·448	240·2	171·9	−10·4	13	64	
		4749	0·433	242·4	171·5	− 9·2	0	3	
		4749	0·414	240·0	169·9	− 9·5	0	5	
1898.				°	°	°			
176d·328	CL, M	4751a	0·902	98·4	85·1	− 6·4	5	20	1256f
I.			0·929	115·6	83·8	−22·5			182
June 26		Centre			(148·7)	(+2·6)	(18)	(92)	(1853)
177·241	CL, M	4749a	0·613	249·3	172·1	−10·3	12	52	
		4749	0·607	251·7	172·1	− 8·8	0	3	
I.		4749	0·590	249·7	170·6	− 9·6	0	5	
		4749	0·578	247·8	169·4	−10·3	0	6	
		4752	0·472	239·7	161·0	−11·3	5	13	
		4752	0·453	233·9	158·6	−13·0	2	11	
		4753	0·269	190·2	139·4	−12·6	0	4	
		4751a	0·781	100·2	86·2	− 6·2	7	19	} 1614f
		4751	0·811	101·2	83·5	− 7·4	0	12	
			0·831	120·5	85·6	−23·2			133
June 27		Centre			(136·6)	(+2·7)	(26)	(125)	(1747)
178·164	CL, M	4749a	0·762	253·9	172·2	−10·3	10	40	188c
		4751a	0·631	103·7	86·4	− 6·4	3	7	} 158c
I.		4751	0·665	104·5	84·0	− 7·4	2	6	
		4751	0·683	104·1	82·6	− 7·5	1	5	
		4754	0·751	105·7	77·3	− 9·8	0	1	
		4754	0·734	104·5	78·5	− 8·6	0	3	
			0·806	102·4	71·8	− 8·2			392
June 28		Centre			(124·3)	(+2·8)	(16)	(62)	(738)
179·443	CL, M	4749a	0·915	257·2	172·3	−10·4	8	31	470f
		4755	0·636	246·6	143·9	−12·3	0	2	
		4755	0·592	246·0	140·8	−11·5	0	2	
		4755	0·590	245·4	140·5	−11·7	0	1	
		4751a	0·374	114·6	87·5	− 6·2	4	9	
		4751	0·445	114·7	83·4	− 8·1	1	4	
			0·925	101·9	40·9	− 9·9			212
			0·969	94·7	32·2	− 3·8			94
June 29		Centre			(107·4)	(+2·9)	(13)	(49)	(776)
									102
180·485	CL, M		0·832	250·5	147·5	−14·4			516nf
I.		4749a	0·983	258·8	172·1	−10·4	0	30	
June 30		Centre			(93·7)	(+3·0)	(0)	(30)	(618)

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Group 4750, June 25. Two small faint spots.
Group 4751, June 26–29. A small regular spot, *a*, followed by a distant small companion on June 27 and 29, and by a close pair on June 28.
Group 4752, June 27. A wide pair of small spots *f* Group 4749.
Group 4753, June 27. A very small faint spot.
Group 4754, June 28. Two very small faint spots *sf* Group 4751.
Group 4755, June 29. Three very small faint spots.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
181d·636	AW, CL		0·936	254·8	146·2	+ 3·1			155
		4756	0·145	157·8	75·3	− 4·6	0	7	
		4756	0·219	162·6	74·6	− 8·9	0	3	
		4756	0·247	164·0	74·4	−10·6	0	10	
		4756	0·195	153·5	73·4	− 7·0	0	3	
July 1		Centre			(78·4)	(+3·1)	(0)	(23)	(155)
182·495	CL, M		0·928	279·8	135·2	+10·3			128
			0·936	253·2	134·7	−14·5			180
		4756	0·202	229·2	75·9	− 4·4	0	2	
		4756	0·283	210·8	75·5	−10·9	0	5	
		4756	0·266	211·2	75·1	− 9·9	0	2	
July 2		Centre			(67·1)	(+3·2)	(0)	(9)	(308)
183·474	AW, M		0·924	247·3	118·6	−19·4			190
			0·897	275·6	117·8	+ 6·5			153
			0·949	87·1	342·6	+ 3·9			90
			0·973	79·5	337·3	+11·0			134
July 3		Centre			(54·1)	(+3·4)	(0)	(0)	(567)
184·478	AW, M		0·896	79·1	337·2	+11·3			170
			0·941	72·5	330·7	+17·7			107
			0·964	78·7	326·1	+11·8			262
July 4		Centre			(40·8)	(+3·5)	(0)	(0)	(539)
185·201 I.	CL, M		0·803	255·1	82·9	− 9·7			100
			0·858	78·2	332·3	+12·0			144
July 5		Centre			(31·2)	(+3·6)	(0)	(0)	(244)
186·350 I.	CL, M		0·898	258·2	78·7	− 8·9			713
			0·749	74·1	328·3	+14·3			133
July 6		Centre			(16·1)	(+3·7)	(0)	(0)	(846)
187·229 M.	CL, M		0·952	260·2	75·5	− 8·1			628
			0·958	102·7	292·4	−11·0			249
July 7		Centre			(4·4)	(+3·8)	(0)	(0)	(877)
1898.				°	°	°			
188d·427	M, AW		0·862	258·6	46·9	− 7·8			236
			0·884	104·3	288·2	−10·7			295
July 8		Centre			(348·6)	(+3·9)	(0)	(0)	(531)
189·194 M.	CL, M		0·913	260·4	43·2	− 7·1			142
			0·780	107·1	289·2	−10·6			196
July 9		Centre			(338·3)	(+4·0)	(0)	(0)	(338)
190·261 M.	CL, M		0·929	105·9	257·9	−13·1			215
July 10		Centre			(324·2)	(+4·1)	(0)	(0)	(215)
191·374 I.	CL, AW		0·939	71·0	239·7	+19·2			163
July 11		Centre			(309·6)	(+4·2)	(0)	(0)	(163)
192·641	AW, M		0·872	244·9	349·3	−19·3			138
			0·845	69·5	235·8	+19·5			195
			0·925	81·8	224·9	+ 9·2			153
July 12		Centre			(292·7)	(+4·3)	(0)	(0)	(486)
193·540	AW, M		0·873	271·4	341·6	+ 3·4			144
July 13		Centre			(280·9)	(+4·4)	(0)	(0)	(144)
194·419	AW, M		0·933	279·1	338·5	+10·2			217
			0·879	289·3	330·5	+19·1			82
			0·836	282·5	325·9	+12·9			128
July 14		Centre			(269·3)	(+4·5)	(0)	(0)	(427)
195·536	CL, M		0·927	278·9	322·6	+10·0			97
			0·879	197·6	280·4	−52·6			44
		4757	0·242	70·9	241·2	+ 9·1	3	10	
		4757	0·260	71·2	240·1	+ 9·2	0	3	
		4757	0·268	76·3	239·3	+ 8·1	0	7	
		4757	0·290	74·1	238·2	+ 9·0	0	3	
July 15		Centre			(254·5)	(+4·6)	(3)	(23)	(141)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4756, July 1–2. A few very faint small spots, in a straggling stream, almost perpendicular to the equator.
Group 4757, July 15–17. A few small unstable spots in an irregular stream.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
196d·493	CL, M		0·864	252·5	299·2	−12·5			150
		4757	0·086	354·7	242·3	+ 9·6	0	13	
		4757	0·044	23·6	240·8	+ 7·0	0	2	
		4757	0·082	16·8	240·4	+ 9·2	0	3	
		4757	0·071	26·3	240·0	+ 8·4	0	1	
		4757	0·079	29·4	239·6	+ 8·6	0	2	
		4757	0·087	38·4	238·7	+ 8·6	7	25	
			0·942	108·5	183·9	−15·7			239
			0·959	99·0	169·4	− 7·2			82
July 16		Centre			(241·8)	(+4·7)	(7)	(46)	(471)
197·250	AW, CL		0·875	254·6	290·8	−11·0			140
		4757	0·145	295·7	239·4	+ 8·2	1	7	
I.		4757	0·145	300·9	239·0	+ 8·9	1	5	
			0·878	109·4	173·2	−14·5			295
			0·934	100·2	164·0	− 7·8			315
July 17		Centre			(231·8)	(+4·7)	(2)	(12)	(750)
198·415	AW, CL		0·964	257·9	289·5	−10·3			194
			0·852	102·2	159·4	− 7·8			199
July 18		Centre			(216·4)	(+4·8)	(0)	(0)	(393)
199·179	CL, M	4758*a*	0·968	103·3	132·3	−11·6	0	29	} 629*c*
I.		4758	0·973	101·7	131·0	−10·2	0	14	
		4758*b*	0·980	103·4	129·3	−12·1	0	31	
July 19		Centre			(206·2)	(+4·9)	(0)	(74)	(629)
200·287	CL, M	4758*a*	0·866	106·5	133·9	−11·6	23	56	} 366*c*
I.		4758*b*	0·896	106·1	130·2	−12·0	6	17	
			0·962	105·3	119·4	−13·3			369
July 20		Centre			(191·6)	(+5·0)	(29)	(73)	(735)
201·431	CL, M	4758*a*	0·702	111·7	135·0	−11·2	12	48	} 199*c*
		4758*b*	0·756	110·2	130·3	−11·6	0	14	
			0·855	108·8	120·5	−13·2			141
July 21		Centre			(176·5)	(+5·1)	(12)	(62)	(340)
1898.				°	°	°			
202d·239	CL, M	4759*a*	0·079	137·7	162·8	+ 1·9	4	27	
		4759	0·126	125·0	159·9	+ 1·1	1	6	
M.		4759*b*	0·116	114·9	159·8	+ 2·4	2	29	
		4758*a*	0·566	119·1	135·6	−11·4	0	5	
		4758*b*	0·635	116·1	130·3	−12·0	0	4	
July 22		Centre			(165·8)	(+5·2)	(7)	(71)	(0)
203·268	CL, M	4759*a*	0·238	254·2	165·4	+ 1·5	10	40	
M.		4759*b*	0·163	251·7	161·1	+ 2·3	6	53	
			0·920	98·4	86·3	− 5·6			155
July 23		Centre			(152·2)	(+5·3)	(16)	(93)	(155)
204·489	CL, M	4759*a*	0·471	263·9	163·8	+ 1·9	8	35	
		4759	0·455	262·3	162·7	+ 1·4	4	21	
		4759	0·454	260·8	162·5	+ 0·7	0	5	
		4759	0·446	263·5	162·2	+ 2·0	0	4	
		4759	0·419	264·6	160·6	+ 2·7	7	31	
		4759	0·408	262·6	159·8	+ 2·0	0	24	
		4759	0·390	262·8	158·7	+ 2·3	3	15	
			0·844	102·8	80·0	− 7·8			116
July 24		Centre			(136·0)	(+5·4)	(22)	(135)	(116)
205·255	CL, M		0·806	246·0	175·6	−15·7			213
		4759*a*	0·623	266·1	164·2	+ 1·9	8	23	
		4759	0·613	265·0	163·4	+ 1·3	7	19	
I.		4759	0·575	266·6	160·8	+ 2·5	1	8	
		4759*b*	0·563	265·4	159·9	+ 1·9	7	20	
		4759	0·551	265·0	159·1	+ 1·8	0	3	
		4760	0·772	108·5	78·0	−10·6	1	4	} 276*c*
		4760	0·766	105·4	77·9	− 8·1	2	7	
			0·958	100·0	53·8	− 8·0			310
July 25		Centre			(125·9)	(+5·4)	(26)	(84)	(799)
206·244	CL, M		0·903	247·8	173·7	−17·3			261
			0·797	254·2	163·6	− 9·1			88
I.		4759*a*	0·782	267·6	164·0	+ 1·6	5	28	} 462*c*
		4759*b*	0·737	266·9	160·0	+ 1·5	3	13	
		4760	0·594	113·5	79·5	− 9·1	2	9	
		4760	0·602	112·4	78·7	− 8·7	0	3	
		4760	0·620	112·0	77·4	− 8·9	0	9	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4758, July 19–22. A pair of small regular spots, *a* and *b*, with a smaller spot between them, on July 19.
Group 4759, July 22–26. A pair of spots, *a* and *b*, appearing first near the centre of the sun. On July 24 and 25, the group appears as two irregular clusters of small spots.
Group 4760, July 25–26. A few small unstable spots in an irregular cluster.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
206d.244	CL, M	4760	0·628	113·8	77·2	−10·2	3	19	
I.			0·889	103·4	51·8	− 9·3			195
July 26		Centre			(112·8)	(+5·5)	(13)	(81)	(1006)
207·429	AW, M		0·971	253·5	171·0	−14·5			172
			0·920	259·1	162·6	− 7·7			186
			0·901	269·2	161·2	+ 1·8			264
		4761	0·282	284·3	113·1	+ 9·4	0	3	
		4761	0·265	286·5	112·0	+ 9·8	0	4	
		4761	0·247	283·9	111·1	+ 8·9	0	2	
July 27		Centre			(97·1)	(+5·6)	(0)	(9)	(622)
208·136	CL, M		0·962	260·4	160·6	− 7·5			91
			0·955	269·9	160·4	+ 1·6			225
I.			0·906	251·0	149·9	−14·6			54
		4762	0·594	109·9	53·7	− 6·9	0	1	
		4762	0·602	110·6	53·3	− 7·5	1	4	
July 28		Centre			(87·8)	(+5·7)	(1)	(5)	(370)
209·219	CL, M		0·907	253·2	136·2	−12·6			153
		4763	0·780	252·6	122·4	− 9·8	0	4	108c
I.		4762	0·406	125·4	54·0	− 8·2	0	4	
		4762	0·407	121·0	53·0	− 6·7	0	2	
		4762	0·416	121·8	52·7	− 7·3	0	4	
		4762	0·443	122·0	51·3	− 8·3	0	6	
		4762	0·450	123·1	51·2	− 8·9	0	2	
		4762	0·447	117·6	50·1	− 6·7	0	1	
		4762	0·459	118·0	49·5	− 7·3	0	4	
July 29		Centre			(73·5)	(+5·7)	(0)	(27)	(261)
210·242	M, CL		0·903	254·5	122·2	−11·3			239
		4762	0·251	160·7	55·1	− 7·9	2	15	
		4762	0·242	157·2	54·5	− 7·1	7	24	
M.		4762	0·249	152·4	53·2	− 7·0	0	5	
		4762	0·285	148·1	51·2	− 8·2	12	36	
		4762	0·321	145·2	49·2	− 9·5	0	5	
		4764	0·733	116·7	17·4	−15·0	7	23	
		4764	0·765	116·7	14·7	−16·0	0	22	
		4764	0·767	114·3	13·9	−14·4	0	10	
July 30		Centre			(59·9)	(+5·8)	(28)	(140)	(239)
1898.				°	°	°			
211d.476	AW, M	4762	0·305	224·3	55·9	− 6·8	13	59	
		4762	0·312	220·9	55·4	− 7·8	0	6	
		4762	0·284	221·8	54·5	− 6·4	0	11	
		4762	0·271	207·0	50·7	− 8·1	23	80	
		4764	0·516	130·4	19·8	−14·1	11	61	
		4764	0·535	128·5	18·1	−14·1	0	21	
		4764	0·542	127·2	17·3	−13·8	0	16	
		4764	0·566	123·5	14·7	−13·0	0	8	
		4764	0·583	125·1	14·2	−14·4	10	47	
		4764	0·597	127·3	14·1	−16·0	1	11	
		4764	0·600	124·1	12·8	−14·6	0	4	
		4765a	0·959	78·1	329·4	+13·1	36	199	585s
July 31		Centre			(43·6)	(+5·9)	(94)	(523)	(585)
212·528	M, AW		0·903	258·8	92·7	− 7·4			201
			0·790	256·0	80·1	− 7·3			137
		4762	0·495	244·6	56·4	− 6·9	8	33	
		4762	0·486	242·4	55·3	− 7·6	0	6	
		4762	0·474	244·3	55·0	− 6·5	0	2	
		4762	0·426	236·7	50·7	− 7·9	2	9	
		4762	0·421	233·8	49·7	− 8·7	5	15	
		4766	0·287	77·6	13·3	+ 9·3	1	6	
		4764a	0·382	154·4	19·9	−14·1	22	138	
		4764	0·391	149·3	17·9	−13·7	0	6	
		4764	0·409	147·3	16·6	−14·3	1	7	
		4764	0·441	147·8	15·6	−16·0	0	3	
		4764	0·427	144·2	14·8	−14·4	0	2	
		4764	0·439	143·1	13·9	−14·7	4	21	
		4764	0·458	145·0	13·9	−16·2	0	20	
		4765a	0·853	79·4	330·9	+12·2	47	333	
		4767	0·879	84·6	327·9	+ 7·6	0	9	
		4768a	0·923	78·1	321·8	+13·3	14	80	784c
		4768b	0·923	76·9	321·8	+14·4	0	11	
Aug. 1		Centre			(29·7)	(+6·0)	(104)	(701)	(1122)
213·433	AW, M		0·883	256·9	78·0	− 8·6			183
		4762	0·660	251·9	56·8	− 7·1	3	18	
		4762	0·584	247·4	50·6	− 7·9	0	3	
		4762	0·583	245·0	50·0	− 9·2	1	8	
		4764a	0·351	185·1	19·6	−14·4	28	142	
		4764	0·369	175·6	16·1	−15·5	0	3	
		4764	0·381	173·9	15·4	−16·2	0	19	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4761, July 27. Three very small faint spots.
Group 4762, July 28–August 3. A few very small unstable spots on July 28 and 29. The group increases up to July 31, on which day it appears as a straight but rather disconnected stream. The group rapidly diminishes after this date.
Group 4763, July 29. A very small spot.
Group 4764, July 30–August 7. A number of small spots in an irregular stream. The group undergoes continual change in its appearance and composition from day to day. The leader, *a*, on August 1 and 2, is a large spot, with triple nucleus, but it speedily breaks up into fragments, the chief of which are lettered *b* and *c*.
Group 4765, July 31–August 11. A large elliptical spot, *a*, usually with several very small companions.
Group 4766, August 1. A very small spot.
Group 4767, August 1. A very small spot, *sf* Group 4765.
Group 4768. August 1–4. Two spots, *a* and *b*, *sf* Group 4765. A few small spots have appeared preceding *a* by August 2, and *b* has disappeared by August 3.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
213d.433	AW, M	4764	0·349	173·4	15·4	−14·2	4	23	
		4764	0·387	169·6	13·6	−16·3	0	9	
		4765a	0·713	79·5	332·3	+11·7	83	369	
		4765	0·747	79·8	329·4	+11·6	0	6	
		4768	0·762	76·6	328·2	+14·1	0	7	1058c
		4768	0·786	77·1	325·9	+13·8	6	23	
		4768a	0·825	77·7	322·0	+13·5	9	57	
		4768b	0·826	76·5	322·0	+14·5	0	6	
		4769a	0·971	104·8	303·8	−12·8	35	274	370c
Aug. 2		Centre			(17·8)	(+6·0)	(169)	(967)	(1611)
214·625	AW, M		0·970	257·5	76·2	−10·5			194
		4762	0·844	257·3	57·9	− 7·3	0	7	563f
		4764b	0·446	220·4	19·3	−14·0	20	122	
		4764	0·468	216·9	18·9	−16·1	0	3	
		4764c	0·438	217·0	17·7	−14·5	5	32	
		4764	0·442	211·0	15·7	−16·3	0	1	
		4764	0·410	213·6	15·5	−14·0	7	33	
		4764	0·403	210·9	14·3	−14·2	0	10	
		4765a	0·485	78·0	333·2	+11·1	70	376	
		4765	0·517	76·5	331·2	+12·2	0	2	
		4765	0·515	79·9	331·1	+10·4	0	5	
		4765	0·533	83·4	329·8	+ 8·7	0	8	
		4768	0·544	74·6	329·5	+13·4	0	2	
		4768	0·595	74·8	325·9	+14·0	2	16	
		4768	0·618	75·5	324·2	+13·7	0	15	
		4768a	0·641	76·0	322·4	+13·7	5	24	
		4769a	0·874	108·6	304·0	−13·0	60	268	
		4769	0·888	110·2	302·7	−14·8	0	3	
		4769b	0·890	107·9	301·9	−12·8	18	100	
		4769	0·914	105·7	298·3	−11·6	4	18	910c
		4769c	0·931	107·3	296·0	−13·7	4	55	
		4769d	0·934	104·8	295·1	−11·5	7	75	
		4769e	0·947	104·6	292·9	−11·7	9	41	
Aug. 3		Centre			(2·0)	(+6·1)	(211)	(1216)	(1667)
215·298	CL, M		0·874	257·4	52·3	− 7·8			345
		4764	0·537	235·4	19·9	−12·2	4	11	
		4764b	0·545	231·9	19·2	−14·0	16	68	
		4764c	0·534	229·6	17·8	−14·6	9	29	
		4764	0·519	232·0	17·8	−13·0	1	6	
I.		4764	0·531	228·0	17·1	−15·1	0	5	

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
215d.298	CL, M	4764	0·496	227·6	15·2	−13·7	14	88	
		4765a	0·344	75·4	333·4	+10·8	85	343	
		4765	0·384	78·3	330·7	+10·2	0	2	
I.		4765	0·406	72·4	329·8	+12·8	0	1	
		4768	0·523	71·1	329·2	+15·0	0	1	
		4768	0·470	71·7	325·8	+14·0	0	4	
		4768a	0·525	73·9	322·0	+13·7	0	7	
		4768	0·539	69·4	321·5	+16·2	0	2	
		4769f	0·799	111·4	303·5	−13·0	84	378	
		4769	0·843	108·7	298·6	−12·1	0	5	
		4769	0·846	107·8	298·0	−11·5	5	22	
		4769	0·860	108·8	296·7	−12·7	0	16	1006c
		4769c	0·877	109·2	294·9	−13·4	6	33	
		4769d	0·879	106·2	294·0	−11·0	14	84	
		4769e	0·893	106·3	292·3	−11·6	12	60	
Aug. 4		Centre			(353·1)	(+6·2)	(250)	(1165)	(1351)
216·411	AW, CL		0·969	260·7	52·8	− 7·4			394
		4764	0·723	246·5	20·9	−12·2	10	41	
		4764	0·708	245·4	19·5	−12·4	0	3	
		4764	0·702	246·8	19·4	−11·4	0	3	
		4764	0·711	241·9	18·7	−14·9	0	3	
		4764	0·693	245·6	18·4	−11·9	0	2	
		4764	0·696	242·8	17·8	−13·7	9	93	
		4764	0·678	240·8	15·9	−14·4	0	2	
		4764	0·659	241·1	14·7	−13·6	15	81	
		4765a	0·095	45·5	334·5	+10·0	73	327	
		4765	0·123	44·0	333·4	+11·3	0	21	
		4765	0·121	57·0	332·5	+ 9·9	0	6	
		4765	0·133	53·8	332·2	+10·7	0	4	
		4769f	0·631	119·2	304·1	−12·8	78	444	
		4769	0·669	118·5	301·3	−13·6	2	18	
		4769	0·682	114·4	299·2	−11·6	2	13	
		4769	0·698	115·5	298·3	−12·7	0	8	
		4769	0·694	113·8	298·2	−11·6	0	2	
		4769	0·710	114·8	297·2	−12·7	1	6	
		4769	0·724	113·6	295·8	−12·3	0	5	
		4769c	0·743	113·7	294·3	−12·9	6	40	
		4769g	0·744	111·1	293·6	−11·1	22	136	
			0·934	87·0	269·2	+ 5·1			216
Aug. 5		Centre			(338·4)	(+6·2)	(218)	(1258)	(610)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4769, August 2–13. A fine group, usually seen as a long straight stream of spots. The leader, *a*, is a large spot, closely followed by another spot, *b*, somewhat smaller, with which it soon coalesces, forming a large spot, *f*, regular on August 6, and showing a fourfold nucleus on August 8. *f* has broken up by August 10, *h* and *j* being the two chief portions. The chief spots in the following part of the group are lettered *c*, *d*, and *e*, on August 3, of which *d* and *e* have coalesced to form *g* by August 5. The group diminishes rapidly after August 8, and *h* remains alone on August 13.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
217d·209	M, CL	4764	0·831	250·7	20·9	−12·2	0	35	
		4764	0·810	248·6	18·3	−13·2	6	28	622c
		4764	0·793	248·1	16·6	−13·1	0	18	
		4764	0·772	247·5	14·5	−12·9	10	61	
		4765a	0·135	301·1	334·4	+10·3	73	301	
M.		4765	0·135	313·6	333·4	+11·6	0	35	
		4765	0·068	307·7	330·8	+ 8·6	2	24	
		4769f	0·502	129·0	304·2	−12·6	99	472	
		4769	0·553	126·9	300·7	−13·7	0	26	
		4769	0·577	123·4	298·2	−13·0	12	82	
		4769	0·598	121·2	296·2	−12·7	0	14	
		4769	0·603	119·7	295·5	−12·0	1	15	
		4769c	0·632	119·7	293·6	−13·0	9	36	
		4769g	0·629	116·8	292·9	−11·3	29	149	
			0·901	81·1	263·3	+10·7			76
Aug. 6		Centre			(327·7)	(+6·3)	(241)	(1296)	(698)
218·213	M. CL	4764	0·940	253·6	22·0	−13·0	0	8	306c
		4764	0·890	251·2	14·4	−13·6	0	7	
		4765a	0·351	281·4	334·8	+ 9·9	55	285	
		4765	0·329	285·7	333·2	+11·1	0	8	
M.		4765	0·322	284·1	332·9	+10·5	0	7	
		4765	0·297	275·6	331·8	+ 7·7	0	9	
		4769f	0·367	152·3	304·5	−12·7	83	481	
		4769	0·411	146·1	300·9	−13·8	0	7	
		4769	0·421	142·9	299·4	−13·4	0	7	
		4769	0·428	140·6	298·4	−13·2	0	15	
		4769	0·439	138·3	297·1	−13·0	3	16	
		4769	0·444	135·2	295·9	−12·4	0	10	
		4769	0·461	134·3	294·8	−12·8	0	6	
		4769	0·481	133·3	293·5	−13·4	2	13	
		4769g	0·462	129·6	293·3	−11·3	19	87	
		4769	0·481	129·5	292·3	−12·0	3	24	
Aug. 7		Centre			(314·5)	(+6·3)	(165)	(990)	(306)
219·304	CL, M		0·977	252·4	15·2	−15·6			641
			0·950	279·2	12·5	+10·7			98
		4765a	0·576	278·9	335·3	+10·3	62	323	
I.		4769f	0·331	195·7	305·3	−12·1	113	463	
		4769	0·300	197·0	305·2	−10·3	0	2	
		4769	0·301	193·9	304·3	−10·6	0	4	
		4769	0·354	188·8	303·3	−14·0	1	5	
1898.				°	°	°			
219d·304	CL, M	4769	0·336	188·8	303·1	−13·0	0	1	
		4769	0·349	184·5	301·7	−13·8	0	2	
I.		4769	0·305	185·5	301·8	−11·2	0	2	
		4769	0·343	182·9	301·1	−13·6	4	15	
		4769	0·328	174·5	298·3	−12·6	4	21	
		4769	0·339	171·5	297·2	−13·1	1	8	
		4769	0·326	170·5	297·0	−12·3	0	10	
		4769	0·322	168·3	296·3	−11·9	0	2	
		4769	0·279	162·3	295·2	− 9·0	0	1	
		4769g	0·315	159·7	293·7	−10·7	17	49	
		4769	0·355	161·6	293·5	−13·3	1	5	
		4769	0·311	157·3	293·1	−10·3	0	2	
		4769	0·334	156·8	292·4	−11·5	2	13	
		4769	0·319	151·2	291·2	− 9·9	0	2	
Aug. 8		Centre			(300·1)	(+6·4)	(205)	(930)	(739)
220·501	AW, CL	4765a	0·778	278·2	335·6	+10·4	51	294	122c
		4765	0·748	278·5	332·9	+10·7	0	4	
		4769	0·514	233·3	309·1	−12·0	0	3	
		4769f	0·479	232·1	306·9	−11·0	91	431	
		4769	0·479	225·9	304·9	−13·3	10	35	
		4769	0·459	225·8	303·9	−12·5	0	22	
		4769	0·468	223·5	303·6	−13·7	0	3	
		4769	0·423	228·8	303·1	−10·0	0	2	
		4769	0·441	224·1	302·5	−12·2	0	3	
		4769	0·403	226·1	301·4	−10·0	0	1	
		4769	0·424	222·5	301·2	−11·9	4	14	
		4769	0·440	220·0	301·1	−13·4	5	21	
		4769	0·386	214·5	297·2	−12·1	3	15	
		4769	0·387	211·3	296·2	−12·9	0	1	
		4769g	0·337	209·9	294·1	−10·5	3	22	
		4769	0·310	206·5	292·3	− 9·6	0	5	
Aug. 9		Centre			(284·3)	(+6·5)	(167)	(876)	(122)
221·206	CL, M		0·955	278·6	348·4	+10·2			131
		4765a	0·876	278·3	336·6	+10·4	59	306	561c
		4765	0·851	277·5	333·7	+ 9·8	0	8	
		4765	0·849	275·2	333·3	+ 7·8	0	4	
I.		4769h	0·621	242·8	309·1	−11·1	49	221	
		4769j	0·590	239·7	306·2	−11·7	33	205	
		4769	0·597	236·0	305·5	−13·9	5	25	
		4769	0·575	236·3	304·3	−12·9	0	6	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.

The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
221d.206	CL, M	4769	0·580	234·5	304·0	−14·0	0	6	
		4769	0·532	234·7	301·2	−12·0	0	4	
I.		4769	0·545	231·9	301·1	−13·8	0	8	
		4769	0·536	233·0	300·9	−12·9	0	4	
		4769	0·494	230·4	297·8	−12·3	0	5	
		4769	0·486	228·4	296·8	−12·7	0	5	
		4769	0·434	228·4	294·2	−10·6	0	5	
			0·960	78·3	200·5	+13·0			196
Aug. 10		Centre			(275·0)	(+6·5)	(146)	(812)	(888)
222·446	AW, M		0·858	289·5	317·7	+20·1			111
		4765*a*	0·974	279·0	336·1	+10·3	29	229	581*f*
		4769*h*	0·804	251·6	309·2	−10·5	45	243	
		4769*j*	0·770	248·9	305·5	−11·6	12	128	
		4769	0·778	246·2	305·4	−13·8	0	10	
		4769	0·774	244·9	304·7	−14·6	0	4	411*c*
		4769	0·764	246·2	304·3	−13·4	0	2	
		4769	0·755	243·5	302·7	−15·0	0	8	
		4770	0·195	74·8	247·6	+ 9·5	0	1	
		4770	0·213	72·4	246·6	+10·2	0	2	
		4770	0·220	80·2	245·9	+ 8·6	3	10	
		4770	0·259	74·4	243·9	+10·4	5	24	
		4771	0·429	136·8	241·1	−11·9	1	5	
		4771	0·455	132·4	238·5	−11·7	0	1	
			0·843	79·4	200·7	+12·5			107
Aug. 11		Centre			(258·5)	(+6·6)	(95)	(667)	(1210)
223·419	AW, CL		0·976	283·5	324·2	+14·6			271
			0·952	289·7	318·9	+20·8			87
		4769*h*	0·911	255·6	309·2	−10·2	36	219	
		4769	0·899	249·8	306·3	−14·9	0	5	
		4769*j*	0·892	253·2	306·2	−11·8	8	38	517*c*
		4769	0·890	250·6	305·4	−13·9	0	12	
		4769	0·876	248·6	303·2	−15·1	4	25	
		4770*a*	0·071	306·5	249·0	+ 9·1	5	27	
		4770	0·075	315·4	248·7	+ 9·7	2	12	
		4770	0·058	312·7	248·2	+ 8·9	1	6	
		4770	0·067	336·7	247·2	+10·2	0	2	
		4770	0·037	357·6	245·8	+ 8·8	2	11	
		4770*b*	0·079	28·1	243·6	+10·6	18	73	
		4771	0·316	170·2	242·6	−11·5	2	6	
		4771	0·318	165·6	241·1	−11·3	0	8	
223d.419	AW, CL	4771*a*	0·330	158·1	238·5	−11·2	5	18	
			0·941	108·0	178·4	−14·4			140
Aug. 12		Centre			(245·7)	(+6·6)	(83)	(462)	(1015)
224·452	AW, M	4769*h*	0·982	258·7	309·5	− 9·7	28	220	700*sf*
		4770*a*	0·312	279·3	250·1	+ 9·3	25	135	
		4770	0·240	277·3	245·9	+ 8·2	6	28	
		4770	0·245	287·3	245·7	+10·7	0	4	
		4770	0·225	275·6	245·0	+ 7·8	0	1	
		4770	0·232	291·5	244·7	+11·4	0	6	
		4770	0·220	279·9	244·6	+ 8·7	0	6	
		4770*b*	0·200	290·8	242·9	+10·6	35	231	
		4771	0·363	213·0	243·6	−11·1	0	4	
		4771	0·350	210·1	242·3	−11·0	0	3	
		4771*a*	0·323	199·4	238·2	−11·0	5	32	
			0·869	115·0	176·4	−17·8			121
			0·869	105·3	173·9	− 9·8			133
			0·908	91·7	167·0	+ 1·3			121
Aug. 13		Centre			(232·0)	(+6·7)	(99)	(670)	(1075)
225·528	AW, M		0·976	256·5	293·2	−11·6			257
		4770*a*	0·548	277·4	251·1	+ 9·7	12	94	
		4770	0·461	274·2	245·3	+ 7·9	4	22	
		4770	0·454	275·9	244·9	+ 8·6	0	13	
		4770	0·436	280·2	243·6	+10·4	0	4	
		4770	0·422	277·8	242·8	+ 9·4	5	29	
		4770*b*	0·425	282·5	242·7	+11·4	33	156	
		4771	0·451	229·9	238·3	−10·6	0	4	
		4771*a*	0·460	227·7	238·0	−11·7	4	15	
		4772	0·269	283·3	233·1	+10·0	0	3	
		4772	0·253	288·1	231·9	+11·0	0	5	
Aug. 14		Centre			(217·8)	(+6·7)	(58)	(345)	(257)
226·532	AW, CL	4770*a*	0·731	276·8	251·8	+ 9·6	13	110	
		4770	0·664	276·8	246·4	+ 9·6	0	7	
		4770	0·653	274·2	245·5	+ 7·9	0	6	
		4770	0·647	275·2	245·1	+ 8·6	4	24	
		4770	0·633	278·0	244·0	+10·3	0	18	
		4770*b*	0·618	279·5	242·9	+11·2	27	119	
		4770	0·615	276·6	242·7	+ 9·5	5	33	
		4771	0·618	243·2	238·6	−10·6	0	4	

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4770, August 11–18. A curved stream of spots convex to the equator, and appearing first near the centre of the disc. The spots are few and small at first, but the group rapidly increases in size up to August 13, after which it slowly diminishes. The first and last spots on August 13, *a* and *b*, are large and composite.
Group 4771, August 11–16. A few spots, mostly very small, in a straight stream. *a*, the last on August 12, is the largest and most stable.
Group 4772, August 14. A very small spot, preceded by a close pair of very small spots which are measured together.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
226d·532	AW, CL	4771*a*	0·619	241·2	238·1	−11·7	2	6	
			0·928	104·0	138·6	−10·3			377
Aug. 15		Centre			(204·6)	(+6·8)	(51)	(327)	(377)
227·514	AW, M	4770*a*	0·869	277·3	252·4	+ 9·7	22	107	
		4770	0·817	275·6	246·7	+ 8·5	3	18	
		4770	0·805	276·4	245·5	+ 9·2	0	14	497*c*
		4770*b*	0·779	278·3	243·1	+10·7	18	138	
		4770	0·778	276·5	243·0	+ 9·3	0	7	
		4771*a*	0·770	248·5	238·4	−11·7	2	8	162*c*
			0·841	108·0	137·2	−11·1			448
			0·902	100·7	128·7	− 6·6			138
Aug. 16		Centre			(191·6)	(+6·8)	(45)	(292)	(1245)
228·616	AW, CL		0·922	253·4	241·7	−12·4			253
		4770*a*	0·963	278·1	252·1	+ 9·6	18	55	
		4770	0·934	275·9	246·6	+ 8·0	0	5	
		4770*b*	0·909	278·4	243·0	+10·5	20	124	598*c*
		4773	0·852	251·4	232·5	−12·0	0	5	
		4773	0·827	249·0	229·4	−13·1	0	5	164*c*
Aug. 17		Centre			(177·1)	(+6·8)	(38)	(194)	(1015)
229·435	CL, AW		0·929	253·9	231·8	−12·1			321
		4770*b*	0·969	279·0	242·5	+10·4	26	98	294*c*
Aug. 18		Centre			(166·1)	(+6·9)	(26)	(98)	(615)
230·478	AW, M	4773	0·984	256·9	230·1	−11·5	0	20	1208*p*
			0·950	100·8	82·2	− 8·0			200
Aug. 19		Centre			(152·4)	(+6·9)	(0)	(20)	(1408)
231·437	AW, M		0·886	103·4	79·3	− 8·5			96
Aug. 20		Centre			(139·7)	(+7·0)	(0)	(0)	(96)
232·541	AW, CL		0·844	243·1	177·5	−18·3			128
		4774	0·279	228·8	137·3	− 3·7	0	3	
		4774	0·250	225·5	135·4	− 3·2	0	5	
			0·900	101·3	62·7	− 7·0			116
Aug. 21		Centre			(125·2)	(+7·0)	(0)	(8)	(244)
1898.				°	°	°			
233d·647	AW, M		0·934	249·1	176·0	−16·6			141
		4775*a*	0·663	254·0	150·2	− 5·1	2	13	
		4775	0·637	254·1	148·4	− 4·6	0	2	
		4775*b*	0·608	254·4	146·4	− 3·7	6	27	
		4776	0·564	237·2	139·4	−11·6	0	1	
		4776	0·547	233·9	137·4	−12·6	0	2	
		4776	0·532	231·7	135·9	−12·9	0	3	
Aug. 22		Centre			(110·6)	(+7·0)	(8)	(48)	(141)
234·508	AW, M	4775*a*	0·796	259·2	150·6	− 4·2	7	41	
		4775*b*	0·739	258·2	145·5	− 3·8	3	24	147*c*
		4776	0·688	243·9	138·2	−12·1	0	7	
		4776	0·659	242·5	135·8	−12·0	0	9	
			0·935	103·9	31·9	−10·9			182
Aug. 23		Centre			(99·2)	(+7·1)	(10)	(81)	(329)
235·459	AW, M		0·895	262·0	149·0	− 3·9			198
			0·816	249·6	137·8	−12·1			174
Aug. 24		Centre			(86·5)	(+7·1)	(0)	(0)	(372)
236·605	AW, M		0·974	264·5	147·5	− 3·7			141
			0·943	256·3	139·8	−10·3			168
			0·878	250·1	129·4	−13·7			92
			0·881	117·0	15·1	−19·7			131
Aug. 25		Centre			(71·4)	(+7·1)	(0)	(0)	(532)
Aug. 26	No	photo	graph						
238·244	CL, M	4777*a*	0·406	137·2	33·6	−10·3	9	60	
		4777*b*	0·441	130·1	29·9	− 9·7	4	32	
I.		4778	0·930	81·2	340·7	+10·9	48	202	398*c*
Aug. 27		Centre			(49·8)	(+7·2)	(61)	(294)	(398)
239·495	CL, M	4777*a*	0·299	183·4	34·3	−10·1	2	21	
		4777*b*	0·295	171·0	30·6	− 9·7	5	15	
		4778	0·781	81·7	341·6	+11·0	32	181	237*c*
			0·894	79·5	329·3	+12·6			355
Aug. 28		Centre			(33·3)	(+7·2)	(39)	(217)	(592)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4773, August 17–19. A pair of very small spots on August 17. The group is not seen on August 18. A small spot on August 19.
Group 4774, August 21. Two very small faint spots.
Group 4775, August 22–23. Two small spots, *a* and *b*, with, on August 22, a very small companion between them.
Group 4776, August 22–23. A few very small spots.
Group 4777, August 27–28. Two spots, *a* and *b*, appearing suddenly, and quickly disappearing again.
Group 4778, August 27–September 7. A large regular spot.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots: Area of UMBRA for each Spot (and for Day).	Spots: Area of WHOLE for each Spot (and for Day).	Faculæ: Area for each Group (and for Day).
1898.				°	°	°			
240d·255	CL, M		0·902	256·8	85·6	− 8·6			179
		4778	0·665	81·8	341·3	+10·9	26	171	112c
I.			0·817	79·7	328·0	+12·6			192
			0·909	69·9	317·2	+21·2			139
			0·961	106·1	311·9	−13·3			772
Aug. 29		Centre			(23·2)	(+7·2)	(26)	(171)	(1394)
241·435	AW, M	4778	0·441	79·1	341·6	+11·3	22	134	
			0·853	108·2	312·1	−11·4			396
Aug. 30		Centre			(7·7)	(+7·2)	(22)	(134)	(396)
242·530	AW, CL		0·956	259·8	64·6	− 7·5			244
		4779	0·131	16·7	351·0	+14·4	0	4	
		4779	0·115	27·8	350·1	+13·1	1	9	
		4778	0·217	68·3	341·4	+11·6	22	127	
			0·720	115·4	311·6	−12·6			309
			0·861	108·7	296·9	−12·1			345
Aug. 31		Centre			(353·2)	(+7·2)	(23)	(140)	(898)
243·615	AW, CL	4780	0·847	253·1	34·1	−10·2	2	11	
		4780	0·841	254·0	33·7	− 9·3	0	6	172c
		4780	0·824	252·2	31·6	−10·3	0	14	
		4778	0·091	327·7	341·7	+11·6	18	121	
			0·931	80·3	269·6	+11·6			169
Sept. 1		Centre			(338·9)	(+7·2)	(20)	(152)	(341)
244·483	AW, M		0·936	256·1	34·5	−10·3			168
		4778	0·253	287·2	341·5	+11·3	24	135	
			0·836	81·3	270·1	+11·2			136
			0·971	81·9	250·5	+ 9·6			224
Sept. 2		Centre			(327·3)	(+7·2)	(24)	(135)	(528)
245·438	AW, M		0·983	257·8	32·2	−10·5			190
			0·890	241·7	11·6	−21·1			91
		4778	0·450	280·3	341·4	+11·1	22	130	
		4781a	0·971	104·9	240·9	−12·6	210	956	
		4781	0·987	103·7	236·0	−12·2	0	58	1708c
			0·906	81·8	249·2	+10·5			236
Sept. 3		Centre			(314·7)	(+7·2)	(232)	(1144)	(2225)
1898.				°	°	°			
246d·476	CL, M	4778	0·651	278·8	341·8	+11·4	22	126	
		4781a	0·894	108·0	240·6	−12·6	204	1033	
		4781	0·911	105·9	237·9	−11·2	2	15	2093c
		4781	0·922	106·7	236·6	−12·3	0	44	
Sept. 4		Centre			(301·0)	(+7·3)	(228)	(1218)	(2093)
247·649	AW, M	4778	0·824	278·6	341·4	+11·2	21	100	227p
		4781a	0·754	113·4	240·6	−12·3	214	1004	
		4781	0·787	111·3	237·2	−11·8	0	12	
		4781	0·818	107·2	233·3	− 9·6	1	8	1400c
		4781	0·848	106·9	230·2	−10·2	4	17	
Sept. 5		Centre			(285·5)	(+7·3)	(240)	(1141)	(1627)
248·428	CL, M	4778	0·908	279·0	341·1	+11·3	17	105	543f
		4781a	0·638	119·2	240·6	−12·1	203	1006	
		4781	0·634	113·6	239·3	− 8·8	0	2	
		4781	0·689	124·3	238·8	−17·0	0	5	
		4781	0·698	113·8	234·8	−10·9	0	5	
		4781	0·707	111·6	233·6	− 9·6	0	13	766c
		4781	0·712	112·8	233·5	−10·6	3	19	
		4781	0·718	110·8	232·5	− 9·4	2	10	
		4781	0·742	110·8	230·6	−10·2	7	34	
		4781	0·762	111·2	229·0	−11·0	0	29	
Sept. 6		Centre			(275·2)	(+7·3)	(232)	(1228)	(1309)
249·648	CL, AW		0·830	248·1	311·4	−13·6			278
		4778	0·987	280·8	341·0	+11·8	0	75	268f
		4781	0·350	142·2	246·7	− 8·9	0	7	
		4781	0·389	137·9	243·9	− 9·7	3	14	
		4781	0·399	136·0	242·9	− 9·6	0	14	
		4781a	0·456	135·6	240·2	−12·1	214	1120	
		4781	0·523	142·4	239·8	−17·6	0	4	
		4781	0·524	140·6	238·9	−17·0	0	7	
		4781	0·499	124·9	234·8	− 9·9	0	10	
		4781b	0·507	125·9	234·6	−10·6	5	43	
		4781	0·504	123·9	234·2	− 9·7	0	4	
		4781	0·522	127·2	234·2	−11·7	0	6	
		4781	0·512	123·9	233·7	−10·0	1	4	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4779, August 31. Two small spots preceding Group 4778.
Group 4780, September 1. Three small spots.
Group 4781, September 3–15. A magnificent group. The principal spot, *a*, is a very large composite spot, and is followed at first by only a few spots of no great size. These following spots rapidly increase in size, and, by September 10, form with *a* an almost continuous straight stream of great complexity. Of these following spots, *b* and *c*, two large composite spots are the principal. *b* moves forward in longitude and has overtaken and coalesced with *a* by September 14. *c* has divided into two large composite spots, *d* and *e*, by September 10. The group diminishes slightly after September 10, especially near the following end of the stream.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
249d.648	CL, AW	4781	0·546	126·5	232·6	−12·4	0	4	
		4781	0·522	118·8	231·8	− 8·0	4	27	
		4781	0·549	121·4	230·9	−10·2	0	2	
		4781*c*	0·563	122·9	230·5	−11·4	7	60	
		4781	0·560	120·6	230·0	−10·2	2	8	
		4781	0·577	123·4	229·8	−12·1	0	2	
		4781	0·569	121·3	229·6	−10·8	2	9	
		4781	0·577	122·3	229·5	−11·6	1	6	
		4781	0·568	119·2	229·1	− 9·8	0	10	
		4781	0·586	121·5	228·7	−11·6	0	8	
Sept. 7		Centre			(259·2)	(+7·3)	(239)	(1444)	(546)
250·480	AW, CL		0·941	287·0	319·5	+18·5			243
			0·912	255·9	311·8	− 9·6			380
			0·911	246·1	309·3	−18·2			178
			0·781	247·8	295·8	−12·3			241
		4781	0·302	167·8	244·5	− 9·9	6	51	
		4781	0·302	161·1	242·5	− 9·3	0	6	
		4781*a*	0·355	159·9	241·1	−12·1	216	1148	
		4781	0·352	141·7	235·5	− 8·9	0	8	
		4781*b*	0·382	143·2	234·8	−10·6	22	297	
		4781	0·408	139·6	232·6	−11·0	0	5	
		4781	0·415	136·4	231·4	−10·4	3	38	
		4781	0·441	139·8	231·3	−12·7	0	16	
		4781	0·416	133·0	230·3	− 9·5	0	11	
		4781*c*	0·439	135·2	229·9	−11·2	33	200	
		4781	0·457	137·2	229·7	−12·6	0	2	
			0·940	99·8	179·6	− 6·6			189
			0·956	110·9	179·0	−17·5			190
Sept. 8		Centre			(248·2)	(+7·3)	(280)	(1782)	(1421)
251·624	AW, M		0·914	254·8	296·8	−10·7			363
		4782	0·395	229·5	250·7	− 8·0	0	1	
		4782	0·365	226·6	248·5	− 7·5	0	3	
		4782	0·348	228·8	248·3	− 6·3	0	1	
		4782	0·319	222·9	245·7	− 6·5	0	1	
		4781	0·401	217·1	247·3	−11·6	0	1	
		4781	0·369	215·5	245·6	−10·4	8	33	
		4781	0·349	211·6	243·8	−10·2	1	15	
		4781	0·301	208·7	241·5	− 8·1	0	4	
		4781*a*	0·359	203·0	241·3	−12·1	218	1169	
		4781	0·329	193·4	237·5	−11·4	5	48	
1898.				°	°	°			
251d.624	AW, M	4781	0·294	193·2	236·8	− 9·4	1	14	
		4781	0·277	191·0	236·2	− 8·6	0	3	
		4781*b*	0·314	188·1	235·7	−10·9	61	300	
		4781	0·313	183·4	234·2	−11·0	0	3	
		4781	0·302	183·4	234·1	−10·3	0	11	
		4781	0·331	180·3	233·2	−12·1	0	8	
		4781	0·283	187·3	233·2	− 9·1	0	5	
		4781	0·281	178·4	232·6	− 9·1	0	2	
		4781	0·313	177·3	232·2	−11·0	0	4	
		4781	0·348	176·1	231·7	−13·0	0	4	
		4781	0·350	172·6	230·5	−13·0	0	4	
		4781*c*	0·324	170·4	230·0	−11·4	49	353	
		4781	0·296	167·4	229·4	− 9·5	1	18	
		4781	0·354	169·2	229·2	−13·1	0	12	
		4783	0·436	175·2	230·9	−18·4	0	4	
			0·860	102·7	175·6	− 7·1			167
			0·947	87·7	161·7	+ 4·6			119
			0·968	99·6	159·1	− 7·4			163
Sept. 9		Centre			(233·1)	(+7·2)	(344)	(2021)	(812)
252·444	AW, CL		0·971	252·4	295·4	−15·1			281
			0·952	259·7	292·8	− 7·5			153
		4781	0·489	232·0	245·2	−10·9	3	16	
		4781	0·483	230·5	244·4	−11·2	6	36	
		4781	0·461	231·9	243·7	− 9·8	0	2	
		4781	0·466	229·4	243·2	−10·9	1	9	
		4781	0·505	221·6	242·5	−15·4	0	1	
		4781	0·434	230·1	241·8	− 9·3	0	2	
		4781	0·493	219·2	241·0	−15·6	0	14	
		4781*a*	0·456	223·2	240·8	−12·5	208	1150	
		4781	0·420	228·3	240·6	− 9·3	1	4	
		4781	0·405	223·2	238·5	−10·2	5	25	
		4781	0·394	224·2	238·3	− 9·5	0	4	
		4781	0·418	217·7	237·3	−12·3	0	10	
		4781*b*	0·383	219·1	236·3	−10·3	45	261	
		4781	0·395	215·4	235·7	−11·7	18	86	
		4781	0·350	220·9	235·5	− 8·2	1	13	
		4781	0·357	217·7	234·9	− 9·3	0	2	
		4781	0·368	212·9	233·9	−10·9	4	54	
		4781	0·347	213·7	233·4	− 9·6	0	3	
		4781	0·344	210·9	232·5	−10·0	0	2	
		4781*d*	0·363	208·5	232·3	−11·4	13	131	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4782, September 9. A few very small spots *np* Group 4781.
Group 4783, September 9. A very small spot *sf* Group 4781.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
252d·444	AW, CL	4781	0·347	205·5	230·9	−11·0	0	3	
		4781	0·374	201·6	230·3	−13·2	0	7	
		4781	0·328	213·9	232·8	− 8·7	0	1	
		4781	0·322	209·6	231·4	− 9·1	3	13	
		4781*e*	0·337	199·7	228·8	−11·3	55	381	
		4781	0·369	196·3	228·3	−13·5	0	5	
			0·797	118·2	175·0	−17·3			152
			0·882	88·4	160·2	+ 4·8			144
			0·912	100·6	157·9	− 6·6			187
Sept. 10		Centre			(222·2)	(+7·2)	(363)	(2235)	(917)
253·435	AW, CL	4781	0·664	244·1	246·5	−11·1	1	7	
		4781	0·661	242·2	245·8	−12·2	0	33	
		4781	0·646	243·5	245·1	−10·9	4	26	
		4781	0·627	241·9	243·4	−11·2	0	28	
		4781	0·620	243·4	243·3	−10·1	0	21	
		4781	0·651	235·8	243·0	−15·5	0	3	
		4781	0·601	243·6	242·2	− 9·5	1	18	
		4781	0·640	234·5	241·8	−15·7	0	8	
		4781*a*	0·613	238·1	241·3	−12·8	207	1131	
		4781	0·569	240·0	239·1	−10·3	0	4	
		4781	0·561	241·8	239·1	− 9·1	0	14	
		4781	0·633	228·0	238·9	−18·8	0	2	
		4781	0·547	243·6	238·7	− 7·8	1	6	
		4781	0·537	242·3	237·8	− 8·1	3	23	
		4781	0·591	231·5	237·7	−15·3	0	2	
		4781*b*	0·545	239·0	237·4	− 9·9	38	195	
		4781	0·556	236·3	237·3	−11·6	17	66	
		4781	0·537	235·5	235·9	−11·3	14	68	
		4781	0·527	236·9	235·7	−10·2	2	10	
		4781	0·521	234·9	234·8	−10·9	0	28	
		4781	0·516	232·4	233·8	−11·7	3	62	
		4781	0·499	234·5	233·5	−10·2	0	1	
		4781	0·495	232·1	232·5	−11·0	0	5	
		4781	0·477	234·1	232·2	− 9·6	0	23	
		4781*d*	0·482	230·6	231·4	−11·1	17	131	
		4781	0·461	234·0	231·3	− 9·1	0	7	
		4781	0·441	229·6	229·0	− 9·8	3	35	
		4781*e*	0·459	226·1	228·9	−11·8	40	244	
			0·821	102·7	262·6	− 6·2			155
Sept. 11		Centre			(209·2)	(+7·2)	(351)	(2201)	(155)
1898.				°	°	°			
254d·477	AW, CL		0·781	278·2	247·1	+10·9			104
		4781	0·804	250·1	245·7	−11·3	5	31	
		4781	0·805	248·6	245·4	−12·5	3	47	
		4781	0·795	249·0	244·5	−11·9	0	10	
		4781	0·787	249·9	244·0	−11·0	0	7	
		4781	0·770	250·6	242·7	−10·0	2	32	
		4781*a*	0·770	246·3	241·6	−13·1	172	1090	
		4781*b*	0·718	248·6	238·0	− 9·9	27	163	
		4781	0·724	246·4	237·9	−11·6	16	90	
		4781	0·707	246·8	236·6	−10·7	0	7	993*c*
		4781	0·699	246·6	236·0	−10·7	0	22	
		4781	0·686	244·3	234·4	−11·7	0	8	
		4781	0·676	246·4	234·2	−10·1	0	5	
		4781	0·652	246·5	232·5	− 9·3	0	1	
		4781*d*	0·651	242·7	231·4	−11·6	5	48	
		4781	0·631	244·1	230·5	−10·2	4	52	
		4781	0·635	240·4	229·7	−12·3	15	89	
		4781	0·611	241·0	228·3	−11·2	8	128	
Sept. 12		Centre			(195·4)	(+7·2)	(257)	(1830)	(1097)
255·628	AW, CL		0·918	281·8	247·6	+13·7			200
		4781	0·926	253·5	245·3	−12·3	11	105	
		4781	0·900	256·1	242·3	− 9·2	0	3	
		4781*a*	0·902	252·0	241·6	−12·8	164	1123	
		4781	0·876	252·5	238·5	−11·6	11	84	
		4781*b*	0·869	254·2	238·1	− 9·9	19	139	
		4781	0·858	253·1	236·6	−10·5	8	58	
		4781	0·845	253·0	235·2	−10·3	0	3	
		4781	0·835	251·0	233·7	−11·6	2	8	
		4781	0·816	250·1	231·6	−11·7	0	11	2079*c*
		4781*d*	0·802	249·5	230·1	−11·7	28	178	
		4781	0·795	252·0	230·1	− 9·6	10	78	
		4781	0·806	247·1	229·8	−13·6	4	24	
		4781	0·793	250·7	229·6	−10·5	3	13	
		4781	0·785	250·2	228·7	−10·7	0	17	
		4781	0·785	248·2	228·2	−12·1	6	38	
		4781	0·778	248·4	227·7	−11·8	0	3	
		4781	0·773	249·1	227·4	−11·1	0	3	
		4784	0·230	95·4	167·0	+ 5·8	1	6	
		4784	0·244	96·3	166·2	+ 5·5	0	5	
		4784	0·284	95·2	163·8	+ 5·5	0	6	
		4784	0·324	81·0	161·3	+ 9·8	0	7	
Sept. 13		Centre			(180·2)	(+7·2)	(267)	(1912)	(2279)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4784, September 13–19. A few small spots on September 13, appearing near the centre of the disk. The group has greatly increased in size by the next day, and forms a straight stream; of which the first and last spots, *a* and *b*, are large and well defined by September 15. *a* is regular, but *b* is indented on its *s* side, and has divided to form a close pair by September 17, the two portions being, however, still measured together.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
256d·433	AW, M		0·969	283·5	246·4	+14·9			142
		4781	0·982	255·7	246·4	−12·5	0	37	
		4781a	0·959	254·8	240·7	−12·3	165	1615	
		4781	0·891	256·0	230·5	− 9·0	0	6	
		4781d	0·894	252·9	230·2	−11·8	43	247	2256c
		4781	0·890	255·3	230·2	− 9·6	0	36	
		4781	0·896	250·2	229·8	−14·2	0	27	
		4785	0·325	198·3	175·5	−10·7	0	1	
		4785	0·313	199·1	175·5	−10·0	0	2	
		4784	0·043	131·1	167·7	+ 5·6	2	13	
		4784	0·041	146·1	167·6	+ 5·9	7	25	
		4784	0·053	125·9	167·1	+ 5·4	5	20	
		4784	0·074	130·4	166·4	+ 4·5	0	2	
		4784	0·076	108·4	165·5	+ 5·8	0	5	
		4784	0·071	118·4	165·1	+ 5·3	0	6	
		4784	0·101	120·7	164·6	+ 4·9	0	5	
		4784	0·107	108·0	163·8	+ 5·3	8	42	
Sept. 14		Centre			(169·6)	(+7·2)	(230)	(2089)	(2398)
257·441	AW, M		0·950	277·1	228·7	+ 9·0			85
		4781	0·998	255·8	240·6	−13·6	0	271	
		4781	0·995	257·7	238·6	−11·4	0	68	
		4781	0·994	259·2	238·4	− 9·9	0	94	1795c
		4781	0·973	256·0	230·8	−11·8	23	154	
		4781	0·971	257·4	230·5	−10·3	0	10	
		4785	0·449	230·3	176·7	− 9·9	6	15	
		4785	0·436	230·8	176·2	− 9·2	0	2	
		4785	0·441	229·3	176·0	− 9·9	0	1	
		4785	0·424	222·7	173·3	−11·2	1	12	
		4784a	0·216	261·8	168·6	+ 5·3	20	112	
		4784	0·194	264·1	167·4	+ 5·9	0	3	
		4784	0·171	264·7	166·1	+ 6·2	0	5	
		4784	0·166	259·4	165·7	+ 5·4	0	2	
		4784	0·158	250·9	164·9	+ 4·2	0	2	
		4784	0·145	264·1	164·6	+ 6·3	0	2	
		4784b	0·135	256·8	163·9	+ 5·4	14	116	
		4784	0·119	244·3	162·4	+ 4·2	0	5	
Sept. 15		Centre			(156·3)	(+7·2)	(64)	(874)	(1880)
258·479	CL, M	4784a	0·445	266·1	168·9	+ 4·7	15	111	
		4784	0·423	266·3	167·6	+ 5·0	0	3	
1898.				°	°	°			
258d·479	CL, M	4784	0·422	264·7	167·4	+ 4·3	0	5	
		4784	0·406	269·6	166·6	+ 6·5	0	5	
		4784	0·397	266·8	166·0	+ 5·4	2	5	
		4784b	0·365	266·7	164·0	+ 5·5	15	104	
		4784	0·344	261·5	162·4	+ 3·9	0	1	
		4786a	0·640	108·5	105·1	− 6·0	8	23	
		4786	0·658	108·1	103·8	− 6·2	0	8	286c
		4786	0·689	106·1	101·1	− 5·6	2	8	
		4786b	0·697	105·3	100·3	− 5·3	6	44	
Sept. 16		Centre			(142·6)	(+7·2)	(48)	(317)	(286)
259·404	CL, M	4785	0·778	250·2	178·3	−10·6	0	5	
		4784a	0·624	267·8	168·9	+ 4·2	13	86	
		4784	0·607	267·3	167·7	+ 4·0	0	3	
		4784	0·590	268·7	166·6	+ 5·0	0	8	
		4784b	0·551	268·9	163·9	+ 5·4	9	32	
		4784	0·551	267·4	163·8	+ 4·5	0	2	
		4786a	0·472	117·2	105·5	− 6·0	7	65	
		4786	0·503	111·8	102·6	− 4·5	0	3	
		4786	0·521	113·2	101·8	− 5·6	0	2	
		4786	0·523	111·9	101·4	− 5·0	0	2	
		4786	0·535	113·6	101·0	− 6·2	1	4	
		4786c	0·547	111·8	99·8	− 5·6	5	16	
Sept. 17		Centre			(130·4)	(+7·1)	(35)	(228)	(0)
260·251	CL, M		0·867	253·7	176·8	−10·3			141
			0·884	244·2	176·3	−18·9			131
			0·829	248·6	171·5	−13·3			117
		4784	0·789	270·0	171·3	+ 4·4	0	8	
		4784a	0·767	269·2	169·3	+ 4·0	11	44	
I.		4784	0·712	269·1	164·6	+ 4·4	0	5	
		4784	0·703	270·8	164·0	+ 5·6	0	8	
		4786a	0·315	135·3	106·4	− 6·0	17	98	
		4786	0·335	132·5	104·9	− 6·2	0	2	
		4786	0·351	124·4	102·4	− 4·6	0	5	
		4786	0·355	126·8	102·7	− 5·4	0	6	
		4786	0·374	125·0	101·3	− 5·6	0	11	
		4786	0·392	125·0	100·4	− 6·2	1	10	
		4786c	0·399	121·9	99·4	− 5·5	5	29	
Sept. 18		Centre			(119·2)	(+7·1)	(34)	(226)	(389)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4785, September 14–17. A few very small spots in a short straight stream. The group is not seen on September 16, but a very small spot marks its place on September 17.

Group 4786, September 16–24. A few spots, mostly small, in a short straight stream, on September 16. The first and last spots, *a* and *b*, are the largest. *b* has broken up by the next day, *c* being its largest portion. *a* increases in size, and has become a large regular spot by September 21, after it has coalesced with a small spot *d* following it.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
261d.402	CL, M		0·954	255·7	174·3	− 11·3			145
			0·833	256·0	158·4	− 7·5			98
		4784	0·906	270·9	169·0	+ 3·9	0	8	} 381c
		4784	0·872	271·2	164·8	+ 4·6	0	3	
		4786a	0·228	196·6	107·7	− 5·5	15	83	
		4786d	0·232	189·5	106·2	− 6·1	4	10	
		4786	0·230	185·7	105·3	− 6·1	0	2	
		4786	0·230	180·3	104·1	− 6·2	1	4	
		4786	0·209	176·2	103·2	− 4·9	0	2	
		4786	0·233	176·3	103·1	− 6·3	0	2	
		4786	0·229	163·3	100·2	− 5·6	2	14	
		4786	0·263	161·1	99·1	− 7·3	0	1	
			0·892	104·4	43·1	− 9·5			58
Sept. 19		Centre			(104·0)	(+ 7·1)	(22)	(129)	(682)
262·634	CL, M		0·980	273·5	166·4	+ 4·8			211
			0·947	260·2	157·5	− 6·9			81
		4786a	0·410	240·3	108·6	− 5·1	15	87	
		4786	0·390	241·5	107·7	− 4·0	0	6	
		4786d	0·395	238·5	107·4	− 5·2	6	23	
		4786	0·381	235·5	106·0	− 5·7	0	2	
		4786	0·358	232·9	104·3	− 5·6	0	2	
		4786	0·324	229·9	102·0	− 5·1	0	5	
		4786	0·324	225·2	101·0	− 6·3	0	4	
		4786	0·303	225·9	100·3	− 5·2	0	3	
Sept. 20		Centre			(87·7)	(+ 7·1)	(21)	(132)	(292)
263·627	CL, M	4786a	0·592	251·4	108·7	− 5·1	26	118	
		4786	0·570	248·2	106·6	− 6·3	0	4	
		4786	0·552	246·8	105·2	− 6·5	0	8	
		4786	0·550	244·5	104·9	− 7·8	0	2	
		4786	0·533	246·1	103·8	− 6·3	0	1	
		4786	0·521	245·9	103·1	− 6·1	0	10	
		4786	0·512	247·0	102·7	− 5·4	0	4	
			0·966	87·3	359·4	+ 4·4			514
Sept. 21		Centre			(74·6)	(+ 7·0)	(26)	(147)	(514)
264·256	CL, M	4786a	0·703	255·0	109·1	− 5·4	24	126	
		4786	0·664	251·3	105·5	− 6·9	0	2	
I.		4786	0·628	250·9	102·8	− 6·2	2	14	
264d.256	CL, M		0·930	88·0	357·8	+ 4·4			1125
I.			0·946	121·0	1·7	− 26·3			34
Sept. 22		Centre			(66·3)	(+ 7·0)	(26)	(142)	(1159)
265·443	CL, M	4786a	0·863	260·0	109·0	− 5·0	14	141	} 506c
		4786	0·807	257·6	102·8	− 5·8	0	16	
			0·801	89·9	357·4	+ 4·3			624
			0·911	78·8	344·3	+ 13·1			226
Sept. 23		Centre			(50·6)	(+ 7·0)	(14)	(157)	(1356)
266·493	CL, M	4786a	0·954	262·2	108·2	− 5·2	0	95	} 385c
		4786	0·938	261·2	105·3	− 5·8	0	13	
		4786	0·928	261·1	103·7	− 5·6	0	14	
		4787	0·618	91·3	358·6	+ 4·7	0	12	
		4787	0·653	89·8	356·0	+ 5·4	3	12	
			0·859	79·7	337·1	+ 12·4			108
			0·926	74·8	328·2	+ 16·7			116
Sept. 24		Centre			(36·8)	(+ 6·9)	(3)	(146)	(609)
267·440	CL, M	4787	0·419	94·5	359·6	+ 4·4	0	17	
		4787	0·479	90·8	355·6	+ 5·7	0	3	
		4787	0·484	92·0	355·4	+ 5·1	0	6	
			0·926	108·0	319·5	− 13·8			216
Sept. 25		Centre			(24·3)	(+ 6·9)	(0)	(26)	(216)
268·398	CL, M		0·880	257·2	71·4	− 7·8			129
		4787	0·289	91·8	354·8	+ 6·0	0	2	
		4787	0·296	97·4	354·6	+ 4·3	0	9	
		4787	0·314	94·6	353·4	+ 5·0	0	6	
			0·866	113·5	315·9	− 16·4			216
			0·926	102·8	305·7	− 9·1			193
Sept. 26		Centre			(11·6)	(+ 6·8)	(0)	(17)	(538)
269·402	CL, M	4787	0·065	126·8	355·4	+ 4·6	0	10	
		4788	0·679	79·2	315·5	+ 12·3	2	10	
		4788	0·696	80·0	314·1	+ 11·9	5	22	
		4788	0·703	80·9	313·5	+ 11·2	2	6	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4787, September 24–27. A few very small faint unstable spots, irregularly distributed.
Group 4788, September 27–October 5. A number of small spots irregularly arranged on September 27. The group increases in size very rapidly up to September 29, after which it diminishes again. For the greater part of its existence it appears as a straight almost continuous stream of great complexity of detail. The component spots undergo continual change.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
269d.402	CL, M	4788	0·705	81·6	313·4	+10·7	1	4	
		4788	0·730	80·6	311·3	+11·5	0	3	
		4788	0·738	80·0	310·6	+12·0	2	10	
			0·849	114·1	304·7	−16·5			514
Sept. 27		Centre			(358·4)	(+6·8)	(12)	(65)	(514)
270·404	CL, M	4788	0·495	76·8	315·8	+12·4	0	3	
		4788	0·495	78·0	315·7	+11·9	0	3	
		4788	0·506	77·0	315·0	+12·4	3	16	
		4788	0·508	78·2	314·8	+11·9	5	22	
		4788	0·519	77·3	314·1	+12·4	0	6	
		4788	0·520	78·9	313·9	+11·6	5	18	
		4788	0·534	76·3	313·2	+13·0	2	7	
		4788	0·536	79·0	312·8	+11·6	4	10	
		4788	0·546	77·8	312·2	+12·3	3	12	
		4788	0·555	79·4	311·5	+11·6	14	67	
		4788	0·585	78·6	309·4	+12·1	1	9	
		4789*a*	0·986	97·1	265·9	− 5·8	31	172	297*f*
			0·893	92·8	282·3	+ 0·7			34
Sept. 28		Centre			(345·2)	(+6·8)	(68)	(345)	(331)
271·413	CL, M	4788	0·282	74·0	315·8	+10·9	0	1	
		4788	0·309	71·5	314·4	+12·0	31	185	
		4788	0·333	68·9	313·3	+13·3	0	2	
		4788	0·330	74·4	313·0	+11·4	2	16	
		4788	0·338	71·6	312·7	+12·4	4	46	
		4788	0·352	72·0	311·8	+12·6	1	7	
		4788	0·356	76·6	311·2	+11·0	33	149	
		4788	0·367	72·6	310·9	+12·6	1	3	
		4788	0·384	75·2	309·6	+11·9	4	15	
		4788	0·395	74·7	309·0	+12·1	3	12	
		4789*a*	0·928	99·3	265·0	− 6·0	23	168	} 813*c*
		4790*a*	0·965	99·7	258·4	− 7·5	26	150	
Sept. 29		Centre			(331·8)	(+6·7)	(128)	(754)	(813)
272·156	CL, M		0·956	261·1	33·7	− 6·5			93
I.		4788	0·164	55·9	314·1	+11·9	31	184	
		4788	0·189	60·2	312·4	+12·0	4	28	
		4788	0·202	67·5	311·1	+11·0	28	139	
		4788	0·245	67·3	308·7	+11·9	7	44	
1898.				°	°	°			
272d.156	CL, M	4789*a*	0·859	100·9	264·2	− 5·8	32	206	} 1022*c*
I.		4790*a*	0·914	101·1	257·5	− 7·3	32	113	
		4791*a*	0·991	103·4	241·6	−12·3	0	716	
Sept. 30		Centre			(322·0)	(+6·7)	(134)	(1430)	(1115)
273·419	CL, M		0·816	268·9	0·0	+ 2·9			343
		4788	0·192	298·9	315·2	+11·9	0	13	
		4788	0·171	302·7	313·8	+11·8	27	140	
		4788	0·131	306·7	311·5	+11·0	16	100	
		4788	0·115	315·4	310·1	+11·3	0	6	
		4788	0·111	315·7	309·9	+11·1	0	6	
		4788	0·114	323·2	309·4	+11·8	0	8	
		4788	0·107	329·8	308·5	+11·9	4	23	
		4788	0·109	337·3	307·9	+12·3	1	5	
		4789*a*	0·677	106·0	264·7	− 5·8	34	211	151*c*
		4790*a*	0·763	105·3	257·7	− 7·1	21	98	95*c*
		4791	0·902	104·9	243·2	−10·4	0	5	
		4791	0·912	103·4	241·6	− 9·3	0	9	
		4791*a*	0·918	106·5	241·4	−12·3	132	769	
		4791	0·923	103·1	240·0	− 9·3	0	12	
		4791	0·934	104·2	238·5	−10·7	0	16	} 1477*c*
		4791	0·939	102·8	237·4	− 9·6	0	12	
		4791*b*	0·945	100·9	236·1	− 8·0	0	71	
		4791	0·966	101·7	232·0	− 9·5	0	13	
		4791	0·968	103·1	231·9	−10·9	0	12	
			0·821	111·1	253·7	−13·1			205
Oct. 1		Centre			(305·4)	(+6·6)	(235)	(1529)	(2271)
274·474	CL, M		0·932	271·6	0·2	+ 3·9			472
			0·833	281·5	348·2	+13·3			95
		4788	0·389	285·5	313·8	+12·1	20	129	
		4788	0·354	284·6	311·8	+11·3	5	35	
		4788	0·334	285·9	310·4	+11·4	4	17	
		4788	0·323	285·3	309·8	+11·1	0	4	
		4788	0·323	289·8	309·5	+12·6	0	6	
		4788	0·300	288·4	308·2	+11·8	6	20	
		4788	0·299	293·5	307·7	+13·2	0	2	
		4789*a*	0·488	114·0	264·9	− 5·5	22	129	
		4789*b*	0·509	113·9	263·6	− 6·0	4	48	153*c*
		4790*a*	0·588	111·5	258·1	− 6·9	20	77	33*c*

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4789, September 28–October 9. A large regular spot, *a, np* Group 4791. It shows symptoms of division on October 1, and a considerable spot, *b*, has become separated from *a* by October 2, but has recombined with it by October 3. *a* has elongated in the *np* direction by October 6, and has broken up by October 7 into three spots, *c, d,* and *e*, in a short straight line nearly perpendicular to the equator.
Group 4790, September 29–October 6. A large regular spot, *a, np* Group 4791. *a* diminishes from day to day, and is preceded by a very small companion on October 3.
Group 4791, September 30–October 12. The return of the great group No. 4781. The principal spot, *a*, is still a very large composite spot. The rest of the group consists chiefly of a number of spots, mostly small, enclosing an immense elliptical area, the site of the following portion of the group at the previous appearance, but within which no spots are seen now.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
274d·474	CL, M	4791*a*	0·806	110·9	241·1	−12·6	124	700	
		4791	0·832	108·4	238·0	−11·3	0	13	
		4791*b*	0·833	104·5	237·0	− 8·2	9	86	2747*c*
		4791	0·862	103·1	233·7	− 7·8	0	13	
		4791	0·879	107·1	232·5	−11·6	0	17	
			0·973	98·1	215·9	− 6·3			188
Oct. 2		Centre			(291·4)	(+6·6)	(214)	(1296)	(3688)
275·421	CL, M		0·960	275·6	353·0	+ 7·2			268
		4788	0·573	281·6	313·8	+12·0	16	66	
		4788	0·545	280·8	311·8	+11·3	4	25	
		4788	0·523	281·4	310·3	+11·5	0	8	
		4788	0·495	281·4	308·4	+11·3	2	8	
		4789*a*	0·319	130·0	264·7	− 5·5	20	133	
		4790	0·382	124·7	260·6	− 6·3	0	6	
		4790*a*	0·415	123·1	258·5	− 7·0	12	58	
		4791	0·606	102·0	242·7	− 2·0	0	3	
		4791*a*	0·671	116·7	241·2	−12·4	111	678	
		4791	0·714	117·2	238·2	−14·1	3	10	
		4791	0·704	113·2	237·8	−11·2	0	3	
		4791	0·707	111·2	237·1	−10·0	0	4	
		4791*b*	0·703	108·8	236·8	− 8·2	9	50	821*c*
		4791	0·729	107·1	234·3	− 7·7	0	6	
		4791	0·755	111·2	233·2	−11·3	0	7	
		4791*c*	0·753	107·4	232·5	− 8·5	8	45	
		4791	0·765	111·3	232·4	−11·7	1	11	
		4791	0·772	108·7	231·2	−10·0	0	11	
			0·877	118·8	223·5	−21·4			170
			0·927	100·0	212·3	− 6·7			233
Oct. 3		Centre			(278·9)	(+6·5)	(186)	(1132)	(1492)
276·228	CL, M		0·905	283·4	333·8	+14·9			184
			0·815	243·3	317·9	−17·4			220
		4788	0·720	281·6	314·5	+12·8	0	15	
I.		4788	0·717	280·0	314·3	+11·6	9	34	222
		4788	0·694	279·7	312·5	+11·4	0	5	
		4792	0·061	277·1	271·9	+ 6·8	0	3	
		4789*a*	0·215	162·9	264·8	− 5·4	24	127	
		4789	0·247	148·9	261·1	− 5·8	0	1	
		4790*a*	0·290	144·6	258·7	− 7·3	1	58	
		4791	0·509	122·0	242·5	− 9·9	0	8	
		4791*a*	0·550	124·1	240·7	−12·3	140	765	
1898.				°	°	°			
276d·228	CL, M	4791	0·539	118·5	239·8	− 9·3	3	16	
		4791	0·600	125·1	238·0	−14·7	1	7	
I.		4791*b*	0·580	114·1	236·2	− 8·3	0	18	
		4791	0·598	112·0	234·5	− 7·6	0	3	
		4791	0·640	116·9	232·9	−11·6	0	4	
		4791*c*	0·629	112·4	232·5	− 8·6	6	29	
		4791	0·651	113·3	231·2	− 9·8	0	4	
			0·770	122·8	225·0	−20·0			175
			0·838	101·8	213·0	− 6·3			269
Oct. 4		Centre			(268·4)	(+6·4)	(184)	(1097)	(1070)
277·166	CL, M		0·886	293·5	318·3	+23·7			117
			0·892	249·7	315·7	−14·9			299
		4788	0·841	279·5	313·6	+11·5	0	5	959*c*
I.		4792	0·271	279·6	271·6	+ 8·8	4	29	
		4792	0·239	282·5	269·6	+ 9·2	3	16	
		4792	0·220	284·9	268·4	+ 9·5	0	2	
		4789*a*	0·252	216·7	264·7	− 5·3	21	118	
		4790*a*	0·246	193·1	259·2	− 7·4	6	45	
		4791	0·363	140·2	242·4	− 9·9	1	6	
		4791*a*	0·411	140·7	240·6	−12·3	108	721	
		4791	0·471	141·0	238·2	−15·3	0	1	
		4791*b*	0·419	126·0	236·1	− 8·2	0	4	
		4791	0·439	123·4	234·4	− 8·0	1	6	
		4791*c*	0·462	122·0	232·8	− 8·2	4	9	
		4791	0·494	124·8	231·7	−10·5	0	14	
		4791	0·556	130·7	230·2	−15·4	0	10	
Oct. 5		Centre			(256·0)	(+6·4)	(148)	(986)	(1375)
278·205	CL, AW		0·935	279·5	312·1	+11·1			608
			0·910	247·6	303·9	−17·4			587
		4792	0·513	276·5	273·2	+ 8·8	4	22	
I.		4792	0·471	276·9	270·4	+ 8·8	0	1	
		4792	0·447	276·3	268·9	+ 8·5	2	8	
		4789*a*	0·427	243·9	264·8	− 5·0	16	103	
		4789	0·429	237·6	263·6	− 7·4	0	2	
		4789	0·402	240·4	262·8	− 5·5	0	10	
		4790*a*	0·379	232·8	259·9	− 7·2	2	9	
		4793	0·375	202·8	250·9	−13·9	0	4	
		4791	0·281	180·7	242·5	−10·0	0	1	
		4791*a*	0·323	175·2	240·7	−12·4	102	649	
		4791	0·271	157·5	236·3	− 8·2	0	3	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4792, October 4–7. A very small spot on October 4. A few small spots in a short straight stream on the succeeding days.
Group 4793, October 6–7. A very small spot midway between Groups 4790 and 4791.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
278d.205	CL, AW	4791	0·282	153·2	234·9	− 8·3	0	2	
		4791	0·293	149·4	233·7	− 8·4	1	8	
I.		4791	0·311	149·7	233·2	− 9·3	1	5	
		4791	0·327	151·2	233·1	−10·4	0	1	
		4791	0·344	151·2	232·6	−11·3	0	3	
		4791	0·332	149·0	232·3	−10·3	0	2	
		4791	0·314	146·4	232·2	− 8·9	0	4	
		4791	0·357	150·1	231·9	−11·7	2	10	
		4791	0·339	146·8	231·5	−10·3	0	2	
		4791	0·398	151·5	231·0	−14·2	0	2	
		4791	0·410	151·8	230·8	−15·0	0	1	
			0·930	106·8	176·5	−13·1			250
			0·936	86·0	172·7	+ 5·9			138
Oct. 6		Centre			(242·3)	(+6·3)	(130)	(852)	(1583)
279·257	AW, M		0·960	250·7	299·1	−16·5			211
		4792	0·727	279·1	275·2	+11·0	0	11	
		4792	0·712	276·5	274·0	+ 9·1	0	6	
		4792	0·667	276·7	270·4	+ 9·2	0	9	
		4789c	0·625	256·2	265·7	− 3·6	4	23	
		4789d	0·625	255·1	265·5	− 4·2	0	7	
I.		4789e	0·620	253·2	264·8	− 5·2	12	44	
		4793	0·501	227·2	250·6	−14·0	0	5	
		4791a	0·377	213·3	240·6	−12·1	126	605	
		4791	0·332	218·7	240·5	− 8·8	0	3	
		4791	0·340	215·8	240·0	− 9·8	2	20	
		4791	0·425	205·6	239·4	−16·3	0	7	
		4791	0·271	196·8	232·9	− 8·7	0	4	
		4791	0·323	192·2	232·4	−12·0	1	2	
		4791	0·335	188·6	231·3	−13·0	0	2	
		4794a	0·979	105·3	152·3	−13·6	0	21	378nf
			0·828	87·8	172·4	+ 5·4			140
Oct. 7		Centre			(228·4)	(+6·3)	(145)	(769)	(729)
280·258	CL, M		0·833	276·5	271·9	+ 8·9			206
		4789c	0·788	260·8	266·2	− 3·3	2	6	} 123c
		4789e	0·779	257·7	264·9	− 5·6	8	23	
I.		4791	0·566	237·2	244·2	−12·4	0	4	
		4791a	0·520	234·0	240·6	−12·2	86	493	
		4791	0·502	237·9	240·6	− 9·5	0	6	
		4791	0·491	237·2	239·9	− 9·8	1	13	
		4791	0·427	226·2	233·4	−11·3	0	2	
1898.				°	°	°			
280d.258	CL, M	4791	0·428	223·2	232·6	−12·2	0	1	
		4794	0·904	108·2	153·4	−13·5	1	6	}
I.		4794a	0·912	108·2	152·3	−13·8	7	49	} 492c
		4794	0·916	107·3	151·5	−13·1	0	9	}
		4795	0·941	107·4	147·7	−14·0	0	3	}
Oct. 8		Centre			(215·2)	(+6·2)	(105)	(615)	(821)
281·154	AW, CL		0·919	277·7	270·6	+ 9·5			274
			0·823	249·8	255·6	−12·8			396
		4789e	0·891	260·3	265·2	− 5·8	3	17	307c
I.		4791a	0·660	243·7	240·5	−12·1	80	423	
		4791	0·640	246·9	239·9	− 9·6	0	5	
		4791	0·630	245·0	238·7	−10·4	0	6	
		4794a	0·799	111·6	153·9	−13·2	12	63	}
		4794a	0·798	110·3	153·6	−12·2	7	29	}
		4794a	0·809	110·6	152·7	−12·7	4	27	} 422c
		4795	0·846	107·7	148·3	−11·4	0	7	}
		4796	0·942	108·8	136·0	−15·4	2	13	166c
Oct. 9		Centre			(203·4)	(+6·1)	(108)	(590)	(1565)
282·198	AW, M		0·957	260·5	261·4	− 7·3			351
			0·931	251·4	255·3	−14·9			370
I.		4791	0·830	248·9	242·3	−13·7	0	5	}
		4791	0·816	252·8	241·8	−10·2	0	38	} 561c
		4791a	0·810	250·1	240·6	−12·1	62	331	}
		4794a	0·637	119·8	155·1	−13·4	14	110	
		4794	0·654	118·2	153·5	−13·0	0	4	
		4795	0·707	113·3	148·2	−11·7	0	6	
			0·850	112·0	135·1	−15·1			88
Oct. 10		Centre			(189·6)	(+6·1)	(76)	(494)	(1370)
283·183	CL, AW		0·903	262·0	240·2	− 4·6			228
			0·824	241·4	226·5	−19·3			134
		4791a	0·914	253·6	240·2	−12·3	51	294	1055c
I.		4794	0·478	133·6	155·8	−13·6	11	38	
		4794	0·490	131·6	154·6	−13·4	8	44	
		4794	0·501	130·3	153·6	−13·3	2	9	
		4795	0·550	124·3	149·0	−12·7	0	3	
		4795	0·558	122·1	147·8	−12·0	0	4	
			0·942	98·2	107·3	− 5·6			179
Oct. 11		Centre			(176·6)	(+6·0)	(72)	(392)	(1596)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4794, October 7–16. A composite spot, *a*, with two small companions on October 8. The spot is measured in three portions on October 9; and has become regular in shape by October 10. It then elongates in the direction of motion and has broken up into a straight stream of small spots, closely following each other, by October 12. The group is not seen on October 15, but a very small spot marks its place on October 16.
Group 4795, October 8–11. One or two very small spots, *f*, Group 4794.
Group 4796, October 9. A small spot, *f*, Group 4795.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
284d·422	CL, M		0·965	263·5	234·2	− 4·7			185
			0·941	248·8	227·0	−17·7			297
		4791a	0·991	256·3	240·7	−12·7	42	252	450c
		4794	0·341	170·0	156·7	−13·7	4	16	
		4794	0·334	167·4	155·9	−13·1	1	9	
		4794	0·338	165·6	155·3	−13·1	0	4	
		4794	0·341	163·9	154·7	−13·2	5	23	
		4794	0·319	162·1	154·5	−11·8	0	1	
		4794	0·340	159·5	153·2	−12·6	1	8	
Oct. 12		Centre			(160·2)	(+5·9)	(53)	(313)	(932)
285·171	AW, M		0·974	240·2	222·0	−27·2			130
			0·973	248·4	223·7	−19·4			316
			0·937	256·8	218·0	−10·2			108
I.		4794	0·362	197·4	156·7	−14·3	0	4	
		4794	0·352	196·8	156·3	−13·8	5	18	
		4794	0·342	194·8	155·4	−13·3	0	3	
		4794	0·338	193·4	154·9	−13·3	0	1	
		4794	0·337	192·1	154·4	−13·3	2	6	
		4797	0·958	80·2	76·4	+11·1	0	12	610n
			0·955	97·5	78·5	− 5·4			131
Oct. 13		Centre			(150·3)	(+5·9)	(7)	(44)	(1295)
286·520	CL, M	4794	0·512	229·7	156·1	−14·0	0	13	
		4794	0·499	228·9	155·2	−13·7	0	4	
		4794	0·492	228·3	154·6	−13·7	1	7	
		4797	0·802	81·1	79·0	+10·6	0	3	
		4797	0·819	80·5	77·3	+11·1	1	6	
		4797	0·831	79·3	76·1	+12·1	0	6	
		4797	0·835	80·3	75·7	+11·3	0	4	345c
		4797	0·835	79·9	75·7	+11·6	0	4	
		4797	0·839	80·5	75·2	+11·1	0	6	
		4797	0·859	79·5	73·0	+12·0	3	10	
		4797	0·872	78·0	71·5	+13·3	2	12	
Oct. 14		Centre			(132·5)	(+5·8)	(7)	(75)	(345)
287·171	AW, M		0·933	277·3	193·2	+ 8·9			105
		4798	0·408	274·2	148·0	+ 7·0	0	4	
I.		4797	0·742	79·8	76·0	+11·4	0	20	
		4797	0·775	78·2	73·1	+12·7	0	4	
		4797	0·781	79·0	72·5	+12·1	0	3	
1898.				°	°	°			
287d·171	AW, M	4797	0·796	78·9	71·0	+12·3	0	6	
I.		4797	0·800	77·4	70·7	+13·5	1	5	405c
Oct. 15		Centre			(123·9)	(+5·7)	(1)	(42)	(510)
288·178	AW, CL		0·896	273·6	174·6	+ 5·8			135
			0·887	246·2	169·2	−18·1			105
I.		4794	0·704	245·6	151·7	−12·7	0	2	159p
		4797	0·575	77·7	76·0	+11·6	0	7	
		4797	0·642	78·4	71·0	+11·7	0	11	
Oct. 16		Centre			(110·8)	(+5·6)	(0)	(20)	(399)
289·452	CL, M		0·893	251·3	154·3	−14·0			294
		4797	0·393	68·9	71·9	+13·2	0	22	
		4797	0·393	70·8	71·7	+12·5	0	4	
		4797	0·416	68·4	70·5	+13·8	0	16	
		4799	0·882	107·3	34·5	−12·4	1	12	128s
Oct. 17		Centre			(93·9)	(+5·5)	(1)	(54)	(422)
290·620	CL, M	4799	0·737	112·2	34·4	−12·2	2	10	
			0·945	84·9	7·3	+ 6·7			88
Oct. 18		Centre			(78·5)	(+5·5)	(2)	(10)	(88)
291·216	CL, M		0·922	254·6	135·6	−11·9			209
		4799	0·651	116·4	34·1	−12·4	2	7	
I.			0·908	89·3	5·4	+ 2·9			464
			0·936	79·1	0·8	+12·1			107
Oct. 19		Centre			(70·6)	(+5·4)	(2)	(7)	(780)
292·443	CL, M	4800	0·456	87·4	27·4	+ 5·9	0	5	
Oct. 20		Centre			(54·5)	(+5·3)	(0)	(5)	(0)
293·257	AW, CL	4800	0·269	85·6	28·1	+ 6·2	2	5	
I.									
Oct. 21		Centre			(43·7)	(+5·2)	(2)	(5)	(0)
294·161	CL, AW	4801	0·993	75·4	307·8	+15·1	0	249	285p
I.			0·943	107·1	323·6	−14·3			186
Oct. 22		Centre			(31·8)	(+5·1)	(0)	(249)	(471)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4797, October 13–17. A number of small, faint unstable spots irregularly distributed in a straggling stream.
Group 4798, October 15. A very small spot.
Group 4799, October 17–19. A small spot.
Group 4800, October 20–21. A very small spot.
Group 4801, October 22–November 3. A very fine and almost continuous stream of spots. The main body of the group is measured as a single spot on October 22 and 23, the effect of foreshortening preventing the component spots being seen separately. But by October 24 the group has advanced sufficiently far on the disc for the separate spots to be recognised. The three principal, *a, b,* and *c,* are large composite spots.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic. Longitude.	Heliographic. Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
295d·527	CL, M		0·865	280·5	73·7	+11·6			285
		4801	0·905	78·3	308·7	+12·7	0	15	1061c
		4801	0·913	75·8	307·6	+15·0	123	1102	
			0·872	116·3	317·6	−20·0			82
Oct. 23		Centre			(13·7)	(+5·0)	(123)	(1117)	(1428)
296·478	AW, M		0·947	282·4	72·8	+13·3			513
		4801a	0·764	75·1	311·7	+14·5	18	168	
		4801	0·771	72·7	311·3	+16·5	0	4	
		4801	0·779	75·3	310·3	+14·5	0	7	
		4801	0·785	76·8	309·6	+13·4	0	12	
		4801	0·791	71·6	309·5	+17·5	1	7	683c
		4801	0·791	72·6	309·4	+16·7	0	18	
		4801	0·799	77·1	308·3	+13·3	3	28	
		4801b	0·810	74·8	307·4	+15·1	82	636	
		4801c	0·847	75·4	303·4	+15·0	62	310	
Oct. 24		Centre			(1·2)	(+4·9)	(166)	(1190)	(1196)
297·134	AW, M	4801a	0·664	73·4	311·7	+14·6	19	134	
		4801	0·677	71·1	310·9	+16·3	0	4	
		4801	0·688	73·8	309·7	+14·6	0	2	
I.		4801	0·697	72·4	309·2	+15·6	6	30	718c
		4801b	0·724	73·2	306·8	+15·4	101	567	
		4801c	0·765	74·6	303·1	+14·9	77	362	
		4802	0·966	83·6	277·3	+ 7·4	0	18	261sf
Oct. 25		Centre			(352·6)	(+4·8)	(203)	(1117)	(979)
289·191	AW, M		0·894	256·5	40·4	− 9·9			229
		4801a	0·475	68·3	311·7	+14·3	14	90	
		4801	0·492	68·6	310·6	+14·4	1	9	
I.		4801	0·526	65·3	308·9	+16·8	4	18	
		4801	0·537	71·7	307·2	+13·7	0	1	
		4801b	0·552	68·2	306·6	+15·8	83	488	
		4801c	0·597	71·5	303·0	+14·7	68	331	
		4802a	0·870	84·2	278·1	+ 7·4	23	100	
		4802	0·902	85·3	274·2	+ 6·3	2	14	394c
			0·942	97·8	269·2	− 5·7			412
Oct. 26		Centre			(338·7)	(+4·7)	(195)	(1051)	(1035)
1898.				°	°	°			
299d·393	AW, M	4801	0·238	40·8	313·6	+14·9	0	1	
		4801a	0·251	49·2	311·6	+14·0	11	52	
		4801	0·281	45·3	310·9	+15·9	0	4	
		4801	0·266	51·6	310·5	+14·0	1	2	
I.		4801b	0·335	53·7	306·6	+15·9	70	425	
		4801	0·374	51·2	305·0	+17·9	0	1	
		4801c	0·375	60·6	303·1	+14·9	64	359	
		4802a	0·700	85·2	278·4	+ 6·6	18	59	
		4802	0·708	84·7	277·7	+ 7·0	0	2	
		4802	0·741	85·3	275·0	+ 6·6	0	2	172c
		4802	0·741	86·4	275·0	+ 5·8	0	2	
		4802	0·755	86·3	273·8	+ 5·8	7	25	
		4803	0·849	100·0	265·8	− 6·0	1	4	
		4803	0·869	99·8	263·6	− 6·2	0	2	372sp
			0·918	109·4	258·9	−15·7			262
			0·969	103·3	248·7	−11·7			204
Oct. 27		Centre			(322·8)	(+4·6)	(172)	(940)	(1010)
300·405	CL, M	4801	0·195	336·4	314·0	+14·7	0	2	
		4801	0·155	345·5	311·7	+13·1	2	5	
		4801a	0·165	346·6	311·7	+13·7	5	17	
		4801	0·191	352·8	310·8	+15·4	0	4	
		4801	0·156	3·8	310·0	+13·5	0	2	
		4801	0·156	357·9	309·7	+13·5	0	1	
		4801	0·163	353·7	308·3	+13·8	0	2	
		4801	0·165	14·3	307·0	+13·7	0	2	
		4801b	0·199	13·6	306·6	+15·6	53	347	
		4801	0·168	23·2	305·5	+13·3	0	2	
		4801	0·222	22·4	304·4	+16·3	0	3	
		4801c	0·203	30·4	303·3	+14·6	42	221	
		4801	0·187	35·4	303·0	+13·2	4	30	
		4801	0·239	32·6	301·7	+16·0	2	9	
		4802a	0·506	84·5	279·1	+ 6·7	11	57	
		4802	0·523	82·7	278·0	+ 7·7	0	2	
		4802	0·563	85·1	275·2	+ 6·5	1	6	
		4802	0·576	86·3	274·3	+ 5·8	5	16	
		4803	0·679	109·4	269·1	− 9·6	0	4	
		4803	0·680	103·9	268·0	− 6·0	0	5	519c
		4803	0·699	106·6	267·0	− 8·2	0	7	
		4804	0·951	105·5	239·4	−13·2	13	48	951p
			0·925	95·4	242·3	− 3·3			224
Oct. 28		Centre			(309·4)	(+4·5)	(138)	(792)	(1694)

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4802, October 25–November 3. A composite spot, *a*, followed by a few small spots irregularly scattered. *a* remains alone by October 30, and has become almost regular.
Group 4803, October 27–28. Two or three very small spots.
Group 4804, October 28–November 1. A single spot. It is not seen on October 31, but a very small spot is seen near its place on November 1.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
301d.193	AW, M		0·928	273·3	7·2	+ 4·8			158
		4801*a*	0·267	307·2	311·7	+13·7	3	15	
		4801	0·240	321·9	307·9	+15·3	8	67	
		4801	0·211	317·3	307·5	+13·4	0	7	
I.		4801*b*	0·246	326·9	307·1	+16·3	24	107	
		4801	0·210	327·4	305·8	+14·7	4	47	
		4801	0·224	332·2	305·3	+15·9	3	61	
		4801*c*	0·191	338·8	303·2	+14·7	57	325	
		4801	0·217	347·0	302·0	+16·7	0	4	
		4802*a*	0·352	82·8	278·6	+ 6·7	12	45	
		4802	0·364	80·8	277·9	+ 7·5	0	3	
		4802	0·382	82·8	276·8	+ 7·0	0	1	
		4802	0·418	85·0	274·5	+ 6·2	0	4	
		4804	0·889	107·8	238·8	−13·6	5	37	
		4805*a*	0·928	105·9	233·0	−12·9	0	13	
		4805	0·928	105·3	232·9	−12·4	8	27	1113*s*
		4805	0·944	106·4	230·5	−13·8	0	44	
		4805	0·955	106·6	228·5	−14·4	0	9	
			0·694	116·2	259·3	−14·4			86
			0·775	107·1	250·5	−10·2			187
			0·888	118·6	241·6	−22·8			240
			0·886	97·4	237·5	− 4·4			404
Oct. 29		Centre			(299·1)	(+4·5)	(124)	(816)	(2188)
302·318	AW, M	4801	0·430	296·9	307·5	+15·2	6	46	
		4801*b*	0·434	299·7	307·2	+16·5	15	92	
		4801	0·415	297·5	306·5	+15·1	0	15	
		4801	0·409	301·6	305·4	+16·5	0	2	
I.		4801	0·401	297·4	305·2	+ 8·8	0	32	
		4801	0·399	300·4	305·0	+15·7	6	51	
		4801*c*	0·373	299·2	303·8	+14·6	37	181	
		4801	0·354	296·5	303·1	+13·3	1	18	
		4801	0·342	300·0	301·9	+14·0	7	83	
		4802*a*	0·097	65·7	279·1	+ 6·7	14	44	
		4804	0·758	112·1	238·1	−13·5	0	6	
		4805*a*	0·799	108·9	233·7	−12·2	13	106	
		4805	0·813	106·9	232·0	−11·0	0	4	1139*s*
		4805	0·829	107·5	230·6	−11·5	0	2	
		4805	0·842	109·8	229·7	−14·0	4	32	
		4805	0·841	107·3	229·2	−12·0	2	12	
			0·772	120·4	239·3	−19·8			139
			0·937	121·5	220·2	−27·4			259
Oct. 30		Centre			(284·2)	(+4·4)	(105)	(726)	(1537)
1898.				°	°	°			
303d.528	CL, M	4801	0·640	288·7	307·0	+15·2	5	18	
		4801	0·639	290·3	306·6	+16·2	10	31	
		4801	0·611	290·2	304·6	+15·6	6	33	
		4801*c*	0·595	288·2	303·7	+14·2	19	135	
		4801	0·571	287·6	302·1	+13·6	12	92	
		4802*a*	0·206	279·9	279·9	+ 6·2	9	37	
		4805*a*	0·586	115·5	235·7	−11·0	13	59	
		4805	0·604	115·0	234·4	−11·2	4	18	
		4805	0·658	113·2	230·2	−11·6	1	6	
		4805	0·671	116·8	230·2	−14·2	0	9	
		4805	0·665	114·4	230·0	−12·6	0	9	
			0·905	83·1	203·3	+ 8·1			121
Oct. 31		Centre			(268·2)	(+4·3)	(79)	(447)	(121)
304·527	CL, M	4801	0·793	286·4	307·1	+15·5	6	30	
		4801	0·777	285·6	305·7	+14·7	0	21	
		4801*c*	0·758	285·3	304·0	+14·3	12	79	743*c*
		4801	0·743	283·3	302·8	+12·7	4	23	
		4801	0·740	285·1	302·4	+14·0	7	60	
		4802*a*	0·423	275·3	280·1	+ 6·0	10	32	
		4804	0·377	140·1	240·9	−12·7	0	4	
		4805	0·409	129·6	236·5	−11·1	0	2	
		4805*a*	0·408	127·6	236·1	−10·4	6	37	
		4805	0·422	128·0	235·5	−11·1	4	10	
		4806	0·468	135·5	235·4	−15·5	0	6	
		4806	0·475	132·6	234·1	−14·7	0	3	
		4807*a*	0·757	83·4	206·0	+ 7·8	25	203	
		4807	0·771	82·7	204·8	+ 8·3	0	4	
		4807	0·802	81·7	201·9	+ 9·2	0	6	
		4807	0·813	84·1	200·8	+ 7·2	0	15	476*c*
		4807	0·816	82·7	200·5	+ 8·4	9	31	
		4807	0·827	83·1	199·4	+ 8·1	0	9	
			0·940	84·5	185·1	+ 6·6			208
Nov. 1		Centre			(255·2)	(+4·2)	(83)	(575)	(1427)
305·184	CL, M		0·851	248·9	301·8	−15·5			204
		4801	0·876	285·7	307·4	+15·7	5	26	
		4801*c*	0·852	284·3	304·7	+14·3	29	86	1035*c*
		4801	0·840	282·2	303·5	+12·5	0	26	
I.		4801	0·833	283·9	302·6	+13·8	0	41	
		4802*a*	0·557	275·0	280·3	+ 6·2	5	16	
		4805*a*	0·308	145·0	236·2	−10·6	6	35	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4805, October 29–November 6. Several spots, irregularly arranged, following Group 4804. The leader, *a*, has become the largest member of the group by October 30, and is the most stable; alone remaining by November 4. The other spots are unstable, and undergo continual change.
Group 4806, November 1–4. A few very small unstable spots, forming *s* of Group 4805.
Group 4807, November 1–10. A large composite spot, *a*, followed by a number of small spots in a straggling stream. The following spots have increased and coalesced by November 4 to form a second large composite spot, *b*. By November 5 the group has formed a fine straight and almost continuous stream of considerable complexity. The following portion of the group then begins to break up, but the preceding portion becomes more defined, and *a* has reformed again by November 8 as a fine, large, sharply-defined spot, which has become regular by November 9. The following portion of the group has nearly disappeared by November 10.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
305d·184	CL, M	4805	0·324	145·2	235·7	−11·3	2	6	
		4806	0·395	151·2	235·1	−16·2	0	5	
		4806	0·398	146·7	233·5	−15·3	0	3	
I.		4807a	0·644	84·0	206·5	+ 7·0	46	223	
		4807	0·681	82·7	203·7	+ 8·0	0	11	429c
		4807	0·731	82·6	199·6	+ 8·2	17	125	
		4808	0·970	101·4	171·8	−10·0	0	24	
		4808	0·974	100·7	170·7	− 9·4	5	30	
		4808	0·981	100·2	168·7	− 9·2	0	30	763c
		4808	0·989	100·8	166·2	−10·0	0	28	
		4808	0·993	101·0	164·5	−10·4	0	53	
			0·881	85·3	184·7	+ 6·1			316
Nov. 2		Centre			(246·5)	(+4·1)	(115)	(768)	(2747)
306·229	CL, M	4801c	0·945	284·2	303·8	+14·7	8	48	585c
		4802a	0·739	275·2	280·3	+ 6·5	3	12	
		4805	0·256	195·6	236·7	−10·3	5	16	
M.		4806	0·355	188·2	235·7	−16·6	5	20	
		4806	0·362	183·4	234·0	−17·2	2	9	
		4806	0·341	181·2	233·1	−16·0	0	2	
		4807a	0·423	84·9	207·8	+ 5·7	28	189	
		4807	0·443	84·6	206·5	+ 5·9	0	6	
		4807	0·454	83·1	205·8	+ 6·6	4	26	
		4807	0·466	81·5	205·1	+ 7·4	0	22	
		4807	0·477	82·5	204·4	+ 7·0	0	5	
		4807	0·490	83·9	203·5	+ 6·4	0	7	
		4807	0·520	82·3	201·5	+ 7·3	5	29	
		4807	0·526	83·5	201·1	+ 6·7	2	9	
		4807	0·541	80·7	200·2	+ 8·3	35	168	
		4807	0·544	83·5	199·9	+ 6·8	0	4	
		4807	0·552	84·8	199·3	+ 6·2	0	8	
		4807	0·561	83·7	198·7	+ 6·7	0	2	
		4808	0·882	103·1	172·3	− 9·6	0	7	390c
		4808	0·926	103·6	166·5	−11·0	0	69	
			0·895	111·8	172·3	−17·5			106
Nov. 3		Centre			(232·7)	(+3·9)	(97)	(658)	(1081)
307·409	CL, M	4805a	0·405	235·8	236·9	− 9·5	3	8	
		4806	0·469	222·2	236·2	−16·6	4	14	
		4807a	0·159	78·4	208·1	+ 5·6	39	216	
		4807	0·188	76·0	206·6	+ 6·3	0	8	
		4807	0·211	74·4	205·3	+ 7·0	0	9	
1898.				°	°	°			
307d·409	CL, M	4807	0·230	79·3	204·0	+ 6·2	2	8	
		4807	0·261	73·6	202·5	+ 7·9	3	14	
		4807b	0·290	72·7	200·9	+ 8·6	38	204	
		4807	0·300	80·4	199·9	+ 6·5	2	14	
		4807	0·321	74·6	198·9	+ 8·5	0	4	
		4808	0·723	106·7	172·7	− 9·3	0	3	
		4808	0·761	106·9	169·6	−10·2	10	60	
		4808	0·763	104·7	169·0	− 8·6	0	7	558c
		4808	0·774	105·7	168·2	− 9·6	0	22	
		4808	0·795	108·1	166·7	−11·9	11	66	
		4808	0·802	106·0	165·7	−10·4	7	38	
			0·894	102·5	155·1	− 9·4			77
Nov. 4		Centre			(217·1)	(+3·8)	(119)	(695)	(635)
308·443	AW, CL		0·944	274·2	274·1	+ 5·2			173
			0·932	260·4	271·1	− 7·5			203
			0·854	250·0	259·3	−14·9			226
		4805a	0·592	248·5	237·2	− 9·5	2	10	
		4807	0·099	287·6	208·8	+ 5·4	19	108	
		4807	0·079	298·4	207·4	+ 5·8	29	115	
		4807	0·070	295·1	207·0	+ 5·4	3	25	
		4807	0·090	334·3	205·7	+ 8·4	0	12	
		4807	0·056	316·1	205·6	+ 6·0	1	24	
		4807	0·068	334·5	205·1	+ 7·2	0	14	
		4807	0·060	349·2	202·8	+ 7·1	0	10	
		4807	0·088	18·7	201·8	+ 8·5	15	84	
		4807	0·102	31·9	200·3	+ 8·6	9	63	
		4807	0·057	9·0	200·2	+ 4·2	17	75	
		4807	0·118	42·6	198·8	+ 8·6	0	6	
		4808	0·559	113·8	172·3	− 9·8	0	8	
		4808	0·577	113·5	171·0	−10·2	3	20	
		4808	0·591	112·7	169·9	−10·1	0	11	
		4808	0·645	113·5	166·4	−12·0	6	29	
		4808	0·643	109·7	165·7	− 9·6	0	10	
		4808	0·650	112·2	165·7	−11·3	0	34	
		4809a	0·639	86·9	163·8	+ 4·8	7	60	
		4809b	0·668	85·3	161·6	+ 5·9	8	39	
Nov. 5		Centre			(203·4)	(+3·7)	(119)	(757)	(602)
309·166	AW, M		0·895	254·1	255·5	−12·5			396
			0·837	247·2	247·4	−16·8			302
			0·742	238·1	235·9	−20·4			209
I.		4805a	0·723	253·1	238·3	− 9·5	4	10	70c

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4808, November 2–13. A number of spots in an irregular but fairly compact cluster. The individual spots of the group are unstable, and the group tends to diminish and to lengthen out into a straight sparse stream.
Group 4809, November 5–12. A pair of spots, *a* and *b*. A third spot, *c*, has formed between them by November 7, and by the succeeding day the group has become a straight stream, of which *a* is the leader and the largest. The group diminishes after November 8, and *a* alone remains by November 12.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
309d.166	AW, M	4807	0·258	277·3	208·7	+ 5·4	35	176	
		4807	0·236	282·3	207·3	+ 6·4	33	150	
		4807	0·224	290·8	206·1	+ 8·1	0	19	
		4807	0·212	285·4	205·7	+ 6·7	0	8	
I.		4807	0·206	291·2	205·0	+ 7·8	0	7	
		4807	0·198	282·2	205·1	+ 6·0	0	1	
		4807	0·188	291·6	204·0	+ 7·5	0	2	
		4807	0·168	293·5	202·8	+ 7·4	26	175	
		4807	0·173	303·2	202·3	+ 9·0	4	44	
		4807	0·145	297·3	201·3	+ 7·4	0	5	
		4807	0·146	306·9	200·6	+ 8·6	17	73	
		4807	0·119	299·5	199·9	+ 6·9	0	4	
		4807	0·133	314·1	199·4	+ 8·9	0	10	
		4807	0·123	323·3	198·2	+ 9·2	0	4	
		4807	0·106	320·4	197·8	+ 8·2	0	2	
		4808	0·444	122·2	171·5	−10·3	5	10	
		4808	0·469	122·2	170·1	−11·1	0	1	
		4808	0·473	120·3	169·5	−10·5	0	8	
		4808	0·501	116·2	166·9	− 9·6	0	2	
		4808	0·531	120·2	166·0	−12·3	2	12	
		4808	0·517	115·0	165·7	− 9·4	4	7	
		4808	0·533	116·6	165·0	−10·6	2	10	
		4808	0·533	118·4	165·4	−11·5	0	6	
		4809*a*	0·488	86·5	164·8	+ 4·9	29	137	
		4809*b*	0·552	84·8	160·5	+ 5·9	21	90	
Nov. 6		Centre			(193·9)	(+3·6)	(182)	(973)	(977)
310·451	AW,CL		0·916	272·1	243·1	+ 3·3			227
			0·919	254·6	241·9	−12·7			619
			0·860	263·1	235·6	− 4·2			235
			0·864	244·1	232·6	−20·2			448
		4807	0·525	274·7	208·5	+ 5·5	42	220	
		4807	0·512	277·8	207·5	+ 7·0	15	70	
		4807	0·505	275·6	207·1	+ 5·9	11	60	
		4807	0·493	277·6	206·3	+ 6·8	0	13	
		4807	0·492	279·8	206·1	+ 7·8	2	18	
		4807	0·475	274·6	205·2	+ 5·3	0	11	
		4807	0·473	278·5	204·9	+ 7·1	1	6	
		4807	0·443	282·1	202·8	+ 8·5	20	150	
		4807	0·440	278·0	202·8	+ 6·7	0	32	
		4807	0·416	282·8	201·0	+ 8·5	4	18	
		4807	0·400	279·4	200·2	+ 6·9	0	8	
		4807	0·402	283·2	200·1	+ 8·5	0	9	
1898.				°	°	°			
310d.451	AW,CL	4807	0·391	283·9	199·4	+ 8·6	3	17	
		4807	0·217	279·1	189·3	+ 5·4	0	4	
		4808	0·252	164·6	173·0	−10·5	0	13	
		4808	0·279	142·4	167·0	− 9·3	0	5	
		4809*a*	0·168	80·9	167·4	+ 5·0	18	94	
		4809*c*	0·217	81·7	164·5	+ 5·2	0	3	
		4809*b*	0·286	82·0	160·4	+ 5·7	11	73	
Nov. 7		Centre			(176·9)	(+3·5)	(127)	(~~234~~)	(1529)
311·515	CL, M		0·953	263·1	234·5	− 5·5			216
			0·927	298·7	229·5	+27·8			152
			0·933	250·8	229·5	−16·5			740
			0·895	238·3	220·7	−26·2			205
		4807	0·723	271·4	209·1	+ 3·4	0	16	
		4807*a*	0·712	275·0	208·2	+ 6·0	98	388	
		4807	0·654	277·9	203·5	+ 7·7	0	11	632*c*
		4807	0·643	279·7	202·6	+ 8·9	0	43	
		4807	0·617	279·9	200·7	+ 8·8	0	6	
		4808	0·280	213·2	171·8	−10·2	2	40	
		4808	0·233	201·1	167·8	− 9·1	0	6	
		4809*a*	0·111	292·2	168·8	+ 5·8	13	93	
		4809*c*	0·037	347·9	163·3	+ 5·5	5	24	
		4809	0·078	19·4	161·4	+ 7·6	0	4	
		4809*b*	0·060	49·5	160·3	+ 5·6	5	28	
			0·969	77·2	92·1	+ 2·1			229
Nov. 8		Centre			(162·9)	(+3·4)	(123)	(659)	(2174)
312·284	AW, M		0·965	252·1	225·7	−16·3			324
			0·918	237·8	213·9	−27·7			176
		4807*a*	0·826	275·0	208·4	+ 6·0	102	428	
		4807	0·786	277·0	204·5	+ 7·5	1	7	
I.		4807	0·773	279·2	203·2	+ 9·2	1	13	
		4807	0·766	278·3	202·6	+ 8·5	0	5	1195*c*
		4807	0·765	276·6	202·6	+ 7·2	0	5	
		4807	0·750	278·8	201·2	+ 8·8	0	4	
		4807	0·728	278·2	199·3	+ 8·2	0	2	
		4808	0·406	235·9	172·7	−10·0	0	36	
		4808	0·338	230·3	168·0	− 9·3	0	1	
		4808	0·354	221·9	166·7	−12·0	0	3	
		4809*a*	0·295	279·1	169·7	+ 5·8	7	60	
		4809	0·264	279·4	167·9	+ 5·7	1	3	
		4809*c*	0·211	280·5	164·8	+ 5·4	7	30	
		4809	0·178	296·1	162·0	+ 7·8	0	5	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.

The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
312d·284	AW, M	4809	0·163	286·6	161·8	+ 5·9	1	7	
		4809*b*	0·141	288·8	160·5	+ 5·9	3	19	
I.			0·934	77·1	83·8	+13·3			120
			0·951	98·1	81·6	− 6·7			59
			0·960	92·7	79·4	− 1·7			74
Nov. 9		Centre			(152·8)	(+3·3)	(123)	(628)	(1948)
313·187	CL, M	4807	0·935	271·7	210·0	+ 2·8	0	6	
		4807*a*	0·926	274·8	208·7	+ 5·6	119	440	} 1157*f*
		4807	0·920	273·0	207·7	+ 4·0	0	11	
		4807	0·886	278·0	203·2	+ 8·6	0	13	
I.		4808	0·566	245·8	172·5	−10·7	0	2	
		4808	0·520	242·5	168·8	−11·0	0	4	
		4809*a*	0·494	274·3	170·4	+ 5·0	16	56	
		4809	0·459	275·3	168·1	+ 5·3	0	3	
		4809	0·422	273·6	165·8	+ 4·4	0	5	
		4809*c*	0·417	275·5	165·4	+ 5·2	2	8	
		4809	0·396	276·2	164·1	+ 5·4	0	3	
		4809	0·363	277·2	162·0	+ 5·6	0	2	
		4809*b*	0·341	277·3	160·7	+ 5·5	0	3	
		4810	0·855	99·9	83·1	− 6·7	0	5	} 90*c*
		4810	0·872	100·4	81·3	− 7·4	0	4	
			0·884	76·1	79·1	+13·8			275
Nov. 10		Centre			(140·9)	(+3·2)	(137)	(565)	(1522)
314·529	AW, M		0·979	275·5	201·5	+ 6·0			621
			0·884	275·6	185·3	+ 6·4			214
		4808	0·760	253·6	170·9	−10·4	0	9	
		4808	0·749	252·6	169·8	−11·4	0	7	} 285*np*
		4808	0·747	250·1	169·1	−12·6	2	13	
		4809*a*	0·738	273·9	170·7	+ 4·9	8	25	
		4809	0·703	274·9	167·7	+ 5·6	0	5	
		4811*a*	0·328	211·9	133·4	−13·2	0	7	
		4811	0·313	203·2	130·5	−13·7	1	4	
		4811	0·294	204·7	130·4	−12·5	0	2	
		4810	0·631	104·8	85·4	− 6·9	0	7	
		4810	0·636	104·0	85·0	− 6·5	7	28	
		4810	0·647	101·7	83·9	− 5·2	2	7	
		4810	0·657	103·2	83·3	− 6·3	0	1	
		4810	0·666	105·2	82·9	− 7·8	0	4	
		4810	0·684	104·1	81·4	− 7·4	9	57	
		4810	0·694	102·7	80·4	− 6·6	0	4	
Nov. 11		Centre			(123·2)	(+3·0)	(29)	(180)	(1120)
1898.				°	°	°			
315d·203	AW, M		0·940	275·5	184·3	+ 6·3			140
		4808	0·873	256·1	173·6	−10·5	3	20	691*c*
		4809*a*	0·842	274·2	171·5	+ 5·2	5	21	335*f*
I.		4811*a*	0·423	230·3	133·7	−12·6	1	10	
		4810	0·504	108·5	85·7	− 6·4	0	4	
		4810	0·516	107·7	84·8	− 6·2	6	22	
		4810	0·526	105·1	83·8	− 5·1	2	18	
		4810	0·549	102·6	81·9	− 4·2	0	8	
		4810	0·576	106·4	80·6	− 6·7	3	36	
Nov. 12		Centre			(114·3)	(+2·9)	(20)	(139)	(1166)
316·507	AW, M		0·920	275·2	163·9	+ 5·9			350
		4808	0·979	258·1	174·4	−11·1	6	51	} 362*sf*
		4808	0·965	257·1	170·7	−11·7	0	9	
		4810	0·247	132·3	86·5	− 6·8	0	5	
		4810*a*	0·249	128·8	85·9	− 6·2	2	17	
		4810	0·263	129·2	85·3	− 6·8	1	5	
		4810	0·260	127·1	85·1	− 6·3	3	16	
		4810	0·267	125·6	84·5	− 6·2	0	10	
		4810	0·291	124·9	83·2	− 6·9	0	4	
		4810	0·305	120·4	81·8	− 6·2	0	7	
		4810	0·323	120·6	80·9	− 6·8	0	11	
		4810	0·332	121·8	80·6	− 7·4	1	6	
Nov. 13		Centre			(97·1)	(+2·8)	(13)	(141)	(712)
317·445	AW, CL		0·969	275·9	160·4	+ 6·4			217
		4810*a*	0·155	189·3	86·1	− 6·0	9	63	
		4810	0·166	170·5	83·1	− 6·7	0	5	
		4810	0·164	158·5	81·3	− 6·1	0	6	
		4810*b*	0·186	156·8	80·5	− 7·1	4	21	
Nov. 14		Centre			(84·7)	(+2·7)	(13)	(95)	(217)
318·188	AW, M		0·876	254·3	134·4	−12·4			183
		4810	0·279	233·3	87·9	− 7·0	0	6	
I.		4810*a*	0·254	232·7	86·6	− 6·3	7	36	
		4810	0·251	228·7	85·8	− 7·0	0	1	
		4810*b*	0·198	210·0	80·6	− 7·3	0	15	
			0·870	81·5	14·6	+ 8·7			114
Nov. 15		Centre			(74·9)	(+2·6)	(7)	(58)	(297)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4810, November 10–16. A pair of very small spots on November 10. The group has greatly increased by the succeeding day, and forms two compact clusters, which have lengthened out into straight streams by November 12. These have combined into a single straight stream by November 14, of which the first and last spots, *a* and *b*, are the largest.
Group 4811, November 11–12. A few very small spots on November 11, of which only the leader, *a*, remains by November 12.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
319d·243	CL, AW		0·960	257·0	133·7	−11·8			114
		4810a	0·464	251·2	87·2	− 6·3	2	11	
I.		4810	0·460	249·6	86·7	− 7·0	0	3	
		4810	0·420	247·9	84·1	− 6·7	0	5	
			0·929	76·0	353·1	+13·9			159
Nov. 16		Centre			(61·1)	(+2·5)	(2)	(19)	(273)
320·191	CL, M	4812	0·552	85·8	15·2	+ 4·3	0	6	
I.		4812	0·569	84·6	14·1	+ 5·0	0	3	
			0·916	79·9	342·5	+10·2			214
Nov. 17		Centre			(48·6)	(+2·4)	(0)	(9)	(214)
321·443	M, AW		0·814	259·8	85·6	− 7·0			185
		4813a	0·629	116·2	356·5	−14·3	7	31	
		4813	0·665	114·7	353·6	−14·4	0	12	
Nov. 18		Centre			(32·0)	(+2·2)	(7)	(43)	(185)
322·485	AW, CL		0·930	285·2	86·3	+14·9			176
			0·919	260·4	84·3	− 8·0			431
		4813a	0·446	128·6	357·3	−14·1	21	95	
		4813	0·474	125·5	355·0	−14·0	0	2	
		4813	0·497	125·6	353·7	−14·9	0	5	
		4813	0·493	124·0	353·5	−14·0	4	24	
		4813	0·508	124·3	352·7	−14·7	2	13	
			0·941	72·4	308·6	+17·3			360
Nov. 19		Centre			(18·3)	(+2·1)	(27)	(139)	(967)
323·185	CL, M		0·964	261·1	83·0	− 8·1			198
		4813a	0·333	143·3	357·3	−13·5	20	98	
I.		4813	0·382	135·1	353·1	−13·7	8	19	
		4813	0·388	134·2	352·5	−13·7	0	2	
		4813	0·399	134·9	352·2	−14·4	0	1	
			0·900	71·4	309·6	+ 8·9			474
			0·888	113·3	309·4	−19·5			58
Nov. 20		Centre			(9·1)	(+2·0)	(28)	(120)	(730)
1898.				°	°	°			
324d·265	CL, M	4813a	0·267	186·2	356·6	−13·4	14	81	
I.		4813	0·260	182·6	355·6	−13·1	0	1	
		4813	0·291	169·9	351·9	−14·7	2	6	
			0·800	67·8	303·6	+18·7			208
Nov. 21		Centre			(354·9)	(+1·9)	(16)	(88)	(208)
325·439	AW, CL	4813a	0·393	230·6	357·5	−12·8	12	62	
Nov. 22		Centre			(339·4)	(+1·7)	(12)	(62)	(0)
326·257	CL, M	4813a	0·535	242·0	357·5	−13·1	12	55	
		4813	0·503	238·2	354·6	−13·9	0	2	
I.			0·819	102·9	274·7	− 9·6			95
			0·918	107·2	263·6	−15·1			227
Nov. 23		Centre			(328·6)	(+1·6)	(12)	(57)	(322)
327·223	CL, M	4813a	0·690	249·1	356·4	−13·1	12	73	
I.			0·913	106·5	250·7	−14·4			247
			0·953	96·1	243·2	− 5·4			61
Nov. 24		Centre			(315·1)	(+1·5)	(12)	(73)	(308)
328·486	CL, M	4813a	0·857	253·6	356·7	−13·2	11	66	158sf
			0·897	113·6	238·3	−20·3			141
Nov. 25		Centre			(299·3)	(+1·4)	(11)	(66)	(299)
329·218	CL, M	4813a	0·933	254·4	356·4	−14·0	17	75	365sf
		4814	0·239	308·4	299·7	+ 9·7	0	4	
I.		4814	0·218	304·5	299·2	+ 8·2	0	5	
			0·800	114·2	238·8	−18·3			266
			0·890	124·9	231·6	−29·9			139
			0·914	111·9	225·0	−19·3			600
			0·952	82·4	216·9	+ 7·6			285
Nov. 26		Centre			(288·8)	(+1·2)	(17)	(84)	(1655)
330·191	M, CL	4815	0·438	120·5	254·2	−11·8	0	3	
		4816	0·920	84·4	210·1	+ 5·6	1	5	710np
I.		4817a	0·968	98·2	201·8	− 7·7	98	265	478f
			0·812	115·4	225·8	−19·7			246
Nov. 27		Centre			(276·8)	(+1·1)	(99)	(273)	(1434)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4812, November 17. Two very small spots.
Group 4813, November 18–26. A regular spot, *a*, usually followed by a few small spots in a short stream.
Group 4814, November 26. A pair of very small spots.
Group 4815, November 27–28. A very small faint spot on November 27. Another similar spot, *f*, the place of the first on November 28.
Group 4816, November 27–December 2. A very small spot on November 27 and 28, and an irregular cluster of small unstable spots on the succeeding days.
Group 4817, November 27–December 8. A large spot, *a*, with a few small companions on November 30. The nucleus of *a* has begun to divide by December 1, and the spot is measured in two portions on December 4.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
331d.238	CL, M	4815	0·280	134·7	251·0	−10·3	0	2	
I.		4816	0·790	84·2	210·7	+ 5·2	2	11	428*f*
		4817*a*	0·883	99·2	201·2	− 7·7	49	312	437*f*
Nov. 28		Centre			(262·6)	(+ 1·0)	(51)	(325)	(865)
332·243	CL, M		0·882	294·7	309·3	+22·0			298
			0·867	286·4	308·7	+14·6			128
		4816	0·613	83·0	212·2	+ 4·9	1	12	
I.		4816	0·663	83·4	208·5	+ 5·0	0	5	
		4817*a*	0·755	101·2	201·5	− 7·9	39	215	350*c*
			0·927	106·3	183·0	−14·8			747
			0·975	82·3	172·7	+ 7·7			106
Nov. 29		Centre			(249·7)	(+ 0·8)	(40)	(232)	(1629)
333·429	AW, M	4816	0·359	81·0	213·4	+ 3·9	2	20	
		4816	0·366	77·9	213·1	+ 5·0	0	5	
		4816	0·410	80·1	210·3	+ 4·7	0	5	
		4817*a*	0·540	105·0	202·5	− 7·4	30	171	
		4817	0·537	101·3	202·3	− 5·5	0	3	
		4817	0·549	99·7	201·3	− 6·1	0	10	
		4817	0·569	105·7	200·6	− 8·2	0	4	
			0·840	104·7	178·2	−11·9			229
Nov. 30		Centre			(234·1)	(+ 0·7)	(32)	(218)	(229)
334·328	CL, M	4816	0·171	72·3	212·9	+ 3·6	0	9	
		4816	0·180	66·0	212·8	+ 4·8	1	3	
I.		4816	0·189	73·0	211·9	+ 3·7	2	10	
		4816	0·206	67·2	211·4	+ 5·1	0	4	
		4817*a*	0·377	112·9	201·9	− 7·8	50	173	98*c*
			0·737	80·5	175·4	+ 7·4			118
Dec. 1		Centre			(222·3)	(+ 0·6)	(53)	(199)	(216)
335·293	CL, M	4816	0·103	330·1	212·4	+ 5·6	0	8	
		4817*a*	0·194	138·1	202·0	− 7·8	29	173	
I.		4818	0·284	99·1	193·3	− 2·1	0	3	
		4818	0·284	95·6	193·2	− 0·8	0	3	
		4818	0·288	93·3	192·9	− 0·5	0	3	
		4819*a*	0·979	102·6	131·9	−12·2	131	445	
		4819	0·980	99·4	131·5	− 9·1	0	16	418*c*
		4819	0·983	100·6	130·6	−10·3	0	10	
Dec. 2		Centre			(209·5)	(+ 0·5)	(160)	(661)	(418)
1898.				°	°	°			
336d.304	CL, M		0·884	251·6	256·8	−16·0			460
			0·780	260·2	246·8	− 7·4			48
I.			0·770	285·7	245·3	+12·2			50
			0·717	243·4	238·5	−18·4			230
		4817*a*	0·177	217·0	202·3	− 7·8	27	141	
		4819	0·906	100·0	131·8	− 8·9	0	4	1001*c*
		4819*a*	0·911	103·6	131·5	−12·3	87	473	
Dec. 3		Centre			(196·2)	(+ 0·3)	(114)	(618)	(1789)
337·459	AW, CL		0·901	250·0	243·5	−17·8			269
		4817*a*	0·386	250·9	202·4	− 7·1	15	59	
		4817*a*	0·392	247·8	202·3	− 8·3	12	79	
		4819*a*	0·767	106·3	132·2	−12·3	88	434	668*c*
		4819	0·784	109·0	131·1	−14·7	0	12	
Dec. 4		Centre			(180·9)	(+ 0·2)	(115)	(584)	(937)
338·178	CL, M		0·927	267·7	239·2	− 2·1			71
			0·890	247·1	232·2	−20·2			702
I.		4817*a*	0·537	255·0	202·9	− 8·0	23	135	
		4819*a*	0·666	109·1	131·5	−12·5	83	411	
		4819	0·697	110·7	129·4	−14·2	0	11	240*c*
Dec. 5		Centre			(171·5)	(+ 0·1)	(106)	(557)	(1013)
339·390	CL, M		0·939	246·4	224·7	−22·1			491
			0·819	280·2	211·0	+ 8·3			453
I.		4817*a*	0·736	259·4	203·4	− 7·8	26	114	231*c*
		4819	0·453	112·5	131·7	−10·1	0	4	
		4819*a*	0·470	117·1	131·4	−12·4	70	443	
			0·909	99·7	91·9	− 8·9			166
Dec. 6		Centre			(156·7)	(− 0·1)	(96)	(561)	(1341)
Dec. 7	No	photograph.							
341·182	CL, M		0·959	279·1	204·9	+ 8·6			273
		4817	0·950	262·7	203·4	− 7·1	6	33	138*c*
		4817	0·945	263·1	202·5	− 6·6	9	32	
M.		4819	0·219	194·3	135·1	−12·5	0	4	
		4819	0·169	189·7	133·5	− 9·9	0	2	

The Groups of Spots are numbered in the order of their appearance. When there is no number in the third column it is to be understood that there is a Facula unaccompanied by a Spot. 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. The longitude and latitude of the centre of the disk are given in brackets.
The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4818, December 2. Three very small faint spots.
Group 4819, December 2–13. A very large spot, *a*, with one or two small companions. *a* has become composite by December 9, and is measured in two or three parts on December 9 and 10. It has divided into two distinct spots, *b* and *c*, by December 13.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic Longitude.	Heliographic Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
341d.182	CL, M	4819	0·151	185·2	132·7	− 8·9	0	4	
		4819a	0·230	182·4	132·5	−13·6	13	116	
		4819	0·191	182·8	132·4	−11·3	2	17	
		4819	0·177	182·3	132·3	−10·4	0	15	
M.		4819	0·265	180·3	132·0	−15·6	0	14	
		4819	0·170	180·6	132·0	−10·0	0	7	
		4819	0·180	177·4	131·4	−10·6	0	3	
		4819a	0·213	177·4	131·3	−12·6	27	213	
		4819	0·182	172·6	130·5	−10·7	0	5	
Dec. 8		Centre			(131·9)	(− 0·3)	(57)	(465)	(411)
342·488	AW, M		0·938	249·8	183·0	−19·0			117
			0·896	256·3	177·5	−12·4			350
			0·881	278·0	176·0	+ 6·9			124
		4819	0·410	240·1	135·9	−12·1	1	2	
		4819	0·403	239·2	135·3	−12·2	0	1	
		4819	0·397	233·5	133·8	−14·0	0	2	
		4819	0·355	239·5	132·8	−10·7	0	4	
		4819	0·396	229·0	132·7	−15·4	0	1	
		4819a	0·370	233·0	132·3	−13·2	22	94	
		4819a	0·343	239·5	132·1	−10·4	4	32	
		4819	0·385	226·9	131·6	−15·6	0	1	
		4819a	0·347	234·5	131·4	−12·0	31	157	
		4819	0·364	229·5	131·2	−14·0	0	7	
Dec. 9		Centre			(114·7)	(− 0·4)	(58)	(301)	(591)
343·184	CL, M		0·911	274·0	170·9	+ 3·4			64
			0·948	256·1	176·4	−13·3			382
		4820	0·903	258·3	169·6	−10·9	0	4	
I.		4820	0·888	259·9	167·7	− 9·2	0	5	167c
		4820	0·888	258·3	167·6	−10·7	0	2	
		4819	0·519	247·9	134·9	−11·8	0	1	
		4819	0·510	248·3	134·4	−11·4	0	3	
		4819	0·521	243·1	134·1	−14·3	0	1	
		4819a	0·474	248·0	132·1	−10·9	0	22	
		4819a	0·481	244·4	131·9	−12·5	66	283	
		4819	0·445	247·9	130·3	−10·2	0	3	
			0·977	96·4	28·1	− 6·4			93
Dec. 10		Centre			(105·6)	(− 0·6)	(66)	(324)	(706)
1898.				°	°	°			
344d.186	CL, M		0·974	258·3	169·0	−11·6			243
		4819a	0·659	251·7	132·1	−12·4	48	236	412c
I.		4819	0·633	254·4	130·5	−10·3	0	2	
			0·913	94·2	26·7	− 4·2			234
			0·942	80·4	22·6	+ 8·8			94
Dec. 11		Centre			(92·4)	(− 0·7)	(48)	(238)	(983)
345·319	CL, M	4819a	0·824	255·4	131·9	−12·4	42	238	744c
I.			0·786	96·1	25·9	− 5·3			99
Dec. 12		Centre			(77·4)	(− 0·8)	(42)	(238)	(843)
346·276	CL, M	4819b	0·932	256·0	132·9	−13·4	20	80	610f
I.		4819c	0·929	257·4	132·6	−12·1	16	84	
			0·915	105·6	359·4	−14·7			79
			0·977	99·6	347·3	− 9·6			234
Dec. 13		Centre			(64·8)	(− 1·0)	(36)	(164)	(923)
347·314	CL, M		0·781	101·5	0·5	− 9·6			170
I.			0·923	95·5	354·1	− 5·5			550
Dec. 14		Centre			(51·2)	(− 1·1)	(0)	(0)	(720)
348·189	CL, M		0·838	100·9	343·2	− 9·8			648
I.									
Dec. 15		Centre			(39·6)	(− 1·2)	(0)	(0)	(648)
349·262	CL, M	4821a	0·950	79·3	314·3	+ 9·8	0	14	203f
I.									
Dec. 16		Centre			(25·4)	(− 1·3)	(0)	(14)	(203)
350·196	CL, M	4821a	0·866	77·9	314·2	+ 9·8	6	17	544c
I.		4821	0·871	79·3	313·5	+ 8·6	0	6	
Dec. 17		Centre			(13·2)	(− 1·4)	(6)	(23)	(544)
351·251	CL, M		0·751	75·1	312·0	+10·0			450
M.			0·935	82·8	290·6	+ 6·2			190
Dec. 18		Centre			(359·3)	(− 1·6)	(0)	(0)	(640)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4820, December 20. Three very small faint spots.
Group 4821, December 16–17. A small spot, *a*, with a very small companion on December 17.

Measures of Positions and Areas of Sun Spots and Faculæ on Photographs—*continued.*

Greenwich Civil Time.	Measurers.	No. of Group, and Letter for Spot.	Distance from Centre in terms of Sun's Radius.	Position Angle from Sun's Axis.	Heliographic. Longitude.	Heliographic. Latitude.	Spots. Area of UMBRA for each Spot (and for Day).	Spots. Area of WHOLE for each Spot (and for Day).	Faculæ. Area for each Group (and for Day).
1898.				°	°	°			
352d·223	CL, M		0·836	272·2	289·9	+ 0·9			71
M.		4822*a*	0·843	80·4	289·7	+ 7·1	11	28	
		4822	0·853	81·9	288·5	+ 6·0	0	6	250*c*
		4822	0·864	79·5	287·5	+ 8·2	2	9	
		4822	0·871	80·4	286·6	+ 7·5	0	8	
Dec. 19		Centre			(346·4)	(−1·7)	(13)	(51)	(321)
353·166	CL, M	4822*a*	0·695	78·3	291·0	+ 6·7	7	21	
M.		4822	0·738	79·3	287·4	+ 6·7	0	1	133*c*
		4822	0·751	77·5	286·5	+ 8·1	0	11	
			0·950	102·9	262·6	−12·8			94
Dec. 20		Centre			(334·1)	(−1·8)	(7)	(33)	(227)
354·162	CL, M		0·869	87·4	261·0	+ 1·3			45
I.			0·897	102·3	257·7	−11·9			156
			0·930	109·7	253·5	−19·0			197
Dec. 21		Centre			(321·0)	(−1·9)	(0)	(0)	(398)
355·272	CL, M		0·889	107·6	244·4	−16·6			178
I.									
Dec. 22		Centre			(306·3)	(−2·1)	(0)	(0)	(178)
356·452	CL, M		0·953	77·8	219·4	−10·9			142
Dec. 23		Centre			(290·7)	(−2·2)	(0)	(0)	(142)
357·203	CL, M		0·891	258·7	343·6	−11·1			294
M.			0·872	113·6	221·9	−21·6			111
			0·907	79·6	216·7	+ 8·4			250
Dec. 24		Centre			(280·9)	(−2·3)	(0)	(0)	(655)
358·485	CL, AW		0·792	285·3	213·2	+10·4			88
Dec. 25		Centre			(264·0)	(−2·5)	(0)	(0)	(88)
1898.				°	°	°			
359d·467	AW, CL		0·970	94·9	175·1	− 5·4			103
Dec. 26		Centre			(251·0)	(−2·6)	(0)	(0)	(103)
360·210	CL, M		0·946	282·3	311·2	+10·7			153
			0·773	282·5	290·7	+ 7·9			174
I.			0·796	103·6	189·1	−12·4			170
			0·920	83·1	175·0	+ 5·2			94
			0·955	100·4	168·6	−10·7			405
Dec. 27		Centre			(241·3)	(−2·7)	(0)	(0)	(996)
361·484	AW, M		0·913	280·5	289·4	+ 8·4			151
			0·842	103·3	167·6	−12·7			166
Dec. 28		Centre			(224·5)	(−2·8)	(0)	(0)	(317)
362·189	CL, M		0·912	264·3	280·9	− 6·4			54
		4823	0·555	109·0	182·8	−12·8	0	6	
I.		4823	0·581	106·1	180·6	−11·6	1	7	
		4824	0·889	101·6	152·7	−11·6	2	19	214*f*
			0·756	105·4	166·8	−13·5			242
Dec. 29		Centre			(215·2)	(−2·9)	(3)	(32)	(510)
363·458	CL, M	4823	0·322	117·0	181·6	−11·3	0	8	
		4823	0·353	116·3	179·7	−11·9	2	8	
		4823	0·350	113·6	179·5	−10·9	0	3	
Dec. 30		Centre			(198·5)	(−3·0)	(2)	(19)	(0)
364·192	CL, M	4823	0·194	113·2	182·1	−12·0	8	33	
		4823	0·193	138·5	181·4	−11·4	0	5	
I.		4823	0·217	131·4	179·4	−11·3	4	41	
			0·875	105·2	128·3	−14·8			109
Dec. 31		Centre			(188·9)	(−3·1)	(12)	(79)	(109)

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The Areas of Spots and Faculæ are expressed in millionths of the Sun's visible Hemisphere.

Group 4822, December 19–20. A small but dark and well-defined spot, *a*, followed by a few small companions.
Group 4823, 1898 December 29–1899 January 2. A pair of very small spots on December 29. The group has increased by December 31, and forms a short irregular stream. Only two composite spots, *a* and *b*, remain by January 1.
Group 4824, 1898 December 29. A small spot.

ROYAL OBSERVATORY, GREENWICH.

LEDGERS

OF

AREAS AND POSITIONS OF GROUPS OF SUN SPOTS

DEDUCED FROM THE MEASUREMENT

OF THE

SOLAR PHOTOGRAPHS

FOR EACH DAY IN THE YEAR

1898.

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS DEDUCED FOR EACH DAY from the MEASUREMENTS of the PHOTOGRAPHS taken at the ROYAL OBSERVATORY, GREENWICH, at DEHRA DÛN IN INDIA, and at the ROYAL ALFRED OBSERVATORY, MAURITIUS, in the YEAR 1898.

NOTE.—The Greenwich Civil Time at which the photograph was taken is expressed by the month, day of the month (civil reckoning), and decimal of a day, reckoned from Greenwich Mean Midnight.

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

The Column "Longitude from Central Meridian" gives the Mean heliographic longitude of the group, reckoned from the meridian passing through the centre of the Sun's disk at the moment of observation; longitudes west of the centre being reckoned as positive.

Dates for which no numbers are given indicate days for which no photographic record is at present available.

Group 4671.

A large regular spot, *a*, with occasionally one or two followers.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1897. d					°	°	°
Dec. 26·298	14	59	55	226	309·2	+15·3	−81·6
27·332	25	131	33	172	311·2	+14·8	−66·0
28·330	31	213	28	188	310·6	+14·5	−53·5
29·200	32	246	22	171	311·4	+14·0	−41·3
30·197	41	248	24	146	312·0	+14·0	−27·5
31·196	53	307	29	166	312·2	+13·5	−14·2
1898.							
Jan. 1·243	53	254	28	132	312·0	+13·1	− 0·6
2·242	41	206	22	110	311·8	+13·7	+12·4
3·193	36	196	21	114	312·4	+13·1	+25·5
4·186	33	173	22	117	312·5	+13·2	+38·8
5·196	23	141	20	122	312·8	+13·1	+52·3
6·518	11	62	16	94	312·0	+14·1	+68·9
7·182	6	40	16	102	311·6	+13·1	+77·3
Means ...	...	...	26	143	311·67	+13·81	...

Group 4672.

A few very small spots in a straight stream.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1897.							
Dec. 30·197	4	31	2	17	8·8	− 9·2	+29·3
31·196	12	62	9	43	10·0	− 9·3	+43·6
1898.							
Jan. 1·243	3	38	3	36	10·5	−10·1	+57·9
Means ...	...	...	5	32	9·77	− 9·53	...

Group 4673.

A large regular spot, *a*, with occasionally a small companion.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1897. d					°	°	°
Dec. 30·197	28	122	42	190	268·8	+ 7·8	−70·7
31·196	49	200	46	192	268·6	+ 7·5	−57·8
1898.							
Jan. 1·243	45	215	32	152	268·8	+ 7·0	−43·8
2·242	41	206	24	121	269·0	+ 6·4	−30·4
3·193	39	228	21	123	269·0	+ 6·6	−17·9
4·186	42	214	21	110	268·9	+ 6·4	− 4·8
5·196	39	191	20	98	269·3	+ 6·2	+ 8·8
6·518	37	182	21	104	269·3	+ 6·7	+26·2
7·182	39	189	25	118	269·5	+ 6·0	+35·2
8·489	19	145	16	121	269·7	+ 6·9	+52·5
9·184	20	88	22	95	269·7	+ 6·0	+61·7
10·245	9	40	19	90	270·4	+ 6·1	+76·4
Means ...	...	...	26	126	269·25	+ 6·63	...

Group 4674.

A large regular spot, *a*, often with one or two small companions.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Jan. 3·193	9	51	23	133	208·9	+10·8	−78·0
4·186	22	140	27	171	209·2	+11·1	−64·5
5·196	33	195	27	162	209·4	+10·7	−51·1
6·518	41	234	26	146	209·2	+10·0	−33·9
7·182	48	253	27	145	209·0	+10·2	−25·3
8·489	49	260	26	135	209·0	+ 9·9	− 8·2
9·184	52	266	27	138	209·1	+ 9·8	+ 1·1
10·245	49	244	26	130	209·0	+ 9·8	+15·0
11·279	46	214	27	126	209·1	+ 9·4	+28·7
12·213	45	183	31	126	209·0	+ 9·6	+40·9
13·209	28	121	25	108	208·9	+ 9·3	+54·0
14·324	15	72	21	103	208·7	+ 9·0	+68·5
15·147	5	23	16	71	209·1	+ 8·9	+79·6
Means ...	...	...	25	130	209·05	+ 9·88	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4675.

A few small spots in an almost continuous straight stream. The leader, *a*, alone remains by January 5.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
Jan. 4·186	4	72	2	38	286·1	−15·0	+12·4
5·196	0	23	0	14	288·3	−15·0	+27·8
Means ...	...	...	1	26	287·20	−15·00	...

Group 4676.

A very small faint spot on January 13, and a pair of such spots on January 14. The group has increased greatly by January 17, and consists of a number of small spots nearly enclosing a diamond-shaped area. By the following day the group has lengthened out into a straight stream, of which *a* and *b*, the leader and the last, are the principal members. The group continues to lengthen out, but the spots in the centre of the group die out, and only *a* and *b* remain by January 21.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Jan. 13·209	0	4	0	4	97·6	−14·1	−57·3
14·324	3	15	2	11	97·8	−14·8	−42·4
15·147	0	9	0	5	101·3	−14·4	−28·2
16·155	8	43	4	23	102·4	−14·2	−13·7
17·197	11	219	6	111	103·2	−14·2	+ 0·7
18·192	68	279	37	146	102·8	−14·9	+13·4
19·201	57	206	32	114	102·3	−15·4	+26·3
20·186	42	172	27	112	102·0	−15·8	+38·9
21·255	23	93	19	78	102·0	−15·3	+53·0
Means ...	...	...	14	67	101·27	−14·79	...

Group 4677.

A straight stream of spots, of which *a* and *b*, two large regular spots, are the chief. *b* and the smaller spots diminish and disappear, and *a* alone remains by January 23.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Jan. 14·324	24	133	53	320	61·8	− 8·2	−78·4
15·147	53	356	64	473	61·2	− 8·7	−68·3
16·155	81	492	71	426	61·4	− 8·9	−54·7
17·197	97	542	65	358	61·7	− 8·8	−40·8
18·192	63	416	36	233	62·9	− 8·6	−26·5
19·201	46	256	24	131	64·8	− 8·2	−11·2
20·186	45	252	22	127	66·8	− 7·8	+ 3·7
21·255	30	199	16	104	67·0	− 8·1	+18·0
22·481	29	146	17	87	67·4	− 7·9	+34·5
23·185	20	100	14	70	68·3	− 8·5	+44·6
24·275	13	62	12	60	68·6	− 8·6	+59·3
25·193	10	40	15	62	68·5	− 8·8	+71·4
Means ...	...	...	34	204	65·03	− 8·43	...

Group 4678.

A regular spot slowly diminishing from day to day. It has divided into two by January 26.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
Jan. 16·155	0	40	0	195	33·3	+11·4	−82·8
17·197	18	89	26	128	34·6	+10·9	−67·9
18·192	19	122	18	112	34·5	+ 9·9	−54·9
19·201	29	140	20	98	34·7	+10·7	−41·3
20·186	33	173	20	102	35·2	+10·6	−27·9
21·255	45	173	24	92	35·1	+10·7	−13·9
22·481	41	182	21	94	35·3	+10·7	+ 2·4
23·185	28	149	15	79	35·9	+10·3	+12·2
24·275	23	109	14	64	36·3	+ 9·9	+27·0
25·193	4	35	3	23	35·8	+ 9·1	+38·7
26·175	0	22	0	19	35·9	+ 8·9	+51·6
Means ...	...	...	15	91	35·15	+10·28	...

Group 4679.

A group first appearing near the centre of the disk as two very small spots. The group increases in size on the succeeding days and has become, by January 20, a straight stream of spots, of which the leader, *a*, is the principal. The group diminishes after January 20, but recovers again later. It lies *n.f.* Group 4676.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Jan. 18·192	0	29	0	15	86·9	− 7·1	− 2·5
19·201	52	206	27	106	88·8	− 7·6	+12·8
20·186	52	239	29	136	90·0	− 7·7	+26·9
21·255	29	190	19	126	90·0	− 7·7	+41·0
22·481	9	53	9	53	93·4	− 7·7	+60·5
23·185	6	60	10	87	94·1	− 8·4	+70·4
24·275	7	56	21	160	89·8	− 8·3	+80·5
Means ...	...	...	16	98	90·43	− 7·79	...

Group 4680.

A pair of very small spots.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Jan. 19·201	0	7	0	6	127·6	−13·6	+51·6
Means ...	...	...	0	6	127·6	−13·6	...

Group 4681.

A large composite spot, *a*, from which two streams of small spots proceed, so as to enclose a considerable area, *f a*. *a* is frequently measured in two parts; the spot being divided into two distinct regions, the more diffused preceding, and the more regular and sharply defined, following. The smaller spots have all disappeared by January 30, leaving *a* alone.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Jan. 19·201	0	81	0	331	353·6	+ 4·9	−82·4
20·186	49	235	68	329	354·9	+ 5·3	−68·2
21·255	77	393	67	344	354·9	+ 5·2	−54·1

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4681—*continued.*

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
Jan. 22·481	107	604	67	379	356·2	+ 4·8	−36·7
23·185	102	646	59	370	356·9	+ 4·7	−26·8
24·275	142	724	72	376	356·9	+ 4·5	−12·4
25·193	138	911	70	464	357·7	+ 4·1	+ 0·6
26·175	117	736	61	385	359·0	+ 3·9	+14·7
27·197	99	773	57	449	359·6	+ 3·7	+28·8
28·224	87	396	59	276	360·1	+ 3·9	+42·9
29·187	61	306	55	279	360·6	+ 3·6	+56·0
30·237	17	105	24	154	360·2	+ 4·3	+69·4
31·246	0	31	0	120	359·4	+ 4·0	+82·0
Means ...	...	...	51	327	357·69	+ 4·38	...

Group 4682.

A very small spot.

Jan. 25·193	0	17	0	9	345·1	+ 2·4	−12·0
26·175	0	13	0	6	344·9	+ 2·9	+ 0·6
27·197	0	6	0	3	346·2	+ 1·9	+15·4
Means ...	...	...	0	6	345·40	+ 2·40	...

Group 4683.

A very small spot, *n*, Group 4678.

Jan. 26·175	2	11	2	9	34·3	+12·0	+50·0
27·197	0	3	0	4	35·3	+12·6	+64·5
Means ...	...	...	1	7	34·80	+12·30	...

Group 4684.

A number of spots, mostly unstable and small, in an irregular stream. The spots undergo frequent changes.

Feb. 4·164	0	21	0	18	172·0	− 8·0	−53·8
5·513	34	156	21	96	171·6	− 8·3	−36·5
6·199	13	141	7	82	172·0	− 8·7	−27·1
7·475	11	85	5	45	172·4	− 8·8	− 9·8
8·161	0	19	0	9	172·7	− 8·8	− 0·6
9·216	2	139	1	72	174·4	− 7·6	+15·1
10·210	28	179	15	104	176·0	− 7·8	+29·8
11·210	21	97	15	67	177·3	− 8·2	+44·2

Group 4684—*continued.*

1898. d					°	°	°
Feb. 12·377	9	41	9	45	181·1	− 8·7	+63·4
13·182	0	7	0	13	183·0	− 9·2	+75·9
Means ...	...	...	7	55	175·25	− 8·41	...

Group 4685.

A regular spot, *a*, which rapidly diminishes in size. *a* is followed by one or two small companions, February 6–8.

Feb. 4·164	4	17	15	62	142·7	−11·9	−83·1
5·513	7	40	7	47	142·5	−12·6	−65·6
6·199	8	44	7	39	143·1	−12·8	−56·0
7·475	13	44	8	29	143·6	−11·9	−38·6
8·161	4	25	2	14	142·8	−11·1	−30·5
9·216	0	22	0	11	144·2	−12·0	−15·1
10·210	4	24	2	12	144·5	−12·0	− 1·7
11·210	0	11	0	5	145·1	−12·3	+12·0
Means ...	...	...	5	27	143·56	−12·08	...

Group 4686.

Two spots, *a* and *b*, suddenly appearing near the W. limb. Both *a* and *b* have a very small companion on February 7.

Feb. 7·475	21	114	15	86	227·5	+11·4	+45·3
8·161	17	85	15	76	227·0	+11·1	+53·7
Means ...	...	...	15	81	227·25	+11·25	...

Group 4687.

A large regular spot, *a*, with a very small companion on February 15, *p*. Group 4688.

Feb. 7·475	5	44	22	192	98·0	− 7·4	−84·2
8·161	19	90	34	160	99·0	− 6·6	−74·3
9·216	35	175	35	170	100·0	− 7·2	−59·3
10·210	46	230	33	166	99·7	− 7·3	−46·5
11·210	50	234	30	140	99·9	− 7·0	−33·2
12·377	66	265	34	138	100·1	− 6·6	−17·6
13·182	48	255	24	147	100·7	− 7·0	− 6·4
14·225	49	263	25	133	101·0	− 6·9	+ 7·6
15·188	38	271	20	143	101·3	− 6·7	+20·6
16·538	39	247	25	157	101·3	− 6·7	+38·3
17·175	39	177	29	131	102·0	− 7·4	+47·4
18·180	25	131	25	132	101·8	− 7·7	+60·5
19·190	13	80	23	142	102·5	− 7·7	+74·5
Means ...	...	...	28	150	100·56	− 7·09	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4688.

A few spots, mostly small, in an irregular stream on February 9. The group rapidly increases in size and complexity, and has become a fine straight stream by February 13; two large regular spots, *a* and *b*, having formed at the two extremities of the stream. The stream becomes very complex in character during the succeeding days, undergoing continual change. Two large composite spots, *c* and *d*, have formed in advance of *b*, which has then become composite by February 15, and have joined it by February 17. *d* is measured in two parts on that day.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
Feb. 9·216	0	34	0	54	87·0	− 8·2	−72·3
10·210	17	137	16	133	86·6	− 8·4	−59·6
11·210	33	162	23	115	87·6	− 8·5	−45·5
12·377	181	893	104	516	87·4	− 8·2	−30·3
13·182	256	1274	135	671	87·8	− 8·3	−19·3
14·225	298	1561	150	787	88·3	− 8·3	− 5·1
15·188	358	2078	182	1049	88·7	− 7·6	+ 8·0
16·538	316	1891	176	1063	89·5	− 8·1	+26·5
17·175	218	1296	138	814	91·3	− 8·5	+36·7
18·180	200	1040	163	828	92·6	− 8·5	+51·3
19·190	108	634	143	764	94·3	− 8·5	+66·3
20·268	0	52	0	120	92·4	− 9·2	+78·5
Means ...	...	...	103	576	89·46	− 8·36	...

Group 4689.

A few very small spots in a straight stream, *n* of Group 4687.

Feb. 13·182	5	28	3	14	97·8	− 1·8	− 9·3
14·225	0	18	0	9	96·9	− 0·2	+ 3·5
Means ...	...	...	2	12	97·35	− 1·00	...

Group 4690.

A small spot, *n* of Group 4688 *b*.

Feb. 13·182	0	6	1	4	84·1	+ 3·6	−23·0
Means ...	...	...	1	4	84·1	+ 3·6	...

Group 4691.

A few spots, mostly small and unstable, in an irregular stream. *a*, the leader on February 16, is the largest and most stable. The group is not seen on February 20, but a small spot is seen near its place on February 21.

Feb 15·188	4	86	5	104	14·1	−14·2	−66·6
16·538	19	125	14	95	14·1	−14·7	−48·9
17·175	19	90	12	58	16·1	−14·6	−38·5

Group 4691—*continued.*

1898. d					°	°	°
Feb. 18·180	25	166	14	94	14·7	−14·0	−26·6
19·190	3	41	1	21	14·8	−14·3	−13·2
20·268	0	0	0	0	...	...	...
21·148	10	35	5	18	12·4	−13·5	+10·2
Means ...	...	...	7	56	14·37	−14·22	...

Group 4692.

A large regular spot, *a*, with a pair of very small companions on February 23.

Feb. 15·188	6	46	15	109	3·1	+ 4·6	−77·6
16·538	30	165	32	176	2·0	+ 4·7	−61·0
17·175	33	194	28	161	2·9	+ 5·5	−51·7
18·180	55	243	36	156	3·2	+ 5·4	−38·1
19·190	58	239	33	135	3·1	+ 5·2	−24·9
20·268	60	232	31	121	3·5	+ 5·3	−10·4
21·148	41	266	21	136	3·5	+ 5·0	+ 1·3
22·157	37	180	19	95	3·7	+ 4·9	+14·8
23·465	38	220	23	133	3·3	+ 5·1	+31·5
24·460	24	163	17	119	3·3	+ 5·3	+44·7
25·644	17	80	18	83	3·2	+ 5·4	+60·2
26·455	6	63	9	99	2·9	+ 5·4	+70·6
Means ...	...	...	24	127	3·14	+ 5·15	...

Group 4693.

Three spots, *a*, *b*, and *c*, forming near the W. limb, *s.p.* Group 4687.

Feb. 16·538	8	76	7	74	122·6	−11·2	+59·6
17·175	10	40	15	57	124·9	−12·0	+70·3
Means ...	...	...	11	66	123·75	−11·60	...

Group 4694.

A few small spots in a short straight stream, *nf*, Group 4688. *a* and *b*, the first and last spots, are the largest and most stable.

Feb. 17·175	12	62	6	33	74·4	− 2·8	+19·8
18·180	11	23	7	26	76·1	− 3·9	+34·8
19·190	2	32	2	23	76·0	− 3·8	+48·0
Means ...	...	...	5	27	75·50	− 3·50	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Date. Greenwich Civil Time.	Projected Area of		Area for Group.		Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
	Umbra.	Whole Spot.	Umbra.	Whole Spot.			
Group 4695. A number of small spots, irregularly scattered, which have formed suddenly by February 17, *s* of Group 4692. The group rapidly increases, and has become a fine straight stream by February 18, *a*, the last spot, being large and regular, and the chief member of the group. *a* alone remains by February 25.							
1898. d					°	°	°
Feb. 17·175	17	96	14	77	4·5	− 0·3	−50·1
18·180	135	549	86	347	4·5	− 0·5	−36·8
19·190	108	525	59	289	4·1	− 0·6	−23·9
20·268	41	357	21	184	3·9	− 1·0	−10·0
21·148	61	317	31	158	2·9	− 1·0	+ 0·7
22·157	67	273	35	142	4·2	− 1·0	+15·3
23·465	36	251	23	149	3·4	− 0·6	+31·6
24·460	16	115	11	81	3·0	− 0·5	+44·4
25·644	8	50	8	50	2·6	− 0·5	+59·6
26·455	6	37	9	56	2·9	− 0·7	+70·6
Means ...	...	...	30	153	3·60	− 0·67	...
Group 4696. Two small faint spots, *n* of Group 4687, and of Group 4698 *a*.							
Feb. 18·180	6	23	6	42	100·6	− 2·5	+59·3
19·190	0	8	0	14	102·9	− 3·1	+74·9
Means ...	...	...	3	28	101·75	− 2·80	...
Group 4697. A small spot, *a*, sometimes with a very small companion. A number of spots have formed *f*, *a*, by February 26, forming with it a straight stream; *b* and *c*, the first and last of the new spots, being the largest. *a* and *b* have united to form a large regular spot, *d*, by February 27. The group diminishes after this date, and *d* and *c* alone remain after March 3.							
Feb. 22·157	0	29	0	86	268·0	− 6·8	−80·9
23·465	0	28	0	33	266·3	− 8·8	−65·5
24·460	9	28	7	24	265·6	− 8·9	−53·0
25·644	8	43	5	27	265·8	− 9·2	−37·2
26·455	71	265	41	156	261·8	−10·3	−30·5
27·643	143	622	74	323	261·8	−10·6	−14·9
28·452	121	623	61	312	261·6	−10·7	− 4·4
Mar. 1·219	85	497	42	250	261·6	−10·5	+ 5·7
2·232	43	325	23	171	262·1	−10·6	+19·5
3·281	32	148	19	90	263·6	−11·0	+34·8
4·630	11	52	9	43	263·8	−10·3	+52·8
5·270	2	30	2	31	263·3	−10·8	+60·8
Means ...	...	...	24	129	263·78	− 9·88	...
Group 4698. Two regular spots, *a* and *b*, close together. *b*, the following spot, is the smaller and has disappeared by March 9. A few small spots are seen following *a* and *b* on March 5.							
1898. d					°	°	°
Feb. 28·452	12	83	25	171	189·2	− 8·1	−76·8
Mar. 1·219	21	116	26	141	189·4	− 8·3	−66·5
2·232	40	165	33	136	189·5	− 8·4	−53·1
3·281	39	177	25	114	189·7	− 8·2	−39·1
4·630	49	219	26	118	189·5	− 8·3	−21·5
5·270	52	229	27	117	188·8	− 7·9	−13·7
6·312	38	170	19	85	189·9	− 8·2	+ 1·1
7·451	25	139	14	72	190·4	− 8·0	+16·6
8·130	30	107	17	59	190·7	− 8·2	+25·8
9·377	18	91	12	60	190·5	− 8·6	+42·1
10·493	14	75	13	68	190·4	− 7·7	+56·7
11·176	12	34	14	40	190·9	− 8·5	+66·2
12·123	4	28	11	70	191·5	− 8·4	+79·2
Means ...	...	...	20	96	190·04	− 8·22	...
Group 4699. Two small spots.							
Mar. 3·281	2	22	2	18	280·8	+ 8·2	+52·0
Means ...	...	...	2	18	280·8	+ 8·2	...
Group 4700. A few small spots in a short straight stream. The leader, *a*, alone remains by March 7.							
Mar. 4·630	6	21	6	21	150·3	−11·8	−60·7
5·270	11	47	9	39	149·2	−11·4	−53·3
6·312	13	88	8	58	149·3	−11·3	−39·5
7·451	6	28	3	15	150·7	−11·3	−23·1
8·131	8	30	4	16	150·9	−11·1	−14·0
9·377	10	25	5	12	151·1	−11·6	+ 2·7
10·493	3	21	2	11	151·9	−11·1	+18·2
Means ...	...	...	5	25	150·49	−11·37	...
Group 4701. A disturbed area, *p*. Group 4700, in which very small unstable spots form and disappear.							
Mar. 6·312	0	4	0	2	159·1	−12·2	−29·7
7·451	0	13	0	7	160·2	−12·8	−13·6
8·131	0	12	0	6	158·0	−13·4	− 6·9

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4701—*continued.*

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
Mar. 9·377	9	41	4	22	162·3	−13·3	+13·9
10·493	0	14	0	8	161·5	−12·2	+27·8
Means ...	...	...	1	9	160·22	−12·78	...

Group 4702.

A very fine straight stream, composed of a great number of spots which undergo continual change as to their number, shape, size, and relationship. Four large spots, *a*, *b*, *c*, and *d*, have attained some stability by March 15.

Mar. 6·312	43	186	79	340	113·5	−13·0	−75·3
7·451	90	566	84	528	115·5	−13·3	−58·3
8·130	124	709	95	535	115·7	−12·8	−49·2
9·377	254	1458	148	864	116·2	−13·0	−32·2
10·493	274	1839	144	966	118·7	−12·9	−15·0
11·176	342	2029	172	1022	120·6	−12·6	− 4·1
12·123	379	2453	195	1260	121·3	−13·0	+ 9·0
13·163	467	2336	256	1293	122·4	−13·2	+23·9
14·218	519	2424	333	1552	122·5	−13·3	+37·9
15·372	342	1514	286	1256	122·7	−13·3	+53·2
16·259	221	997	266	1180	123·5	−13·6	+65·7
17·181	99	445	189	844	121·5	−14·0	+75·9
Means ...	...	...	187	970	119·51	−13·17	...

Group 4703.

A large regular spot, *a*, followed by a short stream of spots. The following spots rapidly diminish, and *a* slowly disintegrates, throwing off small spots. It has divided up into a close cluster of small spots by March 14, when it is measured in two divisions.

Mar. 6·312	39	264	73	545	114·8	+11·6	−74·0
7·451	63	380	65	393	115·2	+11·0	−58·6
8·130	78	468	64	384	115·3	+11·6	−49·6
9·377	61	436	38	275	115·5	+11·7	−32·9
10·493	66	515	37	289	115·2	+11·5	−18·5
11·176	74	435	39	231	115·8	+11·6	− 8·9
12·123	71	362	38	192	115·9	+11·2	+ 3·6
13·163	58	348	33	194	116·0	+10·9	+17·5
14·218	50	237	31	148	116·3	+10·8	+31·7
15·372	22	131	17	102	116·3	+11·0	+46·8
16·259	9	40	9	41	115·7	+10·8	+57·9
Means ...	...	...	40	254	115·64	+11·25	...

Group 4704.

A large regular spot, *a*, usually with a number of small unstable companions.

1898. d					°	°	°
Mar. 7·451	26	162	37	234	103·4	− 7·9	−70·4
8·130	53	269	54	274	103·6	− 6·9	−61·3
9·377	74	326	51	224	103·7	− 7·8	−44·7
10·493	64	389	37	224	103·9	− 7·9	−29·8
11·176	78	367	41	194	104·3	− 7·6	−20·4
12·123	75	365	38	185	104·3	− 7·8	− 8·0
13·163	80	418	41	212	104·5	− 7·6	+ 6·0
14·218	81	386	44	206	104·7	− 7·9	+20·1
15·372	72	322	44	197	104·4	− 8·2	+34·9
16·259	65	294	47	212	104·0	− 8·5	+46·2
17·181	46	190	44	181	104·6	− 8·6	+59·0
18·463	18	91	34	171	104·2	− 7·6	+75·5
Means ...	...	...	43	210	104·14	− 7·86	..

Group 4705.

A very small faint spot, *s.p.* Group 4702.

Mar. 10·493	4	16	2	8	132·8	−19·3	− 0·9
11·176	0	9	0	5	133·9	−19·6	+ 9·2
12·123	1	11	1	6	133·7	−20·0	+21·4
Means ...	...	...	1	6	133·47	−19·63	...

Group 4706.

A pair of very small faint spots on March 12. The group is not seen on March 13 or 14. A single very small spot is seen on March 15 and 16.

Mar. 12·123	0	14	0	8	91·9	− 3·8	−20·4
13·163	0	0	0	0	...	...	...
14·218	0	0	0	0	...	...	...
15·372	2	7	1	4	94·2	− 3·7	+24·7
16·259	0	9	0	5	92·7	− 3·5	+34·9
Means ...	...	...	1	3	92·93	− 3·67	...

Group 4707.

A number of very small faint spots, closely following each other in a curved stream.

Mar. 18·463	0	37	0	21	0·0	− 7·0	−28·7
Means ...	...	...	0	21	0·0	− 7·0	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Date. Greenwich Civil Time.	Projected Area of		Area for Group.		Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
	Umbra.	Whole Spot.	Umbra.	Whole Spot.			
Group 4708. A number of spots, mostly very small, in a straggling group.							
1898. d					°	°	°
Mar. 18·463	6	36	5	31	335·9	+10·2	−52·8
19·174	7	13	4	9	340·2	+11·0	−39·1
Means ...	...	...	5	20	338·05	+10·60	...
Group 4709. A small spot.							
Mar. 22·184	3	19	2	11	11·4	− 2·7	+31·7
Means ...	...	...	2	11	11·4	− 2·7	...
Group 4710. A small spot.							
Mar. 26·157	0	6	0	10	359·6	−15·9	+72·4
Means ...	...	...	0	10	359·6	−15·9	...
Group 4711. Two small spots, *a* and *b*, close together. They are measured as a single spot on March 27.							
Mar. 26·157	2	27	3	42	215·0	−12·8	−72·2
27·187	8	34	7	32	215·1	−12·0	−58·5
28·182	7	38	5	27	215·4	−11·9	−45·1
29·189	1	26	1	16	215·3	−11·9	−31·9
Means ...	...	...	4	29	215·20	−12·15	...
Group 4712. A very small spot.							
Mar. 31·427	2	8	1	6	173·6	−15·9	−44·1
Means ...	...	...	1	6	173·6	−15·9	...
Group 4713. Two large spots, *a* and *b*. *a* is irregular in form and speedily breaks up and diminishes. *b* is regular and stable. A number of small spots, many of them formed by the disintegration of *a*, are seen near *a* and *b*, from time to time making with them an irregular stream.							
1898. d					°	°	°
Mar. 31·427	6	45	37	272	131·3	−11·0	−86·4
Apr. 1·212	43	183	85	410	129·4	−10·3	−77·9
2·164	75	351	89	406	129·8	−10·4	−65·0
3·481	102	587	76	439	129·4	−11·4	−48·0
4·553	123	567	75	345	129·2	−11·6	−34·1
5·431	111	672	60	367	129·2	−11·6	−22·5
6·435	112	586	58	299	128·7	−11·6	− 9·7
7·184	105	556	53	281	129·3	−11·3	+ 0·7
8·410	67	359	35	187	127·7	−11·3	+15·3
9·423	51	276	29	155	126·7	−11·6	+27·7
10·671	33	191	23	132	126·3	−11·4	+43·7
11·131	30	158	24	123	126·9	−12·6	+50·4
12·230	23	103	27	120	127·2	−11·7	+65·2
13·612	6	33	22	118	126·8	−11·7	+83·1
Means ...	...	...	50	261	128·42	−11·39	...
Group 4714. A few faint unstable spots, *f*, Group 4713, and forming a continuation of its stream.							
Apr. 6·435	0	28	0	16	115·9	−14·5	−22·5
7·184	0	19	0	10	119·2	−12·9	− 9·4
8·410	0	5	0	3	117·5	−13·8	+ 5·1
9·423	0	17	0	9	118·7	−13·6	+19·7
Means ...	...	...	0	10	117·83	−13·70	...
Group 4715. A few spots, mostly small, in a straight but broken stream.							
Apr. 8·410	0	10	0	5	93·7	−18·4	−18·7
9·423	15	72	8	37	92·4	−18·2	− 6·6
10·671	18	141	9	74	94·0	−18·0	+11·4
11·131	14	86	8	46	93·8	−18·7	+17·3
12·230	7	46	4	28	95·5	−18·2	+33·5
13·612	0	11	0	9	96·8	−17·5	+53·1
14·200	0	10	0	9	97·0	−17·3	+61·0
Means ...	...	...	4	30	94·74	−18·04	...
Group 4716. A very small spot.							
Apr. 9·423	0	5	0	5	38·1	−15·8	−60·9
Means ...	...	...	0	5	38·1	−15·8	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4717.

A pair of very small spots, forming near the place of Group 4716.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
Apr. 15·491	9	17	1	9	32·7	−15·4	+13·8
Means ...	...	...	1	9	32·7	−15·4	...

Group 4718.

A small very faint spot. A pair of very faint spots on April 25.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Apr. 22·589	0	9	0	28	205·3	+10·6	−79·8
23·434	0	14	0	20	205·6	+10·5	−68·4
24·430	0	15	0	14	204·7	+10·2	−56·1
25·644	0	14	0	10	203·5	+11·1	−41·2
Means ...	...	...	0	18	204·78	+10·60	...

Group 4719.

A number of very small faint spots in an irregular stream.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Apr. 26·631	0	39	0	22	220·7	+20·3	−11·0
Means ...	...	...	0	22	220·7	+20·3	...

Group 4720.

Two small spots, *a* and *b*, on April 26 and 27. Small spots appear between them on the succeeding days, making up with them a straggling stream. One of these spots, *c*, forms a close pair with *a*. *b* has disappeared by April 30, and the group has generally diminished. The group is not seen on May 3, but is represented by a single very small spot on May 4.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Apr. 26·631	0	14	0	25	156·5	−13·7	−75·2
27·269	6	36	6	42	157·6	−13·2	−65·6
28·123	12	56	11	48	157·7	−13·0	−54·3
29·659	22	143	13	86	158·1	−12·2	−33·6
30·220	18	105	10	59	159·8	−11·8	−24·5
May 1·303	16	96	8	50	159·4	−12·4	−10·6
2·203	4	56	2	29	155·7	−12·1	− 2·3
3·395	0	0	0	0	...	...	...
4·218	0	10	0	6	154·9	−14·7	+23·5
Means ...	...	...	6	38	157·46	−12·89	...

Group 4721.

A small spot, *a*, with a very small companion on April 27.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
Apr. 27·269	2	23	1	14	252·6	+15·3	+29·4
28·123	2	10	1	7	252·4	+15·0	+40·4
Means ...	...	...	1	11	252·50	+15·15	...

Group 4722.

A few very small spots, forming two days past the central meridian. The group rapidly increases in size and has become a straight stream by April 29, *a* and *b*, the first and last spots, being much the largest. A third spot, *c*, forms close to *a*, and the group consists, on May 1, of the three spots, *a*, *b*, and *c*, now all large and regular. Several smaller spots are seen near *b* and *c* on the following day.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Apr. 28·123	0	20	0	11	236·3	−12·1	+24·3
29·659	61	297	44	215	238·4	−11·4	+46·7
30·220	101	592	88	511	239·0	−11·7	+54·7
May 1·303	119	487	168	690	239·9	−11·7	+69·9
2·203	18	179	45	457	237·3	−12·4	+79·3
Means ...	...	...	69	377	238·18	−11·86	...

Group 4723.

A small spot.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Apr. 29·659	1	8	1	8	130·2	−11·4	−61·5
30·220	1	12	1	10	130·1	−11·2	−54·2
May 1·303	3	18	2	12	130·5	−11·2	−39·5
Means ...	...	...	1	10	130·27	−11·27	...

Group 4724.

A few very small unstable spots irregularly scattered. The group is not seen on May 4 and 5.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
May 3·395	0	14	0	14	85·3	+14·1	−57·0
4·218	0	0	0	0	...	...	...
5·145	0	0	0	0	...	...	...
6·492	0	35	0	20	83·2	+14·6	−18·2
7·412	1	16	1	8	85·1	+13·9	− 4·1
8·209	3	26	2	14	86·2	+14·3	+ 7·6
Means ...	...	...	1	9	84·95	+14·23	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4725.

A pair of spots, *a* and *b*, that rapidly diminish in size. They are occasionally accompanied by one or two very small companions.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
May 6·492	13	90	17	118	33·8	−12·9	−67·6
7·412	12	52	10	46	34·1	−12·8	−55·1
8·209	9	41	7	29	33·9	−12·8	−44·7
9·660	0	24	0	14	33·1	−13·2	−26·4
Means ...	...	...	9	52	33·73	−12·93	...

Group 4726.

A stream of spots, mostly small, except for a pair of large regular spots, *a* and *b*, at the head of the stream. Two considerable portions, *c* and *d*, have broken off by May 12, from *b*, which is no longer regular in shape, and *a* has elongated in the direction of *b*, its umbra being remarkably long, narrow and straight. The smaller spots undergo a good deal of change.

May 6·492	13	78	46	266	19·4	− 7·3	−82·0
7·412	50	321	73	497	18·1	− 6·3	−71·1
8·209	93	476	94	487	17·9	− 6·1	−60·7
9·660	119	718	78	471	19·0	− 6·2	−40·5
10·168	162	826	97	496	19·4	− 5·8	−33·4
11·489	131	818	68	425	20·0	− 5·9	−15·3
12·474	145	727	73	366	20·5	− 6·2	− 1·7
13·447	91	680	47	349	21·1	− 6·0	+11·7
14·455	59	387	33	216	22·1	− 6·0	+26·0
15·180	56	344	35	215	22·2	− 6·2	+35·8
16·429	33	187	28	155	22·6	− 6·0	+52·7
17·225	12	52	13	59	23·2	− 5·7	+63·8
18·475	2	30	5	65	19·6	− 5·4	+76·8
Means ...	...	...	53	313	20·39	− 6·08	...

Group 4727.

A few small unstable spots irregularly scattered.

May 7·412	7	64	5	46	46·6	+ 9·9	−42·6
8·209	2	30	1	17	47·3	+10·5	−31·3
9·660	2	16	1	8	49·8	+11·6	− 9·7
Means ...	...	...	2	24	47·90	+10·67	...

Group 4728.

A number of spots, mostly very small, in an irregular stream. The leader, *a*, is the largest, and alone remains by May 11.

May 9·660	13	68	7	34	60·4	−11·0	+ 0·9
10·168	20	125	10	63	61·2	−10·4	+ 8·4
11·489	5	14	3	8	63·2	− 9·9	+27·9
Means ...	...	...	7	35	61·60	−10·43	...

Group 4729.

Two very small faint spots.

1898. d					°	°	°
May 14·455	0	11	0	5	356·7	+ 8·4	+ 0·6
Means ...	...	...	0	5	356·7	+ 8·4	...

Group 4730.

A few small unstable spots irregularly scattered. The group is not seen on May 16 and 17.

May 14·455	2	24	2	28	290·8	− 7·3	−65·3
15·180	2	26	2	23	293·0	− 7·0	−53·4
16·429	0	0	0	0	...	...	...
17·225	0	0	0	0	...	...	...
18·475	0	5	0	2	294·9	− 6·7	− 7·9
Means ...	...	...	1	11	292·90	− 7·00	

Group 4731.

A very small spot, *s* of Group 4730.

May 14·455	0	4	0	6	286·4	−11·6	−69·7
Means ...	...	...	0	6	286·4	−11·6	...

Group 4732.

A large spot, *a*, divided by a bridge into two unequal portions which have separated into distinct spots, *b* and *c*, by May 21. A few very small spots are seen near the chief spot on May 19 and 22. *b* alone remains by May 25.

May 17·225	12	105	24	202	244·3	−13·6	−75·1
18·475	30	208	30	204	243·8	−14·0	−59·0
19·239	43	217	33	168	244·0	−13·6	−48·7
20·287	45	218	28	135	244·2	−13·4	−34·7
21·174	53	209	30	116	244·2	−13·6	−23·0
22·518	35	211	18	108	244·7	−13·9	− 4·7
23·498	35	161	18	82	244·6	−13·8	+ 8·2
24·497	28	149	15	82	245·0	−13·6	+21·8
25·120	19	113	11	67	245·1	−13·7	+30·2
26·448	9	70	7	53	245·4	−13·4	+48·0
27·467	10	42	11	44	245·0	−13·5	+61·1
28·131	0	27	0	41	245·5	−13·5	+70·3
Means ...	...	...	19	109	244·65	−13·63	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4733.

A few very small unstable spots irregularly scattered. The group is not seen on May 19.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
May 18·475	2	35	2	25	256·1	+14·6	−46·7
19·239	0	0	0	0	...	...	...
20·287	0	18	0	10	259·8	+14·9	−19·1
21·174	0	4	0	2	261·1	+15·0	− 6·1
Means ...	...	...	1	9	259·00	+14·83	...

Group 4734.

A very small faint spot.

May 22·518	0	7	0	4	238·0	+ 5·1	−11·4
Means ...	...	...	0	4	238·0	+ 5·1	...

Group 4735.

A few unstable spots in a straggling stream. The group is not seen on May 25.

May 24·497	2	27	1	14	205·0	−14·3	−18·2
25·120	0	0	0	0	...	...	...
26·448	15	115	8	60	207·2	−14·8	+ 9·8
27·467	9	105	5	59	207·1	−14·9	+23·2
28·131	7	71	4	43	206·7	−14·6	+31·5
29·121	0	29	0	20	207·3	−14·7	+45·3
Means ...	...	...	3	33	206·66	−14·66	...

Group 4736.

A small spot.

May 25·120	0	8	0	15	140·5	+ 5·6	−74·4
26·448	0	12	0	11	141·0	+ 5·6	−56·4
27·467	0	2	0	2	141·6	+ 6·0	−42·3
Means ...	...	...	0	9	141·03	+ 5·73	...

Group 4737.

A very small spot on May 26. The group is not seen on the three succeeding days, but has reappeared by May 30, as a very small spot. One or two more appear on the next two days.

May 26·448	0	14	0	8	168·6	−12·5	−28·8
27·467	0	0	0	0	...	...	...
28·131	0	0	0	0	...	...	...

Group 4737—*continued.*

1898. d					°	°	°
May 29·121	0	0	0	0	...	...	...
30·487	0	11	0	6	167·5	−12·9	+23·5
31·091	2	27	1	16	168·5	−12·4	+32·5
June 1·650	0	18	0	15	168·1	−12·4	+52·8
2·607	0	17	0	20	167·7	−13·0	+65·0
3·403	0	9	0	17	166·0	−13·1	+73·8
Means ...	...	...	0	9	167·73	−12·72	...

Group 4738.

A pair of very small spots.

May 27·467	0	19	0	11	156·7	−10·3	−27·2
Means ...	...	...	0	11	156·7	−10·3	...

Group 4739.

One or two small faint unstable spots.

May 29·121	0	12	0	16	96·4	−18·7	−65·6
30·487	4	21	3	16	98·0	−18·1	−46·0
31·091	0	26	0	17	96·8	−18·2	−39·2
June 1·650	0	17	0	9	97·8	−18·7	−17·5
2·607	0	8	0	4	100·0	−17·6	− 2·7
Means ...	...	...	1	12	97·80	−18·26	...

Group 4740.

Three spots, *a*, *b*, and *c*, suddenly appearing, *f* Group 4737. The group increases rapidly up to June 1, and diminishes afterwards.

May 30·487	16	112	9	60	155·8	−15·6	+11·8
31·091	63	260	35	142	155·8	−15·2	+19·8
June 1·650	42	236	30	162	155·5	−15·6	+40·2
2·607	18	116	16	101	155·6	−15·8	+52·9
3·403	3	31	4	36	156·0	−15·6	+63·8
4·143	0	20	0	38	156·1	−15·4	+73·8
Means ...	...	...	16	90	155·80	−15·53	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4741.

A few very small faint unstable spots. The group is not seen on June 4, 5, and 7.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
June 1·650	4	17	2	9	105·1	+ 3·0	−10·2
2·607	2	18	1	9	104·7	+ 2·8	+ 2·0
3·403	0	12	0	6	105·8	+ 3·5	+13·6
4·143	0	0	0	0	...	...	...
5·184	0	0	0	0	...	...	...
6·118	27	82	23	69	109·1	+ 5·5	+53·0
7·492	0	0	0	0	...	...	...
8·275	0	3	0	8	106·0	+ 4·4	+78·3
Means ...	...	...	3	13	106·14	+ 3·84	...

Group 4742.

One or two small faint unstable spots.

June 1·650	6	20	5	20	56·8	+10·3	−58·5
2·607	0	13	0	9	57·8	+10·1	−44·9
3·403	0	13	0	8	53·8	+10·6	−38·4
4·143	0	15	0	8	56·2	+10·7	−26·1
Means ...	...	...	1	11	56·15	+10·04	...

Group 4743.

A very few small spots in a short straight stream. The leader only remains by June 4.

June 3·403	4	35	4	27	140·6	+15·0	+48·4
4·143	0	15	0	15	142·9	+14·1	+60·6
Means ...	...	...	2	21	141·75	+14·55	...

Group 4744.

A very small spot.

June 11·446	1	7	1	4	16·7	− 6·5	+31·0
Means ...	...	...	1	4	16·7	− 6·5	...

Group 4745.

A pair of small regular spots, *a* and *b*, with a few very small spots between them, forming together a sparse straight stream considerably inclined to the equator. *b* has thrown off a small companion by June 15. *a* moves forward rapidly in longitude.

1898. d					°	°	°
June 14·328	24	99	13	56	330·7	+13·2	+23·2
15·599	14	83	9	53	329·9	+13·7	+39·2
16·511	9	60	7	49	330·4	+13·9	+51·7
17·631	0	25	0	36	332·2	+12·3	+68·4
Means ...	...	...	7	49	330·80	+13·28	...

Group 4746.

A few spots, mostly small and unstable, in an irregular group which changes rapidly from day to day. The group is not seen on June 20, 21, or 22; but a small spot marks its place on June 23.

June 16·511	4	57	3	43	232·9	+17·1	−45·8
17·631	37	172	22	104	232·9	+17·5	−30·9
18·498	18	169	10	91	234·4	+17·2	−17·9
19·475	0	41	0	21	234·4	+16·7	− 5·0
20·172	0	0	0	0	...	...	...
21·528	0	0	0	0	...	...	...
22·192	0	0	0	0	...	...	...
23·198	0	12	0	9	233·7	+17·0	+43·6
Means ...	...	...	4	34	233·66	+17·10	...

Group 4747.

A wide pair of very small spots, only seen close to the W. limb.

June 18·498	0	6	0	8	318·9	+11·2	+66·6
Means ...	...	...	0	8	318·9	+11·2	...

Group 4748.

A very few small unstable spots *sf* Group 4746.

June 18·498	1	8	1	5	227·5	+11·9	−24·8
19·475	0	24	0	12	227·2	+10·9	−12·2
20·172	0	8	0	4	228·5	+10·3	− 1·6
Means ...	...	...	1	7	227·73	+11.03	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4749.

A regular spot, *a*, with a rapid forward motion in longitude. It is followed by several small companions on June 21, 25, 26, and 27.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
June 20·172	7	24	9	30	163·9	−10·0	−66·2
21·528	21	153	16	113	166·0	−10·9	−46·2
22·192	30	134	19	86	167·3	−10·5	−36·2
23·198	21	166	12	91	168·7	−10·4	−21·4
24·322	26	168	13	87	170·4	−10·6	− 4·9
25·334	27	148	14	77	170·8	−10·6	+ 9·0
26·328	23	128	13	72	171·7	−10·3	+23·0
27·241	18	104	12	66	171·7	−10·2	+35·1
28·164	12	52	10	40	172·2	−10·3	+47·9
29·443	6	25	8	31	172·3	−10·4	+64·9
30·485	0	11	0	30	172·1	−10·4	+78·4
Means ...	...	...	11	66	169·74	−10·42	...

Group 4750.

Two small faint spots.

June 25·334	0	31	0	16	149·6	+ 7·6	−12·2
Means ...	...	...	0	16	149·6	+ 7·6	...

Group 4751.

A small regular spot, *a*, followed by a distant small companion on June 27 and 29, and by a close pair on June 28.

June 26·328	5	17	5	20	85·1	− 6·4	−63·6
27·241	9	37	7	31	85·2	− 6·7	−51·4
28·164	10	27	6	18	84·5	− 7·0	−39·8
29·443	9	25	5	13	86·2	− 6·8	−21·2
Means ...	...	...	6	21	85·25	6·73	...

Group 4752.

A wide pair of small spots *f* Group 4749.

June 27·241	12	42	7	24	159·9	−12·1	+23·3
Means ...	...	...	7	24	159·9	−12·1	...

Group 4753.

A very small faint spot.

1898. d					°	°	°
June 27·241	0	7	0	4	139·4	−12·6	+ 2·8
Means ...	...	...	0	4	139·4	−12·6	...

Group 4754.

Two very small faint spots *sf* Group 4751.

June 28·164	0	6	0	4	78·2	− 8·9	−46·1
Means ...	...	...	0	4	78·2	− 8·9	...

Group 4755.

Three very small faint spots.

June 29·443	0	8	0	5	142·0	−11·9	+34·6
Means ...	...	...	0	5	142·0	−11·9	...

Group 4756.

A few very faint small spots in a straggling stream, almost perpendicular to the equator.

July 1·636	0	46	0	23	74·6	− 8·1	− 3·8
2·495	0	17	0	9	75·5	− 9·2	+ 8·4
Means ...	...	...	0	16	75·05	− 8·65	...

Group 4757.

A few small unstable spots in an irregular stream.

July 15·536	6	45	3	23	240·1	+ 8·8	−14·4
16·493	14	90	7	46	240·0	+ 8·8	− 1·8
17·250	3	25	2	12	239·2	+ 8·5	+ 7·4
Means ...	...	...	4	27	239·77	+ 8·70	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Date. Greenwich Civil Time.	Projected Area of		Area for Group.		Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
	Umbra.	Whole Spot.	Umbra.	Whole Spot.			
Group 4758. A pair of small regular spots, *a* and *b*, with a smaller spot between them on July 19.							
1898. d					°	°	°
July 19·179	0	34	0	74	130·8	−11·5	−75·4
20·287	28	72	29	73	133·0	−11·7	−58·6
21·431	17	87	12	62	133·9	−11·3	−42·6
22·239	0	16	0	9	133·2	−11·7	−32·6
Means ...	...	...	10	55	132·73	−11·55	...
Group 4759. A pair of spots, *a* and *b*, appearing first near the centre of the sun. On July 24 and 25 the group appears as two irregular clusters of small spots.							
July 22·239	14	121	7	62	161·1	+ 2·1	− 4·7
23·268	31	181	16	93	162·9	+ 2·0	+10·7
24·489	42	243	22	135	161·5	+ 2·0	+25·5
25·255	38	117	23	73	162·2	+ 1·8	+36·3
26·244	11	52	8	41	162·7	+ 1·6	+49·9
Means ...	...	...	15	81	162·08	+ 1·90	...
Group 4760. A few small unstable spots in an irregular cluster.							
July 25·255	3	14	3	11	77·9	− 9·0	−48·0
26·244	7	63	5	40	77·9	− 9·5	−34·9
Means ...	...	...	4	26	77·90	− 9·25	...
Group 4761. Three very small faint spots.							
July 27·429	0	18	0	9	112·2	+ 9·5	+15·1
Means ...	...	...	0	9	112·2	+ 9·5	..
Group 4762. A few very small unstable spots on July 28 and 29. The group increases up to July 31, on which day it appears as a straight but rather disconnected stream. The group rapidly diminishes after this date.							
July 28·136	1	8	1	5	53·4	− 7·4	−34·4
29·219	0	43	0	23	51·8	− 7·8	−21·7
30·242	41	160	21	85	52·8	− 7·8	− 7·1
31·476	69	301	36	156	53·1	− 7·5	+ 9·5
Group 4762—*continued.*							
1898. d					°	°	°
Aug. 1·528	26	116	15	65	53·9	− 7·5	+24·2
2·433	6	45	4	29	54·3	− 7·8	+36·5
3·625	0	8	0	7	57·9	− 7·3	+55·9
Means ...	...	...	11	53	53·89	− 7·59	...
Group 4763. A very small spot.							
July 29·219	0	5	0	4	122·4	− 9·8	+48·9
Means ...	...	...	0	4	122·4	− 9·8	...
Group 4764. A number of small spots in an irregular stream. The group undergoes continual change in its appearance and composition from day to day. The leader, *a*, on August 1 and 2, is a large spot, with triple nucleus, but it speedily breaks up into fragments, the chief of which are lettered *b* and *c*.							
July 30·242	9	71	7	55	15·7	−15·3	−44·4
31·476	37	279	22	168	17·0	−14·2	−26·6
Aug. 1·528	51	364	27	197	18·4	−14·4	−11·3
2·433	60	365	32	196	18·4	−14·7	+ 0·6
3·625	58	362	32	201	18·1	−14·1	+16·1
4·298	76	354	44	207	17·3	−13·9	+24·2
5·411	50	331	34	228	17·3	−13·4	+38·9
6·209	19	172	16	142	17·1	−12·8	+49·4
7·213	0	12	0	15	18·5	−13·3	+64·0
Means ...	...	...	24	157	17·53	−14·01	...
Group 4765. A large elliptical spot, *a*, usually with several very small companions.							
July 31·476	20	114	36	199	329·4	+13·1	−74·2
Aug. 1·528	49	351	47	333	330·9	+12·2	−58·8
2·433	118	530	83	375	332·3	+11·7	−45·5
3·625	124	683	70	391	333·1	+11·0	−28·9
4·298	159	647	85	346	333·4	+10·8	−19·7
5·411	144	709	73	358	334·4	+10·1	− 4·0
6·209	147	711	75	360	334·1	+10·3	+ 6·4
7·213	104	578	55	309	334·6	+ 9·9	+20·1
8·304	101	527	62	323	335·3	+10·3	+35·2
9·501	65	376	51	298	335·6	+10·4	+51·3
10·206	57	311	59	318	336·5	+10·4	+61·5
11·446	13	106	29	229	336·1	+10·3	+77·6
Means ...	...	...	60	320	333·81	+10·88	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4766.

A very small spot.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
Aug. 1·528	3	12	1	6	13·3	+ 9·3	−16·4
Means ...	...	...	1	6	13·3	+ 9·3	...

Group 4767.

A very small spot *sf* Group 4765.

Aug. 1·528	0	8	0	9	327·9	+ 7·6	−61·8
Means ...	...	...	0	9	327·9	+ 7·6	...

Group 4768.

Two spots, *a* and *b*, *nf* Group 4765. A few small spots have appeared preceding *a*, by August 2, and *b* has disappeared by August 3.

Aug. 1·528	11	71	14	91	321·8	+13·4	−67·9
2·433	18	111	15	93	323·4	+13·7	−54·4
3·625	12	89	7	57	324·1	+13·8	−37·9
4·298	0	24	0	14	323·5	+14·2	−29·6
Means ...	...	...	9	64	323·20	+13·78	...

Group 4769.

A fine group, usually seen as a long straight stream of spots. The leader, *a*, is a large spot closely followed by another spot, *b*, somewhat smaller, with which it soon coalesces, forming a large spot, *f*, regular on August 6, and showing a fourfold nucleus on August 8. *f* has broken up by August 10, *h* and *j* being the two chief portions. The chief spots in the following part of the group are lettered *c*, *d*, and *e*, on August 3, of which *d* and *e* have coalesced to form *g* by August 5. The group diminishes rapidly after August 8, and *h* remains alone on August 13.

Aug. 2·433	17	134	35	274	303·8	−12·8	−74·0
3·625	94	495	102	560	300·6	−12·7	−61·4
4·298	137	667	121	598	300·5	−12·5	−52·6
5·411	166	1000	111	672	301·0	−12·5	−37·4
6·209	254	1335	150	794	300·6	−12·4	−27·1
7·213	202	1230	110	666	301·8	−12·5	−12·7
8·304	270	1141	143	607	303·2	−12·0	+ 3·1
9·501	204	1019	116	578	305·4	−11·3	+21·1
10·206	138	790	87	494	307·0	−11·6	+32·0
11·446	70	486	57	395	307·7	−11·1	+49·2
12·419	41	257	48	299	308·1	−11·0	+62·4
13·452	11	85	28	220	309·5	− 9·7	+77·5
Means ...	...	...	92	513	304·10	−11·84	...

Group 4770.

A curved stream of spots convex to the equator, and appearing first near the centre of the disc. The spots are few and small at first, but the group rapidly increases in size up to August 13, after which it slowly diminishes. The first and last spots on August 13, *a* and *b*, are large and composite.

1898. d					°	°	°
Aug. 11·446	16	72	8	37	244·7	+10·9	−13·8
12·419	56	262	28	131	245·7	+10·0	0·0
13·452	128	792	66	411	245·6	+10·0	+13·6
14·528	96	559	54	318	245·5	+10·3	+27·7
15·532	73	473	49	317	246·3	+10·1	+41·7
16·514	48	326	43	284	246·9	+10·1	+55·3
17·616	26	138	38	184	245·8	+10·2	+68·7
18·435	13	49	26	98	242·5	+10·4	+76·4
Means ...	...	...	39	223	245·38	+10·25	...

Group 4771.

A few spots, mostly very small, in a straight stream. *a*, the last on August 12, is the largest and most stable.

Aug. 11·446	2	11	1	6	240·7	−11·9	−17·8
12·419	13	60	7	32	239·9	−11·3	− 5·8
13·452	10	74	5	39	239·1	−11·0	+ 7·1
14·528	8	33	4	19	238·1	−11·5	+20·3
15·532	2	16	2	10	238·3	−11·3	+33·7
16·514	1	10	2	8	238·4	−11·7	+46·8
Means ...	...	...	4	19	239·08	−11·45	...

Group 4772.

A very small spot, preceded by a close pair of very small spots, which are measured together.

Aug. 14·528	0	15	0	8	232·4	+10·6	+14·6
Means ...	...	...	0	8	232·4	+10·6	...

Group 4773.

A pair of very small spots on August 17. The group is not seen on August 18. A small spot on August 19.

Aug. 17·616	0	10	0	10	230·9	−12·6	+53·8
18·435	0	0	0	0	...	...	...
19·478	0	7	0	20	230·1	−11·5	+77·7
Means ...	...	...	0	10	230·50	−12·05	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Date. Greenwich Civil Time.	Projected Area of		Area for Group.		Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
	Umbra.	Whole Spot.	Umbra.	Whole Spot.			
Group 4774. Two very small faint spots.							
1898. d					°	°	°
Aug. 21·541	0	15	0	8	136·1	− 3·4	+10·9
Means ...	...	...	0	8	136·1	− 3·4	...
Group 4775. Two small spots, *a* and *b*, with, on August 22, a very small companion between them.							
Aug. 22·647	13	66	8	42	147·7	− 4·2	+37·1
23·508	13	82	10	65	148·7	− 4·1	+49·5
Means ...	...	...	9	54	148·20	− 4·15	...
Group 4776. A few very small spots.							
Aug. 22·647	0	10	0	6	137·0	−12·6	+26·4
23·508	0	23	0	16	136·9	−12·0	+37·7
Means ...	...	...	0	11	136·95	−12·30	...
Group 4777. Two spots, *a* and *b*, appearing suddenly, and quickly disappearing again.							
Aug. 27·244	25	168	13	92	32·3	−10·1	−17·5
28·495	13	68	7	36	32·8	− 9·9	− 0·5
Means ...	...	...	10	64	32·55	−10·00	...
Group 4778. A large regular spot.							
Aug. 27·244	36	151	48	202	340·7	+10·9	−69·1
28·495	41	229	32	181	341·6	+11·0	−51·7
29·255	39	256	26	171	341·3	+10·9	−41·9
30·435	39	239	22	134	341·6	+11·3	−26·1
31·530	42	248	22	127	341·4	+11·6	−11·8
Sept. 1·615	35	241	18	121	341·7	+11·6	+ 2·8
2·483	46	262	24	135	341·5	+11·3	+14·2
3·438	39	232	22	130	341·4	+11·1	+26·7
Group 4778—*continued.*							
1898. d					°	°	°
Sept. 4·476	33	191	22	126	341·8	+11·4	+40·8
5·649	24	114	21	100	341·4	+11·2	+55·9
6·428	14	89	17	105	341·1	+11·3	+65·9
7·648	0	25	0	75	341·0	+11·8	+81·8
Means ...	...	...	23	134	341·37	+11·28	...
Group 4779. Two small spots preceding Group 4778.							
Aug. 31·530	2	26	1	13	350·4	+13·5	− 2·8
Means ...	...	...	1	13	350·4	+13·5	...
Group 4780. Three small spots.							
Sept. 1·615	2	34	2	31	32·9	−10·1	+54·0
Means ...	...	...	2	31	32·9	−10·1	...
Group 4781. A magnificent group. The principal spot, a_1 is a very large composite spot, and is followed at first by only a few spots of no great size. These following spots rapidly increase in size, and by September 10, form with *a*, an almost continuous straight stream of great complexity. Of these following spots, *b* and *c*, two large composite spots, are the principal. *b* moves forward in longitude and has overtaken and coalesced with *a* by September 14. *c* has divided into two large composite spots, *d* and *e*, by September 10. The group diminishes slightly after September 10, especially near the following end of the stream.							
Sept. 3·438	102	486	210	1014	240·6	−12·6	−74·1
4·476	186	980	206	1092	240·4	−12·6	−60·6
5·649	288	1370	219	1041	240·3	−12·2	−45·2
6·428	329	1707	215	1123	239·7	−11·9	−35·5
7·648	422	2532	239	1449	239·1	−11·8	−20·1
8·480	517	3282	280	1782	238·5	−11·6	− 9·7
9·624	640	3742	344	2011	238·1	−11·7	+ 5·0
10·444	653	4033	363	2235	237·2	−11·8	+15·0
11·435	575	3599	351	2201	238·2	−11·9	+29·0
12·477	339	2456	257	1830	239·1	−12·3	+43·7
13·628	250	1792	266	1888	238·9	−12·1	+58·7
14·433	134	1266	208	1968	239·1	−12·2	+69·5
15·441	11	149	23	597	237·3	−12·2	+81·0
Means ...	...	...	245	1556	238·96	−12·07	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4782.

A few very small spots *np* Group 4781.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1897. d					°	°	°
Sept. 9·624	0	10	0	6	248·4	− 7·2	+15·3
Means ...	...	...	0	6	248·4	− 7·2	...

Group 4783.

A very small spot *sf* Group 4781.

Sept. 9·624	0	7	0	4	230·9	−18·4	− 2·2
Means ...	...	...	0	4	230·9	−18·4	...

Group 4784.

A few small spots on September 13, appearing near the centre of the disc. The group has greatly increased in size by the next day, and forms a straight stream, of which the first and last spots, *a* and *b*, are large and well defined by September 15. *a* is regular, but *b* is indented on its *s* side, and has divided to form a close pair by September 17, the two portions being, however, still measured together.

Sept. 13·628	3	46	1	24	164·4	+ 6·8	−15·8
14·433	43	234	22	118	165·8	+ 5·5	− 3·8
15·441	66	486	34	247	166·1	+ 5·4	+ 9·8
16·479	59	424	32	234	166·5	+ 5·1	+23·9
17·404	36	208	22	131	167·4	+ 4·5	+37·0
18·251	14	85	11	65	168·5	+ 4·3	+49·3
19·402	0	9	0	11	167·9	+ 4·1	+63·9
Means ...	...	...	17	118	166·66	+ 5·10	...

Group 4785.

A few very small spots in a short straight stream. The group is not seen on September 16, but a very small spot marks its place on September 17.

Sept. 14·433	0	6	0	3	175·5	−10·2	+ 5·9
15·441	13	53	7	30	175·3	−10·4	+19·0
16·479	0	0	0	0	...	...	...
17·404	0	6	0	5	178·3	−10·6	+47·9
Means ...	...	...	2	10	176·37	−10·40	...

Group 4786.

A few spots, mostly small, in a short straight stream on September 16. The first and last spots, *a* and *b*, are the largest. *b* has broken up by the next day, *c* being its largest portion. *a* increases in size, and has become a large regular spot by September 21, after it has coalesced with a small spot *d* following it.

1897. d					°	°	°
Sept. 16·479	23	122	16	83	102·0	− 5·6	−40·6
17·404	24	161	13	92	104·0	− 5·9	−26·4
18·251	44	302	23	161	104·2	− 5·8	−15·0
19·402	43	232	22	118	106·3	− 5·6	+ 2·3
20·634	39	244	21	132	107·6	− 5·1	+19·9
21·627	41	240	26	147	107·8	− 5·3	+33·2
22·256	37	203	26	142	108·4	− 5·5	+42·1
23·443	14	163	14	157	108·4	− 5·1	+57·8
24·493	0	77	0	122	107·4	− 5·3	+70·6
Means ...	...	...	18	128	106·23	− 5·47	...

Group 4787.

A few very small faint unstable spots irregularly distributed

Sept. 24·493	5	38	3	24	357·3	+ 5·1	−39·5
25·440	0	47	0	26	358·2	+ 4·7	−26·1
26·398	0	29	0	17	354·2	+ 4·7	−17·4
27·402	0	20	0	10	355·4	+ 4·6	− 3·0
Mean ...	...	...	1	19	356·28	+4·78	...

Group 4788.

A number of small spots irregularly arranged on September 27. The group increases in size very rapidly up to September 29, after which it diminishes again. For the greater part of its existence it appears as a straight, almost continuous stream of great complexity of detail. The component spots undergo continual change.

Sept. 27·402	16	78	12	55	313·4	+11·8	−45·0
28·404	60	292	37	173	312·8	+11·9	−32·4
29·413	149	822	79	436	312·7	+11·7	−19·1
30·156	138	769	70	395	312·3	+11·6	− 9·7
Oct. 1·419	96	571	48	301	312·3	+11·5	+ 6·9
2·474	64	393	35	213	312·4	+11·9	+21·0
3·421	36	178	22	107	312·7	+11·7	+33·8
4·228	12	76	9	54	314·2	+11·9	+45·8
5·166	0	5	0	5	313·6	+11·5	+57·6
Means ...	...	...	35	193	312·93	+11·72	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Date. Greenwich Civil Time.	Projected Area of		Area for Group.		Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
	Umbra.	Whole Spot.	Umbra.	Whole Spot.			
Group 4789.							
A large regular spot, *a*, *np* Group 4791. It shows symptoms of division on October 1, and a considerable spot, *b*, has become separated from *a* by October 2, but has recombined with it by October 3. *a* has elongated in the *np* direction by October 6, and has broken up by October 7 into three spots, *c*, *d*, and *e*, in a short straight line nearly perpendicular to the equator.							
1897. d					°	°	°
Sept. 28·404	11	59	31	172	265·9	− 5·8	−79·3
29·413	18	127	23	168	265·0	− 6·0	−66·8
30·156	33	212	32	206	264·2	− 5·8	−57·8
Oct. 1·419	50	310	34	211	264·7	− 5·8	−40·7
2·474	44	305	26	177	264·5	− 5·6	−26·9
3·421	39	252	20	133	264·7	− 5·5	−14·2
4·228	48	253	24	128	264·8	− 5·4	− 3·6
5·166	42	228	21	118	264·7	− 5·3	+ 8·7
6·205	30	208	16	115	264·6	− 5·1	+22·3
7·257	25	118	16	74	265·1	− 4·6	+36·7
8·258	12	37	10	29	265·2	− 5·1	+50·0
9·154	3	15	3	17	265·2	− 5·8	+61·8
Means ...	...	...	21	129	264·88	− 5·48	...
Group 4790.							
A large regular spot, *a*, *np* Group 4791. *a* diminishes from day to day, and is preceded by a very small companion on October 3.							
Sept. 29·413	14	80	26	150	258·4	− 7·5	−73·4
30·156	26	92	32	113	257·5	− 7·3	−64·5
Oct. 1·419	27	126	21	98	257·7	− 7·1	−47·7
2·474	33	124	20	77	258·1	− 6·9	−33·3
3·421	21	116	12	64	258·7	− 6·9	−20·2
4·228	24	111	1	58	258·7	− 7·3	− 9·7
5·166	11	88	6	45	259·2	− 7·4	+ 3·2
6·205	4	18	2	9	259·9	− 7·2	+17·6
Means ...	...	...	15	77	258·53	− 7·20	...
Group 4791.							
The return of the great Group No. 4781. The principal spot, *a*, is still a very large composite spot. The rest of the group consists chiefly of a number of spots, mostly small, enclosing an immense elliptical area, the site of the following portion of the group at the previous appearance, but within which no spots are seen now.							
Sept. 30·156	0	198	0	716	241·6	−12·3	−80·4
Oct. 1·419	105	715	132	919	240·6	−11·8	−64·8
2·474	158	970	133	829	240·3	−12·0	−51·1
3·421	194	1207	132	828	240·0	−11·8	−38·9
4·228	251	1421	150	854	240·2	−12·0	−28·2
5·166	208	1404	114	771	240·2	−12·2	−15·8
6·205	203	1319	106	693	240·2	−12·3	− 2·1
Group 4791—*continued.*							
1897. d					°	°	°
Oct. 7·257	239	1226	129	643	240·5	−12·0	+12·1
8·258	150	888	87	519	240·6	−12·1	+25·4
9·154	120	655	80	434	240·5	−12·0	+37·1
10·198	73	442	62	374	240·7	−11·9	+51·1
11·183	41	240	51	294	240·2	−12·3	+63·6
12·422	12	70	42	252	240·7	−12·7	+80·5
Means ...	...	...	94	625	240·48	−12·11	...
Group 4792.							
A very small spot on October 4. A few small spots in a short straight stream on the succeeding days.							
Oct. 4·228	0	6	0	3	271·9	+ 6·8	+ 3·5
5·166	13	91	7	47	270·8	+ 9·0	+14·8
6·205	9	55	6	31	272·0	+ 8·7	+29·7
7·257	0	37	0	26	273·3	+ 9·9	+44·9
Means ...	...	...	3	27	272·00	+ 8·60	...
Group 4793.							
A very small spot midway between Groups 4790 and 4791.							
Oct. 6·205	0	8	0	4	250·9	−13·9	+ 8·6
7·257	0	9	0	5	250·6	−14·0	+22·2
Means ...	...	...	0	5	250·75	−13·95	...
Group 4794.							
A composite spot, *a*, with two small companions on October 8. The spot is measured in three portions on October 9, and has become regular in shape by October 10. It then elongates in the direction of motion and has broken up into a straight stream of small spots, closely following each other by October 12. The group is not seen on October 15, but a very small spot marks its place on October 16.							
Oct. 7·257	0	9	0	21	152·3	−13·6	−76·1
8·258	7	54	8	64	152·3	−13·7	−62·9
9·154	27	143	23	119	153·6	−12·8	−49·8
10·198	22	177	14	114	155·0	−13·4	−34·6
11·183	36	160	21	91	155·0	−13·5	−21·6
12·422	22	114	11	61	155·2	−13·2	− 5·0
13·171	12	61	7	32	155·9	−13·7	+ 5·6
14·520	2	41	1	24	155·5	−13·9	+23·0
15·171	0	0	0	0	...	...	...
16·178	0	3	0	2	151·7	−12·7	+40·9
Means ...	...	...	9	53	154·06	−13·39	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4795.

One or two very small spots *f* Group 4794.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
Oct. 8·258	0	2	0	3	147·7	−14·0	−67·5
9·154	0	7	0	7	148·3	−11·4	−55·1
10·198	0	9	0	6	148·2	−11·7	−41·4
11·183	0	12	0	7	148·3	−12·3	−28·3
Means ...	...	...	0	6	148·13	−12·35	...

Group 4796.

A small spot *f* Group 4795.

Oct. 9·154	1	9	2	13	136·0	−15·4	−67·4
Means ...	...	...	2	13	136·0	−15·4	...

Group 4797.

A number of small faint unstable spots irregularly distributed in a straggling stream.

Oct. 13·171	0	7	0	12	76·4	+11·1	−73·9
14·520	6	55	6	51	74·6	+11·9	−57·9
15·171	1	50	1	38	73·9	+12·0	−50·0
16·178	0	28	0	18	72·9	+11·7	−37·9
17·452	0	76	0	42	71·3	+13·0	−22·6
Means ...	...	...	1	32	73·82	+11·94	...

Group 4798.

A very small spot.

Oct. 15·171	0	7	0	4	148·0	+ 7·0	+24·1
Means ...	...	...	0	4	148·0	+ 7·0	...

Group 4799.

A small spot.

Oct. 17·452	1	11	1	12	34·5	−12·4	−59·4
18·620	2	14	2	10	34·4	−12·2	−44·1
19·216	2	10	2	7	34·1	−12·4	−36·5
Means ...	...	...	2	10	34·33	−12·33	...

Group 4800.

A very small spot.

1898. d					°	°	°
Oct. 20·443	0	9	0	5	27·4	+ 5·9	−27·1
21·257	3	9	2	5	28·1	+ 6·2	−15·6
Means ...	...	...	1	5	27·75	+ 6·05	...

Group 4801.

A very fine and almost continuous stream of spots. The main body of the group is measured as a single spot on October 22 and 23, the effect of foreshortening preventing the component spots being seen separately. But by October 24 the group has advanced sufficiently far on the disc for the separate spots to be recognised. The three principal, *a*, *b*, and *c*, are large composite spots.

Oct. 22·161	0	61	0	249	307·8	+15·1	−84·0
23·527	102	925	123	1117	307·6	+15·0	−66·1
24·478	192	1399	166	1190	307·1	+15·0	−54·1
25·134	277	1507	203	1099	306·3	+15·1	−46·3
26·191	280	1558	170	937	305·9	+15·3	−32·8
27·393	274	1599	146	844	305·5	+15·4	−17·3
28·405	213	1279	108	647	305·5	+15·1	− 3·9
29·193	196	1241	99	633	305·0	+15·1	+ 5·9
30·318	134	967	72	520	304·7	+14·6	+20·5
31·528	83	498	52	309	303·8	+14·4	+35·6
Nov. 1·527	39	278	29	213	304·0	+14·3	+48·8
2·184	35	190	34	179	304·4	+14·1	+57·9
3·229	5	32	8	48	303·8	+14·7	+71·1
Means ...	...	...	93	614	305·49	+14·86	...

Group 4802.

A composite spot, *a*, followed by a few small spots irregularly scattered. *a* remains alone by October 30, and has become almost regular.

Oct. 25·134	0	9	0	18	277·3	+ 7·4	−75·3
26·191	25	112	25	114	277·6	+ 7·3	−61·1
27·393	35	126	25	90	277·0	+ 6·4	−45·8
28·405	30	138	17	81	277·8	+ 6·5	−31·6
29·193	23	100	12	53	278·2	+ 6·7	−20·9
30·318	28	89	14	44	279·1	+ 6·7	− 5·1
31·528	18	74	9	37	279·9	+ 6·2	+11·7
Nov. 1·527	18	58	10	32	280·1	+ 6·0	+24·9
2·184	8	27	5	16	280·3	+ 6·2	+33·8
3·229	5	16	3	12	280·3	+ 6·5	+47·6
Means ...	...	...	12	50	278·76	+ 6·59	...

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4803.

Two or three very small spots.

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898. d					°	°	°
Oct. 27·393	1	7	1	6	265·1	− 6·1	−57·7
28·405	0	25	0	16	267·8	− 7·9	−41·6
Means ...	...	...	1	11	266·45	− 7·00	...

Group 4804.

A single spot. It is not seen on October 31, but a very small spot is seen near its place on November 1.

Oct. 28·405	8	30	13	48	239·4	−13·2	−70·0
29·193	4	35	5	37	238·8	−13·6	−60·3
30·318	0	8	0	6	238·1	−13·5	−46·1
31·528	0	0	0	0	...	...	...
Nov. 1·527	0	7	0	4	240·9	−12·7	−14·3
Means ...	...	...	4	19	239·30	−13·25	...

Group 4805.

Several spots, irregularly arranged, *f* Group 4804. The leader, *a*, has become the largest member of the group by October 30, and is the most stable; alone remaining by November 4. The other spots are unstable, and undergo continual change.

Oct. 29·193	6	65	8	93	231·5	−13·3	−67·6
30·318	23	184	19	156	232·4	−12·5	−51·8
31·528	30	161	18	101	234·1	−11·5	−34·1
Nov. 1·527	18	89	10	49	236·0	−10·6	−19·2
2·184	15	78	8	41	236·1	−10·7	−10·4
3·229	9	32	5	16	236·7	−10·3	+ 4·0
4·409	5	15	3	8	236·9	− 9·5	+19·8
5·443	3	15	2	10	237·2	− 9·5	+33·8
6·166	6	13	4	10	238·3	− 9·5	+44·4
Means ...	...	...	9	54	235·47	−10·83	...

Group 4806.

A very few small unstable spots, forming *s* of Group 4805.

Nov. 1·527	0	15	0	9	235·0	−15·2	−20·2
2·184	0	15	0	8	234·5	−15·9	−12·0
3·229	13	58	7	31	235·0	−16·8	+ 2·3
4·409	7	24	4	14	236·2	−16·6	+19·1
Means ...	...	...	3	16	235·18	−16·13	...

Group 4807.

A large composite spot, *a*, followed by a number of small spots in a straggling stream. The following spots have increased and coalesced by November 4 to form a second large composite spot, *b*. By November 5 the group has formed a fine straight and almost continuous stream of considerable complexity. The following portion of the group then begins to break up, but the preceding portion becomes more defined, and has re-formed again by November 8 as a fine large sharply-defined spot, which has become regular by November 9. The following portion of the group has nearly disappeared by November 10.

1898. d					°	°	°
Nov. 1·527	44	341	34	268	204·7	+ 7·9	−50·5
2·184	94	533	63	359	204·0	+ 7·4	−42·5
3·229	131	828	74	475	204·0	+ 6·9	−28·7
4·409	163	927	84	477	204·4	+ 7·0	−12·7
5·443	184	1057	93	536	204·6	+ 6·4	+ 1·2
6·166	225	1334	115	680	205·1	+ 6·9	+11·2
7·451	170	1106	98	636	205·7	+ 6·8	+28·8
8·515	137	658	98	464	207·5	+ 6·3	+44·6
9·284	118	532	104	464	208·0	+ 6·2	+55·2
10·187	91	361	119	470	208·5	+ 5·6	+67·6
Means ...	...	...	88	483	205·65	+ 6·74	...

Group 4808.

A number of spots in an irregular but fairly compact cluster. The individual spots of the group are unstable, and the group tends to diminish and to lengthen out into a straight sparse stream.

Nov. 2·184	2	60	5	165	167·7	− 9·9	−78·8
3·229	0	59	0	76	167·0	−10·9	−65·7
4·409	35	246	28	196	167·7	−10·7	−49·4
5·443	14	173	9	112	167·7	−10·9	−35·7
6·166	20	99	13	56	167·3	−10·8	−26·6
7·451	0	35	0	18	171·3	−10·2	− 5·6
8·515	5	89	2	46	171·3	−10·1	+ 8·4
9·284	0	76	0	40	172·1	−10·1	+19·3
10·187	0	9	0	6	170·0	−10·9	+29·1
11·529	3	38	2	29	169·8	−11·6	+46·6
12·203	3	19	3	20	173·6	−10·5	+59·3
13·507	2	25	6	60	173·8	−11·2	+76·7
Means ...	...	...	6	69	169·94	−10·65	...

Group 4809.

A pair of spots, *a* and *b*. A third spot, *c*, has formed between them by November 7, and by the succeeding day the group has become a straight stream, of which *a* is the leader and the largest. The group diminishes after November 8, and *a* alone remains by November 12.

Nov. 5·443	24	151	15	99	162·9	+ 5·2	−40·5
6·166	86	389	50	227	163·1	+ 5·3	−30·8
7·451	56	327	29	170	164·3	+ 5·3	−12·6
8·515	45	294	23	149	166·1	+ 5·8	+ 3·2
9·284	37	242	19	124	166·3	+ 5·8	+13·5

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Group 4809—*continued.*

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898.					°	°	°
Nov. 10·187	31	141	18	80	168·7	+ 5·0	+27·8
11·529	11	40	8	30	170·2	+ 5·0	+47·0
12·203	5	23	5	21	171·5	+ 5·2	+57·2
Means ...	...	...	21	113	166·64	+ 5·33	...

Group 4810.

A pair of very small spots on November 10. The group has greatly increased by the succeeding day, and forms two compact clusters, which have lengthened out into straight streams by November 12. These have combined into a single straight stream by November 14, of which the first and last spots, *a* and *b*, are the largest.

Nov. 10·187	0	9	0	9	82·3	− 7·0	−58·6
11·529	27	162	18	108	82·8	− 7·0	−40·4
12·203	18	148	11	88	82·7	− 6·0	−31·6
13·507	13	156	7	81	84·0	− 6·5	−13·1
14·445	25	185	13	95	84·4	− 6·3	− 0·3
15·188	14	114	7	58	85·2	− 6·6	+10·3
16·243	4	35	2	19	86·3	− 6·5	+25·2
Means ...	...	...	8	65	83·96	− 6·56	...

Group 4811.

A few very small spots on November 11, of which only the leader, *a*, remains by November 12.

Nov. 11·529	1	25	1	13	132·0	−13·2	+ 8·8
12·203	2	17	1	10	133·7	−12·6	+19·4
Means ...	...	...	1	12	132·85	−12·90	...

Group 4812.

Two very small spots.

Nov. 17·191	0	15	0	9	14·8	+ 4·5	−33·8
Means ...	...	...	0	9	14·8	+ 4·5	...

Group 4813.

A regular spot, *a*, usually followed by a few small spots in a short stream.

Nov. 18·443	10	66	7	43	355·7	−14·3	−36·3
19·485	49	249	27	139	356·1	−14·2	−22·2
20·185	53	224	28	120	356·5	−13·5	−12·6
21·265	31	172	16	88	356·3	−13·5	+ 1·4

Group 4813—*continued.*

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
1898.					°	°	°
Nov. 22·439	23	114	12	62	357·5	−12·8	+18·1
23·257	21	97	12	57	357·4	−13·1	+28·8
24·223	17	106	12	73	356·4	−13·1	+41·3
25·486	11	68	11	66	356·7	−13·2	+57·4
26·218	12	55	17	75	356·4	−14·0	+67·6
Means ...	...	...	16	80	356·56	−13·52	...

Group 4814.

A pair of very small spots.

Nov. 26·218	0	16	0	9	299·4	+ 8·9	+10·6
Means ...	...	...	0	9	299·4	+ 8·9	...

Group 4815.

A very small faint spot on November 27. Another similar spot, *f* the place of the first, on November 28.

Nov. 27·191	0	5	0	3	254·2	−11·8	−22·6
28·238	0	4	0	2	251·0	−10·3	−11·6
Means ...	...	...	0	3	252·60	−11·05	...

Group 4816.

A very small spot on November 27 and 28, and an irregular cluster of small unstable spots on the succeeding days.

Nov. 27·191	1	4	1	5	210·1	+ 5·6	−66·7
28·238	2	13	2	11	210·7	+ 5·2	−51·9
29·243	2	26	1	17	211·1	+ 4·9	−38·6
30·429	5	55	2	30	212·8	+ 4·2	−21·3
Dec. 1·328	5	51	3	26	212·3	+ 4·0	−10·0
2·293	0	16	0	8	212·4	+ 5·6	+ 2·9
Means ...	...	...	2	16	211·57	+ 4·92	...

Group 4817.

A large spot, *a*, with a few small companions on November 30. The nucleus of *a* has begun to divide by December 1, and the spot is measured in two portions on December 4.

Nov. 27·191	50	136	98	265	201·8	−7·7	−75·0
28·238	46	295	49	312	201·2	−7·7	−61·4
29·243	51	282	39	215	201·5	−7·9	−48·2
30·429	50	318	30	188	202·4	−7·3	−31·7

AREAS and HELIOGRAPHIC POSITIONS of GROUPS of SUN SPOTS—*continued.*

Date. Greenwich Civil Time.	Projected Area of Umbra.	Projected Area of Whole Spot.	Area for Group. Umbra.	Area for Group. Whole Spot.	Mean Longitude of Group.	Mean Latitude of Group.	Longitude from Central Meridian.
Group 4817—*continued.*							
1898. d					°	°	°
Dec. 1·328	93	321	50	173	201·9	−7·8	−20·4
2·293	57	339	29	173	202·0	−7·8	− 7·5
3·304	54	276	27	141	202·3	−7·8	+ 6·1
4·459	50	254	27	138	202·3	−7·8	+21·4
5·178	40	228	23	135	202·9	−8·0	+31·4
6·300	35	154	26	114	203·4	−7·8	+46·7
7	No	photograph.					
8·182	10	42	15	65	203·0	−6·9	+71·1
Means ...	...	...	38	174	202·25	−7·68	...
Group 4818. Three very small faint spots.							
Dec. 2·293	0	16	0	9	193·1	−1·1	−16·4
Means ...	...	...	0	9	193·1	−1·1	...
Group 4819. A very large spot, *a*, with one or two small companions, *a* has become composite by December 9, and is measured in two or three parts on December 9 and 10. It has divided into two distinct spots, *b* and *c*, by December 13.							
Dec. 2·293	55	195	131	471	131·9	−12·1	−77·6
3·304	73	397	87	477	131·5	−12·3	−64·7
4·459	114	574	88	446	132·2	−12·3	−48·7
5·178	124	631	83	422	131·4	−12·5	−40·1
6·300	124	787	70	447	131·4	−12·4	−25·3
7	No	photograph.					
8·182	82	780	42	400	131·8	−12·7	− 0·1
9·488	104	558	58	301	131·8	−12·3	+17·1
10·184	115	549	66	313	131·9	−12·4	+26·3
11·186	72	358	48	238	132·1	−12·4	+39·7
12·319	48	269	42	238	131·9	−12·4	+54·5
13·276	27	121	36	164	132·7	−12·7	+67·9
Means ...	...	...	68	356	131·87	+12·41	...
Group 4820. Three very small faint spots.							
Dec. 10·184	0	11	0	11	168·4	−10·1	+62·8
Means ...	...	...	0	11	168·4	−10·1	...
Group 4821. A small spot, *a*, with a very small companion on December 17.							
1898. d					°	°	°
Dec. 16·262	0	9	0	14	314·3	+9·8	−71·1
17·196	6	23	6	23	314·0	+9·5	−59·2
Means ...	...	...	3	19	314·15	+9·65	...
Group 4822. A small but dark and well-defined spot, *a*, followed by a few small companions.							
Dec. 19·223	14	54	13	51	288·7	+7·2	−57·7
20·166	9	46	7	33	289·4	+7·2	−44·7
Means ...	...	...	10	42	289·05	+7·20	...
Group 4823. A pair of very small spots on December 29. The group has increased by December 31, and forms a short irregular stream. Only two composite spots, *a* and *b*, remain by January 1.							
Dec. 29·189	2	21	1	13	181·6	−12·1	−33·6
30·458	3	38	2	19	180·5	−11·5	−18·0
31·192	24	155	12	79	180·7	−11·6	− 8·2
1899.							
Jan. 1·222	25	117	13	59	180·9	−11·7	+ 5·6
2·522	7	27	4	15	180·5	−11·1	+22·4
Means ...	...	...	6	37	180·84	−11·60	...
Group 4824. A small spot.							
1898.							
Dec. 29·189	2	18	2	19	152·7	−11·6	−62·5
Means ...	...	...	2	19	152·7	−11·6	...

ROYAL OBSERVATORY, GREENWICH.

TOTAL PROJECTED 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

1898.

Total Projected Areas of Sun Spots and Faculæ for Each Day in the Year 1898.

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

The Greenwich Civil Time is expressed by the month, day of the month (civil reckoning), and decimal of a day, reckoned from Greenwich Mean Midnight.

Greenwich Civil Time.		Projected Area.		
		Umbræ.	Whole Spots.	Faculæ.
1898	d			
Jan.	1·2	101	507	906
	2·2	82	412	0
	3·2	84	475	1060
	4·2	101	598	1144
	5·2	95	550	2041
	6·5	90	479	1694
	7·2	94	482	852
	8·5	68	405	616
	9·2	72	355	674
	10·2	58	285	268
	11·3	46	214	307
	12·2	45	183	873
	13·2	28	125	1959
	14·3	42	220	1566
	15·1	59	388	1363
	16·2	89	575	1070
	17·2	126	850	650
	18·2	151	845	533
	19·2	184	896	777
	20·2	221	1071	1187
	21·3	203	1047	2055
	22·5	185	985	658
	23·2	157	955	831
	24·3	185	951	1150
	25·2	151	1003	756
	26·2	119	782	570
	27·2	99	781	618
	28·2	87	396	341
	29·2	61	306	744
	30·2	17	105	1359
	31·2	0	31	1003
Feb.	1·2	0	0	1107
	2·5	0	0	1510
	3·2	0	0	320
	4·2	4	39	535
	5·5	40	197	1129
	6·2	21	185	485
	7·5	50	287	891
	8·2	40	218	1193
	9·2	38	370	1446
	10·2	95	570	2150
	11·2	104	504	1344
	12·4	256	1199	487
	13·2	311	1570	738
	14·2	347	1842	458
	15·2	406	2481	919
	16·5	411	2506	1562
	17·2	349	1956	1209
	18·2	457	2214	1575
	19·2	292	1559	1199
	20·3	101	641	957

Greenwich Civil Time.		Projected Area.		
		Umbræ.	Whole Spots.	Faculæ.
1898	d			
Feb.	21·1	112	618	532
	22·2	103	482	140
	23·5	74	499	532
	24·5	49	307	1871
	25·6	33	172	995
	26·5	83	365	1030
	27·6	143	622	681
	28·5	133	706	489
Mar.	1·2	106	612	859
	2·2	83	490	1097
	3·3	73	347	853
	4·6	66	292	1580
	5·3	65	306	1382
	6·3	133	711	1215
	7·5	211	1287	1487
	8·1	293	1595	2002
	9·4	425	2375	1014
	10·5	426	2869	503
	11·2	506	2873	928
	12·1	532	3233	586
	13·2	604	3101	488
	14·2	650	3047	1128
	15·4	437	1974	1668
	16·3	295	1341	2594
	17·2	145	634	1324
	18·5	24	163	1247
	19·2	7	13	512
	20·5	0	0	0
	21·5	0	0	0
	22·2	3	19	367
	23·2	0	0	252
	24·5	0	0	513
	25·3	0	0	186
	26·2	2	34	1172
	27·2	8	34	553
	28·2	7	38	378
	29·2	1	26	515
	30·5	0	0	396
	31·4	8	53	492
April	1·2	43	183	495
	2·2	75	351	957
	3·5	102	587	2695
	4·6	123	567	2312
	5·4	111	672	893
	6·4	112	614	162
	7·2	105	575	231
	8·4	67	374	648

Greenwich Civil Time.		Projected Area.		
		Umbræ.	Whole Spots.	Faculæ.
1898	d			
April	9·4	66	369	273
	10·7	51	332	959
	11·1	45	245	901
	12·2	30	149	1950
	13·6	6	43	1841
	14·2	0	10	691
	15·5	9	17	425
	16·2	0	0	138
	17·4	0	0	87
	18·5	0	0	313
	19·6	0	0	236
	20·5	0	0	451
	21·4	0	0	392
	22·6	0	9	756
	23·4	0	14	589
	24·4	0	15	543
	25·6	0	14	1020
	26·6	0	53	124
	27·3	8	59	156
	28·1	14	85	857
	29·7	83	448	1320
	30·2	120	709	1282
May	1·3	138	601	1109
	2·2	22	235	644
	3·4	0	14	1357
	4·2	0	10	330
	5·1	0	0	314
	6·5	27	203	1035
	7·4	70	453	1901
	8·2	107	573	1854
	9·7	134	825	1048
	10·2	182	951	630
	11·5	137	832	712
	12·5	145	727	197
	13·4	91	680	393
	14·5	61	425	543
	15·2	58	371	534
	16·4	33	187	874
	17·2	25	156	1373
	18·5	34	277	1867
	19·2	43	217	1052
	20·3	45	236	388
	21·2	53	213	512
	22·5	35	218	0
	23·5	35	161	296
	24·5	30	175	442
	25·1	19	121	537
	26·4	24	211	842
	27·5	20	169	484
	28·1	7	98	565
	29·1	0	42	791

Greenwich Civil Time.		Projected Area.		
		Umbræ.	Whole Spots.	Faculæ.
1898	d			
May	30·5	20	145	624
	31·1	66	313	379
June	1·7	51	309	936
	2·6	20	172	914
	3·4	7	100	1134
	4·1	0	50	1141
	5·2	0	0	914
	6·1	27	82	795
	7·5	0	0	293
	8·3	0	3	437
	9·3	0	0	173
	10·3	0	0	119
	11·4	1	7	289
	12·2	0	0	294
	13·4	0	0	284
	14·3	24	99	1050
	15·6	14	83	261
	16·5	14	117	899
	17·6	37	197	441
	18·5	20	184	315
	19·5	0	65	0
	20·2	7	32	630
	21·5	21	153	987
	22·2	30	134	352
	23·2	21	178	518
	24·3	26	168	914
	25·3	27	179	352
	26·3	27	145	1163
	27·2	39	190	1748
	28·2	22	86	931
	29·4	15	59	635
	30·5	0	11	403
July	1·6	0	46	110
	2·5	0	17	225
	3·5	0	0	404
	4·5	0	0	368
	5·2	0	0	267
	6·4	0	0	806
	7·2	0	0	535
	8·4	0	0	520
	9·2	0	0	362
	10·3	0	0	162
	11·4	0	0	114
	12·6	0	0	464
	13·5	0	0	142
	14·4	0	0	378
	15·5	6	45	116
	16·5	14	90	362
	17·3	3	25	647
	18·4	0	0	315
	19·2	0	34	267

TOTAL PROJECTED AREAS of SUN SPOTS and FACULÆ—*concluded.*

Greenwich Civil Time.		Projected Area.		
		Umbræ.	Whole Spots.	Faculæ.
1898	d			
July	20·3	28	72	545
	21·4	17	87	420
	22·2	14	137	0
	23·3	31	181	122
	24·5	42	243	126
	25·3	42	131	785
	26·2	18	115	1124
	27·4	0	18	462
	28·1	1	8	232
	29·2	0	47	264
	30·2	50	231	205
	31·5	127	694	325
Aug.	1·5	140	921	1091
	2·4	218	1184	1704
	3·6	287	1637	1548
	4·3	372	1691	1401
	5·4	361	2040	354
	6·2	420	2218	818
	7·2	306	1820	254
	8·3	371	1667	341
	9·5	268	1395	156
	10·2	196	1100	764
	11·4	102	675	1165
	12·4	110	579	744
	13·5	149	950	894
	14·5	104	607	114
	15·5	76	488	276
	16·5	49	336	1386
	17·6	26	148	810
	18·4	13	49	376
	19·5	0	7	376
	20·4	0	0	90
	21·5	0	15	239
	22·6	13	76	102
	23·5	13	105	323
	24·5	0	0	382
	25·6	0	0	394
	26	No	Photo	graph.
	27·2	60	319	301
	28·5	54	298	627
	29·3	39	256	1098

Greenwich Civil Time.		Projected Area.		
		Umbræ.	Whole Spots.	Faculæ.
1898	d			
Aug.	30·4	39	239	417
	31·5	45	273	926
Sept.	1·6	37	275	311
	2·5	46	262	378
	3·4	142	718	1190
	4·5	219	1172	1666
	5·6	312	1485	1898
	6·4	344	1796	1671
	7·6	422	2557	500
	8·5	517	3282	1173
	9·6	640	3759	628
	10·4	653	4033	705
	11·4	575	3599	178
	12·5	339	2456	1499
	13·6	253	1838	2340
	14·4	177	1466	1896
	15·4	90	687	865
	16·5	82	546	421
	17·4	59	376	0
	18·3	58	387	395
	19·4	43	241	604
	20·6	39	244	139
	21·6	41	240	271
	22·3	37	203	858
	23·4	14	163	1505
	24·5	5	115	472
	25·4	0	47	165
	26·4	0	29	488
	27·4	16	98	546
	28·4	70	351	113
	29·4	180	1028	552
	30·2	197	1272	864
Oct.	1·4	278	1722	2024
	2·5	299	1792	3803
	3·4	290	1752	1615
	4·2	335	1866	1249
	5·2	274	1817	1413
	6·2	247	1607	1215
	7·3	264	1399	454
	8·3	168	981	772

Greenwich Civil Time.		Projected Area.		
		Umbræ.	Whole Spots.	Faculæ.
1898	d			
Oct.	9·2	152	830	1544
	10·2	95	628	1232
	11·2	77	412	1330
	12·4	34	184	478
	13·2	12	68	679
	14·5	9	95	367
	15·2	1	57	578
	16·2	0	31	431
	17·5	1	88	383
	18·6	2	14	58
	19·2	2	10	632
	20·4	0	9	0
	21·3	3	9	0
	22·2	0	61	298
	23·5	102	925	1271
	24·5	192	1399	1143
	25·1	277	1516	1126
	26·2	305	1670	707
	27·4	310	1731	965
	28·4	251	1472	1761
	29·2	229	1441	2042
	30·3	185	1247	1644
	31·5	132	733	104
Nov.	1·5	119	788	1696
	2·2	154	903	2528
	3·2	163	1024	812
	4·4	208	1212	771
	5·4	226	1396	498
	6·2	338	1835	1069
	7·5	226	1468	1368
	8·5	187	1042	2009
	9·3	155	774	1936
	10·2	122	520	1388
	11·5	41	266	813
	12·2	28	207	1210
	13·5	15	181	475
	14·4	25	185	109
	15·2	14	114	290
	16·2	4	35	183
	17·2	0	15	172
	18·4	10	66	217
	19·5	49	249	718

Greenwich Civil Time.		Projected Area.		
		Umbræ.	Whole Spots.	Faculæ.
1898	d			
Nov.	20·2	53	224	578
	21·3	31	172	251
	22·4	23	114	0
	23·3	21	97	291
	24·2	17	106	241
	25·5	11	68	296
	26·2	12	71	1428
	27·2	51	145	1115
	28·2	48	313	883
	29·2	54	309	1487
	30·4	55	372	251
Dec.	1·3	98	372	342
	2·3	111	566	166
	3·3	126	673	1703
	4·5	163	829	1090
	5·2	164	859	1059
	6·3	159	941	1310
	7	No	Photo	graph.
	8·2	92	822	246
	9·5	104	558	504
	10·2	115	559	488
	11·2	72	358	985
	12·3	48	269	974
	13·3	27	121	671
	14·3	0	0	639
	15·2	0	0	708
	16·3	0	9	107
	17·2	6	23	495
	18·3	0	0	728
	19·2	14	54	338
	20·2	9	46	241
	21·2	0	0	329
	22·3	0	0	164
	23·5	0	0	85
	24·2	0	0	593
	25·5	0	0	108
	26·5	0	0	51
	27·2	0	0	848
	28·5	0	0	305
	29·2	4	39	543
	30·5	3	38	0
	31·2	24	155	106

MEAN AREAS of SUN SPOTS and FACULÆ, as measured on PHOTOGRAPHS taken at the ROYAL OBSERVATORY, GREENWICH, at DEHRA DÛN, INDIA, and in MAURITIUS, for each ROTATION of the SUN, from 1897 December 28 to 1898 December 18.

The Mean Areas have been formed by taking the Means of the Areas for each day of observation throughout each Rotation of the Sun, the Projected Areas being the Areas as measured on the photographs and expressed in millionths of the Sun's apparent disk, and the Areas corrected for foreshortening being expressed in millionths of the Sun's visible hemisphere.

The rotations adopted in the following table (which is in continuation of those for the years 1873–1897 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 rotations adopted in the volumes of Greenwich Observations, 1877 to 1883, correspond, on the other hand, to the sidereal rotation of the Sun, the commencement of each being defined by the coincidence of the assumed prime meridian with the ascending node. 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 CIVIL 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.
			d							
592	1897	December	28·64	27	103	558	986	74	422	1136
593	1898	January	24·98	28	142	799	969	92	528	1190
594		February	21·32	27	211	1127	1045	147	781	1231
595		March	20·64	27	36	196	755	27	150	866
596		April	16·92	27	47	278	728	39	229	913
597		May	14·16	28	25	159	677	18	115	832
598		June	10·36	27	13	80	562	8	51	666
599		July	7·56	27	38	219	474	28	161	530
600		August	3·77	26	121	657	546	79	437	670
601		August	31·01	27	192	1194	857	134	863	984
602		September	27·28	28	118	732	894	82	553	1007
603		October	24·57	27	142	826	1007	88	516	1077
604		November	20·87	26	62	336	682	48	247	740

MEAN AREAS of SUN SPOTS and FACULÆ, as measured on PHOTOGRAPHS taken at the ROYAL OBSERVATORY, GREENWICH, at DEHRA DÛN, INDIA, and in MAURITIUS, for the YEAR 1898.

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

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

Year.	No. of Days on which Photographs were taken.	Mean of Daily Areas.					
		Projected.			Corrected for Foreshortening.		
		Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.
1898	363	93	532	767	64	375	891

MEAN HELIOGRAPHIC LATITUDE of SUN SPOTS, as measured on PHOTOGRAPHS taken at the ROYAL OBSERVATORY, GREENWICH, at DEHRA DÛN, INDIA, and in MAURITIUS, for each ROTATION of the SUN, from 1897 December 28 to 1898 December 18.

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 Sun's 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.		
	d			°		°	°	°
592	1897 Dec. 28·64	27	281	8·61	142	9·60	+ 2·50	8·94
593	1898 Jan. 24·98	28	120	4·72	408	7·70	− 4·86	7·00
594	Feb. 21·32	27	125	10·50	656	11·45	− 7·92	11·30
595	Mar. 20·64	27	0	...	150	11·61	−11·61	11·61
596	Apr. 16·92	27	9	12·68	220	8·59	− 7·76	8·75
597	May 14·16	28	9	9·06	106	12·22	−10·49	11·96
598	June 10·36	27	19	15·13	33	10·06	− 0·85	11·92
599	July 7·56	27	76	10·29	85	12·41	− 1·69	11·41
600	Aug. 3·77	26	194	10·18	243	11·92	− 2·12	11·14
601	Aug. 31·01	27	68	8·25	795	11·69	−10·13	11·42
602	Sept. 27·28	28	164	13·53	389	10·88	− 3·65	11·67
603	Oct. 24·57	27	432	10·32	84	10·84	+ 6·88	10·41
604	Nov. 20·87	26	6	6·19	242	10·92	−10·53	10·81

MEAN HELIOGRAPHIC LATITUDE of SUN SPOTS, as measured on PHOTOGRAPHS taken at the ROYAL OBSERVATORY, GREENWICH, at DEHRA DÛN, INDIA, and in MAURITIUS, for the YEAR 1898.

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.		
			°		°	°	°
1898	363	110	9·82	266	10·77	−4·75	10·49

NOTE.—In the computations for forming the corresponding Tables given in the volumes for 1884 and 1885 the latitudes of the Spots were only taken to the nearest whole degree, the next higher whole degree being adopted whenever the fractional part of the latitude amounted to or exceeded ·5. Thus, under 8°, for example, would be included all Spots from 7°·5 to 8°·4, both inclusive; and the corresponding mean latitude should have been taken as 7°·95 instead of 8°. The Mean Heliographic Latitudes, therefore, both for Spots North and Spots South of the Equator, and the Mean Distances from the Equator of all Spots, both for the rotations and for entire years, require a correction of − 0°·05. The Mean Latitude of the entire Spotted Area requires the following correction:—

$$-0^\circ\cdot05 + \frac{\text{Mean Area N.} - \text{Mean Area S.}}{\text{Mean Area N.} + \text{Mean Area S.}}$$

These corrections have been applied in computing the Mean Heliographic Latitudes and Mean Distance from the Equator given in the above Tables for 1898, and in corresponding Tables for the years 1886 to 1897.