

APPENDIX TO GREENWICH OBSERVATIONS, 1907.

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CATALOGUE  
OF  
RECURRENT GROUPS OF SUN SPOTS  
FOR THE YEARS  
1874 TO 1906

COMPILED BY  
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FROM THE  
LEDGERS OF GROUPS OF SUN SPOTS

PUBLISHED IN THE  
GREENWICH OBSERVATIONS, 1886-1907,  
UNDER THE DIRECTION OF  
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EDINBURGH:  
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE  
BY NEILL & CO., LIMITED, BELLEVUE.

1909.

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# CATALOGUE OF RECURRENT GROUPS OF SUN SPOTS,

## 1874 TO 1906.

### INTRODUCTION.

THE following Catalogue of Recurrent Groups of Sun Spots, that is to say, of groups observed continuously in two or more consecutive apparitions, has been compiled with the approval of Sir W. H. M. Christie, K.C.B., Astronomer Royal, from the "Ledgers of Areas and Positions of Groups of Sun Spots deduced from the Measurement of the Solar Photographs," that have been published in the volumes of the Greenwich Observations, from 1886 to 1907, and in the Photo-Heliographic Results, 1874-1885, which formed the Appendix to the Greenwich Observations, 1905.

The form of these Ledgers is as follows:—Each group of Sun Spots is given separately, one line of entry being assigned to each day on which the group was under observation. The particulars, supplied for each day of each group, include first, the Greenwich Civil Time at which the photograph was taken, expressed by the month, day of the month, civil reckoning, and decimal of a day reckoned from Greenwich Mean Midnight. Then follow details as to the Area of the Umbrae and Whole Spots contained in the group given in two forms; first as Projected Area, that is to say, uncorrected for the effect of foreshortening; and next as Area, Corrected for the effect of foreshortening, the latter being expressed in millionths of the Sun's visible hemisphere. The mean Heliographic Longitude and Latitude of the group follow next, and after them the Longitude from the Central Meridian, that is to say, the mean heliographic longitude of the group, reckoned from the meridian passing through the centre of the Sun's disc at the moment of observation, longitude west of the centre being reckoned as positive. Finally, at the foot of the record of each group is given the Mean Daily Area of the group during the course of the apparition as corrected for foreshortening, both for the Umbrae and for the Whole Spots, together with the Mean Heliographic Longitude and the Mean Heliographic Latitude of the group for the period of observation. In taking these means the numbers for each day have been added together and divided by the number of days of observation, each day's observation being thus assumed to be of equal weight.

In drawing up the following Catalogue, these four mean numbers, transcribed direct from the Greenwich Sun Spot Ledgers, form the most important details given for each Sun Spot group and they occupy Columns 9, 10, 11 and 12. Column 1 simply contains a reference number; Column 2 the Greenwich number of the spot group;

Column 3 gives the Synodic Rotation of the Sun when the spot group crossed the central meridian, the number of the rotation being taken from the volumes of the Greenwich Observations, wherein it is stated that the assumed period of the Sun's sidereal rotation is 25·38 days, and that rotation No. 1 commenced 1853 Nov. 9.

Columns 4 and 5 give for each group the Date of the photograph upon which the group was first seen, and the Heliographic Longitude from the Central Meridian of the group as measured on that photograph; Columns 6 and 7, in like manner, give the Date of the photograph on which the group was last seen, with its Longitude from the Central Meridian then; whilst Column 8 gives the number of days for which photographs are available on which the group was measured.

The method of forming the Catalogue has been this:—If any spot group when first seen was  $60^\circ$  or more to the east of the Central Meridian—the detail given in Column 5,—then the Spot Ledgers, and, if necessary, the Daily Heliographic Results also, were searched some fifteen or sixteen days earlier, to ascertain whether a spot group of similar heliographic longitude and latitude was then near the west limb of the Sun. Similarly, if any spot group when last seen was  $60^\circ$  or more to the west of the Central Meridian—the detail given in Column 7,—then the Spot Ledgers, and, if necessary, the Daily Heliographic Results also, were searched some fifteen or sixteen days later, to ascertain whether a spot group of similar heliographic longitude and latitude was then near the east limb of the Sun. Both the search forward and the search backward have been made in the case of every spot group that was observed close to both the east and west limbs, in order that no possible case of identity might be overlooked.

The work of identification presented, however, some difficulties. The photographic record was very imperfect in the four years 1874 to 1877, and was somewhat broken in 1879 and 1884, and it necessarily follows that some uncertainty rests upon the identification of spot groups where the observations are interrupted. In these six years, therefore, and especially in the four earlier, probably a few cases of the return of a spot group have escaped notice, and a somewhat larger number have been entered as recurrent, when a continuous record would have shown that they were only revivals of activity.

The chief difficulty in the work of identification has lain in the frequency of intermittent action in spot-formation. Feeble groups often subside for a day or two and then break out again in or near the same place; and the processes of formation or dissipation of greater groups are often, in like manner, marked by intermittency. Nor is such intermittent action confined to periods of one or two days, and to the cases of feeble groups, or of groups in feeble stages of action; even important disturbances will die out completely, and sometimes revive again after a considerable length of time. Intermittent action being so frequently observed in Sun Spots during their presence in the

visible hemisphere, there must always be a measure of uncertainty about the ascription of continuity of existence to a spot group that has returned to view after a full fortnight on the unseen side of the Sun.

The difficulty was further increased by the fact that Sun Spots are stable neither in heliographic longitude nor in heliographic latitude. Their movements in longitude are in the mean closely represented by the formula :—

$$875'.7 - 164' \sin^2 \lambda = \text{Daily Sidereal Motion}$$

where  $\lambda$  is the latitude of the spot. In other words, the greater the distance of the spot from the equator, the slower the daily sidereal motion. But though this formula represents the mean motion of the spots in any latitude with considerable precision, yet, as shown in a paper communicated to the Royal Astronomical Society in 1905 by my husband and myself,\* the deviations from this mean motion are, in the case of many individual groups, very great indeed. It is not possible, therefore, to assume that the mean longitude of a group in one rotation will correspond precisely to its mean longitude in the next, even after correcting for the mean drift of the particular latitude in which the group is placed.

Movements in latitude are much more restricted than movements in longitude. As a rule solar disturbances are propagated in directions parallel to the equator, but striking exceptions are observed from time to time, and a group has sometimes moved three or four degrees in latitude during the fortnight that it has been under observation.

In considering, therefore, the question of the identity of spot groups observed in two consecutive rotations of the Sun, the character of the second group must be carefully compared with that of the first in each of these three elements,—area, longitude and latitude. If the area in the first rotation is increasing or stationary, and in the second rotation, stationary or decreasing, it would seem probable that the group has not been intermittent whilst in the unseen hemisphere. So, if the change in longitude or latitude from the first rotation to the second appears to accord fairly well with the direction and rate of motion of the group whilst on the visible hemisphere, it seems legitimate to assume the identity. For even at the time of the solar maximum, the total area actually covered by Sun Spots never amounts to as much as one per cent. of the surface of the Sun contained within the spot-bearing zones. Where, therefore, an isolated disturbance in one rotation corresponds to an isolated disturbance in the next rotation within three or four degrees of longitude and one or two of latitude, the probability is great that the two disturbances are the same. Where a disturbance manifests itself by the formation of two or more neighbouring and associated groups the question is, of course, more complicated.

In what appeared an undue proportion of cases, there was a difficulty owing to the

\* *The Solar Rotation Period from Greenwich Sun Spot Measures, 1879–1901*, by E. Walter Maunder and A. S. D. Maunder. *Monthly Notices of the Royal Astronomical Society*, Vol. LXV. pp. 813–825.

records not exhibiting the presence of the group when within a couple of days or perhaps three of the limb. In these cases, the area, on the day when the group was seen, was small, and it was difficult to decide whether, when nearer the limb, the spot was non-existent or had been merely overlooked through the dwarfing effect of the foreshortening or had been hidden by masses of surrounding faculæ. If, on the whole, the weight of evidence appeared to render probable the continued existence of the spot, it has been numbered in the catalogue and a note has been added to point out the element of uncertainty. If, on the other hand, the weight of evidence appeared to go in the other direction, but was not quite decisive, the series has been printed in the catalogue but a separate number has not been given it. It has been distinguished by the reference number of the preceding series, placed in brackets and marked with an asterisk. In cases where a well-defined series has been recorded, there have sometimes been included in brackets spot groups undoubtedly belonging to the same general disturbance, but for which the evidence of continuity of action was not sufficient.

In watching the development of sun spot groups, a strongly marked tendency is observed for the groups at one stage of their development to conform to a particular type. A number of spots drawn out in line, usually along a parallel of latitude, is described in the Greenwich Observations as a "stream." The characteristics of a "stream" of this particular type are that both the first and the last spots are large and well marked, and the intermediate spots small and unstable. Usually the intermediate spots disappear at a comparatively early stage, leaving the first and last spots alone and somewhat widely separated. After this the rear spot breaks up and disappears; whilst the leader spot, which is well-defined and usually, but not always, circular in form, persists, and in a large number of instances is the only survivor of the group by the time that it has come within a couple of days of the west limb. Groups conforming more or less closely to this general description I have termed in the Remarks "streams of normal type." It occasionally happens that spots classed together as a single group in one rotation may appear as two groups in the next; the small connecting spots having disappeared in the unseen hemisphere.

All cases have been excluded from the catalogue wherein there has been a clear unmistakable breach of continuity of action. It appears that about three-fourths of the recorded spot groups have been seen only during one rotation.

Of the 624 instances of recurring groups catalogued, 468 were seen only in two rotations, 118 appeared in three rotations, 25 in four rotations, 12 in five rotations, and in one instance only, and that somewhat doubtfully, did a spot group survive to be seen in a sixth apparition. Five months is the longest continuous life-history recorded for any group in the whole of the thirty-three years covered by the catalogue. It is evident, therefore, that a group of solar spots is essentially a short-lived phenomenon.

ANNIE S. D. MAUNDER.



CATALOGUE OF RECURRENT GROUPS OF SUN SPOTS, that is, of Groups observed continuously in two or more consecutive apparitions, for the Years 1874 to 1906. Compiled from the Ledgers of Areas and Positions of Groups of Sun Spots deduced from the Measurement of the Solar Photographs at the Royal Observatory, Greenwich.

In the following Table, the numeration of the Spot Groups and of the Rotations is taken from the volumes of Greenwich Observations.

The Columns "Longitude from Central Meridian" give, for the date on which each group was first seen and last seen, respectively, its heliographic longitude from the meridian passing through the centre of the Sun's disc at the moment of observation; longitude west of the centre being reckoned as positive.

The Mean Areas for Umbra and for Whole Spot are corrected for the effect of foreshortening and are expressed in millionths of the Sun's visible hemisphere.

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                         |
|-------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                  |
| 1                 | 91            | 276       | 1874. June 1  | -63.1                            | 1874. June 5  | -9.2                             | 4                         | 29            | 140         | 195.50                   | -6.94                   | One well-defined spot of regular shape.                                                                                          |
|                   | 97            | 277       | June 30       | -48.6                            | July 4        | +9.1                             | 4                         | 0             | 38          | 189.10                   | -8.74                   | One small faint spot, breaking up into a cluster of very small spots.<br>Note.—No photographs are available for June 6-7 and 28. |
| 2                 | 92*           | 276       | June 15       | +19.2                            | June 19       | +75.5                            | 2                         | 0             | 140         | 92.96                    | -10.20                  | Two spots.                                                                                                                       |
|                   | 100           | 277       | July 4        | -80.7                            | July 16       | +80.8                            | 10                        | 71            | 479         | 101.77                   | -10.54                  | One large regular spot.                                                                                                          |
|                   | 109           | 278       | Aug. 3        | -40.7                            | Aug. 11       | +66.2                            | 5                         | 17            | 61          | 104.29                   | -11.47                  | One small spot.<br>Note.—No photographs are available for Aug. 1 and 2.                                                          |
| 3                 | 98            | 277       | July 2        | -59.6                            | July 13       | +77.2                            | 9                         | 95            | 705         | 149.38                   | +10.66                  | Two small spots; afterwards larger, as two streams.                                                                              |
|                   | 106           | 278       | July 30       | -42.5                            | Aug. 8        | +74.9                            | 5                         | 88            | 561         | 152.69                   | +9.61                   | A fine stream of spots. Leader from Aug. 3 is a large regular spot.                                                              |
|                   | 117           | 279       | Aug. 24       | -73.1                            | Aug. 31       | +19.5                            | 7                         | 7             | 33          | 153.71                   | +11.26                  | One small spot.<br>Note.—No photographs are available for July 26-29.                                                            |
| 4                 | 104*          | 278       | July 16       | -36.8                            | July 25       | +80.4                            | 8                         | 100           | 594         | 346.97                   | +6.21                   | A very faint close cluster of small spots.                                                                                       |
|                   | 110           | 279       | Aug. 8        | -81.9                            | Aug. 20       | +82.9                            | 9                         | 70            | 458         | 358.24                   | +2.03                   | A large regular spot.                                                                                                            |
|                   | 119           | 280       | Sept. 4       | -78.0                            | Sept. 9       | -10.5                            | 3                         | 0             | 40          | 362.85                   | +1.62                   | One spot.                                                                                                                        |
| 5                 | 105           | 278       | July 23       | -76.4                            | Aug. 3        | +72.3                            | 6                         | 51            | 249         | 215.93                   | +6.57                   | One regular spot.                                                                                                                |
|                   | 116           | 279       | Aug. 19       | -73.1                            | Aug. 22       | -33.8                            | 4                         | 11            | 57          | 219.38                   | +6.25                   | One small spot.                                                                                                                  |
| 6                 | 115           | 279       | Aug. 19       | -60.8                            | Aug. 29       | +71.2                            | 10                        | 43            | 244         | 231.21                   | -15.15                  | Two spots close together.                                                                                                        |
|                   | 122           | 280       | Sept. 15      | -66.1                            | Sept. 22      | +25.4                            | 3                         | 0             | 24          | 229.90                   | -13.03                  | One small regular spot.                                                                                                          |
| 7                 | 118           | 279       | Aug. 29       | -8.9                             | Sept. 5       | +81.6                            | 6                         | 20            | 170         | 152.78                   | -7.49                   | A scattered group of faint spots.                                                                                                |
|                   | 124           | 280       | Sept. 22      | -44.8                            | Oct. 1        | +75.4                            | 8                         | 68            | 366         | 160.07                   | -8.60                   | One large regular spot.                                                                                                          |
|                   | 132           | 281       | Oct. 19       | -46.0                            | Oct. 23       | +6.6                             | 4                         | 23            | 105         | 161.22                   | -7.76                   | Single spot.<br>[16-18.<br>Note.—No photographs are available for Sept. 20 and 21, or for Oct.                                   |
| 8                 | 120           | 279       | Sept. 9       | +63.1                            | Sept. 10      | +71.4                            | 2                         | 0             | 52          | 75.65                    | +4.25                   | One small spot.                                                                                                                  |
|                   | 125           | 280       | Sept. 25      | -78.4                            | Sept. 30      | -10.5                            | 5                         | 4             | 31          | 87.37                    | +3.80                   | One small regular spot.                                                                                                          |
| 9                 | 121           | 279       | Sept. 9       | +29.6                            | Sept. 12      | +66.3                            | 3                         | 17            | 191         | 43.20                    | -14.03                  | A group of small spots forming a circle.                                                                                         |
|                   | 127           | 280       | Sept. 28      | -76.8                            | Oct. 10       | +74.6                            | 8                         | 129           | 984         | 44.13                    | -12.98                  | A close cluster composed of many spots.<br>Note.—No photograph is available for Sept. 13.                                        |
| 10                | 129           | 281       | Oct. 10       | +7.3                             | Oct. 15       | +77.9                            | 3                         | 32            | 158         | 335.97                   | -16.48                  | Three spots in a straight line.                                                                                                  |
|                   | 134           | 282       | Nov. 3        | -34.4                            | Nov. 12       | +78.4                            | 8                         | 81            | 519         | 333.80                   | -15.46                  | Two large spots.<br>Note.—No photographs are available for Oct. 30-Nov. 2.                                                       |
| 11                | 131           | 281       | Oct. 15       | -72.7                            | Oct. 23       | +35.3                            | 5                         | 26            | 106         | 188.41                   | +8.76                   | Single spot.                                                                                                                     |
|                   | 135           | 282       | Nov. 12       | -73.7                            | Nov. 23       | +82.1                            | 6                         | 52            | 321         | 184.02                   | +7.21                   | One spot, which extends later to a long irregular line. [greatly.                                                                |
|                   | 140           | 283       | Dec. 9        | -67.7                            | Dec. 18       | +51.3                            | 6                         | 31            | 248         | 185.76                   | +6.48                   | A very scattered group of four spots at first. The group alters<br>Note.—No photographs are available for Oct. 24-25, or Dec. 8. |
| 12                | 142*          | 284       | 1875. Jan. 22 | +37.1                            | 1875. Jan. 25 | +75.0                            | 2                         | 60            | 308         | 71.48                    | +5.88                   | Two large spots close together with a few small markings.                                                                        |
|                   | 144*          | 285       | Feb. 9        | -77.9                            | Feb. 11       | -51.5                            | 3                         | 12            | 56          | 84.37                    | +5.47                   | A regular spot.                                                                                                                  |
| 13                | 145           | 286       | Feb. 18       | -78.2                            | Mar. 2        | +74.2                            | 11                        | 134           | 648         | 320.57                   | +18.19                  | A very large spot, with two or three small ones near.                                                                            |
|                   | 151           | 287       | Mar. 17       | -80.3                            | Mar. 29       | +75.7                            | 13                        | 56            | 334         | 320.78                   | +18.16                  | One large spot.                                                                                                                  |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                      |
|-------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                               |
| 14                | 151*          | 286       | 1875. Mar. 20 | -5°2'                            | 1875. Mar. 26 | +81°5'                           | 7                         | 44            | 308         | 7°77'                    | -14°19'                 | Two large spots.                                                                                                                                                                                              |
|                   | 155           | 287       | Apr. 10       | -74°8'                           | Apr. 21       | +70°7'                           | 10                        | 58            | 361         | 10°30'                   | -13°80'                 | Two large spots very close together.                                                                                                                                                                          |
| 15                | 153*          | 287       | Apr. 5        | -5°3'                            | Apr. 9        | +45°6'                           | 5                         | 1             | 32          | 148°90'                  | +7°72'                  | One very small spot.                                                                                                                                                                                          |
|                   | 157           | 288       | Apr. 26       | -76°3'                           | May 7         | +72°3'                           | 11                        | 88            | 639         | 159°15'                  | +9°19'                  | One large spot with several small ones following it.                                                                                                                                                          |
|                   | 159           | 289       | May 24        | -62°8'                           | May 28        | -8°3'                            | 4                         | 2             | 27          | 163°00'                  | +8°18'                  | One small spot.<br>Note.—No photographs are available for April 11 and 12.                                                                                                                                    |
| 16                | 160           | 289       | June 1        | -59°3'                           | June 11       | +74°2'                           | 8                         | 62            | 423         | 61°28'                   | -10°19'                 | Two spots. The group greatly increases after June 2.                                                                                                                                                          |
|                   | 163           | 290       | June 27       | -72°8'                           | July 6        | +44°9'                           | 8                         | 17            | 103         | 62°94'                   | -10°08'                 | One spot at first, which breaks up into two on July 3.                                                                                                                                                        |
| 17                | 166           | 291       | July 26       | -68°5'                           | Aug. 5        | +69°9'                           | 9                         | 37            | 226         | 47°22'                   | +8°33'                  | Several small spots, close at first, scattered later.                                                                                                                                                         |
|                   | 168           | 292       | Aug. 21       | -81°0'                           | Aug. 31       | +50°3'                           | 11                        | 31            | 169         | 47°57'                   | +7°26'                  | One spot.<br>Note.—No photographs are available for Aug. 6-8.                                                                                                                                                 |
| 18                | 177           | 294       | Oct. 5        | +21°4'                           | Oct. 9        | +75°1'                           | 5                         | 7             | 48          | 276°76'                  | +11°84'                 | A scattered cluster of very small spots.                                                                                                                                                                      |
|                   | 180           | 295       | Oct. 25       | -65°9'                           | Nov. 3        | +55°7'                           | 8                         | 62            | 388         | 284°92'                  | +11°01'                 | One large spot.                                                                                                                                                                                               |
|                   | 185           | 296       | Nov. 20       | -82°8'                           | Nov. 27       | +4°3'                            | 6                         | 9             | 51          | 285°79'                  | +11°53'                 | Single spot.<br>Note.—No photographs are available for Oct. 22-24 or Nov. 4 and 5.                                                                                                                            |
| 19                | 182           | 295       | Nov. 18       | -37°6'                           | Nov. 27       | +81°2'                           | 8                         | 33            | 162         | 0°84'                    | -6°36'                  | A stream of spots.                                                                                                                                                                                            |
|                   | 187           | 296       | Dec. 14       | -44°1'                           | Dec. 14       | -44°1'                           | 1                         | 0             | 10          | 8°30'                    | -6°00'                  | One small spot.<br>Note.—No photographs are available for Dec. 9-13.                                                                                                                                          |
| 20                | 194           | 298       | 1876. Jan. 21 | +5°9'                            | 1876. Jan. 27 | +79°4'                           | 7                         | 24            | 153         | 274°46'                  | -15°21'                 | Scattered group of small spots. A change of shape on Jan. 24.                                                                                                                                                 |
|                   | 196           | 299       | Feb. 10       | -82°9'                           | Feb. 22       | +75°0'                           | 11                        | 91            | 557         | 285°77'                  | -13°18'                 | Single large spot.                                                                                                                                                                                            |
|                   | 199           | 300       | Mar. 9        | -75°5'                           | Mar. 18       | +44°2'                           | 9                         | 11            | 51          | 284°66'                  | -11°81'                 | Single spot.                                                                                                                                                                                                  |
| 21                | 211           | 304       | July 3        | +43°2'                           | July 4        | +57°6'                           | 2                         | 8             | 59          | 308°75'                  | -10°90'                 | Group of small spots.                                                                                                                                                                                         |
|                   | 217           | 305       | July 21       | -71°6'                           | July 31       | +53°2'                           | 9                         | 13            | 63          | 315°01'                  | -10°54'                 | Single spot. Note.—217 is intermittent, not being seen on July 29.<br>Note.—No photograph is available for July 30, but a number of small spots in a short stream are in the position of the spot on July 31. |
| 22                | 226           | 308       | Oct. 19       | -62°5'                           | Oct. 27       | +38°8'                           | 7                         | 31            | 196         | 216°31'                  | -12°76'                 | One large spot and two or three small ones.                                                                                                                                                                   |
|                   | 229           | 309       | Nov. 15       | -63°9'                           | Nov. 21       | +9°8'                            | 6                         | 38            | 152         | 219°04'                  | -11°07'                 | Two spots of nearly equal size.<br>Note.—No photographs are available for Oct. 28-30.                                                                                                                         |
| 23                | 231           | 310       | Dec. 18       | -69°1'                           | Dec. 29       | +75°7'                           | 8                         | 68            | 386         | 145°28'                  | +10°23'                 | Single spot.                                                                                                                                                                                                  |
|                   | 233           | 311       | 1877. Jan. 15 | -50°8'                           | 1877. Jan. 25 | +73°2'                           | 9                         | 31            | 241         | 147°03'                  | +11°07'                 | A regular spot, usually with small companions.<br>Note.—No photograph is available for Jan. 14.                                                                                                               |
| 24                | 232           | 311       | Jan. 10       | -75°7'                           | Jan. 22       | +81°5'                           | 10                        | 40            | 220         | 194°75'                  | +9°11'                  | One regular spot, usually with a small companion.                                                                                                                                                             |
|                   | 235           | 312       | Feb. 7        | -62°0'                           | Feb. 17       | +70°7'                           | 5                         | 26            | 131         | 195°30'                  | +9°08'                  | A well-defined, regular, diminishing spot.                                                                                                                                                                    |
| 25                | 238           | 313       | Mar. 17       | +11°6'                           | Mar. 22       | +81°1'                           | 5                         | 33            | 193         | 129°43'                  | -11°23'                 | A scattered ill-defined group condensing into two well-defined spots.                                                                                                                                         |
|                   | 239           | 314       | Apr. 6        | -79°9'                           | Apr. 7        | -67°0'                           | 2                         | 6             | 49          | 132°60'                  | -12°75'                 | One small well-defined spot.                                                                                                                                                                                  |
| 26                | 240           | 314       | Apr. 16       | +18°9'                           | Apr. 20       | +75°5'                           | 4                         | 59            | 333         | 103°98'                  | -14°60'                 | A group of three spots, of which the smallest gradually disappears.                                                                                                                                           |
|                   | 245           | 315       | May 7         | -60°2'                           | May 11        | -5°1'                            | 5                         | 23            | 96          | 103°64'                  | -14°10'                 | A single well-defined spot.<br>Note.—No photograph is available for May 6.                                                                                                                                    |
| 27                | 261           | 322       | Oct. 26       | -78°8'                           | Nov. 7        | +77°2'                           | 9                         | 100           | 611         | 334°87'                  | -8°12'                  | A large well-defined spot, with small companions.                                                                                                                                                             |
|                   | 264           | 323       | Nov. 22       | -77°8'                           | Dec. 3        | +61°0'                           | 11                        | 61            | 352         | 335°11'                  | -10°31'                 | A well-defined spot, with close companions.                                                                                                                                                                   |
|                   | 264*          | 324       | Dec. 21       | -62°0'                           | Dec. 21       | -62°0'                           | 1                         | 0             | 37          | 334°60'                  | -12°70'                 | A small spot.<br>Note.—No photographs are available for Dec. 4, 19 or 20.                                                                                                                                     |
| 28                | 286           | 346       | 1879. Aug. 28 | -54°3'                           | 1879. Sept. 7 | (+76°5)                          | 9                         | 31            | 155         | 142°42'                  | +28°50'                 | A regular spot, followed by a short train.                                                                                                                                                                    |
|                   | 287           | 347       | Sept. 24      | -68°3'                           | Sept. 27      | -29°2'                           | 4                         | 17            | 54          | 128°38'                  | +29°55'                 | A regular spot.                                                                                                                                                                                               |
| 29                | 291           | 348       | Oct. 16       | -4°8'                            | Oct. 21       | +64°8'                           | 6                         | 56            | 284         | 262°75'                  | -22°67'                 | Two very small spots developing to form a fine stream.                                                                                                                                                        |
|                   | 295           | 349       | Nov. 7        | -67°0'                           | Nov. 18       | +74°8'                           | 12                        | 40            | 226         | 267°12'                  | -22°16'                 | A fine stream chiefly of three regular spots.<br>Note.—No photographs are available for Oct. 22, or Nov. 4-5.                                                                                                 |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                  |
|------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                           |
| 30               | 301           | 351       | 1880. Jan. 3  | -65°3                            | 1880. Jan. 14 | +78°5                            | 11                        | 54            | 285         | 240°77                   | +19°39                  | A small spot, increasing as it approaches the C.M.                                                                                                                                        |
|                  | 308           | 352       | Jan. 30       | -75°1                            | Feb. 11       | +76°3                            | 12                        | 65            | 311         | 232°64                   | +20°22                  | A large spot, with small companions.                                                                                                                                                      |
| 31               | 301A          | 351       | Jan. 4        | -73°1                            | Jan. 7        | -26°7                            | 4                         | 16            | 75          | 228°55                   | -18°18                  | A regular spot, followed by some small companions.                                                                                                                                        |
|                  | 302           | 351       | Jan. 12       | +41°3                            | Jan. 15       | +77°4                            | 4                         | 67            | 317         | 228°05                   | -16°58                  | Two small spots, with a few small faint markings near.                                                                                                                                    |
|                  | 309           | 352       | Jan. 30       | -75°8                            | Feb. 10       | +63°9                            | 11                        | 29            | 139         | 233°44                   | -15°36                  | A regular spot, undergoing little or no change. [days' quiescence. Note.—302 is a revival of 301A, in the same apparition after 4                                                         |
| 32               | 314           | 353       | Mar. 8        | -9°5                             | Mar. 14       | +73°1                            | 7                         | 31            | 159         | 166°21                   | +20°16                  | A regular spot, with distant followers.                                                                                                                                                   |
|                  | 317           | 354       | Mar. 30       | -68°2                            | Apr. 9        | +64°5                            | 9                         | 33            | 161         | 173°80                   | +18°28                  | A large regular spot. Small companions are seen on Apr. 3-6.                                                                                                                              |
|                  | 320           | 355       | Apr. 25       | -74°9                            | May 5         | +62°2                            | 11                        | 90            | 450         | 186°05                   | +20°89                  | A number of spots mostly small, in a long straight stream.                                                                                                                                |
| 33               | 321           | 355       | May 2         | -74°2                            | May 14        | +83°6                            | 13                        | 83            | 447         | 88°99                    | +25°95                  | A large spot, with much smaller companions.                                                                                                                                               |
|                  | 327           | 356       | May 30        | -71°0                            | June 4        | -1°8                             | 6                         | 14            | 54          | 84°02                    | +24°37                  | A regular spot, with a small companion on May 31 and June 1.                                                                                                                              |
| 34               | 342           | 359       | Aug. 2        | -64°8                            | Aug. 13       | +84°8                            | 12                        | 120           | 595         | 323°47                   | +11°93                  | A large regular spot, followed by small stragglers.                                                                                                                                       |
|                  | 351           | 360       | Aug. 28       | -75°4                            | Sept. 8       | +70°2                            | 12                        | 26            | 116         | 327°31                   | +10°18                  | A regular spot.                                                                                                                                                                           |
| 35               | 343           | 359       | Aug. 7        | -89°3                            | Aug. 20       | +82°6                            | 12                        | 56            | 273         | 234°97                   | +24°56                  | A large regular spot.                                                                                                                                                                     |
|                  | 354           | 360       | Sept. 4       | -80°7                            | Sept. 13      | +40°2                            | 10                        | 29            | 108         | 230°38                   | +25°07                  | A regular spot, with two small companions after Sept. 10.                                                                                                                                 |
| 36               | 344           | 359       | Aug. 9        | -66°8                            | Aug. 20       | +76°8                            | 10                        | 24            | 113         | 226°16                   | -16°63                  | A large regular spot.                                                                                                                                                                     |
|                  | 355           | 360       | Sept. 5       | -65°4                            | Sept. 15      | +74°5                            | 11                        | 140           | 615         | 239°04                   | -17°80                  | A number of spots in a straight stream, rapidly increasing.                                                                                                                               |
| 37               | 346           | 359       | Aug. 9        | -75°5                            | Aug. 20       | +59°5                            | 10                        | 27            | 146         | 213°94                   | -19°00                  | A regular spot, followed by a long straight stream after Aug. 13.                                                                                                                         |
|                  | 357           | 360       | Sept. 7       | -55°1                            | Sept. 16      | +74°1                            | 10                        | 171           | 699         | 220°35                   | -16°82                  | A small spot on Sept. 7, which rapidly increases to a large stream.                                                                                                                       |
|                  | 374           | 361       | Oct. 3        | -64°1                            | Oct. 14       | +82°2                            | 12                        | 6             | 36          | 226°69                   | -15°85                  | A few small unstable spots. Not seen on Oct. 10.                                                                                                                                          |
|                  | (385)         | 362       | Oct. 31       | -44°3                            | Nov. 5        | +18°9                            | 6                         | 14            | 61          | 235°28                   | -17°00                  | A small spot, followed by a scattered stream. Note.—385 is probably only a revival of 374, and 357 possibly only a revival of 346. 374 is itself intermittent, not being seen on Oct. 10. |
| 38               | 347           | 359       | Aug. 16       | +46°9                            | Aug. 18       | +79°7                            | 3                         | 20            | 89          | 255°47                   | +20°63                  | A small regular spot, with companion on Aug. 16.                                                                                                                                          |
|                  | 353           | 360       | Sept. 2       | -77°0                            | Sept. 6       | -26°9                            | 5                         | 5             | 21          | 258°88                   | +18°50                  | One small spot.                                                                                                                                                                           |
| 39               | 348           | 359       | Aug. 18       | +9°2                             | Aug. 24       | +82°9                            | 7                         | 83            | 462         | 187°37                   | +22°46                  | A stream of small spots, whose leader becomes large and composite.                                                                                                                        |
|                  | 359           | 360       | Sept. 7       | -78°2                            | Sept. 18      | +64°6                            | 12                        | 64            | 234         | 189°67                   | +22°11                  | A large regular spot, frequently with one or two companions.                                                                                                                              |
|                  | 375           | 361       | Oct. 6        | -65°4                            | Oct. 12       | +17°6                            | 7                         | 11            | 48          | 184°60                   | +22°57                  | A small regular spot, becoming a straggling stream.                                                                                                                                       |
| 40               | 349           | 359       | Aug. 21       | -63°4                            | Sept. 2       | +85°4                            | 13                        | 21            | 139         | 66°81                    | +22°34                  | One or two small spots, not visible on Aug. 22, 25, 26 or 27.                                                                                                                             |
|                  | 364           | 360       | Sept. 18      | -60°8                            | Sept. 27      | +63°7                            | 9                         | 14            | 79          | 64°61                    | +19°34                  | A number of small unstable spots in a straggling stream.                                                                                                                                  |
|                  | 381           | 361       | Oct. 14       | -81°5                            | Oct. 25       | +64°8                            | 11                        | 18            | 70          | 63°35                    | +21°22                  | A regular spot. Sometimes with small companions. [after Nov. 15.                                                                                                                          |
|                  | 392           | 362       | Nov. 13       | -54°6                            | Nov. 23       | +79°3                            | 10                        | 60            | 268         | 56°02                    | +21°94                  | Two spots, which become one very large irregular spot, breaking up Note.—349 is intermittent, not being seen on Aug. 22, 25, 26 or 27. 392 is possibly only a revival of 381.             |
| 41               | 367           | 361       | Sept. 25      | -41°0                            | Oct. 4        | +75°5                            | 10                        | 83            | 442         | 354°72                   | -20°12                  | [cluster, then as a stream. A faint spot, not seen on Sept. 26. Reappearing first as a close                                                                                              |
|                  | 382A          | 362       | Oct. 19       | -81°2                            | Oct. 29       | +54°6                            | 10                        | 53            | 299         | 358°54                   | -21°03                  | A large composite spot, with companions, forming an irregular stream. Note.—367 is intermittent, not being seen on Sept. 26.                                                              |
| 42               | 370           | 361       | Sept. 26      | -62°6                            | Oct. 6        | +76°2                            | 11                        | 73            | 345         | 323°65                   | +16°43                  | A close cluster, becoming a stream with large regular leader.                                                                                                                             |
|                  | 3820          | 362       | Oct. 22       | -71°7                            | Oct. 24       | -45°1                            | 3                         | 3             | 25          | 327°50                   | +15°97                  | A small spot.                                                                                                                                                                             |
| 43               | 397           | 363       | Nov. 24       | -71°4                            | Dec. 4        | +62°9                            | 10                        | 175           | 920         | 254°06                   | +20°68                  | A very fine stream, including two large composite spots.                                                                                                                                  |
|                  | 403           | 364       | Dec. 21       | -74°6                            | Jan. 1        | +67°4                            | 11                        | 55            | 278         | 250°03                   | +20°62                  | A large regular spot.                                                                                                                                                                     |
| 44               | 408           | 365       | 1881. Jan. 17 | +16°5                            | 1881. Jan. 22 | +77°5                            | 6                         | 82            | 413         | 349°18                   | +18°62                  | A stream of spots of normal type.                                                                                                                                                         |
|                  | 419           | 366       | Feb. 6        | -75°9                            | Feb. 17       | +68°5                            | 12                        | 65            | 256         | 354°00                   | +15°92                  | A large regular spot, with a small companion on Feb. 8.                                                                                                                                   |
| 45               | 410D          | 365       | Jan. 23       | -23°5                            | Jan. 30       | +75°8                            | 8                         | 144           | 528         | 235°63                   | -18°56                  | A small pair on Jan. 23, expanding into a fine stream of normal type.                                                                                                                     |
|                  | 424           | 366       | Feb. 14       | -81°0                            | Feb. 27       | +82°6                            | 14                        | 60            | 255         | 240°12                   | -20°28                  | A large regular spot.                                                                                                                                                                     |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.   |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                |
|-------------------|---------------|-----------|---------------|----------------------------------|--------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.        | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                         |
| 46                | 412           | 365       | 1881. Jan. 29 | -11°1'                           | 1881. Feb. 4 | +71°3'                           | 6                         | 117           | 418         | 165°77'                  | -13°04'                 | Two clusters, each very compact and composed of irregular spots. A regular spot, with a small companion on Feb. 23.                                                                                     |
|                   | 426           | 366       | Feb. 20       | -70°1'                           | Feb. 27      | +19°5'                           | 8                         | 19            | 69          | 174°76'                  | -14°89'                 |                                                                                                                                                                                                         |
| 47                | 416           | 365       | Feb. 5        | +32°2'                           | Feb. 8       | +74°2'                           | 4                         | 70            | 184         | 114°65'                  | +21°58'                 | A small faint spot on Feb. 5, rapidly increasing in size after Feb. 6. A regular spot, with several small faint attendants.                                                                             |
|                   | 427           | 366       | Feb. 24       | -74°1'                           | Mar. 1       | -11°0'                           | 6                         | 22            | 61          | 116°72'                  | +22°28'                 |                                                                                                                                                                                                         |
| 48                | 418           | 365       | Feb. 9        | +5°2'                            | Feb. 12      | +49°4'                           | 4                         | 12            | 30          | 35°53'                   | +20°83'                 | A few very small faint spots. Only the leader remains on Feb. 11. A regular spot. Note.—Possibly only a revival, as 418 is not seen close to the W. limb.                                               |
|                   | 428           | 366       | Mar. 3        | -62°4'                           | Mar. 10      | +28°3'                           | 8                         | 16            | 44          | 37°28'                   | +20°38'                 |                                                                                                                                                                                                         |
| 49                | 424A          | 366       | Feb. 16       | +39°8'                           | Feb. 19      | +76°9'                           | 4                         | 40            | 97          | 335°98'                  | -20°63'                 | A few unstable spots in a short irregular stream. A small faint spot. A large regular spot, with distant followers. [of 3 days. Note.—435 is a revival of 429 in the same apparition after a quiescence |
|                   | 429           | 367       | Mar. 7        | -74°6'                           | Mar. 8       | -60°8'                           | 2                         | 0             | 8           | 330°80'                  | -17°95'                 |                                                                                                                                                                                                         |
|                   | 435           | 367       | Mar. 12       | -11°2'                           | Mar. 18      | +74°4'                           | 7                         | 50            | 241         | 331°13'                  | -18°36'                 |                                                                                                                                                                                                         |
|                   |               |           |               |                                  |              |                                  |                           |               |             |                          |                         |                                                                                                                                                                                                         |
| 50                | 433           | 367       | Mar. 9        | -44°3'                           | Mar. 17      | +70°5'                           | 9                         | 79            | 354         | 340°06'                  | +21°51'                 | A straight stream of normal type greatly inclined to equator. A regular spot. [diminish.                                                                                                                |
|                   | 451           | 368       | Apr. 3        | -73°5'                           | Apr. 13      | +55°3'                           | 11                        | 15            | 63          | 335°62'                  | +22°16'                 |                                                                                                                                                                                                         |
| 51                | 436           | 367       | Mar. 12       | -75°0'                           | Mar. 23      | +74°0'                           | 12                        | 86            | 432         | 267°39'                  | -16°30'                 | A compact cluster, of which the leader increases and the followers A large regular spot. A regular spot, with two companions on May 9.                                                                  |
|                   | 453           | 368       | Apr. 7        | -86°3'                           | Apr. 19      | +69°3'                           | 13                        | 35            | 198         | 271°09'                  | -14°61'                 |                                                                                                                                                                                                         |
|                   | 471           | 369       | May 5         | -75°2'                           | May 10       | -13°4'                           | 6                         | 17            | 57          | 269°65'                  | -15°00'                 |                                                                                                                                                                                                         |
| 52                | 439           | 367       | Mar. 19       | -21°1'                           | Mar. 27      | +76°1'                           | 9                         | 123           | 560         | 223°72'                  | +14°01'                 | Two spots, becoming a large double spot, which breaks up. A cluster of small spots.                                                                                                                     |
|                   | 456           | 368       | Apr. 12       | -72°9'                           | Apr. 16      | -21°1'                           | 5                         | 12            | 49          | 219°44'                  | +13°70'                 |                                                                                                                                                                                                         |
| 53                | 446           | 367       | Apr. 1        | +53°8'                           | Apr. 1       | +53°8'                           | 1                         | 0             | 11          | 130°00'                  | -25°00'                 | A small faint spot. A small spot.                                                                                                                                                                       |
|                   | 463           | 368       | Apr. 18       | -79°2'                           | Apr. 19      | -69°8'                           | 2                         | 5             | 27          | 131°35'                  | -26°40'                 |                                                                                                                                                                                                         |
| 54                | 461           | 368       | Apr. 18       | -63°7'                           | Apr. 29      | +78°7'                           | 11                        | 65            | 307         | 150°33'                  | +7°38'                  | A large regular spot, becoming a stream of normal type. A small spot. [represents the leader spot of 461. Note.—Possibly 474 is a new disturbance, but more probably it                                 |
|                   | 474           | 369       | May 13        | -75°3'                           | May 16       | -35°5'                           | 4                         | 6             | 21          | 167°15'                  | +6°25'                  |                                                                                                                                                                                                         |
| 55                | 477           | 369       | May 19        | +12°8'                           | May 24       | +73°4'                           | 6                         | 20            | 74          | 174°65'                  | -30°55'                 | A scattered group of small spots undergoing continual change. A straggling stream of small spots.                                                                                                       |
|                   | 490           | 370       | June 10       | -57°7'                           | June 15      | +7°6'                            | 5                         | 8             | 64          | 173°15'                  | -29°05'                 |                                                                                                                                                                                                         |
| 56                | 481           | 369       | May 22        | -37°1'                           | May 30       | +76°0'                           | 9                         | 46            | 226         | 90°04'                   | -27°62'                 | Two regular spots, with companion. A small regular spot.                                                                                                                                                |
|                   | 496           | 370       | June 15       | -83°2'                           | June 25      | +47°2'                           | 10                        | 16            | 89          | 83°75'                   | -26°79'                 |                                                                                                                                                                                                         |
| 57                | 485           | 370       | May 27        | -76°7'                           | June 6       | +60°0'                           | 11                        | 135           | 635         | 341°00'                  | -9°74'                  | A very fine stream, whose rear spot is very large. Two small spots; the following disappears by June 25. Note.—No photograph is available for June 7.                                                   |
|                   | 500           | 371       | June 23       | -69°7'                           | June 25      | -40°7'                           | 3                         | 3             | 38          | 351°73'                  | -9°67'                  |                                                                                                                                                                                                         |
| 58                | 487           | 370       | May 31        | -74°3'                           | June 11      | +66°2'                           | 11                        | 31            | 133         | 288°00'                  | +22°29'                 | Two spots, which become two compact clusters. A regular spot, with two or three short-lived companions.                                                                                                 |
|                   | 506           | 371       | June 28       | -68°5'                           | July 7       | +43°9'                           | 10                        | 19            | 101         | 282°11'                  | +23°77'                 |                                                                                                                                                                                                         |
| 59                | 495           | 370       | June 14       | -40°2'                           | June 23      | +81°7'                           | 9                         | 17            | 59          | 140°81'                  | -19°06'                 | One or two small spots, not seen on June 22. Two large spots, which soon coalesce. Note.—495 is intermittent, not being seen on June 22.                                                                |
|                   | 516           | 371       | July 9        | -64°2'                           | July 19      | +68°9'                           | 10                        | 62            | 333         | 142°24'                  | -19°55'                 |                                                                                                                                                                                                         |
| (59*)             | 514           | 371       | July 7        | -0°1'                            | July 11      | +60°5'                           | 3                         | 11            | 35          | 237°84'                  | +15°30'                 | Three or four small spots; only one remains on July 11. A small spot, followed on July 29 by another similar spot.                                                                                      |
|                   | 533           | 372       | July 28       | -69°6'                           | July 30      | -42°4'                           | 3                         | 5             | 21          | 245°37'                  | +18°17'                 |                                                                                                                                                                                                         |
| 60                | 515           | 371       | July 4        | -73°8'                           | July 15      | +78°4'                           | 10                        | 42            | 225         | 203°27'                  | +14°82'                 | A large regular spot, with large proper motion, followed by a large A small spot. [composite spot.                                                                                                      |
|                   | 537           | 372       | Aug. 1        | -64°9'                           | Aug. 2       | -50°9'                           | 2                         | 0             | 21          | 197°35'                  | +15°35'                 |                                                                                                                                                                                                         |
| 61                | 526           | 372       | July 23       | -76°2'                           | Aug. 4       | +81°7'                           | 12                        | 97            | 446         | 306°83'                  | +27°12'                 | A large regular spot, crossed by a fine bridge. A large regular spot, frequently attended by small spots.                                                                                               |
|                   | 549           | 373       | Aug. 20       | -74°5'                           | Sept. 1      | +77°6'                           | 11                        | 42            | 209         | 293°38'                  | +28°43'                 |                                                                                                                                                                                                         |
| 62                | 528           | 372       | July 24       | -64°0'                           | Aug. 2       | +51°7'                           | 9                         | 52            | 228         | 300°59'                  | -15°40'                 | A cluster of small spots. A small spot.                                                                                                                                                                 |
|                   | 548           | 373       | Aug. 20       | -64°6'                           | Aug. 20      | -64°6'                           | 1                         | 0             | 11          | 305°20'                  | -14°00'                 |                                                                                                                                                                                                         |
| 63                | 538           | 372       | Aug. 1        | -81°9'                           | Aug. 13      | +74°0'                           | 12                        | 48            | 272         | 180°32'                  | +12°93'                 | A large regular spot. A small spot.                                                                                                                                                                     |
|                   | 560           | 373       | Aug. 30       | -61°0'                           | Sept. 1      | -36°4'                           | 2                         | 7             | 37          | 176°77'                  | +13°47'                 |                                                                                                                                                                                                         |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                         |
|-------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|----------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                  |
| 64                | 552           | 373       | 1881. Aug. 23 | -65°7'                           | 1881. Sept. 3 | +75°4'                           | 10                        | 49            | 329         | 266°29'                  | +14°83'                 | A large composite spot, with small companions.                                   |
|                   | 574           | 374       | Sept. 19      | -73°7'                           | Sept. 28      | +46°9'                           | 10                        | 11            | 37          | 263°47'                  | +14°59'                 | A regular spot.                                                                  |
| 65                | 553           | 373       | Aug. 23       | -69°7'                           | Sept. 3       | +71°9'                           | 10                        | 76            | 346         | 263°30'                  | +20°43'                 | A large regular spot. A considerable spot forms behind it on Aug. 26.            |
|                   | 575           | 374       | Sept. 19      | -80°0'                           | Oct. 1        | +78°5'                           | 13                        | 45            | 235         | 257°30'                  | +20°76'                 | A large regular spot.                                                            |
|                   | 591           | 375       | Oct. 16       | -78°6'                           | Oct. 26       | +55°7'                           | 11                        | 22            | 112         | 262°15'                  | +21°02'                 | A large regular spot, frequently with some small companions.                     |
| 66                | 561           | 373       | Aug. 29       | -76°7'                           | Sept. 9       | +70°3'                           | 10                        | 92            | 467         | 179°08'                  | -25°22'                 | A large composite spot, followed by small spots.                                 |
|                   | 577           | 374       | Sept. 26      | -67°7'                           | Oct. 1        | -4°9'                            | 6                         | 4             | 14          | 173°08'                  | -25°10'                 | A small regular spot.                                                            |
| 67                | 566           | 373       | Sept. 6       | -46°9'                           | Sept. 15      | +76°9'                           | 10                        | 99            | 519         | 100°72'                  | +13°57'                 | A small regular spot, developing into a fine stream, with large leader.          |
|                   | 582           | 374       | Oct. 1        | -75°1'                           | Oct. 5        | -22°9'                           | 5                         | 7             | 18          | 102°48'                  | +12°02'                 | A single spot.                                                                   |
| 68                | 572           | 374       | Sept. 12      | -80°4'                           | Sept. 24      | +76°4'                           | 13                        | 64            | 361         | 346°62'                  | +22°86'                 | Two large regular spots, which coalesce.                                         |
|                   | 588           | 375       | Oct. 10       | -77°8'                           | Oct. 14       | -27°1'                           | 5                         | 5             | 71          | 340°00'                  | +24°54'                 | A group, steadily diminishing in size.                                           |
| 69                | 581           | 374       | Oct. 1        | -49°0'                           | Oct. 10       | +69°8'                           | 10                        | 26            | 183         | 128°72'                  | -20°16'                 | A cluster of small spots, increasing rapidly.                                    |
|                   | 595           | 375       | Oct. 26       | -73°8'                           | Oct. 29       | -33°7'                           | 4                         | 7             | 33          | 133°35'                  | -19°25'                 | A small spot.                                                                    |
| 70                | 583           | 374       | Oct. 2        | +58°7'                           | Oct. 4        | +79°6'                           | 3                         | 22            | 84          | 218°47'                  | +19°93'                 | A cluster of small spots.                                                        |
|                   | 593           | 375       | Oct. 20       | -70°9'                           | Oct. 26       | +2°5'                            | 7                         | 5             | 38          | 212°01'                  | +20°83'                 | A few small unstable spots in a scattered stream.                                |
| 71                | 586           | 374       | Oct. 6        | -74°4'                           | Oct. 17       | +74°7'                           | 12                        | 55            | 305         | 38°78'                   | +13°99'                 | A large regular spot, usually with a few companions.                             |
|                   | 598           | 375       | Nov. 2        | -76°1'                           | Nov. 13       | +74°3'                           | 12                        | 21            | 101         | 41°45'                   | +14°28'                 | A regular spot.                                                                  |
| 72                | 589           | 375       | Oct. 14       | -75°8'                           | Oct. 26       | +82°3'                           | 13                        | 63            | 357         | 289°13'                  | +15°97'                 | A large spot.                                                                    |
|                   | 603           | 376       | Nov. 11       | -71°1'                           | Nov. 22       | +73°7'                           | 12                        | 94            | 432         | 288°81'                  | +15°98'                 | A large regular spot, with unstable and variable companions.                     |
|                   | 625           | 377       | Dec. 9        | -66°1'                           | Dec. 16       | +25°5'                           | 8                         | 8             | 37          | 282°00'                  | +16°53'                 | A single spot.                                                                   |
| 73                | 594           | 375       | Oct. 22       | -10°8'                           | Oct. 29       | +82°7'                           | 8                         | 31            | 199         | 248°96'                  | +20°63'                 | A large spot, preceded by a few spots in a short stream.                         |
|                   | 605           | 376       | Nov. 13       | -76°4'                           | Nov. 18       | -12°3'                           | 6                         | 8             | 46          | 251°20'                  | +23°15'                 | A regular spot, with a few very small attendants.                                |
| 74                | 606           | 376       | Nov. 15       | -80°3'                           | Nov. 26       | +76°4'                           | 12                        | 45            | 256         | 233°25'                  | +17°38'                 | Small spots, becoming a straight stream with large leader.                       |
|                   | 628           | 377       | Dec. 12       | -72°8'                           | Dec. 22       | +61°1'                           | 11                        | 22            | 91          | 238°34'                  | +16°36'                 | A regular spot.                                                                  |
| 75                | 607           | 376       | Nov. 15       | -76°3'                           | Nov. 27       | +75°8'                           | 13                        | 152           | 764         | 221°32'                  | +10°88'                 | Spots, becoming a straight stream of normal type.                                |
|                   | 629           | 377       | Dec. 13       | -75°5'                           | Dec. 19       | +9°4'                            | 7                         | 14            | 99          | 221°86'                  | +11°61'                 | A number of unstable spots, undergoing frequent and great changes.               |
| 76                | 618           | 376       | Dec. 2        | +50°0'                           | Dec. 4        | +74°7'                           | 3                         | 58            | 375         | 130°13'                  | -19°33'                 | Two spots.                                                                       |
|                   | 630           | 377       | Dec. 20       | -67°5'                           | Dec. 22       | -45°6'                           | 3                         | 3             | 29          | 132°53'                  | -20°00'                 | Two small spots.                                                                 |
| 77                | 627           | 377       | Dec. 11       | -74°5'                           | Dec. 23       | +78°4'                           | 13                        | 78            | 418         | 246°57'                  | +27°53'                 | A large regular spot, followed by a stream of small spots.                       |
|                   | 645           | 378       | 1882. Jan. 8  | -77°6'                           | 1882. Jan. 9  | -61°8'                           | 2                         | 10            | 49          | 236°90'                  | +28°20'                 | One or two small spots.                                                          |
| 78                | 638           | 377       | 1881. Dec. 31 | -39°7'                           | 1882. Jan. 8  | +67°2'                           | 9                         | 31            | 155         | 20°69'                   | +15°54'                 | An irregular cluster of many very small spots, fluctuating in size.              |
|                   | 657           | 378       | 1882. Jan. 25 | -67°4'                           | 1882. Jan. 29 | -12°9'                           | 5                         | 4             | 17          | 24°66'                   | +17°22'                 | A small spot.                                                                    |
|                   | 642           | 377       | 1882. Jan. 5  | +14°5'                           | 1882. Jan. 9  | +74°9'                           | 5                         | 37            | 188         | 11°24'                   | +16°88'                 | A straight stream, whose leader rapidly increases, and the followers [disappear. |
| 79                | 658           | 378       | Jan. 25       | -72°0'                           | Feb. 5        | +72°6'                           | 10                        | 38            | 272         | 18°67'                   | +16°10'                 | A regular spot. Small companions on Jan. 27.                                     |
|                   | 648           | 378       | Jan. 13       | -8°6'                            | Jan. 20       | +80°6'                           | 8                         | 26            | 164         | 237°88'                  | +14°51'                 | A variable double spot, of which one portion increases greatly.                  |
| 80                | 667           | 379       | Feb. 4        | -78°1'                           | Feb. 10       | +5°8'                            | 6                         | 1             | 20          | 241°77'                  | +14°18'                 | One spot, which slowly diminishes.                                               |
|                   | 653           | 378       | Jan. 19       | -71°4'                           | Jan. 29       | +59°4'                           | 11                        | 27            | 155         | 97°75'                   | -17°40'                 | Small regular spot.                                                              |
| 81                | 677           | 379       | Feb. 15       | -66°3'                           | Feb. 25       | +59°3'                           | 10                        | 18            | 83          | 102°30'                  | -17°82'                 | An irregular spot, with several small spots near it.                             |
|                   |               |           |               |                                  |               |                                  |                           |               |             |                          |                         | Note.—No photographs are available for Jan. 30 and 31.                           |
| 82                | 664           | 379       | Feb. 2        | -63°1'                           | Feb. 12       | +86°2'                           | 10                        | 40            | 337         | 286°05'                  | -13°65'                 | Very small spot on E. limb. Afterwards a large spot with train.                  |
|                   | 687           | 380       | Feb. 27       | -80°7'                           | Mar. 11       | +74°6'                           | 13                        | 62            | 327         | 294°47'                  | -12°86'                 | Regular spot, with occasional variable companions.                               |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number.                                                                                                         | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                       |
|---------------------------------------------------------------------------------------------------------------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|--------------------------------------------------------------------------------|
|                                                                                                                           |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                |
|                                                                                                                           |               |           |                  |                                  |                  |                                  |                           |               |             |                          |                         |                                                                                |
| 83                                                                                                                        | 670           | 379       | 1882.<br>Feb. 10 | -66°8                            | 1882.<br>Feb. 20 | +68°2                            | 11                        | 69            | 338         | 171°97                   | +10°74                  | Fine group of 3 clusters in a line. Middle cluster disappears by Feb. 15.      |
|                                                                                                                           | 695           | 380       | Mar. 8           | -78°6                            | Mar. 17          | +53°6                            | 10                        | 19            | 82          | 185°10                   | +9°39                   |                                                                                |
| 84                                                                                                                        | 672           | 379       | Feb. 12          | -76°4                            | Feb. 24          | +81°7                            | 12                        | 43            | 234         | 136°72                   | -18°79                  | A small regular spot, with small followers which disappear after C.M.          |
|                                                                                                                           | 699           | 380       | Mar. 11          | -82°2                            | Mar. 22          | +63°2                            | 12                        | 24            | 151         | 134°77                   | -18°33                  |                                                                                |
| 85                                                                                                                        | 676           | 379       | Feb. 14          | +28°0                            | Feb. 18          | +79°6                            | 5                         | 43            | 187         | 213°50                   | +1°92                   | Two small spots, developing into an irregular stream.                          |
|                                                                                                                           | 691           | 380       | Mar. 5           | -77°1                            | Mar. 16          | +73°6                            | 12                        | 62            | 271         | 221°78                   | -0°48                   |                                                                                |
|                                                                                                                           | 718           | 381       | Apr. 1           | -74°7                            | Apr. 13          | +81°3                            | 13                        | 27            | 147         | 224°81                   | +1°17                   |                                                                                |
| 86                                                                                                                        | 693           | 380       | Mar. 8           | +10°2                            | Mar. 12          | +65°3                            | 5                         | 22            | 114         | 268°32                   | +23°34                  | A straight stream of small spots. The leading spot increases.                  |
|                                                                                                                           | 713           | 381       | Mar. 29          | -72°8                            | Apr. 5           | +22°5                            | 8                         | 14            | 65          | 267°14                   | +25°38                  |                                                                                |
| 87                                                                                                                        | 697           | 380       | Mar. 10          | +11°9                            | Mar. 15          | +81°4                            | 6                         | 52            | 267         | 244°97                   | -15°85                  | Two straight streams, becoming a stream of normal type.                        |
|                                                                                                                           | 715           | 381       | Mar. 30          | -73°6                            | Apr. 4           | -5°7                             | 6                         | 5             | 22          | 252°25                   | -14°33                  |                                                                                |
| 88                                                                                                                        | 702           | 380       | Mar. 15          | -84°1                            | Mar. 28          | +80°6                            | 14                        | 87            | 434         | 74°90                    | -22°13                  | A large regular spot, with close small followers. One of these [becomes large. |
|                                                                                                                           | 732           | 381       | Apr. 14          | -53°7                            | Apr. 18          | -0°5                             | 5                         | 5             | 31          | 72°40                    | -21°70                  |                                                                                |
| 89                                                                                                                        | 704           | 380       | Mar. 20          | +57°7                            | Mar. 21          | +70°5                            | 2                         | 48            | 188         | 154°00                   | +21°20                  | Two spots, with two or three small markings near them.                         |
|                                                                                                                           | 722           | 381       | Apr. 6           | -68°3                            | Apr. 17          | +75°2                            | 12                        | 32            | 178         | 160°78                   | +20°78                  |                                                                                |
|                                                                                                                           | 749           | 382       | May 3            | -78°1                            | May 14           | +64°7                            | 12                        | 37            | 181         | 155°95                   | +20°91                  |                                                                                |
| 90                                                                                                                        | 705           | 380       | Mar. 21          | -81°6                            | Apr. 2           | +80°4                            | 13                        | 74            | 377         | 3°15                     | -10°25                  | A large regular spot, with some small companions.                              |
|                                                                                                                           | 735           | 381       | Apr. 17          | -80°7                            | Apr. 28          | +67°1                            | 12                        | 31            | 176         | 6°58                     | -10°73                  |                                                                                |
|                                                                                                                           | 762           | 382       | May 14           | -72°6                            | May 26           | +84°1                            | 13                        | 133           | 826         | 16°15                    | -15°29                  |                                                                                |
|                                                                                                                           | 779           | 383       | June 11          | -63°6                            | June 13          | -37°8                            | 3                         | 18            | 55          | 16°90                    | -12°77                  |                                                                                |
| 91                                                                                                                        | 728           | 381       | Apr. 11          | -23°2                            | Apr. 19          | +75°7                            | 9                         | 73            | 508         | 143°17                   | -18°10                  | A V-shaped group, which becomes a stream of normal type.                       |
|                                                                                                                           | 750           | 382       | May 4            | -75°4                            | May 5            | -58°3                            | 2                         | 0             | 24          | 149°00                   | -19°35                  |                                                                                |
| 92                                                                                                                        | 729           | 381       | Apr. 13          | -75°8                            | Apr. 25          | +77°4                            | 13                        | 270           | 1744        | 64°75                    | -28°45                  | A very large variable spot. Small followers.                                   |
|                                                                                                                           | 759           | 382       | May 10           | -81°8                            | May 24           | +82°5                            | 15                        | 230           | 1061        | 51°97                    | -29°15                  |                                                                                |
| 93                                                                                                                        | 730           | 381       | Apr. 14          | +52°6                            | Apr. 14          | +52°6                            | 1                         | 0             | 17          | 178°90                   | +20°80                  | A small spot.                                                                  |
|                                                                                                                           | 744           | 382       | May 1            | -85°2                            | May 13           | +72°8                            | 13                        | 127           | 545         | 176°69                   | +23°08                  |                                                                                |
|                                                                                                                           | 767           | 383       | May 29           | -82°0                            | June 9           | +61°5                            | 12                        | 48            | 219         | 168°39                   | +21°19                  |                                                                                |
| 94                                                                                                                        | 734           | 381       | Apr. 16          | -77°9                            | Apr. 27          | +66°1                            | 12                        | 29            | 181         | 22°85                    | +11°26                  | A regular spot, with a small companion.                                        |
|                                                                                                                           | 760           | 382       | May 12           | -79°8                            | May 22           | +55°5                            | 11                        | 57            | 299         | 37°40                    | +10°59                  |                                                                                |
| 95                                                                                                                        | 754           | 382       | May 7            | -73°6                            | May 17           | +63°9                            | 11                        | 34            | 188         | 109°61                   | +13°68                  | A regular spot, followed by a close cluster of small spots.                    |
|                                                                                                                           | 772           | 383       | June 3           | -68°9                            | June 3           | -68°9                            | 1                         | 0             | 10          | 116°90                   | +14°90                  |                                                                                |
| 96                                                                                                                        | 762           | 382       | May 14           | -72°6                            | May 26           | +84°1                            | 13                        | 133           | 826         | 16°15                    | -15°29                  | Two large regular spots, with small spots near them.                           |
|                                                                                                                           | 779           | 383       | June 11          | -63°6                            | June 13          | -37°8                            | 3                         | 18            | 55          | 16°90                    | -12°77                  |                                                                                |
| 97                                                                                                                        | 765           | 383       | May 25           | -79°1                            | June 6           | +79°9                            | 13                        | 40            | 188         | 230°19                   | +14°29                  | A regular spot, with a small companion.                                        |
|                                                                                                                           | 782           | 384       | June 23          | -51°6                            | June 24          | -38°2                            | 2                         | 0             | 10          | 229°75                   | +14°30                  |                                                                                |
| Note.—782 is possibly merely a revival of 765, as it is not seen close to the E. limb. More probably it is a real return. |               |           |                  |                                  |                  |                                  |                           |               |             |                          |                         |                                                                                |
| 98                                                                                                                        | 781           | 384       | June 20          | -28°1                            | June 26          | +51°2                            | 7                         | 15            | 86          | 292°61                   | +15°30                  | A small regular spot, with smaller followers. [July 22.                        |
|                                                                                                                           | 797           | 385       | July 14          | -72°8                            | July 25          | +73°9                            | 12                        | 89            | 473         | 292°54                   | +14°43                  |                                                                                |
|                                                                                                                           | 812           | 386       | Aug. 9           | -79°3                            | Aug. 20          | +64°1                            | 10                        | 28            | 140         | 296°73                   | +15°28                  |                                                                                |
| Note.—Possibly 797 is merely a revival of 781. There are no photographs for June 18 and 19.                               |               |           |                  |                                  |                  |                                  |                           |               |             |                          |                         |                                                                                |
| 99                                                                                                                        | 785           | 384       | June 25          | -61°0                            | July 5           | +79°0                            | 10                        | 31            | 151         | 196°78                   | +10°27                  | A small spot, becoming a long stream of which the leader is the                |
|                                                                                                                           | 806           | 385       | July 21          | -74°8                            | July 27          | +3°5                             | 7                         | 5             | 44          | 197°01                   | +10°47                  |                                                                                |
| A small spot, with two or three faint small companions. [largest.                                                         |               |           |                  |                                  |                  |                                  |                           |               |             |                          |                         |                                                                                |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                         |
|------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------|
|                  |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                  |
|                  |               |           |               |                                  |               |                                  |                           |               |             |                          |                         |                                                                                                                  |
| 100              | 808           | 385       | 1882. July 27 | -73°0                            | 1882. Aug. 6  | +69°9                            | 8                         | 49            | 350         | 123°12                   | -11°74                  | A close faint cluster, becoming a large V-shaped group.                                                          |
|                  | 821           | 386       | Aug. 22       | -81°0                            | Sept. 2       | +66°8                            | 11                        | 20            | 103         | 128°55                   | -11°19                  | A regular spot.                                                                                                  |
| 101              | 811           | 385       | Aug. 9        | -6°4                             | Aug. 16       | +79°9                            | 7                         | 62            | 310         | 9°11                     | +19°89                  | Two spots, which rapidly increase in size on Aug. 10 and 11.                                                     |
|                  | 827           | 386       | Aug. 31       | -84°8                            | Sept. 11      | +58°1                            | 11                        | 38            | 197         | 2°53                     | +20°53                  | A regular spot, with smaller companions.                                                                         |
| 102              | 816           | 386       | Aug. 18       | -78°1                            | Aug. 29       | +75°1                            | 10                        | 125           | 609         | 189°98                   | +13°18                  | Two regular spots, with small spots between them.                                                                |
|                  | 838           | 387       | Sept. 13      | -79°1                            | Sept. 25      | +82°4                            | 11                        | 86            | 539         | 198°65                   | +11°38                  | A large regular spot with a straight train.                                                                      |
|                  | 856           | 388       | Oct. 10       | -80°2                            | Oct. 22       | +84°5                            | 13                        | 32            | 186         | 203°28                   | +12°46                  | A regular spot.                                                                                                  |
| 103              | 830           | 386       | Sept. 2       | +2°8                             | Sept. 8       | +81°0                            | 7                         | 150           | 577         | 65°91                    | +21°00                  | Two small spots, becoming large regular spots with small companions.                                             |
|                  | 845           | 387       | Sept. 23      | -79°7                            | Oct. 2        | +42°1                            | 10                        | 6             | 33          | 67°32                    | +21°27                  | A small spot.                                                                                                    |
| 104              | 833           | 387       | Sept. 2       | -71°4                            | Sept. 12      | +68°5                            | 10                        | 49            | 218         | 353°29                   | +7°55                   | A number of spots arranged in a straight line.                                                                   |
|                  | 850           | 388       | Sept. 30      | -68°9                            | Oct. 7        | +32°6                            | 8                         | 7             | 24          | 348°88                   | +6°58                   | A small spot.                                                                                                    |
| 105              | 837           | 387       | Sept. 12      | +35°4                            | Sept. 16      | +87°4                            | 4                         | 21            | 128         | 324°50                   | +22°18                  | A small spot, which becomes a straight stream.                                                                   |
|                  | 851           | 388       | Oct. 3        | -50°2                            | Oct. 6        | -14°4                            | 4                         | 1             | 11          | 322°70                   | +21°98                  | A very small faint spot.<br>Note.—851 is possibly only a revival of 837.                                         |
| 106              | 846           | 387       | Sept. 25      | -65°6                            | Oct. 6        | +72°0                            | 12                        | 225           | 984         | 50°18                    | -21°65                  | A very fine large regular spot.                                                                                  |
|                  | 868           | 388       | Oct. 22       | -75°8                            | Nov. 3        | +77°7                            | 13                        | 210           | 1030        | 43°15                    | -22°38                  | A very fine large regular spot. [seen by Dec. 1.                                                                 |
|                  | 890           | 389       | Nov. 19       | -72°0                            | Dec. 1        | +74°6                            | 13                        | 55            | 283         | 36°12                    | -22°85                  | Two regular spots. The preceding breaks up, and only the final is                                                |
| 107              | 855           | 388       | Oct. 10       | +34°6                            | Oct. 12       | +61°6                            | 3                         | 1             | 12          | 319°30                   | +16°60                  | One or two small faint spots.                                                                                    |
|                  | 870           | 389       | Oct. 27       | -83°6                            | Nov. 8        | +77°4                            | 13                        | 82            | 433         | 332°57                   | +16°00                  | A large regular spot, followed by two small clusters which disappear.                                            |
|                  | 895           | 390       | Nov. 24       | -74°9                            | Dec. 2        | +26°3                            | 9                         | 5             | 24          | 330°78                   | +15°69                  | A small regular spot.<br>Note.—870 is possibly a fresh outbreak.                                                 |
| 108              | 860           | 388       | Oct. 18       | +35°9                            | Oct. 19       | +51°4                            | 2                         | 0             | 10          | 213°35                   | -21°70                  | A very small spot.                                                                                               |
|                  | 877           | 389       | Nov. 6        | -69°2                            | Nov. 17       | +75°6                            | 12                        | 47            | 259         | 217°13                   | -23°43                  | A regular spot, with small followers which disappear by Nov. 14.<br>Note.—877 is possibly only a revival of 860. |
| 109              | 861           | 388       | Oct. 18       | +24°4                            | Oct. 22       | +86°3                            | 5                         | 27            | 190         | 202°64                   | +15°06                  | An irregular spot, with small companions close to it.                                                            |
|                  | 878           | 389       | Nov. 6        | -75°9                            | Nov. 14       | +26°3                            | 9                         | 9             | 28          | 208°27                   | +14°66                  | Several small spots.                                                                                             |
| 110              | 864           | 388       | Oct. 20       | -26°0                            | Oct. 28       | +78°9                            | 9                         | 128           | 689         | 123°78                   | +19°71                  | A rectangular group, increasing to two large spots.                                                              |
|                  | 885           | 389       | Nov. 12       | -86°0                            | Nov. 25       | +83°7                            | 14                        | 348           | 1711        | 120°84                   | +19°22                  | A very fine large spot.                                                                                          |
|                  | 908           | 390       | Dec. 10       | -80°6                            | Dec. 20       | +53°3                            | 11                        | 34            | 285         | 120°26                   | +17°65                  | A large spot, becoming a long straight stream.                                                                   |
| 111              | 872           | 388       | Oct. 30       | -15°1                            | Nov. 6        | +75°6                            | 8                         | 19            | 109         | 4°75                     | -19°69                  | A straight stream of small spots.                                                                                |
|                  | 891           | 389       | Nov. 22       | -69°6                            | Nov. 30       | +32°1                            | 9                         | 9             | 44          | 4°11                     | -20°72                  | Three or four small spots.                                                                                       |
| 112              | 875           | 389       | Nov. 4        | +33°3                            | Nov. 7        | +70°7                            | 4                         | 33            | 191         | 344°85                   | -9°88                   | Several small spots.                                                                                             |
|                  | 894           | 390       | Nov. 23       | -71°6                            | Dec. 3        | +61°1                            | 11                        | 54            | 338         | 349°64                   | -8°34                   | A fine variable and irregular group.                                                                             |
| 113              | 887           | 389       | Nov. 15       | +5°2                             | Nov. 20       | +77°2                            | 6                         | 15            | 79          | 175°57                   | +19°08                  | Several small faint spots. The preceding increases, the following                                                |
|                  | 904           | 390       | Dec. 6        | -72°3                            | Dec. 10       | -18°8                            | 5                         | 6             | 28          | 180°82                   | +18°32                  | A small regular spot. [disappears.                                                                               |
| 114              | 903           | 390       | Dec. 5        | -9°6                             | Dec. 11       | +80°3                            | 7                         | 14            | 150         | 262°24                   | -14°50                  | Several small spots undergoing change.                                                                           |
|                  | 920           | 391       | Dec. 26       | -78°0                            | 1883. Jan. 7  | +79°2                            | 13                        | 52            | 269         | 269°92                   | -14°25                  | A regular spot.                                                                                                  |
|                  | 942           | 392       | 1883. Jan. 23 | -68°2                            | Jan. 23       | -68°2                            | 1                         | 0             | 11          | 268°60                   | -14°10                  | A small faint spot.                                                                                              |
| 115              | 911           | 390       | 1882. Dec. 13 | +52°7                            | 1882. Dec. 14 | +64°8                            | 2                         | 0             | 19          | 209°75                   | -23°95                  | A small spot.                                                                                                    |
|                  | 929           | 391       | 1883. Dec. 31 | -77°8                            | 1883. Jan. 7  | +13°2                            | 8                         | 12            | 69          | 204°49                   | -20°95                  | A small regular spot, which breaks up.                                                                           |



Catalogue of Recurrent Groups of Sun Spots—*continued*.

| Reference Number. | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                       |
|-------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                                |
| 83                | 670           | 379       | 1882.<br>Feb. 10 | -66°8                            | 1882.<br>Feb. 20 | +68°2                            | 11                        | 69            | 338         | 171°97                   | +10°74                  | Fine group of 3 clusters in a line. Middle cluster disappears by Feb. 15.<br>A very small spot, which increases. Small followers.                                                                                                              |
|                   | 695           | 380       | Mar. 8           | -78°6                            | Mar. 17          | +53°6                            | 10                        | 19            | 82          | 185°10                   | +9°39                   |                                                                                                                                                                                                                                                |
| 84                | 672           | 379       | Feb. 12          | -76°4                            | Feb. 24          | +81°7                            | 12                        | 43            | 234         | 136°72                   | -18°79                  | A small regular spot, with small followers which disappear after C.M.<br>A small regular spot, becoming a large irregular cluster.                                                                                                             |
|                   | 699           | 380       | Mar. 11          | -82°2                            | Mar. 22          | +63°2                            | 12                        | 24            | 151         | 134°77                   | -18°33                  |                                                                                                                                                                                                                                                |
| 85                | 676           | 379       | Feb. 14          | +28°0                            | Feb. 18          | +79°6                            | 5                         | 43            | 187         | 213°50                   | +1°92                   | Two small spots, developing into an irregular stream.<br>A regular spot.<br>A regular spot.                                                                                                                                                    |
|                   | 691           | 380       | Mar. 5           | -77°1                            | Mar. 16          | +73°6                            | 12                        | 62            | 271         | 221°78                   | -0°48                   |                                                                                                                                                                                                                                                |
|                   | 718           | 381       | Apr. 1           | -74°7                            | Apr. 13          | +81°3                            | 13                        | 27            | 147         | 224°81                   | +1°17                   |                                                                                                                                                                                                                                                |
| 86                | 693           | 380       | Mar. 8           | +10°2                            | Mar. 12          | +65°3                            | 5                         | 22            | 114         | 268°32                   | +23°34                  | A straight stream of small spots. The leading spot increases.<br>A small regular spot.                                                                                                                                                         |
|                   | 713           | 381       | Mar. 29          | -72°8                            | Apr. 5           | +22°5                            | 8                         | 14            | 65          | 267°14                   | +25°38                  |                                                                                                                                                                                                                                                |
| 87                | 697           | 380       | Mar. 10          | +11°9                            | Mar. 15          | +81°4                            | 6                         | 52            | 267         | 244°97                   | -15°85                  | Two straight streams, becoming a stream of normal type.<br>A small regular spot.                                                                                                                                                               |
|                   | 715           | 381       | Mar. 30          | -73°6                            | Apr. 4           | -5°7                             | 6                         | 5             | 22          | 252°25                   | -14°33                  |                                                                                                                                                                                                                                                |
| 88                | 702           | 380       | Mar. 15          | -84°1                            | Mar. 28          | +80°6                            | 14                        | 87            | 434         | 74°90                    | -22°13                  | A large regular spot, with close small followers. [becomes large. One of these<br>A small spot.                                                                                                                                                |
|                   | 732           | 381       | Apr. 14          | -53°7                            | Apr. 18          | -0°5                             | 5                         | 5             | 31          | 72°40                    | -21°70                  |                                                                                                                                                                                                                                                |
| 89                | 704           | 380       | Mar. 20          | +57°7                            | Mar. 21          | +70°5                            | 2                         | 48            | 188         | 154°00                   | +21°20                  | Two spots, with two or three small markings near them.<br>A regular spot.<br>A regular spot, with small companions.                                                                                                                            |
|                   | 722           | 381       | Apr. 6           | -68°3                            | Apr. 17          | +75°2                            | 12                        | 32            | 178         | 160°78                   | +20°78                  |                                                                                                                                                                                                                                                |
|                   | 749           | 382       | May 3            | -78°1                            | May 14           | +64°7                            | 12                        | 37            | 181         | 155°95                   | +20°91                  |                                                                                                                                                                                                                                                |
| 90                | 705           | 380       | Mar. 21          | -81°6                            | Apr. 2           | +80°4                            | 13                        | 74            | 377         | 3°15                     | -10°25                  | A large regular spot, with some small companions.<br>A regular spot.<br>Two large regular spots, with small companions.<br>Two or three small spots.                                                                                           |
|                   | 735           | 381       | Apr. 17          | -80°7                            | Apr. 28          | +67°1                            | 12                        | 31            | 176         | 6°58                     | -10°73                  |                                                                                                                                                                                                                                                |
|                   | 762           | 382       | May 14           | -72°6                            | May 26           | +84°1                            | 13                        | 133           | 826         | 16°15                    | -15°29                  |                                                                                                                                                                                                                                                |
|                   | 779           | 383       | June 11          | -63°6                            | June 13          | -37°8                            | 3                         | 18            | 55          | 16°90                    | -12°77                  |                                                                                                                                                                                                                                                |
| 91                | 728           | 381       | Apr. 11          | -23°2                            | Apr. 19          | +75°7                            | 9                         | 73            | 508         | 143°17                   | -18°10                  | A V-shaped group, which becomes a stream of normal type.<br>A small spot.                                                                                                                                                                      |
|                   | 750           | 382       | May 4            | -75°4                            | May 5            | -58°3                            | 2                         | 0             | 24          | 149°00                   | -19°35                  |                                                                                                                                                                                                                                                |
| 92                | 729           | 381       | Apr. 13          | -75°8                            | Apr. 25          | +77°4                            | 13                        | 270           | 1744        | 64°75                    | -28°45                  | A very large variable spot. Small followers.<br>Two very large irregular spots. The preceding spot breaks up after passing the C.M.                                                                                                            |
|                   | 759           | 382       | May 10           | -81°8                            | May 24           | +82°5                            | 15                        | 230           | 1061        | 51°97                    | -29°15                  |                                                                                                                                                                                                                                                |
| 93                | 730           | 381       | Apr. 14          | +52°6                            | Apr. 14          | +52°6                            | 1                         | 0             | 17          | 178°90                   | +20°80                  | A small spot.<br>A large regular spot.<br>A regular spot.                                                                                                                                                                                      |
|                   | 744           | 382       | May 1            | -85°2                            | May 13           | +72°8                            | 13                        | 127           | 545         | 176°69                   | +23°08                  |                                                                                                                                                                                                                                                |
|                   | 767           | 383       | May 29           | -82°0                            | June 9           | +61°5                            | 12                        | 48            | 219         | 168°39                   | +21°19                  |                                                                                                                                                                                                                                                |
| 94                | 734           | 381       | Apr. 16          | -77°9                            | Apr. 27          | +66°1                            | 12                        | 29            | 181         | 22°85                    | +11°26                  | A regular spot, with a small companion.<br>A straight stream.                                                                                                                                                                                  |
|                   | 760           | 382       | May 12           | -79°8                            | May 22           | +55°5                            | 11                        | 57            | 299         | 37°40                    | +10°59                  |                                                                                                                                                                                                                                                |
| 95                | 754           | 382       | May 7            | -73°6                            | May 17           | +63°9                            | 11                        | 34            | 188         | 109°61                   | +13°68                  | A regular spot, followed by a close cluster of small spots.<br>Two small spots.                                                                                                                                                                |
|                   | 772           | 383       | June 3           | -68°9                            | June 3           | -68°9                            | 1                         | 0             | 10          | 116°90                   | +14°90                  |                                                                                                                                                                                                                                                |
| 96                | 762           | 382       | May 14           | -72°6                            | May 26           | +84°1                            | 13                        | 133           | 826         | 16°15                    | -15°29                  | Two large regular spots, with small spots near them.<br>Two or three small spots.                                                                                                                                                              |
|                   | 779           | 383       | June 11          | -63°6                            | June 13          | -37°8                            | 3                         | 18            | 55          | 16°90                    | -12°77                  |                                                                                                                                                                                                                                                |
| 97                | 765           | 383       | May 25           | -79°1                            | June 6           | +79°9                            | 13                        | 40            | 188         | 230°19                   | +14°29                  | A regular spot, with a small companion.<br>A small spot.<br>Note.—782 is possibly merely a revival of 765, as it is not seen close to the E. limb. More probably it is a real return.                                                          |
|                   | 782           | 384       | June 23          | -51°6                            | June 24          | -38°2                            | 2                         | 0             | 10          | 229°75                   | +14°30                  |                                                                                                                                                                                                                                                |
| 98                | 781           | 384       | June 20          | -28°1                            | June 26          | +51°2                            | 7                         | 15            | 86          | 292°61                   | +15°30                  | A small regular spot, with smaller followers. [July 22.<br>A large regular spot, with small followers which disappear before<br>A regular spot.<br>Note.—Possibly 797 is merely a revival of 781. There are no photographs for June 18 and 19. |
|                   | 797           | 385       | July 14          | -72°8                            | July 25          | +73°9                            | 12                        | 89            | 473         | 292°54                   | +14°43                  |                                                                                                                                                                                                                                                |
|                   | 812           | 386       | Aug. 9           | -79°3                            | Aug. 20          | +64°1                            | 10                        | 28            | 140         | 296°73                   | +15°28                  |                                                                                                                                                                                                                                                |
| 99                | 785           | 384       | June 25          | -61°0                            | July 5           | +79°0                            | 10                        | 31            | 151         | 196°78                   | +10°27                  | A small spot, becoming a long stream of which the leader is the<br>A small spot, with two or three faint small companions. [largest.                                                                                                           |
|                   | 806           | 385       | July 21          | -74°8                            | July 27          | +3°5                             | 7                         | 5             | 44          | 197°01                   | +10°47                  |                                                                                                                                                                                                                                                |

Catalogue of Recurrent Groups of Sun Spots—*continued.*

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                         |
|-------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                  |
| 100               | 808           | 385       | 1882. July 27 | -73°0                            | 1882. Aug. 6  | +69°9                            | 8                         | 49            | 350         | 123°12                   | -11°74                  | A close faint cluster, becoming a large V-shaped group.                                                          |
|                   | 821           | 386       | Aug. 22       | -81°0                            | Sept. 2       | +66°8                            | 11                        | 20            | 103         | 128°55                   | -11°19                  | A regular spot.                                                                                                  |
| 101               | 811           | 385       | Aug. 9        | -6°4                             | Aug. 16       | +79°9                            | 7                         | 62            | 310         | 9°11                     | +19°89                  | Two spots, which rapidly increase in size on Aug. 10 and 11.                                                     |
|                   | 827           | 386       | Aug. 31       | -84°8                            | Sept. 11      | +58°1                            | 11                        | 38            | 197         | 2°53                     | +20°53                  | A regular spot, with smaller companions.                                                                         |
| 102               | 816           | 386       | Aug. 18       | -78°1                            | Aug. 29       | +75°1                            | 10                        | 125           | 609         | 189°98                   | +13°18                  | Two regular spots, with small spots between them.                                                                |
|                   | 838           | 387       | Sept. 13      | -79°1                            | Sept. 25      | +82°4                            | 11                        | 86            | 539         | 198°65                   | +11°38                  | A large regular spot with a straight train.                                                                      |
|                   | 856           | 388       | Oct. 10       | -80°2                            | Oct. 22       | +84°5                            | 13                        | 32            | 186         | 203°28                   | +12°46                  | A regular spot.                                                                                                  |
| 103               | 830           | 386       | Sept. 2       | +2°8                             | Sept. 8       | +81°0                            | 7                         | 150           | 577         | 65°91                    | +21°00                  | Two small spots, becoming large regular spots with small companions.                                             |
|                   | 845           | 387       | Sept. 23      | -79°7                            | Oct. 2        | +42°1                            | 10                        | 6             | 33          | 67°32                    | +21°27                  | A small spot.                                                                                                    |
| 104               | 833           | 387       | Sept. 2       | -71°4                            | Sept. 12      | +68°5                            | 10                        | 49            | 218         | 353°29                   | +7°55                   | A number of spots arranged in a straight line.                                                                   |
|                   | 850           | 388       | Sept. 30      | -68°9                            | Oct. 7        | +32°6                            | 8                         | 7             | 24          | 348°88                   | +6°58                   | A small spot.                                                                                                    |
| 105               | 837           | 387       | Sept. 12      | +35°4                            | Sept. 16      | +87°4                            | 4                         | 21            | 128         | 324°50                   | +22°18                  | A small spot, which becomes a straight stream.                                                                   |
|                   | 851           | 388       | Oct. 3        | -50°2                            | Oct. 6        | -14°4                            | 4                         | 1             | 11          | 322°70                   | +21°98                  | A very small faint spot.<br>Note.—851 is possibly only a revival of 837.                                         |
| 106               | 846           | 387       | Sept. 25      | -65°6                            | Oct. 6        | +72°0                            | 12                        | 225           | 984         | 50°18                    | -21°65                  | A very fine large regular spot.                                                                                  |
|                   | 868           | 388       | Oct. 22       | -75°8                            | Nov. 3        | +77°7                            | 13                        | 210           | 1030        | 43°15                    | -22°38                  | A very fine large regular spot. [seen by Dec. 1.                                                                 |
|                   | 890           | 389       | Nov. 19       | -72°0                            | Dec. 1        | +74°6                            | 13                        | 55            | 283         | 36°12                    | -22°85                  | Two regular spots. The preceding breaks up, and only the final is                                                |
| 107               | 855           | 388       | Oct. 10       | +34°6                            | Oct. 12       | +61°6                            | 3                         | 1             | 12          | 319°30                   | +16°60                  | One or two small faint spots.                                                                                    |
|                   | 870           | 389       | Oct. 27       | -83°6                            | Nov. 8        | +77°4                            | 13                        | 82            | 433         | 332°57                   | +16°00                  | A large regular spot, followed by two small clusters which disappear.                                            |
|                   | 895           | 390       | Nov. 24       | -74°9                            | Dec. 2        | +26°3                            | 9                         | 5             | 24          | 330°78                   | +15°69                  | A small regular spot.<br>Note.—870 is possibly a fresh outbreak.                                                 |
| 108               | 860           | 388       | Oct. 18       | +35°9                            | Oct. 19       | +51°4                            | 2                         | 0             | 10          | 213°35                   | -21°70                  | A very small spot.                                                                                               |
|                   | 877           | 389       | Nov. 6        | -69°2                            | Nov. 17       | +75°6                            | 12                        | 47            | 259         | 217°13                   | -23°43                  | A regular spot, with small followers which disappear by Nov. 14.<br>Note.—877 is possibly only a revival of 860. |
| 109               | 861           | 388       | Oct. 18       | +24°4                            | Oct. 22       | +86°3                            | 5                         | 27            | 190         | 202°64                   | +15°06                  | An irregular spot, with small companions close to it.                                                            |
|                   | 878           | 389       | Nov. 6        | -75°9                            | Nov. 14       | +26°3                            | 9                         | 9             | 28          | 208°27                   | +14°66                  | Several small spots.                                                                                             |
| 110               | 864           | 388       | Oct. 20       | -26°0                            | Oct. 28       | +78°9                            | 9                         | 128           | 689         | 123°78                   | +19°71                  | A rectangular group, increasing to two large spots.                                                              |
|                   | 885           | 389       | Nov. 12       | -86°0                            | Nov. 25       | +83°7                            | 14                        | 348           | 1711        | 120°84                   | +19°22                  | A very fine large spot.                                                                                          |
|                   | 908           | 390       | Dec. 10       | -80°6                            | Dec. 20       | +53°3                            | 11                        | 34            | 285         | 120°26                   | +17°65                  | A large spot, becoming a long straight stream.                                                                   |
| 111               | 872           | 388       | Oct. 30       | -15°1                            | Nov. 6        | +75°6                            | 8                         | 19            | 109         | 4°75                     | -19°69                  | A straight stream of small spots.                                                                                |
|                   | 891           | 389       | Nov. 22       | -69°6                            | Nov. 30       | +32°1                            | 9                         | 9             | 44          | 4°11                     | -20°72                  | Three or four small spots.                                                                                       |
| 112               | 875           | 389       | Nov. 4        | +33°3                            | Nov. 7        | +70°7                            | 4                         | 33            | 191         | 344°85                   | -9°88                   | Several small spots.                                                                                             |
|                   | 894           | 390       | Nov. 23       | -71°6                            | Dec. 3        | +61°1                            | 11                        | 54            | 338         | 349°64                   | -8°34                   | A fine variable and irregular group.                                                                             |
| 113               | 887           | 389       | Nov. 15       | +5°2                             | Nov. 20       | +77°2                            | 6                         | 15            | 79          | 175°57                   | +19°08                  | Several small faint spots. The preceding increases, the following                                                |
|                   | 904           | 390       | Dec. 6        | -72°3                            | Dec. 10       | -18°8                            | 5                         | 6             | 28          | 180°82                   | +18°32                  | A small regular spot. [disappears.                                                                               |
| 114               | 903           | 390       | Dec. 5        | -9°6                             | Dec. 11       | +80°3                            | 7                         | 14            | 150         | 262°24                   | -14°50                  | Several small spots undergoing change.                                                                           |
|                   | 920           | 391       | Dec. 26       | -78°0                            | 1883. Jan. 7  | +79°2                            | 13                        | 52            | 269         | 269°92                   | -14°25                  | A regular spot.                                                                                                  |
|                   | 942           | 392       | 1883. Jan. 23 | -68°2                            | Jan. 23       | -68°2                            | 1                         | 0             | 11          | 268°60                   | -14°10                  | A small faint spot.                                                                                              |
| 115               | 911           | 390       | 1882. Dec. 13 | +52°7                            | 1882. Dec. 14 | +64°8                            | 2                         | 0             | 19          | 209°75                   | -23°95                  | A small spot.                                                                                                    |
|                   | 929           | 391       | 1883. Dec. 31 | -77°8                            | 1883. Jan. 7  | +13°2                            | 8                         | 12            | 69          | 204°49                   | -20°95                  | A small regular spot, which breaks up.                                                                           |

CATALOGUE OF RECURRENT GROUPS OF SUN SPOTS FOR THE YEARS 1874 TO 1906.

Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                             |
|-------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|--------------------------|---------------|-------------|--------------------------|-------------------------|--------------------------------------------------------------------------------------|
|                   |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                          | Um-bra.       | Whole Spot. |                          |                         |                                                                                      |
| 116               | 912           | 390       | 1882.<br>Dec. 15 | +47°8                            | 1882.<br>Dec. 17 | +75°2                            | 3                        | 0             | 16          | 180°43                   | + 2°27                  | Two very small faint spots.                                                          |
|                   | 930           | 391       | 1883.<br>Jan. 1  | -78°0                            | 1883.<br>Jan. 11 | +58°2                            | 11                       | 57            | 381         | 194°42                   | + 4°95                  | A large irregular group, breaking up after passing the C.M.                          |
| 117               | 925           | 391       | 1882.<br>Dec. 30 | -11°2                            | 1883.<br>Jan. 6  | +85°1                            | 8                        | 47            | 249         | 283°64                   | -28°36                  | Two regular spots, with sometimes small companions.                                  |
|                   | 941           | 392       | 1883.<br>Jan. 22 | -74°0                            | Feb. 3           | +79°9                            | 11                       | 25            | 114         | 274°62                   | -27°21                  | A regular spot. Small companions close to it on Jan. 26.                             |
| 118               | 927           | 391       | 1882.<br>Dec. 30 | -80°5                            | 1883.<br>Jan. 11 | +74°9                            | 13                       | 31            | 167         | 213°94                   | -17°93                  | A regular spot.                                                                      |
|                   | 946           | 392       | 1883.<br>Jan. 27 | -74°9                            | Feb. 3           | +18°3                            | 8                        | 12            | 55          | 211°04                   | -19°45                  | A small regular spot.                                                                |
| 119               | 933           | 391       | 1883.<br>Jan. 10 | -73°7                            | Jan. 21          | +70°2                            | 11                       | 89            | 659         | 76°07                    | - 9°06                  | A large regular spot, with small followers.                                          |
|                   | 960           | 392       | Feb. 6           | -73°0                            | Feb. 12          | + 3°8                            | 7                        | 2             | 25          | 79°40                    | - 8°19                  | One or two small spots.                                                              |
| 120               | 943           | 392       | Jan. 26          | +49°2                            | Jan. 27          | +60°8                            | 2                        | 10            | 95          | 347°10                   | -13°20                  | Three small spots, which increase.                                                   |
|                   | 967           | 393       | Feb. 14          | -64°3                            | Feb. 21          | +37°9                            | 8                        | 7             | 29          | 352°90                   | -15°65                  | A few small spots.<br><i>Note.</i> —No photographs are available for Jan. 24 and 25. |
| 121               | 962           | 392       | Feb. 7           | +39°7                            | Feb. 9           | +78°8                            | 3                        | 4             | 47          | 186°33                   | + 3°17                  | One or two small spots.                                                              |
|                   | 972           | 393       | Feb. 26          | -59°9                            | Mar. 1           | -24°1                            | 4                        | 2             | 21          | 188°93                   | + 4°90                  | One or two small faint spots.                                                        |
| 122               | 982           | 394       | Mar. 19          | -46°2                            | Mar. 26          | +58°2                            | 8                        | 19            | 149         | 291°60                   | -18°29                  | A scattered group, becoming a stream of normal type.                                 |
|                   | 1000          | 395       | Apr. 12          | -72°1                            | Apr. 23          | +76°0                            | 11                       | 62            | 455         | 303°68                   | -16°01                  | A fine irregular spot, with close companions.                                        |
|                   | 1026          | 396       | May 9            | -79°6                            | May 14           | -13°4                            | 6                        | 1             | 11          | 303°15                   | -15°47                  | A small spot.                                                                        |
| 123               | 984           | 394       | Mar. 22          | -41°5                            | Mar. 31          | +82°6                            | 10                       | 42            | 251         | 251°19                   | -24°10                  | Small spots expanding to long stream, whose leader is left alone.                    |
|                   | 1002          | 395       | Apr. 16          | -67°8                            | Apr. 17          | -59°3                            | 2                        | 12            | 28          | 254°15                   | -24°60                  | A small spot.<br><i>Note.</i> —No photograph is available for April 15.              |
| 124               | 986           | 394       | Mar. 28          | +58°3                            | Mar. 30          | +79°3                            | 3                        | 0             | 41          | 272°47                   | -19°23                  | A small faint spot.                                                                  |
|                   | 1001          | 395       | Apr. 13          | -83°4                            | Apr. 24          | +70°8                            | 11                       | 28            | 288         | 282°28                   | -16°06                  | Compact cluster, followed by straight stream.                                        |
| 125               | 987           | 394       | Mar. 28          | -80°1                            | Apr. 9           | +80°4                            | 13                       | 91            | 536         | 135°32                   | +13°35                  | A very large regular spot, with small companions.                                    |
|                   | 1011          | 395       | Apr. 24          | -72°6                            | May 1            | +11°6                            | 8                        | 8             | 41          | 140°23                   | +12°95                  | A small spot. Small companions from April 29 to May 1.                               |
| 126               | 992           | 394       | Apr. 1           | -71°1                            | Apr. 12          | +79°4                            | 12                       | 39            | 291         | 90°46                    | -16°98                  | Small spot, rapidly increasing. Occasional followers.                                |
|                   | 1014          | 395       | Apr. 28          | -68°5                            | Apr. 29          | -57°6                            | 2                        | 7             | 30          | 98°20                    | -16°45                  | A small spot. A companion on April 29.                                               |
| 127               | 999           | 395       | Apr. 12          | -70°4                            | Apr. 23          | +76°5                            | 11                       | 70            | 516         | 305°33                   | -22°36                  | Two large spots; the following one breaks up.                                        |
|                   | 1027          | 396       | May 9            | -80°0                            | May 21           | +79°3                            | 13                       | 57            | 291         | 301°02                   | -22°29                  | A large regular spot. A small companion on May 11.                                   |
|                   | 1046          | 397       | June 6           | -74°2                            | June 17          | +70°4                            | 12                       | 39            | 453         | 294°43                   | -23°24                  | A large irregular variable spot.                                                     |
|                   | 1066          | 398       | July 3           | -83°6                            | July 13          | +50°0                            | 10                       | 68            | 490         | 290°45                   | -22°55                  | Two or three spots, which coalesce to form one long irregular spot.                  |
| 128               | 1024          | 395       | May 7            | +62°7                            | May 7            | +62°7                            | 1                        | 0             | 25          | 111°90                   | +13°40                  | Two small faint spots.                                                               |
|                   | 1037          | 396       | May 24           | -62°3                            | May 25           | -52°0                            | 2                        | 0             | 33          | 116°35                   | +13°05                  | A small spot on May 24. Two small spots on May 25.                                   |
| 129               | 1030          | 396       | May 14           | - 0°6                            | May 20           | +81°1                            | 7                        | 17            | 98          | 319°90                   | -14°77                  | One or two small spots, which become one regular spot.                               |
|                   | 1043          | 397       | June 3           | -80°6                            | June 11          | +20°7                            | 9                        | 9             | 40          | 327°12                   | -16°38                  | A small regular spot.                                                                |
| 130               | 1040          | 396       | June 1           | - 4°7                            | June 7           | +71°8                            | 7                        | 109           | 704         | 70°37                    | - 7°73                  | A large spot, followed by irregular group of small spots.                            |
|                   | 1058          | 397       | June 22          | -75°2                            | July 4           | +74°4                            | 13                       | 85            | 611         | 74°80                    | - 9°72                  | A very fine large composite spot, with small spots preceding it.                     |
|                   | 1080          | 398       | July 19          | -81°5                            | July 31          | +74°0                            | 10                       | 195           | 1363        | 73°89                    | - 9°51                  | A very large composite spot, with small spots preceding it.                          |
|                   | 1100          | 399       | Aug. 17          | -65°7                            | Aug. 19          | -36°1                            | 3                        | 4             | 24          | 73°97                    | -10°77                  | Two small spots.                                                                     |
| 131               | 1052          | 397       | June 17          | -10°7                            | June 24          | +80°1                            | 8                        | 66            | 436         | 213°28                   | -24°40                  | Two small spots, becoming two streams.                                               |
|                   | 1067          | 398       | July 9           | -75°5                            | July 21          | +77°1                            | 10                       | 65            | 493         | 211°59                   | -26°03                  | A very large spot, with occasional small companions.                                 |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                  |
|------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
|                  |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                           |
| 132              | 1054          | 397       | 1883.<br>June 17 | -76°2                            | 1883.<br>June 28 | +64°9                            | 12                        | 32            | 239         | 144°12                   | -15°83                  | A fine regular spot, with many small followers.                                                                                           |
|                  | 1074          | 398       | July 15          | -77°2                            | July 27          | +81°2                            | 9                         | 92            | 702         | 133°32                   | -15°22                  | A large regular spot, followed by a large circular cluster.<br><i>Note.</i> —1074 is possibly a fresh outbreak, and not a return of 1054. |
| 133              | 1056          | 397       | June 20          | -12°2                            | June 27          | +82°2                            | 8                         | 97            | 648         | 170°19                   | -10°21                  | An irregular group, which becomes three regular spots.                                                                                    |
|                  | 1071          | 398       | July 12          | -78°1                            | July 21          | +44°7                            | 7                         | 64            | 367         | 176°50                   | -10°95                  | A regular spot, with small companions.                                                                                                    |
|                  | 1094          | 399       | Aug. 8           | -78°6                            | Aug. 20          | +81°2                            | 13                        | 32            | 226         | 177°96                   | -10°25                  | A regular spot, with companions.<br><i>Note.</i> —No photographs are available for July 22 and 23.                                        |
| 134              | 1062          | 397       | June 25          | -79°1                            | July 7           | +80°3                            | 13                        | 220           | 1366        | 36°18                    | +10°48                  | Two or three very large spots, which coalesce and break up again.                                                                         |
|                  | 1086          | 398       | July 24          | -51°7                            | Aug. 2           | +66°3                            | 9                         | 21            | 114         | 42°17                    | +9°18                   | A regular spot. Two very faint companions on July 27.<br><i>Note.</i> —No photographs are available for July 22 and 23.                   |
| 135              | 1097          | 399       | Aug. 14          | +77°5                            | Aug. 14          | +77°5                            | 1                         | 0             | 362         | 253°40                   | -16°50                  | Two spots.                                                                                                                                |
|                  | 1109          | 400       | Aug. 30          | -67°8                            | Sept. 10         | +74°0                            | 10                        | 70            | 457         | 253°96                   | -18°95                  | A fine regular spot, with small companions.                                                                                               |
|                  | 1126          | 401       | Sept. 26         | -75°3                            | Oct. 8           | +75°2                            | 13                        | 19            | 124         | 249°48                   | -18°68                  | A regular spot.                                                                                                                           |
| 136              | 1105          | 399       | Aug. 25          | -16°8                            | Sept. 1          | +83°7                            | 7                         | 30            | 209         | 18°40                    | +20°58                  | Two small spots, which become a regular spot followed by a train.                                                                         |
|                  | 1123          | 400       | Sept. 16         | -74°6                            | Sept. 18         | -46°3                            | 3                         | 1             | 29          | 25°10                    | +18°33                  | A small spot.                                                                                                                             |
| 137              | 1106          | 400       | Aug. 27          | -54°8                            | Sept. 5          | +75°9                            | 8                         | 22            | 141         | 315°56                   | -8°98                   | Three small spots, which increase.                                                                                                        |
|                  | 1124          | 401       | Sept. 22         | -64°4                            | Sept. 22         | -64°4                            | 1                         | 0             | 5           | 317°40                   | -7°40                   | A small spot.                                                                                                                             |
| 138              | 1110          | 400       | Sept. 1          | -79°3                            | Sept. 12         | +69°1                            | 9                         | 46            | 274         | 218°97                   | +10°97                  | A large regular spot, with small variable distant followers.                                                                              |
|                  | 1129          | 401       | Sept. 29         | -63°7                            | Sept. 30         | -53°5                            | 2                         | 1             | 15          | 225°00                   | +13°05                  | A small spot.                                                                                                                             |
| 139              | 1114          | 400       | Sept. 8          | -70°1                            | Sept. 20         | +81°2                            | 12                        | 181           | 920         | 132°60                   | -21°83                  | A very large regular spot.                                                                                                                |
|                  | 1133          | 401       | Oct. 5           | -77°5                            | Oct. 17          | +76°7                            | 13                        | 80            | 403         | 128°78                   | -22°41                  | A regular spot, with companions on Oct. 11 and 12.                                                                                        |
|                  | 1169          | 402       | Nov. 2           | -82°3                            | Nov. 13          | +63°1                            | 11                        | 35            | 202         | 118°59                   | -23°30                  | A large regular spot.                                                                                                                     |
|                  | 1194          | 403       | Dec. 2           | -58°0                            | Dec. 2           | -58°0                            | 1                         | 5             | 11          | 108°80                   | -24°20                  | A small spot.<br><i>Note.</i> —No photographs are available for Dec. 1 and 3.                                                             |
| 140              | 1138          | 401       | Oct. 8           | -51°7                            | Oct. 17          | +75°4                            | 10                        | 149           | 805         | 124°30                   | +11°77                  | Two small spots, increasing to form an irregular stream.                                                                                  |
|                  | 1166          | 402       | Nov. 1           | -83°2                            | Nov. 10          | +42°4                            | 10                        | 30            | 241         | 132°37                   | +10°67                  | Three spots, with companions covering a wide district.<br><i>Note.</i> —No photograph is available for Nov. 11.                           |
| 141              | 1142          | 401       | Oct. 11          | -4°1                             | Oct. 17          | +77°1                            | 7                         | 49            | 248         | 129°77                   | -9°44                   | [regular spots.<br>A group of small spots, becoming two clusters, and later two                                                           |
|                  | 1165          | 402       | Nov. 1           | -81°6                            | Nov. 9           | +25°7                            | 9                         | 3             | 19          | 132°97                   | -10°58                  | A small spot, with occasional companions.                                                                                                 |
| 142              | 1144          | 401       | Oct. 12          | -83°5                            | Oct. 24          | +75°8                            | 13                        | 192           | 1121        | 35°28                    | -9°78                   | A very large fine spot, which throws off a regular spot.                                                                                  |
|                  | 1173          | 402       | Nov. 9           | -68°6                            | Nov. 21          | +81°6                            | 12                        | 159           | 914         | 35°31                    | -8°83                   | A large regular variable spot, followed by a chain of spots.                                                                              |
|                  | 1198          | 403       | Dec. 6           | -76°3                            | Dec. 18          | +78°7                            | 13                        | 32            | 197         | 34°49                    | -9°72                   | A regular spot, with small companions.                                                                                                    |
|                  | 1233          | 404       | 1884.<br>Jan. 3  | -74°9                            | 1884.<br>Jan. 10 | +19°4                            | 8                         | 3             | 17          | 31°15                    | -10°68                  | A small regular spot.                                                                                                                     |
| 143              | 1145          | 401       | 1883.<br>Oct. 13 | +63°5                            | 1883.<br>Oct. 14 | +79°1                            | 2                         | 2             | 46          | 169°95                   | +4°55                   | A small spot, with two companions on Oct. 14.                                                                                             |
|                  | 1161          | 402       | Oct. 28          | -80°0                            | Nov. 8           | +64°4                            | 12                        | 38            | 263         | 184°76                   | +3°15                   | Three regular spots, with occasional companions.                                                                                          |
| 144              | 1149          | 402       | Oct. 20          | -49°8                            | Oct. 30          | +80°8                            | 11                        | 41            | 346         | 323°66                   | -11°54                  | A number of variable small spots.                                                                                                         |
|                  | 1177          | 403       | Nov. 13          | -81°8                            | Nov. 25          | +72°2                            | 13                        | 63            | 378         | 332°38                   | -13°72                  | A regular spot, with occasional companions.                                                                                               |
|                  | 1206          | 404       | Dec. 11          | -72°4                            | Dec. 19          | +31°1                            | 9                         | 5             | 31          | 331°58                   | -16°96                  | A small faint spot, with occasional companions.                                                                                           |
| 145              | 1156          | 402       | Oct. 25          | -81°7                            | Nov. 5           | +69°9                            | 12                        | 55            | 402         | 224°37                   | -9°82                   | A large regular spot, becoming two clusters.                                                                                              |
|                  | 1187          | 403       | Nov. 22          | -69°6                            | Dec. 2           | +61°4                            | 10                        | 28            | 199         | 226°16                   | -10°93                  | A regular spot.                                                                                                                           |
|                  | 1212          | 404       | Dec. 19          | -75°8                            | Dec. 29          | +60°3                            | 11                        | 33            | 526         | 227°92                   | -8°81                   | A large irregular spot, which breaks up.<br><i>Note.</i> —No photograph is available for Dec. 3.                                          |
| 146              | 1163          | 402       | Oct. 30          | -37°0                            | Nov. 8           | +84°4                            | 10                        | 22            | 198         | 206°72                   | -11°26                  | An irregular scattered variable group.                                                                                                    |
|                  | 1188          | 403       | Nov. 22          | -79°3                            | Dec. 4           | +80°0                            | 11                        | 32            | 231         | 216°51                   | -10°54                  | A regular spot, with occasional companions.                                                                                               |
|                  | 1213          | 404       | Dec. 19          | -82°8                            | Dec. 28          | +34°5                            | 10                        | 26            | 209         | 218°89                   | -12°96                  | A regular spot, which breaks up.                                                                                                          |



Catalogue of Recurrent Groups of Sun Spots--continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                    |
|-------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                             |
| 147               | 1172          | 402       | 1883. Nov. 9  | -57°2                            | 1883. Nov. 20 | +81°1                            | 11                        | 80            | 454         | 47°63                    | -14°89                  | Two regular spots, with occasional companions. [with train.                                                 |
|                   | 1197          | 403       | 1884. Dec. 6  | -64°6                            | 1884. Dec. 17 | +81°7                            | 12                        | 27            | 226         | 46°58                    | -13°18                  | Two small spots, becoming first two clusters and then a regular spot                                        |
|                   | 1231          | 404       | 1884. Jan. 2  | -75°8                            | 1884. Jan. 13 | +76°3                            | 12                        | 9             | 45          | 47°09                    | -13°03                  | A group of small spots in constant change.                                                                  |
| 148               | 1180          | 403       | 1883. Nov. 16 | -20°0                            | 1883. Nov. 23 | +81°2                            | 8                         | 34            | 363         | 361°33                   | -12°03                  | A number of small spots, irregularly arranged.                                                              |
|                   | 1200          | 404       | 1884. Dec. 8  | -81°6                            | 1884. Dec. 20 | +73°9                            | 13                        | 12            | 98          | 364°82                   | -10°18                  | A regular spot, which disappears by Dec. 18. Variable companions.                                           |
|                   | 1237          | 405       | 1884. Jan. 5  | -82°6                            | 1884. Jan. 17 | +76°8                            | 12                        | 51            | 443         | 355°65                   | -10°88                  | A large regular spot, with occasional small companions.                                                     |
| 149               | 1181          | 403       | 1883. Nov. 16 | -49°8                            | 1883. Nov. 25 | +74°0                            | 10                        | 66            | 624         | 331°34                   | +17°76                  | Two or three small spots, becoming a compact cluster.                                                       |
|                   | 1205          | 404       | 1884. Dec. 11 | -71°2                            | 1884. Dec. 23 | +78°3                            | 13                        | 18            | 118         | 331°38                   | +21°05                  | A regular spot, with occasional companions.                                                                 |
| 150               | 1191          | 403       | 1883. Nov. 27 | -23°3                            | 1883. Dec. 4  | +72°9                            | 6                         | 39            | 233         | 208°94                   | +9°40                   | A faint irregular group, becoming a regular spot with train.                                                |
|                   | 1215          | 404       | 1884. Dec. 20 | -76°8                            | 1884. Dec. 29 | +40°3                            | 10                        | 32            | 182         | 211°08                   | +8°24                   | A regular spot, with occasional companions.                                                                 |
| 151               | 1202          | 403       | 1883. Dec. 9  | -78°3                            | 1883. Dec. 20 | +75°7                            | 12                        | 40            | 216         | 0°52                     | +12°54                  | A regular spot, with occasional companions.                                                                 |
|                   | 1235          | 404       | 1884. Jan. 4  | -81°9                            | 1884. Jan. 15 | +67°1                            | 12                        | 106           | 1003        | 12°72                    | +14°95                  | A large regular spot, followed by a long train.                                                             |
|                   | 1268          | 405       | 1884. Jan. 31 | -70°9                            | 1884. Feb. 11 | +74°7                            | 11                        | 52            | 398         | 23°48                    | +13°54                  | A large irregular variable spot, with small companions.                                                     |
| 152               | 1204          | 404       | 1883. Dec. 10 | -75°1                            | 1883. Dec. 21 | +70°0                            | 12                        | 9             | 58          | 346°10                   | +13°37                  | An irregular group in constant change. Not seen on Dec. 15.                                                 |
|                   | 1243          | 405       | 1884. Jan. 7  | -70°9                            | 1884. Jan. 15 | +40°7                            | 9                         | 9             | 46          | 345°99                   | +12°52                  | A small regular spot, with companions until Jan. 11. Note.—1204 is intermittent, not being seen on Dec. 15. |
| 153               | 1216          | 404       | 1883. Dec. 20 | -82°7                            | 1884. Jan. 2  | +76°3                            | 11                        | 114           | 778         | 202°04                   | -9°23                   | A large regular spot, with a long variable train.                                                           |
|                   | 1255          | 405       | 1884. Jan. 17 | -72°8                            | 1884. Jan. 29 | +86°1                            | 12                        | 73            | 357         | 208°19                   | -8°54                   | A large regular spot.                                                                                       |
|                   | 1284          | 406       | 1884. Feb. 13 | -74°4                            | 1884. Feb. 25 | +85°1                            | 11                        | 60            | 321         | 207°83                   | -9°67                   | A large regular spot, with unstable companions.                                                             |
|                   | 1320          | 407       | 1884. Mar. 11 | -82°0                            | 1884. Mar. 23 | +81°1                            | 12                        | 20            | 129         | 208°24                   | -9°67                   | A regular spot.                                                                                             |
|                   | 1357          | 408       | 1884. Apr. 8  | -71°5                            | 1884. Apr. 10 | -41°2                            | 3                         | 3             | 19          | 207°97                   | -9°33                   | A small regular spot.                                                                                       |
| 154               | 1217          | 404       | 1883. Dec. 21 | -74°8                            | 1884. Jan. 2  | +82°7                            | 10                        | 34            | 192         | 200°06                   | +1°92                   | A regular spot, with occasional companions.                                                                 |
|                   | 1256          | 405       | 1884. Jan. 17 | -77°6                            | 1884. Jan. 29 | +83°7                            | 12                        | 13            | 84          | 203°49                   | +1°28                   | A regular spot.                                                                                             |
| 155               | 1229          | 404       | 1884. Jan. 2  | -19°2                            | 1884. Jan. 9  | +75°8                            | 8                         | 6             | 59          | 100°65                   | +11°26                  | A variable group of small spots.                                                                            |
|                   | 1261          | 405       | 1884. Jan. 24 | -77°5                            | 1884. Feb. 2  | +38°7                            | 9                         | 12            | 102         | 107°63                   | +9°76                   | A regular spot, with small companions on Jan. 27 and 28.                                                    |
| 156               | 1232          | 404       | 1884. Jan. 2  | -81°2                            | 1884. Jan. 14 | +79°1                            | 13                        | 33            | 405         | 36°68                    | +10°93                  | A large stream of normal type, changing to a compact cluster.                                               |
|                   | 1266          | 405       | 1884. Jan. 29 | -80°0                            | 1884. Feb. 10 | +81°5                            | 12                        | 23            | 157         | 42°82                    | +8°46                   | A regular spot.                                                                                             |
|                   | 1301          | 406       | 1884. Feb. 25 | -82°0                            | 1884. Mar. 7  | +62°4                            | 10                        | 78            | 458         | 41°46                    | +10°42                  | A large regular spot, which divides. Small companions.                                                      |
|                   | 1339          | 407       | 1884. Mar. 24 | -72°2                            | 1884. Mar. 27 | -32°2                            | 4                         | 4             | 28          | 45°18                    | +9°53                   | A regular spot. Note.—No photograph is available for March 8.                                               |
| 157               | 1236          | 404       | 1884. Jan. 5  | +57°9                            | 1884. Jan. 7  | +79°2                            | 3                         | 10            | 122         | 134°27                   | -17°20                  | Several very small spots. One large regular spot on Jan. 7.                                                 |
|                   | 1259          | 405       | 1884. Jan. 22 | -75°9                            | 1884. Jan. 31 | +37°8                            | 9                         | 6             | 52          | 137°70                   | -16°76                  | A regular spot, disappearing by Jan. 30. Its companions vary.                                               |
| 158               | 1242          | 404       | 1884. Jan. 7  | +75°1                            | 1884. Jan. 7  | +75°1                            | 1                         | 0             | 11          | 128°10                   | +8°00                   | A small spot.                                                                                               |
|                   | 1260          | 405       | 1884. Jan. 23 | -66°6                            | 1884. Feb. 2  | +74°3                            | 10                        | 55            | 415         | 142°15                   | +6°34                   | Two small spots, which increase.                                                                            |
|                   | 1291          | 406       | 1884. Feb. 18 | -67°2                            | 1884. Feb. 27 | +52°1                            | 9                         | 24            | 148         | 151°98                   | +8°11                   | A regular spot, with companions in constant change. Note.—No photograph is available for Feb. 17.           |
| 159               | 1264          | 405       | 1884. Jan. 27 | -71°9                            | 1884. Feb. 7  | +72°6                            | 11                        | 61            | 399         | 74°65                    | +10°68                  | A large irregular variable spot, which breaks up.                                                           |
|                   | 1295          | 406       | 1884. Feb. 23 | -76°9                            | 1884. Mar. 3  | +39°7                            | 9                         | 13            | 63          | 73°61                    | +12°25                  | A regular spot.                                                                                             |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                                                      |
|-------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                                                               |
| 160               | 1267          | 405       | 1884. Jan. 30 | -80.4                            | 1884. Feb. 11 | +77.5                            | 12                        | 90            | 564         | 27.28                    | -24.53                  | A large regular spot, followed by a large irregular spot, which breaks [up.<br>A regular spot, followed by a smaller one.                                                                                                                                                     |
|                   | 1303          | 406       | Feb. 27       | -80.7                            | Mar. 10       | +79.2                            | 10                        | 16            | 116         | 19.52                    | -26.71                  |                                                                                                                                                                                                                                                                               |
| 161               | 1271          | 406       | Feb. 4        | -71.8                            | Feb. 15       | +75.1                            | 12                        | 27            | 174         | 329.44                   | +11.83                  | A large regular spot. A second appears on Feb. 14.<br>A small spot.                                                                                                                                                                                                           |
|                   | 1306          | 407       | Mar. 3        | -61.9                            | Mar. 3        | -61.9                            | 1                         | 0             | 3           | 332.30                   | +11.00                  |                                                                                                                                                                                                                                                                               |
| 162               | 1288          | 406       | Feb. 16       | -69.6                            | Feb. 27       | +82.0                            | 10                        | 38            | 284         | 177.12                   | +13.49                  | A large regular spot, with a train.<br>A regular spot.<br>Note.—No photograph is available for March 13.                                                                                                                                                                      |
|                   | 1323          | 407       | Mar. 14       | -57.3                            | Mar. 24       | +72.1                            | 11                        | 13            | 87          | 188.52                   | +13.48                  |                                                                                                                                                                                                                                                                               |
| 163               | 1298          | 406       | Feb. 25       | +50.3                            | Feb. 27       | +72.5                            | 3                         | 47            | 304         | 173.33                   | +7.57                   | Two or three small spots.<br>A regular spot, with a companion on March 21-23.<br>A regular spot, with small companions.<br>A number of variable small spots.<br>Note.—No photograph is available for March 13.                                                                |
|                   | 1324          | 407       | Mar. 14       | -65.8                            | Mar. 25       | +77.5                            | 12                        | 56            | 322         | 180.39                   | +7.48                   |                                                                                                                                                                                                                                                                               |
|                   | 1358          | 408       | Apr. 9        | -80.6                            | Apr. 21       | +77.5                            | 12                        | 19            | 187         | 182.76                   | +8.87                   |                                                                                                                                                                                                                                                                               |
|                   | 1380          | 409       | May 7         | -74.8                            | May 16        | +48.3                            | 9                         | 11            | 133         | 184.51                   | +7.01                   |                                                                                                                                                                                                                                                                               |
| 164               | 1308          | 407       | Mar. 3        | -77.2                            | Mar. 12       | +50.7                            | 8                         | 55            | 415         | 318.97                   | -9.63                   | Two large irregular spots, with small companions.<br>A large regular spot, with train on April 1-4.<br>Note.—No photograph is available for March 13.                                                                                                                         |
|                   | 1342          | 408       | Mar. 29       | -79.5                            | Apr. 9        | +71.1                            | 12                        | 13            | 108         | 333.37                   | -9.02                   |                                                                                                                                                                                                                                                                               |
| 165               | 1310          | 407       | Mar. 6        | -88.8                            | Mar. 18       | +74.6                            | 11                        | 30            | 207         | 268.12                   | -16.68                  | A regular spot, which becomes variable.<br>A regular spot.                                                                                                                                                                                                                    |
|                   | 1350          | 408       | Apr. 3        | -77.8                            | Apr. 15       | +80.6                            | 12                        | 13            | 95          | 268.09                   | -17.07                  |                                                                                                                                                                                                                                                                               |
| 166               | 1317          | 407       | Mar. 10       | -43.1                            | Mar. 19       | +71.3                            | 9                         | 16            | 130         | 254.98                   | -12.51                  | A small spot, rapidly increasing and very variable.<br>A very large spot, with small companions from April 9.<br>Two unstable small spots.                                                                                                                                    |
|                   | 1351          | 408       | Apr. 3        | -79.8                            | Apr. 15       | +80.2                            | 12                        | 67            | 611         | 266.75                   | -12.92                  |                                                                                                                                                                                                                                                                               |
|                   | 1374          | 409       | May 1         | -70.9                            | May 6         | -71                              | 6                         | 1             | 23          | 263.35                   | -10.57                  |                                                                                                                                                                                                                                                                               |
| 167               | 1330          | 407       | Mar. 18       | -74.5                            | Mar. 29       | +72.5                            | 12                        | 76            | 460         | 121.82                   | -8.68                   | A large regular spot, with a variable train.<br>A regular spot, with a small companion on Apr. 20.<br>Two regular spots, with unstable companions from April 17.<br>A regular spot. [alone is continued in 1385.<br>Note.—1330 returns as two groups, 1360 and 1363, but 1363 |
|                   | 1360          | 408       | Apr. 13       | -83.8                            | Apr. 23       | +51.1                            | 11                        | 7             | 55          | 129.18                   | -9.05                   |                                                                                                                                                                                                                                                                               |
|                   | 1363          | 408       | Apr. 15       | -70.7                            | Apr. 26       | +81.9                            | 12                        | 31            | 263         | 118.32                   | -9.52                   |                                                                                                                                                                                                                                                                               |
|                   | 1385          | 409       | May 11        | -81.5                            | May 16        | -13.2                            | 6                         | 4             | 29          | 123.87                   | -8.58                   |                                                                                                                                                                                                                                                                               |
| 168               | 1343          | 407       | Mar. 31       | -8.0                             | Apr. 7        | +82.3                            | 8                         | 130           | 1132        | 19.11                    | -10.25                  | Four spots which become a large regular spot, followed by a train.<br>A very fine stream of normal type.<br>A regular spot showing large proper motion.<br>A regular spot.<br>A small spot.<br>Note.—No photographs are available for July 13-18.                             |
|                   | 1371          | 408       | Apr. 21       | -79.3                            | May 3         | +82.6                            | 12                        | 118           | 867         | 24.69                    | -10.61                  |                                                                                                                                                                                                                                                                               |
|                   | 1393          | 409       | May 18        | -84.2                            | May 30        | +76.3                            | 12                        | 52            | 265         | 28.53                    | -9.32                   |                                                                                                                                                                                                                                                                               |
|                   | 1414          | 410       | June 14       | -78.9                            | June 25       | +67.6                            | 9                         | 16            | 111         | 31.43                    | -8.18                   |                                                                                                                                                                                                                                                                               |
|                   | 1433          | 411       | July 12       | -70.4                            | July 12       | -70.4                            | 1                         | 0             | 6           | 32.70                    | -10.30                  |                                                                                                                                                                                                                                                                               |
| 169               | 1344          | 407       | Apr. 1        | +32.2                            | Apr. 3        | +60.6                            | 3                         | 6             | 32          | 45.50                    | -12.10                  | Two small spots.<br>Two regular spots. Variable companions.<br>Two regular spots in contact. Occasional small companions.                                                                                                                                                     |
|                   | 1369          | 408       | Apr. 19       | -77.1                            | May 1         | +82.6                            | 12                        | 32            | 214         | 56.55                    | -14.02                  |                                                                                                                                                                                                                                                                               |
|                   | 1389          | 409       | May 16        | -76.1                            | May 28        | +84.0                            | 12                        | 38            | 261         | 61.50                    | -13.94                  |                                                                                                                                                                                                                                                                               |
| 170               | 1370          | 408       | Apr. 21       | +37.6                            | Apr. 24       | +75.6                            | 4                         | 54            | 329         | 143.78                   | -8.35                   | Three small spots, which increase to a variable group.<br>A very large, regular spot, with occasional small companions.<br>A large regular spot, with unstable follower.<br>A regular spot.<br>Note.—No photographs are available for June 5, or July 13-18.                  |
|                   | 1381          | 409       | May 9         | -72.5                            | May 21        | +81.4                            | 11                        | 103           | 588         | 153.12                   | -7.52                   |                                                                                                                                                                                                                                                                               |
|                   | 1409          | 410       | June 6        | -67.8                            | June 16       | +68.8                            | 8                         | 28            | 188         | 152.27                   | -6.60                   |                                                                                                                                                                                                                                                                               |
|                   | 1425          | 411       | July 3        | -70.2                            | July 12       | +47.3                            | 8                         | 14            | 82          | 151.29                   | -7.25                   |                                                                                                                                                                                                                                                                               |
| 171               | 1376          | 409       | May 6         | -39.0                            | May 15        | +77.4                            | 9                         | 34            | 331         | 232.80                   | +9.71                   | Small spots widely scattered. The preceding spot increases.<br>A regular spot, with unstable train.<br>A regular spot. [and 7.<br>Note.—No photographs are available for June 8 and 9, or July 6                                                                              |
|                   | 1403          | 410       | May 30        | -69.2                            | June 7        | +30.6                            | 7                         | 28            | 219         | 238.19                   | +8.07                   |                                                                                                                                                                                                                                                                               |
|                   | 1420          | 411       | June 26       | -72.5                            | July 5        | +45.5                            | 8                         | 10            | 62          | 239.65                   | +9.29                   |                                                                                                                                                                                                                                                                               |
| 172               | 1388          | 409       | May 15        | -77.2                            | May 27        | +82.0                            | 12                        | 26            | 175         | 74.98                    | -2.39                   | A regular spot, with occasional small companions.<br>A regular spot.                                                                                                                                                                                                          |
|                   | 1410          | 410       | June 11       | -71.9                            | June 20       | +50.3                            | 7                         | 8             | 75          | 80.04                    | -2.34                   |                                                                                                                                                                                                                                                                               |
| 173               | 1422          | 411       | June 30       | +5.0                             | July 5        | +77.1                            | 4                         | 29            | 219         | 268.07                   | +9.93                   | A small spot, becoming large regular spot with train.<br>A regular spot.<br>Note.—No photographs are available for July 21 and 22.                                                                                                                                            |
|                   | 1439          | 412       | July 20       | -82.7                            | July 20       | -82.7                            | 1                         | 4             | 67          | 272.80                   | +10.00                  |                                                                                                                                                                                                                                                                               |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                       |
|-------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                |
| 174               | 1427          | 411       | 1884.<br>July 8  | -71°6'                           | 1884.<br>July 19 | +84°4'                           | 6                         | 39            | 260         | 87°48'                   | +11°46'                 | A large irregular spot preceded by a stream.<br>A few small unstable spots.<br><i>Note.</i> —No photographs are available for July 13-18 inclusive.                                                            |
|                   | 1448          | 412       | Aug. 3           | -74°0'                           | Aug. 11          | +27°5'                           | 9                         | 1             | 21          | 92°29'                   | +13°11'                 |                                                                                                                                                                                                                |
| 175               | 1438          | 412       | July 20          | -45°1'                           | July 27          | +48°5'                           | 5                         | 31            | 210         | 311°99'                  | -3°75'                  | Three very small spots, becoming two large irregular spots.<br>A regular spot, with small companions from Aug. 14-18.<br><i>Note.</i> —No photographs are available for July 28-30 inclusive.                  |
|                   | 1455          | 413       | Aug. 13          | -74°3'                           | Aug. 24          | +71°7'                           | 11                        | 13            | 100         | 323°43'                  | -3°17'                  |                                                                                                                                                                                                                |
| 176               | 1443          | 412       | July 31          | +51°1'                           | Aug. 1           | +64°7'                           | 2                         | 4             | 32          | 261°55'                  | -15°35'                 | Two small spots close together.<br>A few small unstable spots.<br><i>Note.</i> —No photograph is available for Aug. 19.                                                                                        |
|                   | 1460          | 413       | Aug. 20          | -49°3'                           | Aug. 23          | -6°7'                            | 4                         | 3             | 17          | 257°75'                  | -15°68'                 |                                                                                                                                                                                                                |
| 177               | 1445          | 412       | July 31          | +4°9'                            | Aug. 5           | +75°3'                           | 6                         | 27            | 322         | 217°32'                  | -5°43'                  | A variable group, becoming a stream of normal type.<br>A regular spot, with a larger irregular spot following.<br><i>Note.</i> —No photographs are available for July 28-30 inclusive.                         |
|                   | 1463          | 413       | Aug. 20          | -80°8'                           | Aug. 27          | +8°5'                            | 8                         | 15            | 132         | 225°09'                  | -8°03'                  |                                                                                                                                                                                                                |
| 178               | 1446          | 412       | Aug. 1           | -42°6'                           | Aug. 10          | +81°6'                           | 10                        | 24            | 173         | 156°83'                  | +8°40'                  | A few unstable spots.<br>A small spot.<br><i>Note.</i> —No photographs are available for Aug. 30-Sept. 1 inclusive.                                                                                            |
|                   | 1468          | 413       | Aug. 26          | -66°5'                           | Aug. 29          | -26°1'                           | 4                         | 1             | 15          | 159°98'                  | +7°53'                  |                                                                                                                                                                                                                |
| 179               | 1454          | 412       | Aug. 13          | -14°2'                           | Aug. 17          | +40°4'                           | 5                         | 8             | 50          | 23°74'                   | -11°12'                 | A cluster of small spots.<br>A small regular spot.<br><i>Note.</i> —No photograph is available for Aug. 19. 1476 is possibly a revival of 1454, as the latter does not seem to have been detected [on Aug. 18. |
|                   | 1476          | 413       | Sept. 5          | -69°4'                           | Sept. 11         | +13°2'                           | 7                         | 6             | 27          | 25°87'                   | -11°39'                 |                                                                                                                                                                                                                |
| 180               | 1458          | 413       | Aug. 20          | -30°4'                           | Aug. 27          | +63°9'                           | 8                         | 45            | 366         | 276°98'                  | +4°05'                  | Small faint spots, becoming a close stream.<br>A large regular spot which divides.<br><i>Note.</i> —No photograph is available for Aug. 19.                                                                    |
|                   | 1484          | 414       | Sept. 12         | -75°3'                           | Sept. 23         | +70°9'                           | 11                        | 24            | 141         | 287°27'                  | +4°55'                  |                                                                                                                                                                                                                |
| 181               | 1465          | 413       | Aug. 24          | -28°9'                           | Aug. 29          | +37°0'                           | 6                         | 59            | 421         | 223°48'                  | +15°42'                 | Several small spots, becoming two large spots.<br>Two regular spots, with occasional small companions.<br><i>Note.</i> —No photographs are available for Aug. 30-Sept. 1 inclusive and Sept. 28 and 29.        |
|                   | 1486          | 414       | Sept. 16         | -81°6'                           | Sept. 27         | +59°3'                           | 11                        | 58            | 333         | 225°05'                  | +15°73'                 |                                                                                                                                                                                                                |
| 182               | 1477          | 413       | Sept. 6          | +41°0'                           | Sept. 9          | +78°0'                           | 4                         | 39            | 200         | 125°65'                  | -14°10'                 | A few very small spots, becoming a stream of normal type.<br>A large regular spot.<br>Two regular spots, with some small spots near them.                                                                      |
|                   | 1495          | 414       | Sept. 23         | -82°2'                           | Oct. 5           | +72°0'                           | 9                         | 43            | 243         | 133°90'                  | -13°47'                 |                                                                                                                                                                                                                |
|                   | 1518          | 415       | Oct. 21          | -77°8'                           | Oct. 28          | +16°2'                           | 7                         | 18            | 102         | 132°64'                  | -14°29'                 |                                                                                                                                                                                                                |
| 183               | 1480          | 413       | Sept. 6          | -70°8'                           | Sept. 17         | +80°3'                           | 11                        | 119           | 748         | 15°38'                   | +14°02'                 | Small spots, increasing first to a compact cluster, then to two large [spots.<br>A fine stream of normal type.                                                                                                 |
|                   | 1501          | 414       | Oct. 2           | -77°6'                           | Oct. 15          | +80°9'                           | 14                        | 112           | 780         | 15°18'                   | +14°18'                 |                                                                                                                                                                                                                |
| 184               | 1491          | 414       | Sept. 21         | -45°1'                           | Sept. 30         | +77°6'                           | 7                         | 45            | 429         | 200°78'                  | -7°29'                  | Two small spots, increasing to a regular spot, with train.<br>An irregular spot, breaking up into small spots.                                                                                                 |
|                   | 1509          | 415       | Oct. 15          | -82°0'                           | Oct. 22          | +16°6'                           | 8                         | 14            | 102         | 207°78'                  | -9°74'                  |                                                                                                                                                                                                                |
| 185               | 1516          | 415       | Oct. 20          | -24°2'                           | Oct. 28          | +81°9'                           | 8                         | 60            | 382         | 200°43'                  | -8°59'                  | Two small spots, moving apart and increasing. Small companions.<br>A very close pair of spots.                                                                                                                 |
|                   | 1538          | 416       | Nov. 12          | -71°4'                           | Nov. 16          | -18°3'                           | 5                         | 6             | 49          | 208°24'                  | -8°28'                  |                                                                                                                                                                                                                |
| 186               | 1532          | 416       | Nov. 9           | -23°6'                           | Nov. 16          | +75°3'                           | 8                         | 46            | 350         | 299°46'                  | -8°15'                  | A small spot, increasing to a large regular spot, with variable followers.<br>A regular spot.                                                                                                                  |
|                   | 1548          | 417       | Dec. 2           | -68°8'                           | Dec. 8           | +10°9'                           | 7                         | 6             | 29          | 307°10'                  | -6°56'                  |                                                                                                                                                                                                                |
| 187               | 1542          | 416       | Nov. 18          | -57°2'                           | Nov. 28          | +75°5'                           | 10                        | 45            | 355         | 142°23'                  | -7°31'                  | A small spot, becoming a large regular spot with train.<br>A large regular spot, with variable companions.                                                                                                     |
|                   | 1556          | 417       | Dec. 14          | -71°4'                           | Dec. 25          | +71°5'                           | 11                        | 37            | 245         | 145°03'                  | -6°95'                  |                                                                                                                                                                                                                |
| 188               | 1546          | 417       | Nov. 28          | -80°2'                           | Dec. 9           | +70°6'                           | 11                        | 42            | 329         | 350°29'                  | +3°72'                  | Four spots, becoming a long straight continuous stream.                                                                                                                                                        |
|                   | 1563          | 418       | Dec. 25<br>1885. | -78°1'                           | Jan. 5           | +68°0'                           | 12                        | 14            | 107         | 355°97'                  | +1°63'                  | A regular spot, with variable companions.                                                                                                                                                                      |
|                   | 1577          | 419       | Jan. 22<br>1885. | -65°6'                           | Jan. 22          | -65°6'                           | 1                         | 1             | 10          | 358°90'                  | +0°90'                  | A small spot.                                                                                                                                                                                                  |
| 189               | 1566          | 418       | 1885.<br>Jan. 1  | -58°5'                           | 1885.<br>Jan. 9  | +60°9'                           | 9                         | 7             | 47          | 287°02'                  | -12°99'                 | Two variable spots, becoming a long straight stream.<br>A large regular spot, with a train.                                                                                                                    |
|                   | 1580          | 419       | Jan. 25          | -80°4'                           | Feb. 6           | +78°2'                           | 13                        | 72            | 421         | 301°82'                  | -13°55'                 |                                                                                                                                                                                                                |



Catalogue of Recurrent Groups of Sun Spots—*continued*.

| Reference Number. | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                                                                                                      |
|-------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                                                                                                               |
| 190               | 1572          | 418       | 1885.<br>Jan. 16 | -62°7                            | 1885.<br>Jan. 26 | +70°2                            | 10                        | 35            | 240         | 80°12                    | -20°99                  | Two variable spots.                                                                                                                                                                                                                                                                                                           |
|                   | 1594          | 419       | Feb. 11          | -75°8                            | Feb. 22          | +76°3                            | 12                        | 34            | 262         | 87°88                    | -21°50                  | A group undergoing great changes.                                                                                                                                                                                                                                                                                             |
| 191               | 1573          | 418       | Jan. 18          | -6°0                             | Jan. 25          | +85°6                            | 7                         | 81            | 515         | 109°11                   | -5°44                   | Two small faint spots, which increase greatly.                                                                                                                                                                                                                                                                                |
|                   | 1592          | 419       | Feb. 8           | -86°5                            | Feb. 20          | +73°3                            | 13                        | 43            | 338         | 116°37                   | -6°02                   | A large irregular variable spot, followed by a large regular spot.                                                                                                                                                                                                                                                            |
| 192               | 1574          | 418       | Jan. 20          | -18°6                            | Jan. 26          | +62°3                            | 7                         | 2             | 25          | 71°69                    | +7°57                   | Three or four variable spots.                                                                                                                                                                                                                                                                                                 |
|                   | 1596          | 419       | Feb. 12          | -69°0                            | Feb. 23          | +80°1                            | 12                        | 21            | 136         | 78°17                    | +8°47                   | A regular spot, with scattered train.                                                                                                                                                                                                                                                                                         |
|                   | 1622          | 420       | Mar. 10          | -77°1                            | Mar. 22          | +82°8                            | 13                        | 35            | 232         | 86°35                    | +5°16                   | A large regular spot, which divides. Occasional companions.                                                                                                                                                                                                                                                                   |
|                   | 1624          | 420       | Mar. 11          | -75°4                            | Mar. 19          | +30°2                            | 9                         | 11            | 124         | 72°77                    | +9°33                   | A regular spot, which becomes an unstable group.                                                                                                                                                                                                                                                                              |
|                   | 1639          | 421       | Apr. 7           | -73°1                            | Apr. 18          | +77°9                            | 12                        | 37            | 374         | 84°01                    | +7°53                   | A large irregular group undergoing constant change.                                                                                                                                                                                                                                                                           |
|                   | 1662          | 422       | May 3            | -77°1                            | May 14           | +66°8                            | 11                        | 12            | 130         | 91°22                    | +4°33                   | A regular spot. By May 7, spots are seen <i>s.p.</i> forming a short stream.                                                                                                                                                                                                                                                  |
|                   |               |           |                  |                                  |                  |                                  |                           |               |             |                          |                         | <i>Note.</i> —The disturbance is represented in rotation 420 by two distinct groups, 1622 and 1624.                                                                                                                                                                                                                           |
| 193               | 1582          | 418       | Jan. 27          | +37°6                            | Jan. 29          | +63°2                            | 3                         | 11            | 60          | 34°23                    | -1°43                   | Two small spots, with occasional companions.                                                                                                                                                                                                                                                                                  |
|                   | 1600          | 419       | Feb. 15          | -69°4                            | Feb. 16          | -54°8                            | 2                         | 0             | 11          | 40°65                    | -3°35                   | A few very small variable spots.                                                                                                                                                                                                                                                                                              |
| (193*)            | 1586          | 419       | Jan. 30          | -69°6                            | Feb. 10          | +77°1                            | 12                        | 31            | 166         | 246°78                   | +1°60                   | A regular spot, with an occasional small companion.                                                                                                                                                                                                                                                                           |
|                   | 1612          | 420       | Feb. 26          | -79°2                            | Mar. 9           | +72°6                            | 12                        | 46            | 346         | 245°91                   | -3°45                   | A regular spot which undergoes change. Small companions.<br><i>Note.</i> —It is doubtful whether 1612 is a return of 1586, or merely an example of the action, frequently witnessed, of spot-formation on a single meridian, but alternately in latitudes of opposite sign. It has therefore not been numbered in the series. |
| 194               | 1590          | 419       | Feb. 7           | +19°1                            | Feb. 10          | +57°7                            | 4                         | 6             | 55          | 229°08                   | -20°68                  | Two or three spots, which become compact clusters.                                                                                                                                                                                                                                                                            |
|                   | 1614          | 420       | Feb. 27          | -80°7                            | Mar. 11          | +78°1                            | 13                        | 66            | 578         | 231°60                   | -18°24                  | A small spot, which becomes two large unstable streams.                                                                                                                                                                                                                                                                       |
|                   | 1632          | 421       | Mar. 26          | -77°1                            | Apr. 6           | +73°9                            | 12                        | 43            | 326         | 237°02                   | -16°07                  | A scattered group, which coalesces to form three regular spots.                                                                                                                                                                                                                                                               |
|                   | 1647          | 422       | Apr. 21          | -86°0                            | May 3            | +74°7                            | 13                        | 17            | 137         | 243°02                   | -16°35                  | A large regular spot, with occasional small companions.                                                                                                                                                                                                                                                                       |
|                   | 1675          | 423       | May 20           | -52°6                            | May 28           | +55°7                            | 8                         | 5             | 42          | 257°48                   | -15°84                  | A small spot, which becomes a straggling variable stream.                                                                                                                                                                                                                                                                     |
|                   | 1705          | 424       | June 15          | -57°4                            | June 25          | +68°6                            | 11                        | 16            | 188         | 262°63                   | -15°04                  | Two irregularly shaped groups which diminish.                                                                                                                                                                                                                                                                                 |
|                   |               |           |                  |                                  |                  |                                  |                           |               |             |                          |                         | <i>Note.</i> —Possibly 1675 is only a revival of 1647.                                                                                                                                                                                                                                                                        |
| 195               | 1597          | 419       | Feb. 13          | +18°5                            | Feb. 17          | +75°5                            | 5                         | 8             | 62          | 152°52                   | -15°34                  | A small spot, with occasional scattered companions.                                                                                                                                                                                                                                                                           |
|                   | 1618          | 420       | Mar. 4           | -82°0                            | Mar. 16          | +74°3                            | 13                        | 38            | 226         | 159°75                   | -15°28                  | A large regular spot, with occasional small companions.                                                                                                                                                                                                                                                                       |
|                   | 1636          | 421       | Apr. 1           | -73°7                            | Apr. 11          | +58°2                            | 11                        | 11            | 63          | 158°54                   | -13°65                  | A regular group.                                                                                                                                                                                                                                                                                                              |
|                   | 1656          | 422       | Apr. 28          | -81°7                            | Apr. 29          | -69°5                            | 2                         | 0             | 30          | 154°80                   | -15°85                  | A single spot, diminishing rapidly.                                                                                                                                                                                                                                                                                           |
|                   | 1657          | 422       | May 1            | -41°5                            | May 1            | -41°5                            | 1                         | 0             | 3           | 154°90                   | -13°80                  | A very small spot.<br><i>Note.</i> —1656 and 1657 form one intermittent group.                                                                                                                                                                                                                                                |
| 196               | 1638          | 421       | Apr. 4           | -71°7                            | Apr. 15          | +73°5                            | 12                        | 79            | 731         | 122°03                   | +12°31                  | A large irregular and variable group.                                                                                                                                                                                                                                                                                         |
|                   | 1658          | 422       | Apr. 30          | -77°6                            | May 11           | +70°7                            | 12                        | 23            | 214         | 133°40                   | +11°75                  | Two regular spots, with small companions.                                                                                                                                                                                                                                                                                     |
|                   | 1684          | 423       | May 27           | -75°2                            | May 29           | -49°3                            | 3                         | 1             | 12          | 136°97                   | +11°50                  | A small spot.                                                                                                                                                                                                                                                                                                                 |
| 197               | 1650          | 422       | Apr. 26          | -13°6                            | May 2            | +61°1                            | 7                         | 10            | 101         | 247°21                   | +14°87                  | A compact cluster, which becomes very unstable.                                                                                                                                                                                                                                                                               |
|                   | 1672          | 423       | May 18           | -77°5                            | May 30           | +80°4                            | 12                        | 80            | 516         | 254°21                   | +13°94                  | A very large regular spot, with occasional small companions.                                                                                                                                                                                                                                                                  |
| 198               | 1664          | 422       | May 6            | -72°7                            | May 16           | +64°3                            | 10                        | 14            | 126         | 60°20                    | -8°07                   | Two regular spots. The following spot disappears.                                                                                                                                                                                                                                                                             |
|                   | 1690          | 423       | June 1           | -80°7                            | June 13          | +74°0                            | 13                        | 92            | 814         | 61°90                    | -10°55                  | A fine group of variable spots.                                                                                                                                                                                                                                                                                               |
|                   | 1714          | 424       | June 28          | -83°6                            | July 11          | +77°7                            | 14                        | 55            | 544         | 56°31                    | -10°76                  | Seven large spots which change and break up.                                                                                                                                                                                                                                                                                  |
|                   | 1734          | 425       | July 28          | -53°2                            | July 28          | -53°2                            | 1                         | 0             | 11          | 58°50                    | -12°40                  | A small spot. [rather than a continuation of it.]                                                                                                                                                                                                                                                                             |
|                   |               |           |                  |                                  |                  |                                  |                           |               |             |                          |                         | <i>Note.</i> —1664 is a diminishing group, and 1690 is possibly a revival                                                                                                                                                                                                                                                     |
| 199               | 1677          | 423       | May 20           | -68°7                            | May 31           | +72°0                            | 11                        | 18            | 205         | 236°05                   | +9°67                   | A large irregular diminishing spot.                                                                                                                                                                                                                                                                                           |
|                   | 1706          | 424       | June 15          | -76°9                            | June 27          | +80°6                            | 12                        | 112           | 1321        | 241°11                   | +10°52                  | A large spot, followed by irregular variable mass.                                                                                                                                                                                                                                                                            |
|                   | 1720          | 425       | July 12          | -80°4                            | July 24          | +80°0                            | 13                        | 43            | 420         | 247°05                   | +9°11                   | Two principal spots, with a stream. The preceding spot breaks up.                                                                                                                                                                                                                                                             |
|                   | 1742          | 426       | Aug. 8           | -78°0                            | Aug. 19          | +71°4                            | 12                        | 4             | 70          | 252°08                   | +12°74                  | A large spot, which breaks up into variable small spots.                                                                                                                                                                                                                                                                      |
|                   |               |           |                  |                                  |                  |                                  |                           |               |             |                          |                         | <i>Note.</i> —1677 is a diminishing group, and 1706 is possibly a revival rather than a continuation of it.                                                                                                                                                                                                                   |
| 200               | 1681          | 423       | May 23           | +12°2                            | May 28           | +76°1                            | 5                         | 7             | 76          | 277°48                   | -10°08                  | A small spot, becoming a regular spot followed by a cluster.                                                                                                                                                                                                                                                                  |
|                   | 1701          | 424       | June 14          | -62°5                            | June 18          | -8°3                             | 5                         | 6             | 31          | 270°78                   | -10°76                  | A spot with an occasional companion.                                                                                                                                                                                                                                                                                          |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.     |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                              |
|-------------------|---------------|-----------|-----------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.           | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                                       |
| 201               | 1683          | 423       | 1885.<br>May 24 | +15°8                            | 1885.<br>May 27  | +59°9                            | 3                         | 4             | 34          | 270°30                   | -2°73                   | Three or four variable small spots.<br>A small regular spot. [of 1683.<br>Note.—Possibly 1700 is a fresh outburst rather than a continuation                                                                                                          |
|                   | 1700          | 424       | June 12         | -77°5                            | June 18          | +1°6                             | 7                         | 0             | 11          | 282°23                   | -1°40                   |                                                                                                                                                                                                                                                       |
| 202               | 1694          | 424       | June 7          | -70°6                            | June 18          | +76°0                            | 12                        | 103           | 572         | 356°91                   | -14°52                  | A very large spot, with companions. It breaks up by June 11.<br>A regular spot.                                                                                                                                                                       |
|                   | 1716          | 425       | July 4          | -74°7                            | July 15          | +69°5                            | 12                        | 11            | 77          | 354°03                   | -15°11                  |                                                                                                                                                                                                                                                       |
| 203               | 1710          | 424       | June 23         | -58°0                            | July 2           | +69°6                            | 9                         | 47            | 475         | 162°06                   | -13°37                  | Two spots which separate. The following spot disappears.<br>A regular spot, with occasional small followers.<br>A regular spot.                                                                                                                       |
|                   | 1728          | 425       | July 17         | -79°8                            | July 29          | +77°9                            | 13                        | 73            | 396         | 175°12                   | -11°35                  |                                                                                                                                                                                                                                                       |
|                   | 1748          | 426       | Aug. 14         | -71°3                            | Aug. 25          | +71°2                            | 12                        | 35            | 213         | 173°17                   | -13°93                  |                                                                                                                                                                                                                                                       |
| 204               | 1715          | 424       | July 1          | -58°1                            | July 11          | +74°1                            | 11                        | 55            | 641         | 53°00                    | -18°90                  | A small spot, which becomes two large spots, which coalesce.<br>Two spots, with occasional companions.                                                                                                                                                |
|                   | 1733          | 425       | July 27         | -73°5                            | Aug. 7           | +67°7                            | 12                        | 23            | 239         | 48°85                    | -21°51                  |                                                                                                                                                                                                                                                       |
| 205               | 1717          | 424       | July 5          | +24°8                            | July 8           | +67°9                            | 4                         | 10            | 127         | 83°70                    | -16°85                  | A spot with varying followers.<br>Two or three variable spots.                                                                                                                                                                                        |
|                   | 1732          | 425       | July 24         | -72°2                            | Aug. 3           | +69°1                            | 11                        | 7             | 50          | 98°60                    | -12°61                  |                                                                                                                                                                                                                                                       |
| 206               | 1718          | 425       | July 9          | -72°5                            | July 20          | +77°5                            | 12                        | 39            | 265         | 292°31                   | -8°46                   | A regular spot, with faint follower.<br>A regular spot, with variable companions.                                                                                                                                                                     |
|                   | 1737          | 426       | Aug. 5          | -67°7                            | Aug. 16          | +76°1                            | 12                        | 33            | 242         | 298°42                   | -11°22                  |                                                                                                                                                                                                                                                       |
| 207               | 1726          | 425       | July 17         | +31°8                            | July 19          | +63°7                            | 3                         | 3             | 43          | 289°67                   | -11°70                  | Three well-defined spots. Only one small spot is seen on July 19.<br>A regular spot. By Aug. 8 a following stream is seen.<br>A regular spot, with an occasional small companion.                                                                     |
|                   | 1738          | 426       | Aug. 5          | -78°9                            | Aug. 17          | +82°6                            | 13                        | 26            | 204         | 288°31                   | -11°37                  |                                                                                                                                                                                                                                                       |
|                   | 1759          | 427       | Sept. 1         | -76°0                            | Sept. 12         | +67°3                            | 12                        | 12            | 88          | 293°37                   | -12°42                  |                                                                                                                                                                                                                                                       |
| 208               | 1756          | 426       | Aug. 27         | -62°0                            | Sept. 7          | +81°2                            | 11                        | 21            | 252         | 18°43                    | -4°83                   | A well-defined spot, with three fainter variable spots preceding.<br>A large regular spot, with a small companion on Sept. 25.                                                                                                                        |
|                   | 1767          | 427       | Sept. 21        | -76°4                            | Oct. 3           | +79°0                            | 13                        | 14            | 123         | 28°33                    | -2°64                   |                                                                                                                                                                                                                                                       |
| 209               | 1757          | 427       | Aug. 28         | -80°6                            | Sept. 9          | +77°0                            | 12                        | 38            | 350         | 341°14                   | +10°32                  | Two variable spots. Occasional small companions.<br>A regular spot, with a very small companion on Sept. 28.                                                                                                                                          |
|                   | 1770          | 428       | Sept. 25        | -68°3                            | Oct. 5           | +61°7                            | 11                        | 11            | 78          | 344°60                   | +11°97                  |                                                                                                                                                                                                                                                       |
| 210               | 1763          | 427       | Sept. 8         | -73°5                            | Sept. 19         | +68°7                            | 12                        | 82            | 558         | 203°15                   | -13°55                  | A very large and variable spot. Occasional small companions.<br>A regular spot, which breaks up.                                                                                                                                                      |
|                   | 1775          | 428       | Oct. 5          | -82°9                            | Oct. 14          | +34°9                            | 10                        | 15            | 85          | 200°59                   | -13°94                  |                                                                                                                                                                                                                                                       |
| 211               | 1764          | 427       | Sept. 13        | +42°4                            | Sept. 14         | +61°3                            | 2                         | 0             | 113         | 257°00                   | -16°00                  | A group of faint spots.<br>Two large regular spots, with small companions.<br>A large regular spot, with very small companions on Nov. 3-4.                                                                                                           |
|                   | 1773          | 428       | Oct. 1          | -71°0                            | Oct. 13          | +76°9                            | 13                        | 89            | 557         | 261°05                   | -16°82                  |                                                                                                                                                                                                                                                       |
|                   | 1788          | 429       | Oct. 28         | -74°2                            | Nov. 9           | +77°3                            | 13                        | 37            | 189         | 260°50                   | -15°08                  |                                                                                                                                                                                                                                                       |
| 212               | 1783          | 428       | Oct. 20         | -77°9                            | Nov. 1           | +81°3                            | 13                        | 26            | 192         | 4°08                     | -3°85                   | A regular diminishing spot. Occasional small followers.<br>A stream of small spots; not seen on Nov. 25.<br>Note.—1797 is intermittent, not being seen on Nov. 25.                                                                                    |
|                   | 1797          | 429       | Nov. 17         | -70°1                            | Nov. 26          | +44°4                            | 10                        | 5             | 48          | 5°57                     | -3°56                   |                                                                                                                                                                                                                                                       |
| 213               | 1795          | 429       | Nov. 13         | -77°0                            | Nov. 24          | +70°3                            | 12                        | 88            | 536         | 53°73                    | +14°82                  | Two large diminishing spots, with very small companions.<br>A large regular spot, which divides. Occasional small companions.                                                                                                                         |
|                   | 1806          | 430       | Dec. 10         | -76°5                            | Dec. 21          | +65°0                            | 12                        | 22            | 140         | 53°29                    | +15°22                  |                                                                                                                                                                                                                                                       |
| 214               | 1803          | 430       | Dec. 2          | +42°3                            | Dec. 5           | +81°3                            | 4                         | 6             | 127         | 279°55                   | +14°15                  | A short stream, whose leader is largest and alone remains by Dec. 4.<br>A large regular spot, with very small companion on Dec. 24-25.                                                                                                                |
|                   | 1813          | 431       | Dec. 20         | -74°7                            | Dec. 31          | +70°7                            | 12                        | 30            | 182         | 288°15                   | +17°13                  |                                                                                                                                                                                                                                                       |
| 215               | 1812          | 430       | Dec. 20         | +23°0                            | Dec. 23          | +61°4                            | 4                         | 1             | 16          | 24°73                    | -4°58                   | One or two small spots.<br>Three regular spots, which become unstable.                                                                                                                                                                                |
|                   | 1826          | 431       | 1886.<br>Jan. 8 | -79°1                            | 1886.<br>Jan. 17 | +43°8                            | 10                        | 44            | 327         | 32°72                    | -3°73                   |                                                                                                                                                                                                                                                       |
| 216               | 1821          | 431       | 1886.<br>Jan. 2 | -81°1                            | 1886.<br>Jan. 15 | +86°5                            | 13                        | 60            | 416         | 104°84                   | -13°92                  | A large regular spot, which breaks up. Unstable followers.<br>A large regular spot, with occasional companions.                                                                                                                                       |
|                   | 1833          | 432       | Jan. 30         | -74°7                            | Feb. 11          | +80°0                            | 13                        | 17            | 140         | 107°75                   | -14°91                  |                                                                                                                                                                                                                                                       |
| 217               | 1828          | 431       | Jan. 12         | -31°9                            | Jan. 21          | +86°2                            | 9                         | 54            | 538         | 29°48                    | -10°09                  | Four clusters, becoming regular spot with variable train.<br>A very large regular spot which divides. Occasional small companions.<br>A large regular spot. A fluctuating stream suddenly appears south.<br>A small spot, with one or two companions. |
|                   | 1835          | 432       | Feb. 4          | -75°8                            | Feb. 16          | +78°1                            | 13                        | 72            | 422         | 35°34                    | -9°50                   |                                                                                                                                                                                                                                                       |
|                   | 1852          | 433       | Mar. 3          | -81°8                            | Mar. 15          | +74°5                            | 13                        | 30            | 226         | 35°68                    | -8°72                   |                                                                                                                                                                                                                                                       |
|                   | 1863          | 434       | Mar. 31         | -70°6                            | Apr. 7           | +19°5                            | 8                         | 1             | 18          | 37°74                    | -11°34                  |                                                                                                                                                                                                                                                       |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                   |
|------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|------------------------------------------------------------------------------------------------------------|
|                  |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                            |
| 218              | 1840          | 432       | 1886.<br>Feb. 11 | -1°9'                            | 1886.<br>Feb. 17 | +82°3'                           | 7                         | 7             | 68          | 25°43'                   | -5°73'                  | A very small spot, becoming a straggling unstable stream.                                                  |
|                  | 1853          | 433       | Mar. 4           | -79°8'                           | Mar. 16          | +76°1'                           | 13                        | 94            | 651         | 22°90'                   | -5°05'                  | A very large regular spot, followed by an unstable stream.                                                 |
|                  | 1864          | 434       | Mar. 31          | -82°9'                           | Apr. 12          | +78°5'                           | 13                        | 49            | 256         | 26°66'                   | -5°42'                  | A large regular spot, with occasional companions.                                                          |
|                  | 1876          | 435       | Apr. 27          | -80°9'                           | May 9            | +79°8'                           | 13                        | 21            | 167         | 32°17'                   | -6°51'                  | A large regular spot.                                                                                      |
|                  | 1886          | 436       | May 24           | -84°8'                           | May 31           | +14°9'                           | 8                         | 5             | 37          | 34°85'                   | -5°85'                  | A small regular spot.                                                                                      |
| 219              | 1849          | 433       | Mar. 2           | -6°4'                            | Mar. 8           | +75°3'                           | 7                         | 45            | 391         | 125°69'                  | -1°29'                  | Two small spots, becoming large spot, with variable preceding stream.                                      |
|                  | 1859          | 434       | Mar. 23          | -80°2'                           | Apr. 4           | +76°6'                           | 13                        | 38            | 323         | 135°90'                  | -1°30'                  | Two large regular spots, with occasional small companions.                                                 |
|                  | 1872          | 435       | Apr. 19          | -79°9'                           | May 1            | +80°2'                           | 13                        | 14            | 170         | 139°36'                  | -1°38'                  | A large variable spot, followed by a faint variable irregular spot.                                        |
| 220              | 1856          | 434       | Mar. 18          | -82°3'                           | Mar. 30          | +76°3'                           | 13                        | 44            | 275         | 199°60'                  | +5°36'                  | A large regular fluctuating spot, followed by a short stream.                                              |
|                  | 1869          | 435       | Apr. 15          | -67°2'                           | Apr. 26          | +78°1'                           | 12                        | 14            | 96          | 201°77'                  | +4°25'                  | A large regular diminishing spot, with distant companion on Apr. 24.                                       |
| 221              | 1860          | 434       | Mar. 26          | -61°0'                           | Apr. 5           | +78°1'                           | 11                        | 57            | 487         | 116°04'                  | -16°79'                 | Three small spots, increasing to two large spots.                                                          |
|                  | 1874          | 435       | Apr. 20          | -83°3'                           | May 3            | +83°3'                           | 14                        | 64            | 413         | 117°54'                  | -18°26'                 | A large regular spot, with occasional small companions.                                                    |
| 222              | 1878          | 435       | Apr. 29          | -15°2'                           | May 6            | +75°3'                           | 8                         | 65            | 606         | 69°21'                   | -11°45'                 | Two small spots, becoming an irregular stream, and later two very                                          |
|                  | 1884          | 436       | May 21           | -80°3'                           | June 2           | +78°4'                           | 13                        | 70            | 328         | 74°23'                   | -10°64'                 | A large regular spot. Diminishing.                                                                         |
|                  | 1897          | 437       | June 17          | -81°6'                           | June 28          | +61°9'                           | 12                        | 17            | 153         | 74°10'                   | -11°69'                 | A large regular spot. Diminishing.                                                                         |
|                  | 1906          | 438       | July 15          | -75°1'                           | July 26          | +75°0'                           | 12                        | 55            | 346         | 73°47'                   | -9°37'                  | A small spot, increasing to a large regular variable spot, with train.                                     |
|                  | 1915          | 439       | Aug. 11          | -72°1'                           | Aug. 20          | +49°3'                           | 10                        | 15            | 84          | 79°05'                   | -9°33'                  | A regular spot, with small companion on Aug. 12-13.                                                        |
| 223              | 1888          | 436       | May 30           | +56°3'                           | June 1           | +81°1'                           | 3                         | 41            | 210         | 90°20'                   | -12°63'                 | Two spots, which increase and separate.                                                                    |
|                  | 1896          | 437       | June 16          | -71°6'                           | June 26          | +60°1'                           | 11                        | 14            | 81          | 98°09'                   | -15°00'                 | A regular spot, with small companion on June 23.                                                           |
| 224              | 1891          | 437       | June 3           | -48°9'                           | June 12          | +81°2'                           | 10                        | 83            | 509         | 302°59'                  | -14°72'                 | Three small spots, increasing to a regular spot, with train.                                               |
|                  | 1901          | 438       | June 27          | -80°5'                           | July 9           | +75°1'                           | 13                        | 56            | 407         | 302°09'                  | -15°34'                 | A large regular spot, with fluctuating companions.                                                         |
|                  | 1910          | 439       | July 25          | -76°3'                           | Aug. 5           | +72°0'                           | 12                        | 22            | 140         | 300°53'                  | -13°28'                 | A regular spot, with two very small companions on July 31.                                                 |
| 225              | 1937          | 442       | Oct. 29          | +68°1'                           | Oct. 30          | +74°6'                           | 2                         | 0             | 29          | 253°05'                  | -6°30'                  | One or two small spots.                                                                                    |
|                  | 1939          | 443       | Nov. 15          | -61°3'                           | Nov. 17          | -31°6'                           | 3                         | 0             | 6           | 263°77'                  | -4°90'                  | One or two very small spots.<br>Note.—1939 is possibly a fresh outbreak and not a return of 1937.          |
| 226              | 1958          | 446       | 1887.<br>Feb. 19 | -71°2'                           | 1887.<br>Mar. 2  | +76°2'                           | 12                        | 12            | 89          | 70°69'                   | +11°23'                 | A regular spot. Other spots appear, of which one is large.                                                 |
|                  | 1962          | 447       | Mar. 17          | -76°4'                           | Mar. 22          | -4°9'                            | 6                         | 10            | 61          | 83°35'                   | +12°78'                 | A spot, with occasional companions.<br>Note.—1962 is possibly a fresh outbreak and not a return of 1958.   |
| 227              | 1973          | 449       | May 2            | -81°1'                           | May 14           | +82°7'                           | 13                        | 40            | 287         | 191°02'                  | +12°65'                 | A large regular spot, followed by small unstable spots.                                                    |
|                  | 1974          | 450       | May 30           | -66°5'                           | May 30           | -66°5'                           | 1                         | 0             | 10          | 193°40'                  | +11°40'                 | A small faint spot.                                                                                        |
| 228              | 1978          | 449       | May 14           | -31°3'                           | May 21           | +67°1'                           | 8                         | 56            | 383         | 80°35'                   | -9°19'                  | Two or three small faint spots, becoming a stream of normal type.                                          |
|                  | 1987          | 450       | June 6           | -68°8'                           | June 18          | +84°4'                           | 13                        | 95            | 525         | 95°01'                   | -8°51'                  | Two large spots, with occasional companions.                                                               |
|                  | 1992          | 451       | July 2           | -82°4'                           | July 14          | +76°2'                           | 13                        | 34            | 200         | 97°18'                   | -7°28'                  | A large regular spot, with occasional companions.                                                          |
|                  | 1998          | 452       | July 30          | -71°2'                           | Aug. 9           | +60°9'                           | 11                        | 9             | 66          | 97°53'                   | -7°49'                  | A regular spot.<br>Note.—No photograph is available for May 22.                                            |
| 229              | 1991          | 451       | June 27          | -69°4'                           | July 8           | +79°5'                           | 12                        | 31            | 185         | 179°21'                  | -11°60'                 | A large regular spot, with occasional companions. Diminishing.                                             |
|                  | 1996          | 452       | July 24          | -67°4'                           | July 28          | -14°8'                           | 5                         | 2             | 14          | 182°16'                  | -13°14'                 | A small spot, with a very small companion on July 28.                                                      |
| 230              | 2005          | 453       | Aug. 27          | +67°4'                           | Aug. 28          | +77°5'                           | 2                         | 0             | 49          | 226°55'                  | +4°50'                  | Two small spots.                                                                                           |
|                  | 2008          | 454       | Sept. 14         | -52°1'                           | Sept. 24         | +76°3'                           | 11                        | 47            | 321         | 232°93'                  | +4°91'                  | Three small spots, which become a fine stream of normal type.<br>Note.—2008 may be only a revival of 2005. |
| 231              | 2021          | 457       | Dec. 3           | -81°0'                           | Dec. 15          | +72°7'                           | 13                        | 68            | 571         | 223°74'                  | -7°62'                  | A fine long variable stream.                                                                               |
|                  | 2026          | 458       | Dec. 31          | -74°2'                           | 1888.<br>Jan. 10 | +59°7'                           | 11                        | 22            | 134         | 227°85'                  | -7°98'                  | A regular spot.                                                                                            |
| 232              | 2024          | 457       | Dec. 14          | -79°5'                           | 1887.<br>Dec. 26 | +79°8'                           | 13                        | 102           | 712         | 81°44'                   | -7°98'                  | A very large regular spot with train, all undergoing great changes.                                        |
|                  | 2029          | 458       | 1888.<br>Jan. 10 | -84°0'                           | 1888.<br>Jan. 21 | +60°5'                           | 12                        | 21            | 128         | 84°74'                   | -8°66'                  | A regular spot with occasional small companions.<br>Note.—No photograph is available for 1888 Jan. 22.     |

## CATALOGUE OF RECURRENT GROUPS OF SUN SPOTS FOR THE YEARS 1874 TO 1906.

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                              |
|-------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                       |
| 233               | 2033          | 459       | 1888.<br>Jan. 30 | +28°9'                           | 1888.<br>Feb. 2  | +65°3'                           | 4                         | 9             | 48          | 291°85'                  | -5°90'                  | A very small spot, with occasional small followers.                                                                                                                                                                   |
|                   | 2035          | 460       | Feb. 18          | -79°3'                           | Feb. 29          | +68°2'                           | 11                        | 31            | 220         | 297°25'                  | -4°66'                  | A long straggling variable stream.                                                                                                                                                                                    |
|                   | 2039          | 461       | Mar. 16          | -74°5'                           | Mar. 19          | -33°2'                           | 4                         | 4             | 46          | 307°15'                  | -4°35'                  | Two or three small spots.                                                                                                                                                                                             |
| 234               | 2056          | 464       | June 24          | +3°4'                            | June 29          | +72°5'                           | 6                         | 8             | 66          | 139°58'                  | +4°63'                  | A small spot, with an irregular train.                                                                                                                                                                                |
|                   | 2060          | 465       | July 15          | -70°5'                           | July 19          | -14°4'                           | 5                         | 1             | 10          | 150°30'                  | +5°98'                  | A small spot, not seen on July 18.<br>Note.—2060 is intermittent, not being seen on July 18.                                                                                                                          |
| 235               | 2070          | 467       | Sept. 6          | -71°4'                           | Sept. 16         | +60°1'                           | 11                        | 11            | 57          | 163°78'                  | -14°93'                 | A regular spot, preceded by an irregular cluster of unstable spots.                                                                                                                                                   |
|                   | 2072          | 468       | Oct. 3           | -74°1'                           | Oct. 3           | -74°1'                           | 1                         | 0             | 22          | 166°80'                  | -14°50'                 | A small spot.                                                                                                                                                                                                         |
| 236               | 2075          | 469       | Nov. 11          | -72°7'                           | Nov. 22          | +72°7'                           | 12                        | 35            | 193         | 15°64'                   | -3°97'                  | A regular spot, with occasional companions.                                                                                                                                                                           |
|                   | 2077          | 470       | Dec. 9           | -61°1'                           | Dec. 9           | -61°1'                           | 1                         | 0             | 9           | 19°70'                   | -3°70'                  | A small spot.                                                                                                                                                                                                         |
| 237               | 2085          | 474       | 1889.<br>Mar. 13 | +24°5'                           | 1889.<br>Mar. 17 | +79°4'                           | 5                         | 17            | 110         | 308°20'                  | +6°24'                  | Three or four variable spots.                                                                                                                                                                                         |
|                   | 2086          | 475       | Apr. 1           | -71°2'                           | Apr. 11          | +55°9'                           | 11                        | 12            | 71          | 315°14'                  | +5°29'                  | A regular spot.                                                                                                                                                                                                       |
| 238               | 2090          | 477       | June 16          | -74°3'                           | June 28          | +86°9'                           | 13                        | 89            | 500         | 30°60'                   | -5°47'                  | A large spot, followed by an unstable cluster.                                                                                                                                                                        |
|                   | 2092          | 478       | July 12          | -82°3'                           | July 24          | +74°3'                           | 13                        | 54            | 318         | 36°30'                   | -7°94'                  | A regular spot, with occasional companions. Fresh outburst by                                                                                                                                                         |
|                   | 2099          | 479       | Aug. 9           | -75°5'                           | Aug. 20          | +71°5'                           | 12                        | 15            | 73          | 36°91'                   | -8°14'                  | A regular spot, with occasional companions. [July 18.                                                                                                                                                                 |
| 239               | 2097          | 479       | Aug. 2           | -45°3'                           | Aug. 11          | +77°4'                           | 10                        | 52            | 336         | 161°46'                  | -20°65'                 | Two very small spots, increasing to a stream of normal type.                                                                                                                                                          |
|                   | 2100          | 480       | Aug. 27          | -70°4'                           | Sept. 7          | +69°2'                           | 12                        | 37            | 198         | 160°38'                  | -19°35'                 | A regular spot.                                                                                                                                                                                                       |
| 240               | 2102          | 480       | Sept. 7          | +56°7'                           | Sept. 8          | +74°4'                           | 2                         | 10            | 113         | 148°75'                  | -22°40'                 | Two or three variable spots.                                                                                                                                                                                          |
|                   | 2103          | 481       | Sept. 24         | -71°6'                           | Oct. 4           | +63°1'                           | 11                        | 26            | 141         | 152°53'                  | -20°91'                 | A regular spot, with occasional companions.                                                                                                                                                                           |
| 241               | 2108          | 484       | Dec. 12          | +74°3'                           | Dec. 13          | +85°3'                           | 2                         | 4             | 72          | 334°50'                  | -7°45'                  | A regular spot.                                                                                                                                                                                                       |
|                   | 2111          | 485       | Dec. 27          | -83°9'                           | 1890.<br>Jan. 7  | +67°0'                           | 12                        | 14            | 62          | 343°92'                  | -9°27'                  | A regular spot.                                                                                                                                                                                                       |
| (241*)            | 2141          | 493       | 1890.<br>Aug. 25 | -77°8'                           | 1890.<br>Sept. 6 | +78°8'                           | 13                        | 96            | 601         | 40°70'                   | +21°14'                 | Two spots, which increase to a large complicated group.                                                                                                                                                               |
|                   | 2151          | 494       | Sept. 24         | -48°7'                           | Oct. 1           | +45°4'                           | 7                         | 14            | 89          | 37°19'                   | +22°19'                 | Two small spots, which increase to a straggling stream.<br>Note.—2151 is only a revival of 2141.                                                                                                                      |
| 242               | 2159          | 497       | Nov. 22          | -71°9'                           | Dec. 4           | +82°2'                           | 13                        | 72            | 421         | 312°44'                  | +19°91'                 | Two spots, which increase to five large fluctuating spots.                                                                                                                                                            |
|                   | 2165          | 498       | Dec. 20          | -70°6'                           | Dec. 21          | -54°7'                           | 2                         | 0             | 13          | 310°05'                  | +20°15'                 | A small spot.<br>Note.—2165 after Dec. 22 appears to be a new formation, and should be numbered as a distinct group.                                                                                                  |
| 243               | 2172          | 499       | 1891.<br>Jan. 19 | -70°3'                           | 1891.<br>Jan. 22 | -26°5'                           | 4                         | 0             | 15          | 274°50'                  | -22°70'                 | Two or three faint variable spots not seen on Jan. 21.                                                                                                                                                                |
|                   | 2174          | 499       | Jan. 25          | +9°4'                            | Jan. 29          | +59°0'                           | 4                         | 1             | 32          | 272°33'                  | -24°60'                 | An irregular group of many small spots, not seen on Jan. 28.                                                                                                                                                          |
|                   | 2182          | 500       | Feb. 13          | -75°1'                           | Feb. 24          | +34°7'                           | 10                        | 5             | 47          | 271°14'                  | -22°73'                 | A few unstable spots in a straggling stream, not seen on Feb. 18.<br>Note.—2172 and 2174 are themselves intermittent and together form one intermittent group. 2182 is also intermittent, not being seen [on Feb. 18. |
| 244               | 2179          | 499       | Feb. 10          | -21°8'                           | Feb. 17          | +75°8'                           | 8                         | 44            | 216         | 34°99'                   | +15°65'                 | A long stream of small spots, whose leader alone remains on Feb. 15.                                                                                                                                                  |
|                   | 2190          | 500       | Mar. 5           | -70°7'                           | Mar. 13          | +35°9'                           | 9                         | 15            | 80          | 39°12'                   | +15°89'                 | A double spot with companions. Many changes.                                                                                                                                                                          |
| 245               | 2180          | 499       | Feb. 11          | -10°2'                           | Feb. 17          | +69°6'                           | 7                         | 6             | 30          | 28°40'                   | -18°64'                 | A few very variable small spots.                                                                                                                                                                                      |
|                   | 2187          | 500       | Mar. 4           | -84°8'                           | Mar. 7           | -43°4'                           | 4                         | 2             | 22          | 41°10'                   | -20°33'                 | One or two small spots.                                                                                                                                                                                               |
| 246               | 2183          | 500       | Feb. 16          | -57°7'                           | Feb. 25          | +66°0'                           | 10                        | 86            | 394         | 277°22'                  | +19°18'                 | A cluster of small spots, which becomes a stream of normal type.                                                                                                                                                      |
|                   | 2193          | 501       | Mar. 13          | -77°1'                           | Mar. 25          | +77°4'                           | 13                        | 40            | 194         | 284°70'                  | +19°61'                 | A large regular spot.                                                                                                                                                                                                 |
| 247               | 2199          | 502       | Apr. 14          | +14°8'                           | Apr. 19          | +76°9'                           | 6                         | 27            | 153         | 317°25'                  | +22°45'                 | Three small spots, which increase to two pairs of spots.                                                                                                                                                              |
|                   | 2210          | 503       | May 4            | -79°2'                           | May 15           | +67°2'                           | 12                        | 10            | 108         | 313°99'                  | +22°39'                 | An irregular group of small spots undergoing changes.                                                                                                                                                                 |
|                   | 2231          | 504       | June 1           | -80°8'                           | June 11          | +60°4'                           | 11                        | 18            | 132         | 310°17'                  | +23°02'                 | A regular spot with companions, one being large.<br>Note.—2210 is intermittent, not being seen on May 14.                                                                                                             |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.  |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                                                        |
|------------------|---------------|-----------|---------------|----------------------------------|-------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |               |           | Date.         | Longitude from Central Meridian. | Date.       | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                                                                 |
| 248              | 2204          | 502       | 1891. Apr. 21 | -74.9                            | 1891. May 2 | +72.8                            | 12                        | 68            | 394         | 135.59                   | -19.77                  | A large regular spot, followed by a fine but diminishing train.<br>A regular spot.                                                                                                                                                                                              |
|                  | 2220          | 503       | May 18        | -79.9                            | May 29      | +68.5                            | 12                        | 9             | 56          | 135.53                   | -19.43                  |                                                                                                                                                                                                                                                                                 |
| 249              | 2205          | 502       | Apr. 22       | +16.0                            | Apr. 26     | +75.8                            | 5                         | 25            | 157         | 215.78                   | +16.74                  | Small spots, becoming a fine regular spot with train.<br>A regular spot, with a small companion on May 16.                                                                                                                                                                      |
|                  | 2216          | 503       | May 12        | -73.3                            | May 22      | +59.9                            | 11                        | 19            | 100         | 218.48                   | +16.32                  |                                                                                                                                                                                                                                                                                 |
| 250              | 2219          | 503       | May 17        | -67.1                            | May 28      | +79.5                            | 12                        | 55            | 341         | 159.31                   | +16.20                  | A regular spot, with a train. The whole increases.<br>Two small faint spots, which increase to a large irregular group.<br>A fine stream parallel to the sun's equator.<br>A large regular spot, which divides. A small companion on Aug. 11.                                   |
|                  | 2236          | 504       | June 13       | -61.0                            | June 23     | +72.4                            | 11                        | 15            | 115         | 168.21                   | +14.24                  |                                                                                                                                                                                                                                                                                 |
|                  | 2255          | 505       | July 8        | -83.4                            | July 20     | +83.6                            | 13                        | 49            | 309         | 179.61                   | +15.65                  |                                                                                                                                                                                                                                                                                 |
|                  | 2277          | 506       | Aug. 4        | -77.4                            | Aug. 16     | +77.1                            | 13                        | 27            | 166         | 181.98                   | +17.00                  |                                                                                                                                                                                                                                                                                 |
| 251              | 2221          | 503       | May 19        | -79.5                            | May 29      | +59.0                            | 11                        | 11            | 72          | 125.24                   | +20.17                  | A regular spot, at first; later a variable diminishing stream.<br>A large regular spot, with diminishing train.<br>Two regular spots, which coalesce. Large companions form near.<br>A few very small unstable spots.<br><i>Note.</i> —2283 is possibly only a revival of 2258. |
|                  | 2237          | 504       | June 14       | -75.1                            | June 26     | +84.6                            | 13                        | 41            | 277         | 138.95                   | +18.20                  |                                                                                                                                                                                                                                                                                 |
|                  | 2258          | 505       | July 12       | -78.4                            | July 24     | +83.4                            | 13                        | 94            | 544         | 130.10                   | +20.00                  |                                                                                                                                                                                                                                                                                 |
|                  | 2283          | 506       | Aug. 10       | -50.5                            | Aug. 15     | +18.2                            | 6                         | 2             | 22          | 132.68                   | +19.50                  |                                                                                                                                                                                                                                                                                 |
| 252              | 2222          | 503       | May 22        | +41.3                            | May 25      | +72.4                            | 4                         | 0             | 15          | 196.80                   | +25.55                  | One or two small faint spots, not seen on May 23 and 24.<br>A small faint spot. A fresh outbreak occurs on June 12.<br><i>Note.</i> —2222 is intermittent, not being seen on May 23 and 24.                                                                                     |
|                  | 2235          | 504       | June 10       | -76.2                            | June 20     | +60.8                            | 11                        | 11            | 74          | 199.74                   | +26.07                  |                                                                                                                                                                                                                                                                                 |
| 253              | 2238          | 504       | June 15       | +60.5                            | June 16     | +76.7                            | 2                         | 47            | 337         | 264.35                   | +20.70                  | Two small spots, which increase greatly.<br>Two large regular spots, with companions. Fresh spots break out.<br>Two variable compact clusters, which break up by July 31.                                                                                                       |
|                  | 2252          | 505       | July 1        | -76.2                            | July 12     | +72.5                            | 12                        | 47            | 298         | 276.53                   | +19.00                  |                                                                                                                                                                                                                                                                                 |
|                  | 2270          | 506       | July 27       | -80.5                            | Aug. 2      | +3.8                             | 7                         | 11            | 114         | 288.11                   | +15.64                  |                                                                                                                                                                                                                                                                                 |
| 254              | 2239          | 504       | June 16       | -3.6                             | June 21     | +62.7                            | 6                         | 4             | 45          | 183.48                   | +26.83                  | Two irregular spots, of which one alone remains by June 18.<br>A fine stream of normal type.<br>A large regular spot, followed by a faint diminishing irregular spot.<br>A large regular spot, with diminishing train.<br>A regular spot, with an occasional companion.         |
|                  | 2256          | 505       | July 9        | -72.9                            | July 21     | +85.7                            | 13                        | 48            | 256         | 173.14                   | +24.78                  |                                                                                                                                                                                                                                                                                 |
|                  | 2278          | 506       | Aug. 4        | -82.3                            | Aug. 16     | +71.4                            | 13                        | 42            | 280         | 177.05                   | +24.28                  |                                                                                                                                                                                                                                                                                 |
|                  | 2294          | 507       | Aug. 31       | -84.6                            | Sept. 13    | +83.2                            | 14                        | 62            | 366         | 176.98                   | +25.48                  |                                                                                                                                                                                                                                                                                 |
|                  | 2311          | 508       | Sept. 28      | -80.8                            | Oct. 10     | +68.5                            | 13                        | 19            | 108         | 170.52                   | +26.65                  |                                                                                                                                                                                                                                                                                 |
| 255              | 2240          | 504       | June 17       | +39.2                            | June 20     | +72.9                            | 4                         | 2             | 49          | 213.90                   | +22.13                  | Two or three small spots.<br>A fine stream, greatly inclined to sun's equator. Unstable.<br>A regular spot, which breaks up. Not seen on Aug. 9.<br><i>Note.</i> —2272 is intermittent, not being seen on Aug. 9.                                                               |
|                  | 2254          | 505       | July 6        | -71.2                            | July 17     | +83.0                            | 12                        | 55            | 384         | 219.13                   | +20.42                  |                                                                                                                                                                                                                                                                                 |
|                  | 2272          | 506       | Aug. 1        | -77.4                            | Aug. 10     | +40.0                            | 10                        | 4             | 47          | 222.69                   | +18.21                  |                                                                                                                                                                                                                                                                                 |
| 256              | 2244          | 504       | June 21       | -76.3                            | July 3      | +80.0                            | 13                        | 25            | 154         | 43.34                    | +16.12                  | A large regular spot, with occasional small faint companions.<br>A regular spot which breaks up. The group becomes unstable.<br>A short stream of very small spots.<br><i>Note.</i> —2265 very nearly dies out on July 25.                                                      |
|                  | 2265          | 505       | July 19       | -65.4                            | July 29     | +62.7                            | 11                        | 12            | 68          | 45.31                    | +16.34                  |                                                                                                                                                                                                                                                                                 |
|                  | 2285          | 506       | Aug. 16       | -59.9                            | Aug. 20     | -4.4                             | 5                         | 2             | 13          | 45.42                    | +14.30                  |                                                                                                                                                                                                                                                                                 |
| 257              | 2247          | 504       | June 24       | -45.7                            | July 3      | +72.4                            | 10                        | 70            | 391         | 34.92                    | -20.90                  | Two or three small spots, which increase to a stream of normal type.<br>A regular spot. Occasional companions.                                                                                                                                                                  |
|                  | 2266          | 505       | July 20       | -69.1                            | July 25     | -4.0                             | 6                         | 13            | 63          | 29.73                    | -22.53                  |                                                                                                                                                                                                                                                                                 |
| 258              | 2271          | 506       | Aug. 1        | -27.3                            | Aug. 9      | +82.5                            | 9                         | 35            | 384         | 275.42                   | -18.40                  | A small faint spot, increasing and forming a large elongated spot.<br>One or two faint variable spots.                                                                                                                                                                          |
|                  | 2291          | 507       | Aug. 25       | -65.2                            | Aug. 28     | -26.5                            | 4                         | 0             | 8           | 277.70                   | -15.65                  |                                                                                                                                                                                                                                                                                 |
| 259              | 2284          | 506       | Aug. 15       | +39.8                            | Aug. 19     | +86.5                            | 5                         | 22            | 255         | 152.86                   | +25.82                  | A small regular spot, becoming a stream of normal type.<br>A regular spot, with occasional companion.                                                                                                                                                                           |
|                  | 2297          | 507       | Sept. 2       | -84.8                            | Sept. 15    | +76.8                            | 14                        | 21            | 144         | 148.38                   | +28.57                  |                                                                                                                                                                                                                                                                                 |
| 260              | 2293          | 507       | Aug. 29       | -68.5                            | Sept. 10    | +86.7                            | 13                        | 137           | 1212        | 221.48                   | +21.79                  | A stream whose middle spots increase contrary to the usual type.<br>A large spot, followed by short stream. Disintegrates and diminishes.<br>A regular spot, with an occasional companion.<br><i>Note.</i> —2329 may possibly be only a revival of 2306.                        |
|                  | 2306          | 508       | Sept. 24      | -79.7                            | Oct. 5      | +65.0                            | 12                        | 38            | 269         | 227.40                   | +23.23                  |                                                                                                                                                                                                                                                                                 |
|                  | 2329          | 509       | Oct. 23       | -54.6                            | Oct. 30     | +35.5                            | 8                         | 8             | 36          | 228.19                   | +25.93                  |                                                                                                                                                                                                                                                                                 |
| 261              | 2295          | 507       | Sept. 2       | -40.8                            | Sept. 11    | +77.1                            | 10                        | 23            | 178         | 198.89                   | +15.44                  | Small variable spots closely crowded together.<br>A few very small faint scattered spots, not seen on Oct. 1 and Oct. 3.<br><i>Note.</i> —2308 is intermittent, not being seen on Oct. 1 and Oct. 3.                                                                            |
|                  | 2308          | 508       | Sept. 27      | -64.1                            | Oct. 7      | +74.0                            | 11                        | 7             | 45          | 208.67                   | +14.73                  |                                                                                                                                                                                                                                                                                 |
| 262              | 2299          | 507       | Sept. 10      | -80.3                            | Sept. 22    | +78.9                            | 13                        | 59            | 305         | 51.63                    | +14.62                  | A large regular spot, with occasional very small companions.<br>A regular spot, with occasional small companions.                                                                                                                                                               |
|                  | 2318          | 508       | Oct. 7        | -83.4                            | Oct. 19     | +74.9                            | 13                        | 15            | 86          | 53.52                    | +14.15                  |                                                                                                                                                                                                                                                                                 |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.    |                                  | Last Seen.     |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                                                                                            |
|-------------------|---------------|-----------|----------------|----------------------------------|----------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.          | Longitude from Central Meridian. | Date.          | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                                                                                                     |
| 263               | 2302          | 507       | 1891. Sept. 16 | -50.4                            | 1891. Sept. 26 | +77.0                            | 11                        | 49            | 353         | 5.69                     | -23.18                  | A straggling stream, of which three spots become large and regular. A close pair of very small spots.                                                                                                                                                                                                               |
|                   | 2322          | 508       | Oct. 12        | -64.1                            | Oct. 14        | -36.7                            | 3                         | 0             | 13          | 6.43                     | -22.83                  |                                                                                                                                                                                                                                                                                                                     |
| 264               | 2313          | 508       | Oct. 1         | -74.4                            | Oct. 12        | +73.5                            | 12                        | 24            | 185         | 143.93                   | +19.41                  | A compact cluster whose members vary. A compact cluster.                                                                                                                                                                                                                                                            |
|                   | 2336          | 509       | Oct. 29        | -58.4                            | Nov. 2         | -6.6                             | 5                         | 6             | 43          | 146.88                   | +21.12                  |                                                                                                                                                                                                                                                                                                                     |
| 265               | 2317          | 508       | Oct. 6         | -20.0                            | Oct. 14        | +81.1                            | 9                         | 5             | 44          | 128.60                   | +23.78                  | An irregular group of unstable spots, seen only as a faint patch on A few variable spots. [Oct. 12. Note.—2317 is too faint to measure on Oct. 12.                                                                                                                                                                  |
|                   | 2338          | 509       | Oct. 30        | -75.3                            | Nov. 6         | +22.9                            | 8                         | 4             | 43          | 122.69                   | +22.76                  |                                                                                                                                                                                                                                                                                                                     |
| 266               | 2328          | 509       | Oct. 22        | -81.2                            | Nov. 2         | +64.9                            | 12                        | 21            | 125         | 218.10                   | +17.96                  | A regular spot. A stream of normal type appears to the N., but A few variable spots. [disappears. One or two variable spots.                                                                                                                                                                                        |
|                   | 2350          | 510       | Nov. 18        | -80.8                            | Nov. 29        | +70.1                            | 12                        | 64            | 365         | 228.80                   | +19.29                  |                                                                                                                                                                                                                                                                                                                     |
|                   | 2368          | 511       | Dec. 16        | -68.3                            | Dec. 18        | -42.0                            | 3                         | 9             | 67          | 227.20                   | +19.33                  |                                                                                                                                                                                                                                                                                                                     |
| 267               | 2339          | 509       | Nov. 2         | -49.4                            | Nov. 10        | +58.9                            | 9                         | 18            | 116         | 106.34                   | +18.92                  | A compact cluster, expanding into a long straight stream. A small spot, with a dark nucleus.                                                                                                                                                                                                                        |
|                   | 2355          | 510       | Nov. 28        | -64.8                            | Dec. 4         | +11.9                            | 7                         | 5             | 26          | 103.97                   | +19.73                  |                                                                                                                                                                                                                                                                                                                     |
| 268               | 2349          | 510       | Nov. 15        | -84.1                            | Nov. 27        | +78.8                            | 13                        | 103           | 681         | 261.41                   | -19.25                  | A very fine stream of normal type. A regular spot.                                                                                                                                                                                                                                                                  |
|                   | 2364          | 511       | Dec. 12        | -80.1                            | Dec. 24        | +77.6                            | 13                        | 21            | 120         | 267.67                   | -19.88                  |                                                                                                                                                                                                                                                                                                                     |
| 269               | 2358          | 510       | Dec. 6         | +12.1                            | Dec. 10        | +62.8                            | 5                         | 12            | 42          | 78.14                    | +26.36                  | A few small spots in a straight stream. One or two small faint spots.                                                                                                                                                                                                                                               |
|                   | 2371          | 511       | Dec. 26        | -78.4                            | Dec. 28        | -50.4                            | 3                         | 0             | 25          | 84.67                    | +24.03                  |                                                                                                                                                                                                                                                                                                                     |
| 270               | 2348          | 510       | Nov. 14        | -67.2                            | Nov. 24        | +63.0                            | 11                        | 4             | 33          | 285.19                   | -19.01                  | A small faint spot, not seen on Nov. 16. Afterwards scattered group. One or two small faint spots, increasing to large regular spots with [variable companions. Note.—2348 is intermittent, not being seen on Nov. 16. Also note that 2365 is probably only a revival of 2348.                                      |
|                   | 2365          | 511       | Dec. 13        | -48.2                            | Dec. 23        | +80.7                            | 11                        | 36            | 248         | 284.42                   | -19.07                  |                                                                                                                                                                                                                                                                                                                     |
|                   | 2391          | 512       | 1892. Jan. 8   | -68.0                            | 1892. Jan. 9   | -59.1                            | 2                         | 0             | 20          | 281.00                   | -19.25                  |                                                                                                                                                                                                                                                                                                                     |
| 271               | 2369          | 511       | 1891. Dec. 19  | -61.1                            | 1891. Dec. 30  | +84.0                            | 12                        | 88            | 610         | 194.81                   | +28.57                  | A straight stream, whose leader becomes large, regular, and divides. A large composite spot, shedding fragments, and becoming regular.                                                                                                                                                                              |
|                   | 2399          | 512       | 1892. Jan. 15  | -76.0                            | 1892. Jan. 27  | +79.0                            | 13                        | 72            | 560         | 184.15                   | +28.02                  |                                                                                                                                                                                                                                                                                                                     |
| 272               | 2373          | 511       | 1891. Dec. 28  | +52.6                            | 1891. Dec. 30  | +76.4                            | 3                         | 39            | 470         | 186.40                   | -11.40                  | Two large spots, appearing suddenly near the W. limb. A large composite spot, becoming regular. Occasional companions.                                                                                                                                                                                              |
|                   | 2397          | 512       | 1892. Jan. 14  | -82.4                            | 1892. Jan. 26  | +75.1                            | 13                        | 27            | 213         | 189.22                   | -11.32                  |                                                                                                                                                                                                                                                                                                                     |
| 273               | 2376          | 511       | 1891. Dec. 29  | -78.7                            | 1892. Jan. 10  | +71.5                            | 13                        | 72            | 434         | 39.36                    | +21.13                  | A large spot with train. A regular small spot, with an occasional very small companion.                                                                                                                                                                                                                             |
|                   | 2411          | 512       | 1892. Jan. 26  | -69.9                            | Feb. 1         | +9.0                             | 7                         | 7             | 38          | 45.47                    | +22.07                  |                                                                                                                                                                                                                                                                                                                     |
| 274               | 2377          | 511       | 1891. Dec. 30  | +29.2                            | 1892. Jan. 3   | +82.0                            | 5                         | 16            | 137         | 140.40                   | +18.06                  | Two very small fluctuating spots. A large regular spot, with occasional small companions. A large regular spot, with small companion on Feb. 16.                                                                                                                                                                    |
|                   | 2405          | 512       | 1892. Jan. 18  | -72.6                            | Jan. 29        | +74.2                            | 12                        | 46            | 246         | 148.84                   | +18.60                  |                                                                                                                                                                                                                                                                                                                     |
|                   | 2431          | 513       | Feb. 15        | -67.3                            | Feb. 26        | +78.0                            | 12                        | 21            | 132         | 144.50                   | +19.35                  |                                                                                                                                                                                                                                                                                                                     |
| 275               | 2390          | 512       | 1892. Jan. 8   | -67.4                            | 1892. Jan. 21  | +81.3                            | 14                        | 74            | 421         | 275.39                   | -25.46                  | A large regular spot. Others also form, all showing rapid P.M. A very large composite spot, surrounded by small spots. A straggling irregular stream. From Mar. 7 a fine composite spot.                                                                                                                            |
|                   | 2421          | 513       | Feb. 5         | -81.2                            | Feb. 18        | +82.5                            | 12                        | 392           | 2402        | 255.68                   | -28.33                  |                                                                                                                                                                                                                                                                                                                     |
|                   | 2440          | 514       | Mar. 4         | -84.6                            | Mar. 17        | +87.0                            | 14                        | 53            | 386         | 250.04                   | -28.38                  |                                                                                                                                                                                                                                                                                                                     |
| 276               | 2403          | 512       | Jan. 18        | -27.6                            | Jan. 24        | +56.9                            | 7                         | 4             | 45          | 194.26                   | +18.89                  | Two very small spots, becoming a straight stream. A few scattered small spots.                                                                                                                                                                                                                                      |
|                   | 2426          | 513       | Feb. 11        | -69.5                            | Feb. 16        | -1.9                             | 4                         | 15            | 69          | 194.38                   | +16.50                  |                                                                                                                                                                                                                                                                                                                     |
| 277               | 2408          | 512       | Jan. 22        | -81.2                            | Feb. 3         | +77.6                            | 13                        | 50            | 294         | 83.88                    | -15.28                  | A large regular spot with a diminishing train. A single spot. Two small spots. A large composite spot, dividing into two regular spots. Note.—2437 is a revival of 2433 in the same rotation after a quiescence of seven days. So 2433 and 2437 form one intermittent group. No photograph is available for Mar. 1. |
|                   | 2433          | 513       | Feb. 18        | -83.2                            | Feb. 21        | -47.6                            | 4                         | 10            | 54          | 85.45                    | -14.30                  |                                                                                                                                                                                                                                                                                                                     |
|                   | 2437          | 513       | Feb. 29        | +59.8                            | Feb. 29        | +59.8                            | 1                         | 4             | 36          | 84.30                    | -15.70                  |                                                                                                                                                                                                                                                                                                                     |
|                   | 2451          | 514       | Mar. 17        | -76.3                            | Mar. 29        | +81.5                            | 13                        | 51            | 312         | 84.64                    | -15.92                  |                                                                                                                                                                                                                                                                                                                     |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.  |                                  | Last Seen.   |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                        |
|-------------------|---------------|-----------|--------------|----------------------------------|--------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.        | Longitude from Central Meridian. | Date.        | Longitude from Central Meridian. |                           | Um. bra.      | Whole Spot. |                          |                         |                                                                                                                                                                                                 |
| 278               | 2438          | 513       | 1892. Mar. 4 | +69°8                            | 1892. Mar. 5 | +76°3                            | 2                         | 44            | 197         | 38°45                    | +27°00                  | A pair of large spots.                                                                                                                                                                          |
|                   | 2454          | 514       | Mar. 20      | -79°5                            | Apr. 2       | +75°5                            | 14                        | 84            | 478         | 31°03                    | +27°74                  | A very large stream, with variable components.<br>Note.—No photograph is available for Mar. 3.                                                                                                  |
| 279               | 2448          | 514       | Mar. 16      | -68°3                            | Mar. 27      | +75°2                            | 12                        | 50            | 251         | 105°93                   | +9°49                   | A large regular spot, with a small companion on March 21 and 22.                                                                                                                                |
|                   | 2481          | 515       | Apr. 11      | -82°2                            | Apr. 23      | +75°6                            | 13                        | 31            | 201         | 106°84                   | +11°41                  | A large regular spot, with occasional companions, which break up.                                                                                                                               |
|                   | 2512          | 516       | May 9        | -73°0                            | May 15       | +3°4                             | 7                         | 3             | 18          | 107°79                   | +10°13                  | A faint irregular spot. A small companion following it on May 12.                                                                                                                               |
| 280               | 2485          | 515       | Apr. 17      | -35°7                            | Apr. 26      | +83°3                            | 10                        | 46            | 376         | 81°18                    | -13°82                  | A very small spot, becoming a stream and then a pair of large spots.                                                                                                                            |
|                   | 2515          | 516       | May 10       | -82°4                            | May 22       | +76°8                            | 13                        | 101           | 742         | 84°31                    | -14°02                  | A large composite spot, dividing into three. A distant follower.<br>Note.—This series is a revival of 2437 and 2451.                                                                            |
| 281               | 2486          | 515       | Apr. 18      | -74°6                            | Apr. 29      | +81°2                            | 12                        | 73            | 560         | 27°62                    | +10°53                  | A very large and complicated stream of spots.                                                                                                                                                   |
|                   | 2519          | 516       | May 14       | -69°0                            | May 25       | +80°5                            | 12                        | 41            | 233         | 48°85                    | +10°00                  | A stream of three large spots. By May 21 there is a fresh outburst.                                                                                                                             |
|                   | 2554          | 517       | June 9       | -75°8                            | June 17      | +32°0                            | 9                         | 4             | 29          | 55°52                    | +10°48                  | A regular spot, breaking up to form a stream.                                                                                                                                                   |
| 282               | 2492          | 516       | Apr. 23      | -78°7                            | May 5        | +79°3                            | 13                        | 50            | 295         | 313°68                   | -18°05                  | A large regular spot, with an occasional small companion.                                                                                                                                       |
|                   | 2528          | 517       | May 20       | -82°8                            | May 28       | +23°0                            | 9                         | 7             | 44          | 313°09                   | -17°06                  | A regular spot.                                                                                                                                                                                 |
| 283               | 2499          | 516       | May 2        | +60°6                            | May 3        | +72°8                            | 2                         | 6             | 48          | 335°15                   | +17°35                  | One or two spots.                                                                                                                                                                               |
|                   | 2524          | 517       | May 18       | -79°7                            | May 30       | +79°0                            | 13                        | 60            | 438         | 342°27                   | +15°56                  | A large irregular spot, with small companions.                                                                                                                                                  |
| 284               | 2507          | 516       | May 5        | -67°6                            | May 16       | +77°9                            | 12                        | 34            | 183         | 166°84                   | +18°87                  | A large regular spot, with an occasional companion.                                                                                                                                             |
|                   | 2545          | 517       | June 1       | -74°0                            | June 8       | +18°7                            | 8                         | 7             | 32          | 163°14                   | +18°38                  | A small regular spot. A companion on June 6.                                                                                                                                                    |
| 285               | 2513          | 516       | May 10       | +51°8                            | May 11       | +66°3                            | 2                         | 2             | 15          | 220°60                   | -21°25                  | One or two faint spots.                                                                                                                                                                         |
|                   | 2542          | 517       | May 27       | -84°6                            | June 4       | +19°6                            | 9                         | 27            | 190         | 217°91                   | -18°72                  | A very irregular group, which has formed into a stream by June 3.                                                                                                                               |
| 286               | 2516          | 516       | May 12       | +38°1                            | May 15       | +79°3                            | 4                         | 10            | 66          | 180°93                   | +23°00                  | A straggling group.                                                                                                                                                                             |
|                   | 2544          | 517       | May 31       | -63°3                            | June 5       | +6°1                             | 6                         | 1             | 14          | 188°18                   | +21°23                  | A small regular spot, with a companion on June 1 and 2.                                                                                                                                         |
| 287               | 2530          | 517       | May 21       | -20°8                            | May 28       | +71°3                            | 8                         | 44            | 294         | 361°53                   | +10°50                  | An irregular stream, of which two spots become very large.                                                                                                                                      |
|                   | 2562          | 518       | June 13      | -84°3                            | June 25      | +76°1                            | 13                        | 28            | 230         | 354°97                   | +11°14                  | A pair of spots becoming a stream; the preceding spots disappear.                                                                                                                               |
| 288               | 2539          | 517       | May 26       | -42°1                            | June 3       | +66°0                            | 9                         | 25            | 165         | 274°87                   | +13°16                  | Two or three spots becoming a stream of three well-defined groups.                                                                                                                              |
|                   | 2567          | 518       | June 19      | -72°9                            | June 29      | +57°6                            | 11                        | 40            | 337         | 284°84                   | +11°51                  | A very large spot, which breaks up and is followed by a short train.<br>[panions.                                                                                                               |
| 289               | 2550          | 517       | June 7       | -73°7                            | June 18      | +75°9                            | 12                        | 29            | 202         | 86°47                    | +8°69                   | A regular spot which divides, forming two large spots with com-                                                                                                                                 |
|                   | 2581          | 518       | July 4       | -79°0                            | July 16      | +77°5                            | 13                        | 243           | 1591        | 83°19                    | +11°01                  | Three large spots, with small companions. [Aug. 10.                                                                                                                                             |
|                   | 2611          | 519       | July 30      | -80°0                            | Aug. 11      | +76°7                            | 13                        | 92            | 654         | 93°88                    | +9°83                   | A fine complex stream of which the rear spot alone remains by                                                                                                                                   |
|                   | 2643          | 520       | Aug. 26      | -82°8                            | Sept. 8      | +83°7                            | 14                        | 38            | 229         | 93°19                    | +10°44                  | A regular spot, with occasional small companions.                                                                                                                                               |
|                   | 2675          | 521       | Sept. 23     | -75°9                            | Oct. 5       | +79°2                            | 13                        | 25            | 150         | 91°78                    | +10°60                  | A regular spot. Occasional companions.                                                                                                                                                          |
| 290               | 2559          | 517       | June 12      | -53°8                            | June 23      | +85°0                            | 12                        | 27            | 231         | 35°45                    | +25°14                  | A small regular spot, becoming a fine variable stream.                                                                                                                                          |
|                   | 2584          | 518       | July 8       | -78°0                            | July 20      | +78°8                            | 13                        | 17            | 91          | 26°11                    | +28°00                  | A regular spot, with a small companion on July 9.                                                                                                                                               |
| 291               | 2560          | 517       | June 13      | -32°9                            | June 22      | +81°5                            | 10                        | 44            | 432         | 47°28                    | -30°98                  | A small scattered group increasing to a straight stream.                                                                                                                                        |
|                   | 2583          | 518       | July 7       | -81°3                            | July 19      | +68°3                            | 13                        | 197           | 829         | 33°12                    | -31°32                  | A large composite spot, with small companions irregularly placed.                                                                                                                               |
|                   | 2615          | 519       | Aug. 5       | -76°0                            | Aug. 16      | +58°5                            | 12                        | 42            | 277         | 16°53                    | -30°37                  | A large irregular compound spot undergoing changes. Occasional<br>[small companions.                                                                                                            |
| 292               | 2578*         | 518       | July 8       | +65°2                            | July 8       | +65°2                            | 1                         | 0             | 21          | 171°90                   | +10°70                  | Two small spots.                                                                                                                                                                                |
|                   | 2598          | 519       | July 25      | -71°4                            | Aug. 5       | +80°0                            | 12                        | 72            | 452         | 174°77                   | +13°33                  | A large regular spot, with a diminishing train.                                                                                                                                                 |
|                   | 2636          | 520       | Aug. 20      | -82°9                            | Sept. 1      | +73°4                            | 13                        | 16            | 132         | 173°95                   | +12°78                  | A regular spot, with occasional small companions.                                                                                                                                               |
| 293               | 2578          | 518       | June 30      | -70°1                            | July 11      | +80°6                            | 12                        | 26            | 188         | 148°66                   | +14°36                  | A straggling group of small spots, increasing to a stream.                                                                                                                                      |
|                   | 2599          | 519       | July 25      | -83°2                            | Aug. 6       | +78°7                            | 13                        | 78            | 463         | 160°99                   | +15°15                  | A large spot, with elongated nucleus which divides.                                                                                                                                             |
| 294               | 2580          | 518       | July 3       | -72°3                            | July 14      | +66°1                            | 12                        | 75            | 474         | 97°57                    | -22°89                  | A large regular but variable spot, with a diminishing train.                                                                                                                                    |
|                   | 2612          | 519       | July 31      | -74°0                            | Aug. 11      | +72°7                            | 12                        | 56            | 303         | 91°18                    | -22°04                  | A large regular spot.                                                                                                                                                                           |
|                   | 2644          | 520       | Aug. 27      | -84°0                            | Sept. 8      | +71°7                            | 13                        | 31            | 178         | 82°15                    | -22°75                  | A regular spot, with a small companion on Aug. 28 and 29.                                                                                                                                       |
|                   | 2679          | 521       | Sept. 26     | -52°7                            | Oct. 6       | +76°5                            | 11                        | 80            | 520         | 76°17                    | -23°41                  | Two small spots, greatly increasing. Numerous small companions.                                                                                                                                 |
|                   | 2711          | 522       | Oct. 23      | -61°7                            | Oct. 26      | -18°8                            | 4                         | 0             | 9           | 74°20                    | -22°60                  | A close pair of very small faint spots, not seen on Oct. 24 and 25.<br>Note.—2711 is intermittent, not being seen on Oct. 24 and 25.<br>Also note that 2679 is possibly only a revival of 2644. |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                                                  |
|-------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                                                           |
| 295               | 2586          | 519       | 1892.<br>July 15 | -75°4                            | 1892.<br>July 26 | +75°2                            | 12                        | 40            | 236         | 301°83                   | -9°37                   | A large regular spot, with sometimes a small companion.<br>A regular spot.                                                                                                                                                                                                |
|                   | 2623          | 520       | Aug. 11          | -73°2                            | Aug. 22          | +71°0                            | 12                        | 10            | 62          | 303°22                   | -6°99                   |                                                                                                                                                                                                                                                                           |
| 296               | 2587          | 518       | July 17          | +33°0                            | July 20          | +79°5                            | 4                         | 22            | 143         | 23°85                    | +14°85                  | Two spots, with occasional small companions.<br>A small spot.                                                                                                                                                                                                             |
|                   | 2614          | 519       | Aug. 5           | -67°1                            | Aug. 10          | +1°1                             | 6                         | 0             | 9           | 30°08                    | +13°07                  |                                                                                                                                                                                                                                                                           |
| 297               | 2596          | 519       | July 23          | +11°5                            | July 27          | +69°0                            | 5                         | 10            | 63          | 281°20                   | -20°50                  | A straggling group, becoming two small clusters.<br>A large irregular spot, with diminishing train.                                                                                                                                                                       |
|                   | 2626          | 520       | Aug. 13          | -69°3                            | Aug. 24          | +77°5                            | 12                        | 27            | 234         | 282°26                   | -18°33                  |                                                                                                                                                                                                                                                                           |
| 298               | 2628          | 520       | Aug. 15          | -55°4                            | Aug. 23          | +50°3                            | 9                         | 7             | 61          | 269°22                   | -24°93                  | An irregular variable spot, with train.<br>A few faint spots barely visible on Sept. 14; later a small stream.<br><i>Note.</i> —Possibly 2628 dies out before reaching the W. limb and 2661 [is a revival only.]                                                          |
|                   | 2661          | 521       | Sept. 11         | -62°6                            | Sept. 20         | +68°1                            | 10                        | 1             | 28          | 270°44                   | -25°28                  |                                                                                                                                                                                                                                                                           |
| 299               | 2648          | 520       | Sept. 1          | -59°9                            | Sept. 11         | +72°8                            | 11                        | 20            | 124         | 39°51                    | -19°62                  | A large spot, with diminishing train.<br>A very large irregular variable group.                                                                                                                                                                                           |
|                   | 2680          | 521       | Sept. 26         | -80°6                            | Oct. 7           | +60°9                            | 12                        | 22            | 282         | 46°26                    | -21°38                  |                                                                                                                                                                                                                                                                           |
| 300               | 2653          | 521       | Sept. 7          | -78°4                            | Sept. 18         | +77°5                            | 12                        | 53            | 426         | 308°33                   | +11°92                  | An irregular variable and unstable group.<br>Two small spots surrounded by dense faculae.                                                                                                                                                                                 |
|                   | 2689          | 522       | Oct. 4           | -63°8                            | Oct. 4           | -63°8                            | 1                         | 4             | 22          | 320°60                   | +10°60                  |                                                                                                                                                                                                                                                                           |
| 301               | 2685          | 521       | Oct. 2           | -50°8                            | Oct. 12          | +81°3                            | 11                        | 112           | 675         | 4°53                     | +14°87                  | One small spot. On Oct. 3 a great outburst, forming three large [spots].<br>A large composite spot, diminishing and throwing off fragments.                                                                                                                               |
|                   | 2715          | 522       | Oct. 26          | -80°7                            | Nov. 3           | +26°6                            | 9                         | 21            | 108         | 13°68                    | +14°58                  |                                                                                                                                                                                                                                                                           |
| 302               | 2698          | 522       | Oct. 10          | +7°7                             | Oct. 15          | +70°3                            | 6                         | 6             | 55          | 312°73                   | +7°90                   | Three unstable spots, not seen on Oct. 12 and 13. By Oct. 15 a [large spot].<br>A few small spots in an irregular group.<br><i>Note.</i> —2698 is intermittent, not being seen on Oct. 12 and 13. [16.]                                                                   |
|                   | 2723          | 523       | Oct. 31          | -77°1                            | Nov. 3           | -33°5                            | 4                         | 2             | 25          | 315°70                   | +8°68                   |                                                                                                                                                                                                                                                                           |
| 303               | 2703          | 522       | Oct. 14          | -79°8                            | Oct. 26          | +77°9                            | 13                        | 9             | 77          | 167°37                   | +8°12                   | A regular spot until Oct. 19. A variable stream appears by Oct. 16.<br>A pair of small spots, becoming an irregular variable stream.                                                                                                                                      |
|                   | 2736          | 523       | Nov. 12          | -58°9                            | Nov. 21          | +67°3                            | 10                        | 13            | 82          | 174°10                   | +8°59                   |                                                                                                                                                                                                                                                                           |
| 304               | (2684         | 521       | Oct. 2           | -27°5                            | Oct. 9           | +70°4                            | 8                         | 15            | 99          | 27°67                    | -20°60                  | A few small faint spots not visible on Oct. 3, afterwards a scattered [stream].<br>Two small spots, increasing to a stream.<br>Four large spots.<br><i>Note.</i> —2684 is intermittent, not being seen on Oct. 3. Note also that 2717 is probably only a revival of 2684. |
|                   | 2717          | 522       | Oct. 28          | -42°1                            | Nov. 6           | +82°0                            | 10                        | 31            | 158         | 29°48                    | -21°00                  |                                                                                                                                                                                                                                                                           |
|                   | 2745          | 523       | Nov. 21          | -76°7                            | Dec. 2           | +68°9                            | 12                        | 66            | 325         | 32°50                    | -20°62                  |                                                                                                                                                                                                                                                                           |
| 305               | 2725          | 523       | Nov. 2           | -29°3                            | Nov. 9           | +67°3                            | 9                         | 11            | 66          | 334°73                   | -8°58                   | An irregular group, becoming a diminishing stream.<br>A few small spots in a short variable stream.                                                                                                                                                                       |
|                   | 2755          | 524       | Nov. 26          | -65°6                            | Dec. 3           | +31°1                            | 8                         | 8             | 53          | 344°48                   | -8°56                   |                                                                                                                                                                                                                                                                           |
| 306               | 2726          | 523       | Nov. 2           | -74°3                            | Nov. 13          | +75°5                            | 12                        | 60            | 320         | 287°69                   | +8°18                   | A small faint spot, increasing to a stream of normal type.<br>A regular spot, with occasional small companions.                                                                                                                                                           |
|                   | 2760          | 524       | Nov. 29          | -78°0                            | Dec. 10          | +70°8                            | 12                        | 14            | 99          | 291°48                   | +6°60                   |                                                                                                                                                                                                                                                                           |
| 307               | 2730          | 523       | Nov. 6           | -18°6                            | Nov. 13          | +80°9                            | 8                         | 49            | 273         | 294°50                   | +20°01                  | Two or three small variable spots.<br>A regular spot.                                                                                                                                                                                                                     |
|                   | 2759          | 524       | Nov. 29          | -75°9                            | Dec. 8           | +43°5                            | 10                        | 4             | 27          | 292°94                   | +19°62                  |                                                                                                                                                                                                                                                                           |
| 308               | 2734          | 523       | Nov. 11          | +4°8                             | Nov. 16          | +75°8                            | 6                         | 2             | 39          | 251°43                   | -21°25                  | A few very small faint spots in an irregular group.<br>Two regular spots, with occasional small companions.                                                                                                                                                               |
|                   | 2770          | 524       | Dec. 2           | -72°0                            | Dec. 12          | +55°4                            | 11                        | 36            | 185         | 253°05                   | -22°16                  |                                                                                                                                                                                                                                                                           |
| 309               | 2740          | 523       | Nov. 17          | +34°2                            | Nov. 18          | +45°4                            | 2                         | 6             | 47          | 198°85                   | +19°75                  | A small irregular group of spots.<br>A regular spot, with an occasional small companion.<br><i>Note.</i> —Possibly 2740 dies out before reaching the W. limb and 2779 is a revival only.                                                                                  |
|                   | 2779          | 524       | Dec. 7           | -61°1                            | Dec. 10          | -21°9                            | 4                         | 3             | 29          | 198°05                   | +20°43                  |                                                                                                                                                                                                                                                                           |
| 310               | 2746          | 523       | Nov. 23          | +54°2                            | Nov. 24          | +68°4                            | 2                         | 13            | 79          | 142°45                   | +13°70                  | A very small spot, becoming a large regular spot. A distant follower.<br>A regular spot, sometimes followed by a train.                                                                                                                                                   |
|                   | 2782          | 524       | Dec. 9           | -82°3                            | Dec. 18          | +35°2                            | 10                        | 27            | 169         | 152°18                   | +13°44                  |                                                                                                                                                                                                                                                                           |
| 311               | 2749          | 523       | Nov. 24          | -69°6                            | Dec. 5           | +80°5                            | 12                        | 49            | 262         | 6°83                     | -15°63                  | A large regular spot, with an occasional small companion.<br>Two regular spots, developing into a long irregular stream.<br>A very small spot in a large mass of faculae.                                                                                                 |
|                   | 2787          | 524       | Dec. 21          | -71°5                            | 1893.<br>Jan. 1  | +73°0                            | 12                        | 23            | 149         | 6°08                     | -17°42                  |                                                                                                                                                                                                                                                                           |
|                   | 2821          | 525       | 1893.<br>Jan. 18 | -68°2                            | Jan. 18          | -68°2                            | 1                         | 0             | 8           | 2°40                     | -15°70                  |                                                                                                                                                                                                                                                                           |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                                               |
|-------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                                                        |
| 312               | 2773          | 524       | 1892.<br>Dec. 3  | -57°1                            | 1892.<br>Dec. 12 | +69°4                            | 10                        | 42            | 246         | 260°38                   | -11°45                  | Two small spots, increasing to three spots, with small companions.                                                                                                                                                                                                     |
|                   | 2794          | 525       | Dec. 28          | -76°5                            | 1893.<br>Jan. 4  | +16°7                            | 8                         | 3             | 24          | 271°59                   | -12°68                  | Two small regular spots, with small companions.                                                                                                                                                                                                                        |
| 313               | 2778          | 524       | 1892.<br>Dec. 6  | -69°6                            | 1892.<br>Dec. 17 | +70°8                            | 12                        | 13            | 80          | 206°78                   | +19°27                  | A regular spot, becoming a curved variable stream.                                                                                                                                                                                                                     |
|                   | 2806          | 525       | 1893.<br>Jan. 2  | -69°5                            | 1893.<br>Jan. 9  | +21°4                            | 8                         | 3             | 21          | 209°65                   | +22°31                  | A regular spot.                                                                                                                                                                                                                                                        |
| 314               | 2781          | 524       | 1892.<br>Dec. 9  | +38°3                            | 1892.<br>Dec. 12 | +79°9                            | 4                         | 11            | 126         | 273°18                   | -27°83                  | A regular spot; by Dec. 10 there is an outburst of a close stream.                                                                                                                                                                                                     |
|                   | 2795          | 525       | Dec. 28          | -75°5                            | 1893.<br>Jan. 8  | +74°1                            | 12                        | 13            | 95          | 271°47                   | -26°13                  | A number of small spots in a scattered variable group.                                                                                                                                                                                                                 |
|                   | 2826          | 526       | 1893.<br>Jan. 24 | -78°7                            | Feb. 6           | +83°8                            | 14                        | 139           | 899         | 269°78                   | -21°76                  | A long broad stream of irregular spots. [largest.                                                                                                                                                                                                                      |
|                   | 2857          | 527       | Feb. 21          | -76°2                            | Mar. 5           | +81°9                            | 13                        | 21            | 127         | 266°09                   | -17°18                  | A stream of small spots inclined to equator. The middle spot is Note.—2826 is doubtful. This series may perhaps consist only of 2781 and 2795, but examination of the Daily Results seems to indicate that all are outbursts from different parts of the same [region. |
| 315               | 2789          | 524       | 1892.<br>Dec. 23 | +30°3                            | 1892.<br>Dec. 24 | +47°9                            | 2                         | 5             | 49          | 83°15                    | +8°15                   | A few small spots forming a stream whose rear spot is the largest.                                                                                                                                                                                                     |
|                   | 2815          | 525       | 1893.<br>Jan. 10 | -82°5                            | 1893.<br>Jan. 22 | +77°2                            | 13                        | 23            | 125         | 91°95                    | +9°14                   | A regular spot, with two small companions on Jan. 18. Note.—Perhaps 2815 is only a revival of 2789.                                                                                                                                                                    |
| 316               | 2811          | 525       | 1893.<br>Jan. 6  | +24°2                            | 1893.<br>Jan. 10 | +76°6                            | 5                         | 28            | 177         | 249°20                   | +23°90                  | Two very small spots, greatly increasing and becoming regular.                                                                                                                                                                                                         |
|                   | 2831          | 526       | Jan. 26          | -81°8                            | Feb. 6           | +66°6                            | 12                        | 13            | 84          | 245°03                   | +24°87                  | A regular spot, with occasional small companions.                                                                                                                                                                                                                      |
| 317               | 2819          | 525       | Jan. 16          | -80°3                            | Jan. 27          | +69°3                            | 12                        | 120           | 772         | 14°94                    | -13°08                  | A very large group of irregular variable spots.                                                                                                                                                                                                                        |
|                   | 2846          | 526       | Feb. 12          | -75°2                            | Feb. 23          | +74°5                            | 12                        | 38            | 241         | 28°20                    | -14°51                  | A very large spot, with straggling nebulous train.                                                                                                                                                                                                                     |
|                   | 2880          | 527       | Mar. 10          | -73°9                            | Mar. 17          | +16°4                            | 8                         | 4             | 33          | 40°90                    | -13°09                  | A few variable spots. [rotation. Note.—2819 breaks up into two groups, 2846 and 2847, in the next                                                                                                                                                                      |
| 318               | 2819          | 525       | Jan. 16          | -80°3                            | Jan. 27          | +69°3                            | 12                        | 120           | 772         | 14°94                    | -13°08                  | A very large group of irregular spots all undergoing change.                                                                                                                                                                                                           |
|                   | 2847          | 526       | Feb. 12          | -77°2                            | Feb. 23          | +76°7                            | 12                        | 15            | 123         | 25°45                    | -10°38                  | A regular spot, with companions.                                                                                                                                                                                                                                       |
|                   | 2881          | 527       | Mar. 10          | -75°8                            | Mar. 21          | +74°0                            | 12                        | 82            | 474         | 42°00                    | -8°16                   | A very large regular spot, followed by an ill-defined cluster.                                                                                                                                                                                                         |
|                   | 2914          | 528       | Apr. 5           | -81°6                            | Apr. 18          | +82°3                            | 14                        | 60            | 390         | 44°56                    | -8°46                   | Two large regular spots, with companions.                                                                                                                                                                                                                              |
|                   | 2959          | 529       | May 3            | -80°8                            | May 10           | +16°3                            | 8                         | 6             | 24          | 45°86                    | -7°54                   | A small regular spot.                                                                                                                                                                                                                                                  |
| 319               | 2820          | 525       | Jan. 18          | -12°1                            | Jan. 23          | +60°5                            | 6                         | 3             | 24          | 62°63                    | -16°80                  | A faint group of scattered spots.                                                                                                                                                                                                                                      |
|                   | 2843          | 526       | Feb. 9           | -70°0                            | Feb. 20          | +80°6                            | 12                        | 34            | 167         | 71°53                    | -17°88                  | A large regular spot, with an occasional small companion.                                                                                                                                                                                                              |
| 320               | 2825          | 526       | Jan. 24          | -33°6                            | Feb. 2           | +75°4                            | 10                        | 40            | 240         | 316°07                   | -17°30                  | A faint but increasing group of scattered small spots.                                                                                                                                                                                                                 |
|                   | 2851          | 527       | Feb. 16          | -82°9                            | Feb. 23          | +7°2                             | 8                         | 3             | 27          | 322°73                   | -16°81                  | A few variable unstable spots.                                                                                                                                                                                                                                         |
| 321               | 2829          | 526       | Jan. 26          | -43°0                            | Feb. 4           | +80°1                            | 10                        | 78            | 393         | 282°16                   | +17°18                  | A large spot with a train.                                                                                                                                                                                                                                             |
|                   | 2854          | 527       | Feb. 20          | -67°5                            | Feb. 21          | -58°9                            | 2                         | 2             | 11          | 282°95                   | +15°25                  | A small nebulous spot.                                                                                                                                                                                                                                                 |
| 322               | 2835          | 526       | Feb. 1           | -31°8                            | Feb. 9           | +70°0                            | 9                         | 5             | 38          | 211°93                   | -22°97                  | Very small spots in an irregular group; very faint on Feb. 3 and 4.                                                                                                                                                                                                    |
|                   | 2861          | 527       | Feb. 24          | -88°5                            | Mar. 8           | +79°0                            | 12                        | 49            | 262         | 217°26                   | -20°71                  | A large regular spot, with occasional companions.                                                                                                                                                                                                                      |
|                   | 2899          | 528       | Mar. 25          | -66°2                            | Apr. 5           | +79°8                            | 12                        | 39            | 316         | 213°99                   | -19°99                  | A few small spots, developing into a fine stream.                                                                                                                                                                                                                      |
|                   | 2935          | 529       | Apr. 21          | -71°8                            | Apr. 25          | -24°4                            | 5                         | 1             | 32          | 206°56                   | -19°52                  | A few variable spots.                                                                                                                                                                                                                                                  |
| 323               | 2853          | 527       | Feb. 18          | -79°1                            | Mar. 1           | +72°4                            | 12                        | 68            | 393         | 300°36                   | +15°28                  | A fine stream of large irregular spots.                                                                                                                                                                                                                                |
|                   | 2889          | 528       | Mar. 17          | -78°4                            | Mar. 27          | +52°0                            | 11                        | 14            | 64          | 304°23                   | +13°80                  | A regular spot, with small companions.                                                                                                                                                                                                                                 |
| 324               | 2856          | 527       | Feb. 21          | -55°1                            | Mar. 3           | +77°3                            | 11                        | 64            | 418         | 290°10                   | +9°37                   | A few faint spots. After Feb. 23 a large regular spot with train.                                                                                                                                                                                                      |
|                   | 2892          | 528       | Mar. 18          | -74°0                            | Mar. 30          | +82°6                            | 13                        | 56            | 364         | 291°66                   | +9°72                   | A fine stream.                                                                                                                                                                                                                                                         |
| 325               | 2860          | 527       | Feb. 24          | +2°0                             | Feb. 28          | +57°1                            | 5                         | 4             | 35          | 303°70                   | +8°92                   | An irregular stream whose final spot is the largest.                                                                                                                                                                                                                   |
|                   | 2890          | 528       | Mar. 17          | -79°7                            | Mar. 22          | -10°9                            | 6                         | 1             | 22          | 303°67                   | +8°82                   | A few very small spots.                                                                                                                                                                                                                                                |



Catalogue of Recurrent Groups of Sun Spots—continued.

1000GG

| Reference Number.                                                                                                                                      | No. of Group. | Rotation. | First Seen.  |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|--------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|----------------------------------------------------------------------------------------|
|                                                                                                                                                        |               |           | Date.        | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                        |
|                                                                                                                                                        |               |           |              |                                  |               |                                  |                           |               |             |                          |                         |                                                                                        |
| 326                                                                                                                                                    | 2872          | 527       | 1893. Mar. 4 | -36°3                            | 1893. Mar. 11 | +69°0                            | 7                         | 3             | 36          | 163°79                   | -17°06                  | A very small spot, which becomes an irregular stream.                                  |
|                                                                                                                                                        | 2906          | 528       | Mar. 27      | -72°5                            | Apr. 7        | +76°1                            | 12                        | 28            | 185         | 181°59                   | -14°37                  | A large regular spot, advancing in longitude, and breaking up                          |
|                                                                                                                                                        | 2939          | 529       | Apr. 22      | -77°2                            | May 3         | +62°3                            | 12                        | 18            | 107         | 189°93                   | -14°38                  | A diminishing regular spot, with occasional small companions.                          |
| 327                                                                                                                                                    | 2875          | 527       | Mar. 8       | +57°5                            | Mar. 10       | +78°0                            | 3                         | 12            | 86          | 196°40                   | -23°63                  | Two regular spots, with occasional companions.                                         |
|                                                                                                                                                        | 2902          | 528       | Mar. 26      | -68°5                            | Mar. 26       | -68°5                            | 1                         | 0             | 11          | 199°40                   | -21°30                  | A small faint spot.                                                                    |
| 328                                                                                                                                                    | 2893          | 528       | Mar. 19      | -84°0                            | Mar. 31       | +74°7                            | 13                        | 59            | 373         | 274°94                   | +23°72                  | A very large regular spot, with occasional companions.                                 |
|                                                                                                                                                        | 2930          | 529       | Apr. 17      | -66°6                            | Apr. 25       | +39°7                            | 9                         | 14            | 104         | 268°79                   | +24°87                  | A regular diminishing spot. Fresh spots spring up by April 24.                         |
| 329                                                                                                                                                    | 2896          | 528       | Mar. 23      | +4°1                             | Mar. 29       | +80°4                            | 7                         | 27            | 191         | 307°91                   | -14°19                  | A very small faint spot, becoming a stream of normal type.                             |
|                                                                                                                                                        | 2924          | 529       | Apr. 13      | -69°4                            | Apr. 16       | -32°7                            | 4                         | 12            | 55          | 316°80                   | -15°35                  | A regular spot.                                                                        |
| 330                                                                                                                                                    | 2919          | 528       | Apr. 8       | -36°8                            | Apr. 16       | +68°5                            | 9                         | 26            | 152         | 55°50                    | -28°14                  | A very small spot, becoming an irregular stream, whose leader [advances.               |
|                                                                                                                                                        | 2956          | 529       | May 2        | -82°9                            | May 15        | +82°7                            | 14                        | 35            | 282         | 52°24                    | -27°06                  | A long irregular stream, whose leader recedes. New spots form in [advance.             |
| 331                                                                                                                                                    | 2923          | 529       | Apr. 12      | -72°0                            | Apr. 23       | +77°8                            | 12                        | 60            | 360         | 331°63                   | -14°66                  | A large regular spot, with train from April 12-16.                                     |
|                                                                                                                                                        | 2964          | 530       | May 9        | -73°0                            | May 18        | +49°3                            | 10                        | 14            | 75          | 331°01                   | -12°92                  | A regular spot, with small companions occasionally to the north.                       |
| 332                                                                                                                                                    | 2938          | 529       | Apr. 22      | -69°3                            | May 2         | +70°0                            | 11                        | 43            | 266         | 204°60                   | +8°59                   | Two small spots, becoming a long stream.                                               |
|                                                                                                                                                        | 2976          | 530       | May 18       | -61°1                            | May 19        | -49°9                            | 2                         | 2             | 6           | 220°75                   | +9°60                   | A very small spot.                                                                     |
| 333                                                                                                                                                    | 2941          | 529       | Apr. 24      | -80°2                            | May 6         | +76°2                            | 13                        | 35            | 224         | 158°72                   | +22°68                  | A large diminishing spot, with irregular train. A new spot becomes [large and regular. |
|                                                                                                                                                        | 2982          | 530       | May 22       | -75°9                            | June 1        | +53°7                            | 11                        | 53            | 355         | 156°35                   | +23°68                  | Two small spots in faculae, becoming an irregular stream.                              |
| 334                                                                                                                                                    | 2948          | 529       | Apr. 27      | -65°1                            | May 8         | +79°9                            | 12                        | 58            | 362         | 136°78                   | -12°28                  | A few small spots, becoming a stream, with a very large spot north.                    |
|                                                                                                                                                        | 2984          | 530       | May 23       | -75°5                            | May 25        | -47°7                            | 3                         | 0             | 8           | 144°03                   | -10°37                  | A very small spot.                                                                     |
| 335                                                                                                                                                    | 2951          | 529       | Apr. 29      | -81°0                            | May 11        | +76°6                            | 13                        | 31            | 201         | 93°78                    | -19°42                  | A regular spot, with an occasional small companion.                                    |
|                                                                                                                                                        | 2992          | 530       | May 26       | -82°4                            | June 8        | +82°8                            | 14                        | 59            | 421         | 91°01                    | -20°78                  | A very large composite spot, with a short train.                                       |
| 336                                                                                                                                                    | (2884         | 527       | Mar. 16      | +49°8                            | Mar. 16       | +49°8                            | 1                         | 0             | 12          | 86°30                    | -18°70                  | Two very small spots.                                                                  |
|                                                                                                                                                        | (2913         | 528       | Apr. 3       | -78°9                            | Apr. 12       | +43°4                            | 10                        | 5             | 42          | 81°74                    | -20°58                  | A nebulous spot, sometimes with a train.                                               |
|                                                                                                                                                        | 2953          | 529       | May 1        | -71°8                            | May 10        | +45°8                            | 10                        | 13            | 94          | 77°47                    | -21°72                  | A regular spot, with some small companions.                                            |
|                                                                                                                                                        | 2993          | 530       | May 28       | -72°6                            | June 9        | +82°9                            | 13                        | 81            | 633         | 77°21                    | -21°01                  | A very large composite spot, with very irregular train.                                |
|                                                                                                                                                        | 3034          | 531       | June 25      | -64°9                            | June 30       | +2°1                             | 6                         | 6             | 30          | 77°35                    | -19°53                  | A regular diminishing spot, sometimes with a train.                                    |
| Note.—Probably 2913 is a revival of 2884, and 2953 of 2913, as both 2913 and 2953 diminish as they approach the W. limb, and are not seen close to it. |               |           |              |                                  |               |                                  |                           |               |             |                          |                         |                                                                                        |
| 337                                                                                                                                                    | 2965          | 529       | May 11       | +48°0                            | May 13        | +78°1                            | 3                         | 0             | 30          | 66°30                    | +11°77                  | One or two small spots.                                                                |
|                                                                                                                                                        | 2994          | 530       | May 28       | -74°6                            | June 6        | +44°4                            | 10                        | 13            | 63          | 76°96                    | +10°52                  | A regular spot, steadily diminishing.                                                  |
| 338                                                                                                                                                    | 2967          | 530       | May 12       | -52°0                            | May 22        | +84°4                            | 11                        | 29            | 277         | 310°87                   | -12°91                  | An irregular stream, becoming continuous. Two large spots on [May 21.                  |
|                                                                                                                                                        | 3005          | 531       | June 5       | -83°4                            | June 17       | +75°0                            | 13                        | 39            | 247         | 321°64                   | -12°54                  | A very large regular spot, with occasional small companions.                           |
|                                                                                                                                                        | 3047          | 532       | July 3       | -73°9                            | July 14       | +69°9                            | 12                        | 33            | 184         | 322°38                   | -11°95                  | A large regular spot, which divides; occasional companions.                            |
| 339                                                                                                                                                    | 2980          | 530       | May 22       | -26°8                            | May 30        | +80°8                            | 9                         | 19            | 145         | 208°54                   | +14°66                  | A pair of spots, increasing to a stream of normal type. [place.                        |
|                                                                                                                                                        | 3016          | 531       | June 14      | -73°4                            | June 19       | -10°2                            | 6                         | 7             | 32          | 213°03                   | +16°58                  | A regular spot, dying out by June 19. Two small spots take its                         |
| 340                                                                                                                                                    | 2996          | 530       | May 31       | -71°4                            | June 11       | +77°6                            | 12                        | 27            | 174         | 41°80                    | +17°74                  | A large regular spot, with a curved train.                                             |
|                                                                                                                                                        | 3036          | 531       | June 27      | -73°9                            | July 6        | +46°0                            | 10                        | 15            | 84          | 40°12                    | +18°94                  | A very irregular group of very variable spots.                                         |
| 341                                                                                                                                                    | 3002          | 530       | June 4       | -52°6                            | June 13       | +70°4                            | 10                        | 11            | 61          | 9°45                     | -15°93                  | A regular spot, with a short diminishing train.                                        |
|                                                                                                                                                        | 3042          | 531       | June 29      | -79°4                            | July 11       | +75°6                            | 13                        | 41            | 276         | 6°67                     | -18°10                  | A very large regular spot, which divides into two by July 10.                          |
| 342                                                                                                                                                    | 3006          | 530       | June 7       | +12°0                            | June 11       | +64°0                            | 5                         | 8             | 57          | 30°20                    | +17°82                  | A scattered group of small variable spots.                                             |
|                                                                                                                                                        | 3040          | 531       | June 28      | -75°6                            | June 28       | -75°6                            | 1                         | 4             | 15          | 26°50                    | +19°90                  | A small spot.                                                                          |
| 343                                                                                                                                                    | 3009          | 531       | June 10      | -30°7                            | June 18       | +73°8                            | 9                         | 11            | 96          | 309°65                   | -9°10                   | An irregularly scattered group, not seen on June 15. Fresh outburst                    |
|                                                                                                                                                        | 3050          | 532       | July 4       | -73°8                            | July 11       | +18°4                            | 8                         | 12            | 102         | 308°34                   | -9°21                   | A scattered group of small nebulous spots. [on June 6.                                 |
| Note.—3009 is intermittent, not being seen on June 15.                                                                                                 |               |           |              |                                  |               |                                  |                           |               |             |                          |                         |                                                                                        |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen. |                                  | Last Seen. |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                     |
|-------------------|---------------|-----------|-------------|----------------------------------|------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.       | Longitude from Central Meridian. | Date.      | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                              |
| 344               | 3010          | 531       | June 10     | -37°9                            | June 17    | +61°0                            | 8                         | 6             | 19          | 305°91                   | -17°71                  | One or two small spots.                                                                                                                                                                      |
|                   | 3046          | 532       | July 2      | -82°2                            | July 15    | +76°4                            | 14                        | 146           | 1000        | 320°85                   | -16°24                  | A large composite spot, followed by a stream which becomes of the                                                                                                                            |
|                   | 3097          | 533       | July 30     | -79°5                            | Aug. 10    | +68°2                            | 12                        | 29            | 159         | 322°06                   | -17°91                  | A large variable spot. Occasional attendants. [normal type.<br>Note.—3010 certainly represents the following spots of 3046.                                                                  |
| 345               | 3015          | 531       | June 13     | -13°9                            | June 20    | +76°2                            | 8                         | 45            | 408         | 287°03                   | -19°61                  | A straggling stream, whose leader becomes large and regular.                                                                                                                                 |
|                   | 3054          | 532       | July 6      | -71°5                            | July 17    | +73°5                            | 12                        | 38            | 270         | 283°56                   | -20°02                  | A large regular spot, with train on n.f. side.                                                                                                                                               |
|                   | 3110          | 533       | Aug. 3      | -66°3                            | Aug. 5     | -41°8                            | 3                         | 1             | 10          | 278°00                   | -22°77                  | A small spot.                                                                                                                                                                                |
| 346               | 3018          | 531       | June 15     | -11°4                            | June 22    | +79°7                            | 8                         | 4             | 25          | 262°09                   | +13°64                  | A small spot. A short stream forms round it.                                                                                                                                                 |
|                   | 3064          | 532       | July 8      | -68°6                            | July 12    | -18°3                            | 5                         | 11            | 41          | 259°16                   | +14°26                  | A single spot, rapidly diminishing.                                                                                                                                                          |
| 347               | 3020          | 531       | June 17     | -24°7                            | June 25    | +78°5                            | 8                         | 33            | 238         | 223°88                   | +16°99                  | Small spots on a curved stream, which straightens later.                                                                                                                                     |
|                   | 3071          | 532       | July 11     | -73°5                            | July 22    | +73°3                            | 12                        | 36            | 234         | 216°44                   | +17°24                  | A composite spot, with small companions. Many changes.                                                                                                                                       |
|                   | 3116          | 533       | Aug. 6      | -81°5                            | Aug. 17    | +70°4                            | 12                        | 20            | 121         | 227°96                   | +16°81                  | A pair of large spots, of which the following spot breaks up.                                                                                                                                |
| 348               | 3031          | 531       | June 23     | -27°3                            | July 1     | +73°8                            | 8                         | 16            | 131         | 139°83                   | -30°51                  | An irregular stream, undergoing rapid changes.                                                                                                                                               |
|                   | 3075          | 532       | July 18     | -58°2                            | July 21    | -15°3                            | 4                         | 5             | 32          | 140°58                   | -31°30                  | Two or three small spots.                                                                                                                                                                    |
| 349               | 3048          | 532       | July 3      | -79°0                            | July 12    | +45°6                            | 10                        | 5             | 33          | 320°19                   | -6°45                   | A small regular spot.                                                                                                                                                                        |
|                   | 3102          | 533       | July 31     | -66°8                            | Aug. 5     | +5°4                             | 6                         | 2             | 12          | 321°80                   | -5°68                   | A short stream, not seen on Aug. 3.<br>Note.—3102 is intermittent, not being seen on 1893 Aug. 3. Also perhaps 3048 dies before reaching W. limb and 3102 is only a [revival.                |
| 350               | 3059          | 532       | July 7      | -27°6                            | July 15    | +77°5                            | 9                         | 79            | 502         | 315°69                   | +11°60                  | A large stream of normal type.                                                                                                                                                               |
|                   | 3098          | 533       | July 30     | -80°9                            | Aug. 11    | +83°2                            | 13                        | 13            | 82          | 322°39                   | +10°33                  | A regular spot, with a small companion on July 31.                                                                                                                                           |
| 351               | 3067          | 532       | July 9      | -63°6                            | July 20    | +83°7                            | 12                        | 56            | 398         | 250°52                   | +16°03                  | A curved stream, becoming one of normal type.                                                                                                                                                |
|                   | 3112          | 533       | Aug. 4      | -84°7                            | Aug. 15    | +63°9                            | 12                        | 20            | 145         | 245°56                   | +16°94                  | A large regular spot, with occasionally a very small companion.                                                                                                                              |
| 352               | 3073          | 532       | July 14     | +20°4                            | July 16    | +50°8                            | 3                         | 7             | 20          | 273°37                   | -14°23                  | A small spot, with followers on July 14.                                                                                                                                                     |
|                   | 3108          | 533       | Aug. 2      | -78°5                            | Aug. 7     | -13°6                            | 6                         | 4             | 18          | 279°78                   | -14°26                  | A diminishing spot, not seen on Aug. 6. Occasional companions.<br>Note.—3108 is intermittent, not being seen on Aug. 6.                                                                      |
| 353               | 3078          | 532       | July 19     | -77°3                            | July 31    | +82°5                            | 13                        | 29            | 181         | 108°57                   | -21°50                  | A large regular spot, with occasional small companions.                                                                                                                                      |
|                   | 3135          | 533       | Aug. 16     | -73°6                            | Aug. 26    | +60°0                            | 11                        | 43            | 309         | 101°72                   | -18°86                  | A large irregular spot, with straggling unstable train.                                                                                                                                      |
|                   | 3181          | 534       | Sept. 12    | -70°1                            | Sept. 15   | -32°1                            | 4                         | 6             | 37          | 105°28                   | -19°13                  | An ill-defined spot.                                                                                                                                                                         |
| 354               | 3083          | 532       | July 20     | -80°1                            | July 30    | +48°1                            | 11                        | 13            | 110         | 87°33                    | -11°39                  | A large spot, which breaks up. Not seen on July 29.                                                                                                                                          |
|                   | 3137          | 533       | Aug. 17     | -71°7                            | Aug. 28    | +76°3                            | 12                        | 37            | 225         | 90°13                    | -9°78                   | A large regular spot, with occasional companions.<br>Note.—3083 is intermittent, not being seen on July 29 and perhaps dies out before reaching the W. limb, so 3137 may be only a [revival. |
| 355               | 3106          | 533       | Aug. 2      | -65°6                            | Aug. 13    | +79°3                            | 12                        | 252           | 1594        | 292°64                   | -17°55                  | Small scattered spots, becoming two very large spots, with train.                                                                                                                            |
|                   | 3156          | 534       | Aug. 28     | -82°4                            | Sept. 9    | +74°1                            | 13                        | 81            | 556         | 291°80                   | -19°45                  | A very large regular spot, shedding small spots on its s.f. side.                                                                                                                            |
| 356               | 3107          | 533       | Aug. 2      | -66°5                            | Aug. 13    | +76°4                            | 12                        | 82            | 481         | 294°64                   | +15°61                  | A few spots, becoming a straight stream of normal type.                                                                                                                                      |
|                   | 3155          | 534       | Aug. 28     | -73°3                            | Sept. 9    | +83°6                            | 13                        | 126           | 560         | 301°72                   | +14°15                  | A very large regular spot. Occasional companions.                                                                                                                                            |
|                   | 3203          | 535       | Sept. 24    | -77°1                            | Oct. 6     | +77°6                            | 13                        | 70            | 313         | 300°63                   | +12°81                  | A large regular spot, with occasional companions.                                                                                                                                            |
|                   | 3250          | 536       | Oct. 21     | -83°6                            | Nov. 2     | +71°2                            | 13                        | 37            | 188         | 298°50                   | +13°81                  | A regular spot, with stream on sp. side from Oct. 23-30.                                                                                                                                     |
| 357               | 3124          | 533       | Aug. 11     | +22°8                            | Aug. 15    | +74°7                            | 5                         | 24            | 190         | 261°82                   | -28°54                  | A short stream.                                                                                                                                                                              |
|                   | 3165          | 534       | Sept. 2     | -50°3                            | Sept. 4    | -22°7                            | 3                         | 1             | 10          | 259°67                   | -29°57                  | A small spot.<br>Note.—Perhaps 3165 is a revival only of 3124.                                                                                                                               |
| 358               | 3139          | 533       | Aug. 18     | -37°4                            | Aug. 26    | +64°1                            | 9                         | 26            | 126         | 109°04                   | -28°14                  | An irregular diminishing stream whose leader is largest.                                                                                                                                     |
|                   | 3184          | 534       | Sept. 13    | -56°4                            | Sept. 15   | -31°3                            | 3                         | 2             | 8           | 105°80                   | -28°47                  | A small spot.                                                                                                                                                                                |
| 359               | 3143          | 533       | Aug. 19     | -84°5                            | Aug. 31    | +79°3                            | 13                        | 18            | 90          | 52°40                    | +9°45                   | Two spots moving apart.                                                                                                                                                                      |
|                   | 3186          | 534       | Sept. 15    | -77°0                            | Sept. 26   | +71°6                            | 12                        | 96            | 479         | 61°08                    | +8°36                   | A very large unstable composite spot, with nebulous companions.                                                                                                                              |

Catalogue of Recurrent Groups of Sun Spots—*continued*.

| Reference Number. | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                               |
|-------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                        |
| 360               | 3151          | 533       | 1893.<br>Aug. 25 | +74°8                            | 1893.<br>Aug. 25 | +74°8                            | 1                         | 4             | 35          | 129°30                   | + 6°70                  | A spot closely surrounded by dense faculae.                                                                                                                            |
|                   | 3176          | 534       | Sept. 10         | -70°0                            | Sept. 16         | + 5°8                            | 7                         | 7             | 39          | 130°60                   | + 8°11                  | A regular spot, with very small companion on Sept. 12-14.                                                                                                              |
| 361               | 3154          | 534       | Aug. 28          | -75°7                            | Sept. 9          | +80°0                            | 13                        | 135           | 938         | 301°78                   | -10°43                  | A fine broad stream of normal type.                                                                                                                                    |
|                   | 3202          | 535       | Sept. 24         | -72°0                            | Oct. 5           | +72°0                            | 12                        | 17            | 104         | 305°54                   | -11°28                  | A large regular spot, with occasional small companions.                                                                                                                |
| 362               | 3173          | 534       | Sept. 7          | -72°8                            | Sept. 19         | +83°5                            | 13                        | 93            | 589         | 169°42                   | - 8°73                  | A very large spot, with a fine train.                                                                                                                                  |
|                   | 3216          | 535       | Oct. 4           | -70°6                            | Oct. 15          | +73°2                            | 12                        | 21            | 106         | 176°17                   | - 8°06                  | A regular spot, slowly diminishing.                                                                                                                                    |
|                   | 3261          | 536       | Oct. 30          | -77°3                            | Nov. 9           | +53°5                            | 11                        | 14            | 66          | 184°79                   | - 7°28                  | A diminishing nebulous spot, receding in longitude.                                                                                                                    |
| 363               | 3191          | 534       | Sept. 20         | -23°0                            | Sept. 28         | +81°1                            | 9                         | 20            | 138         | 50°44                    | +12°41                  | One or two small spots, increasing to a stream.                                                                                                                        |
|                   | 3232          | 535       | Oct. 12          | -82°3                            | Oct. 24          | +72°0                            | 13                        | 58            | 316         | 53°13                    | +11°77                  | Two large spots, with irregular train.                                                                                                                                 |
|                   | 3272          | 536       | Nov. 11          | -52°1                            | Nov. 20          | +74°0                            | 10                        | 22            | 117         | 59°27                    | +10°63                  | A confused nebulous cluster, becoming an irregular stream.<br>Note.—Possibly 3272 is a revival only of 3232.                                                           |
| 364               | 3206          | 535       | Sept. 27         | -16°4                            | Oct. 4           | +75°3                            | 8                         | 99            | 598         | 321°95                   | + 7°58                  | Two streams, enclosing oval space.                                                                                                                                     |
|                   | 3246          | 536       | Oct. 19          | -79°1                            | Oct. 30          | +68°2                            | 12                        | 33            | 178         | 329°91                   | + 7°81                  | Two spots, increasing to a long irregular stream.                                                                                                                      |
| 365               | 3227          | 535       | Oct. 10          | -85°6                            | Oct. 22          | +73°2                            | 13                        | 46            | 267         | 85°62                    | +23°62                  | A large regular spot, with occasional small companions.                                                                                                                |
|                   | 3266          | 536       | Nov. 7           | -76°7                            | Nov. 10          | -40°0                            | 4                         | 5             | 26          | 80°60                    | +22°85                  | A small spot.                                                                                                                                                          |
| 366               | 3233          | 535       | Oct. 13          | +44°7                            | Oct. 15          | +71°2                            | 3                         | 3             | 36          | 174°87                   | -10°77                  | A few very small spots in a short stream.                                                                                                                              |
|                   | 3262          | 536       | Oct. 31          | -71°6                            | Nov. 1           | -59°4                            | 2                         | 0             | 22          | 179°30                   | -10°70                  | A small spot.                                                                                                                                                          |
| (366*)            | 3243          | 536       | Oct. 18          | -80°0                            | Oct. 28          | +48°7                            | 11                        | 41            | 258         | 339°86                   | -20°37                  | A large spot, followed by large irregular nebulous spot, which [breaks up.                                                                                             |
|                   | 3283          | 537       | Nov. 17          | -57°9                            | Nov. 25          | +54°1                            | 9                         | 8             | 56          | 332°82                   | -20°06                  | A very small spot, increasing. Occasional followers.<br>Note.—3243 grows very small and probably dies before reaching the W. Limb, so that 3283 may be a revival only. |
| 367               | 3244          | 536       | Oct. 18          | -81°3                            | Oct. 30          | +74°8                            | 13                        | 143           | 724         | 338°86                   | - 6°80                  | A very large spot, with a train.                                                                                                                                       |
|                   | 3280          | 537       | Nov. 15          | -76°3                            | Nov. 25          | +60°3                            | 11                        | 11            | 60          | 339°96                   | - 5°58                  | A regular and diminishing spot, not seen on Nov. 24.<br>Note.—3280 is intermittent, not being seen on Nov. 24.                                                         |
| 368               | 3256          | 536       | Oct. 24          | - 7°1                            | Oct. 30          | +76°4                            | 7                         | 28            | 153         | 338°40                   | +18°33                  | Faint spots, increasing to a large composite spot, with train.                                                                                                         |
|                   | 3287          | 537       | Nov. 18          | -46°2                            | Nov. 27          | +82°5                            | 10                        | 66            | 286         | 332°34                   | +19°43                  | A small nebulous increasing spot, with unstable straggling train. [19.                                                                                                 |
|                   | 3304          | 538       | Dec. 13          | -70°5                            | Dec. 22          | +47°6                            | 10                        | 13            | 55          | 334°95                   | +18°79                  | A large regular but diminishing spot. Very small companion on Dec.<br>Note.—3287 is not seen close to the E. limb, so possibly it is a revival only of 3256.           |
| 369               | 3271          | 536       | Nov. 11          | +41°0                            | Nov. 13          | +74°2                            | 3                         | 12            | 87          | 151°03                   | +18°57                  | A pair of spots that move rapidly apart.                                                                                                                               |
|                   | 3295          | 537       | Nov. 29          | -81°0                            | Dec. 11          | +80°1                            | 13                        | 74            | 519         | 150°09                   | +19°35                  | A very large spot, with a large nebulous area near.                                                                                                                    |
|                   | 3328          | 538       | Dec. 26          | -77°8                            | 1894.<br>Jan. 2  | +13°9                            | 6                         | 29            | 129         | 154°03                   | +17°62                  | A large spot, breaking up by Dec. 28 to an irregular diminishing [stream.                                                                                              |
| 370               | 3281          | 537       | 1893.<br>Nov. 16 | -80°4                            | 1893.<br>Nov. 28 | +79°7                            | 13                        | 161           | 1234        | 322°05                   | - 5°10                  | A very large irregular composite variable spot.                                                                                                                        |
|                   | 3305          | 538       | Dec. 13          | -76°8                            | Dec. 25          | +82°9                            | 13                        | 64            | 268         | 330°17                   | - 0°79                  | A large regular spot.                                                                                                                                                  |
|                   | 3352          | 539       | 1894.<br>Jan. 9  | -77°0                            | 1894.<br>Jan. 20 | +74°0                            | 12                        | 19            | 135         | 335°93                   | - 2°03                  | A large regular stable spot, advancing in longitude.                                                                                                                   |
| 371               | 3290          | 537       | 1893.<br>Nov. 25 | -63°3                            | 1893.<br>Dec. 5  | +72°7                            | 11                        | 72            | 465         | 220°18                   | +18°19                  | A curved stream, becoming one of normal type.                                                                                                                          |
|                   | 3317          | 538       | Dec. 20          | -81°2                            | Dec. 26          | - 4°7                            | 7                         | 22            | 144         | 230°41                   | +18°79                  | An irregular group of small spots, breaking up.                                                                                                                        |
| 372               | 3293          | 537       | Nov. 28          | - 2°5                            | Dec. 3           | +62°0                            | 6                         | 10            | 68          | 241°22                   | +18°38                  | A small nebulous spot, preceded by a short irregular stream.                                                                                                           |
|                   | 3321          | 538       | Dec. 22          | -48°3                            | Dec. 29          | +48°9                            | 8                         | 7             | 44          | 241°50                   | +18°56                  | Irregularly scattered small spots, mostly unstable.<br>Note.—3321 is not seen close to E. limb, and perhaps is a revival [only of 3293.                                |
| 373               | 3302          | 537       | Dec. 10          | -43°3                            | Dec. 19          | +84°8                            | 10                        | 53            | 323         | 45°78                    | -15°72                  | A pair of small spots, increasing to a straggling stream.                                                                                                              |
|                   | 3345          | 538       | 1894.<br>Jan. 3  | -80°4                            | 1894.<br>Jan. 15 | +79°5                            | 13                        | 45            | 232         | 50°85                    | -14°21                  | A large regular spot, preceded by a straight stream.                                                                                                                   |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                          |
|------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                   |
| 374              | 3318          | 538       | 1893.<br>Dec. 21 | -75°8                            | 1893.<br>Dec. 30 | +45°2                            | 10                        | 62            | 331         | 221°32                   | -3°54                   | A broad stream.                                                                                                                                                                                   |
|                  | 3367          | 539       | 1894.<br>Jan. 17 | -74°5                            | 1894.<br>Jan. 28 | +78°8                            | 12                        | 32            | 184         | 233°84                   | -3°13                   | A regular spot, with occasional small companion. [Jan. 1.<br>Note.—No photographs are available for 1893 Dec. 31 or 1894                                                                          |
| 375              | 3322          | 538       | 1893.<br>Dec. 23 | +31°8                            | 1893.<br>Dec. 27 | +84°6                            | 5                         | 22            | 268         | 305°88                   | +11°08                  | Small spots in an irregular stream.                                                                                                                                                               |
|                  | 3356          | 539       | 1894.<br>Jan. 11 | -71°6                            | 1894.<br>Jan. 23 | +84°1                            | 13                        | 51            | 296         | 309°55                   | +11°71                  | A large regular spot, with an irregular stream.                                                                                                                                                   |
|                  | 3396          | 540       | Feb. 7           | -78°3                            | Feb. 19          | +81°3                            | 13                        | 25            | 117         | 308°80                   | +11°05                  | A regular spot, sometimes followed by companions.                                                                                                                                                 |
| 376              | 3323          | 538       | 1893.<br>Dec. 23 | -79°8                            | Jan. 5           | +84°8                            | 12                        | 88            | 569         | 190°54                   | -12°12                  | A large regular spot, with large p.m. in longitude, followed by [nebulous areas.                                                                                                                  |
|                  | 3370          | 539       | 1894.<br>Jan. 19 | -73°1                            | Jan. 25          | +1°2                             | 7                         | 7             | 20          | 201°61                   | -9°81                   | A small regular spot.                                                                                                                                                                             |
| 377              | 3325          | 538       | 1893.<br>Dec. 25 | -80°7                            | 1894.<br>Jan. 6  | +81°7                            | 11                        | 70            | 346         | 168°88                   | -7°50                   | [companions.<br>A large regular spot, advancing in longitude after Dec. 29. Small                                                                                                                 |
|                  | 3372          | 539       | 1894.<br>Jan. 21 | -80°0                            | Feb. 2           | +79°3                            | 13                        | 22            | 115         | 173°45                   | -6°90                   | A large spot, followed by a smaller, both diminishing.                                                                                                                                            |
| (377*)           | 3329          | 538       | 1893.<br>Dec. 26 | -79°5                            | Jan. 7           | +84°4                            | 11                        | 63            | 312         | 155°82                   | -7°93                   | A large spot, which breaks up. Small companions.                                                                                                                                                  |
|                  | 3380          | 539       | 1894.<br>Jan. 25 | -42°9                            | Feb. 3           | +82°1                            | 10                        | 15            | 97          | 158°79                   | -8°40                   | Two small spots, becoming a large spot, which advances.<br>Note.—3380 is not seen near E. limb, and is probably a revival only [of 3329.                                                          |
| 378              | 3336          | 538       | 1893.<br>Dec. 30 | +60°3                            | 1893.<br>Dec. 30 | +60°3                            | 1                         | 22            | 114         | 240°00                   | +1°10                   | A short stream.                                                                                                                                                                                   |
|                  | 3366          | 539       | 1894.<br>Jan. 16 | -76°8                            | 1894.<br>Jan. 20 | -20°2                            | 5                         | 6             | 32          | 243°25                   | -1°73                   | Two or three small spots irregularly scattered, not seen on Jan. 19.<br>Note.—3366 is intermittent, not being seen on 1894 Jan. 19. No photographs are available for 1893 Dec. 31 or 1894 Jan. 1. |
| 379              | 3354          | 539       | Jan. 10          | -75°1                            | Jan. 22          | +83°2                            | 13                        | 105           | 740         | 322°34                   | -13°07                  | A very large composite spot, with train.                                                                                                                                                          |
|                  | 3394          | 540       | Feb. 6           | -79°3                            | Feb. 13          | +13°9                            | 8                         | 9             | 58          | 322°30                   | -15°60                  | A regular spot, with very small companion on Feb. 10.                                                                                                                                             |
| 380              | 3360          | 539       | Jan. 14          | -77°7                            | Jan. 26          | +84°9                            | 13                        | 73            | 382         | 267°36                   | -14°88                  | A large spot, with very irregular train.                                                                                                                                                          |
|                  | 3401          | 540       | Feb. 10          | -82°9                            | Feb. 22          | +80°1                            | 13                        | 24            | 129         | 267°52                   | -14°62                  | A large regular spot, with a very small companion on Feb. 17.                                                                                                                                     |
| 381              | 3371          | 539       | Jan. 20          | -3°2                             | Jan. 26          | +79°9                            | 7                         | 63            | 305         | 262°36                   | +15°46                  | A few small faint spots, becoming a stream of normal type.                                                                                                                                        |
|                  | 3402          | 540       | Feb. 11          | -71°4                            | Feb. 22          | +78°5                            | 12                        | 33            | 194         | 265°42                   | +16°94                  | A large regular spot, with occasional small companion.                                                                                                                                            |
|                  | 3443          | 541       | Mar. 10          | -75°8                            | Mar. 20          | +55°5                            | 11                        | 10            | 55          | 263°99                   | +16°80                  | A regular spot, with small companion on March 16.                                                                                                                                                 |
| 382              | 3379          | 539       | Jan. 25          | +7°9                             | Jan. 29          | +57°9                            | 5                         | 15            | 94          | 203°48                   | -29°92                  | A stream, whose most southerly member recedes.                                                                                                                                                    |
|                  | 3408          | 540       | Feb. 15          | -81°4                            | Feb. 26          | +61°0                            | 12                        | 35            | 210         | 200°92                   | -26°47                  | A very large composite spot, breaking up into small and unstable [spots.<br>Note.—3379 is not seen close to the W. limb.                                                                          |
| 383              | 3386          | 539       | Feb. 1           | +31°9                            | Feb. 5           | +86°7                            | 5                         | 16            | 123         | 138°60                   | +3°70                   | An irregular and unstable group.                                                                                                                                                                  |
|                  | 3416          | 540       | Feb. 19          | -76°9                            | Feb. 28          | +40°1                            | 10                        | 14            | 70          | 151°49                   | +3°84                   | A regular and diminishing spot, with occasional small companions.                                                                                                                                 |
| 384              | 3392          | 540       | Feb. 5           | -81°5                            | Feb. 16          | +65°1                            | 12                        | 22            | 168         | 333°21                   | -10°32                  | An irregular variable group. Only one spot is left by Feb. 14.                                                                                                                                    |
|                  | 3434          | 541       | Mar. 5           | -63°9                            | Mar. 5           | -63°9                            | 1                         | 0             | 16          | 339°20                   | -8°90                   | A small spot.                                                                                                                                                                                     |
| 385              | 3409          | 540       | Feb. 16          | +52°3                            | Feb. 17          | +66°8                            | 2                         | 2             | 12          | 323°80                   | -18°95                  | A small spot.                                                                                                                                                                                     |
|                  | 3435          | 541       | Mar. 5           | -78°6                            | Mar. 5           | -78°6                            | 1                         | 0             | 20          | 324°50                   | -18°70                  | A small spot.                                                                                                                                                                                     |
| 386              | 3413          | 540       | Feb. 18          | -85°4                            | Mar. 3           | +79°0                            | 14                        | 34            | 205         | 152°14                   | -25°94                  | A large regular spot, with occasional small companions. [23.                                                                                                                                      |
|                  | 3449          | 541       | Mar. 19          | -77°0                            | Mar. 24          | -12°5                            | 6                         | 2             | 13          | 143°43                   | -25°72                  | A small and diminishing spot. Two small spots precede it on Mar.                                                                                                                                  |
| 387              | 3414          | 540       | Feb. 19          | +32°7                            | Feb. 22          | +76°0                            | 4                         | 20            | 92          | 261°05                   | -4°35                   | A small spot, becoming a short stream, whose leader advances.                                                                                                                                     |
|                  | 3442          | 541       | Mar. 10          | -71°7                            | Mar. 21          | +78°7                            | 12                        | 19            | 101         | 270°61                   | -4°47                   | A large spot, with occasional small companion.                                                                                                                                                    |
| 388              | 3429          | 540       | Feb. 28          | -10°6                            | Mar. 5           | +62°9                            | 6                         | 11            | 39          | 104°05                   | -19°05                  | An irregular stream, whose leader alone remains by March 4.                                                                                                                                       |
|                  | 3455          | 541       | Mar. 23          | -64°5                            | Mar. 23          | -64°5                            | 1                         | 0             | 13          | 101°20                   | -19°50                  | A small spot.                                                                                                                                                                                     |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                              |
|-------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                       |
| 389               | 3445          | 541       | 1894. Mar. 12 | +17°8                            | 1894. Mar. 16 | +70°4                            | 5                         | 4             | 27          | 327°44                   | -15°70                  | A few unstable spots, becoming a short stream.                                                        |
|                   | 3471          | 542       | Apr. 1        | -74°6                            | Apr. 13       | +84°1                            | 13                        | 25            | 135         | 335°65                   | -15°23                  | A regular spot, breaking up and becoming very variable.                                               |
| 390               | 3460          | 541       | Mar. 27       | -64°1                            | Apr. 7        | +82°9                            | 12                        | 73            | 397         | 53°44                    | +9°79                   | An irregular stream, whose largest spot advances.                                                     |
|                   | 3492          | 542       | Apr. 22       | -75°8                            | May 4         | +83°2                            | 13                        | 65            | 332         | 54°85                    | +11°90                  | A large regular spot, with occasional very small companions.                                          |
| 391               | 3464          | 541       | Mar. 28       | -64°9                            | Apr. 8        | +70°5                            | 12                        | 159           | 926         | 33°25                    | +21°46                  | Two very large irregular variable spots, with small companions.                                       |
|                   | 3494          | 542       | Apr. 25       | -53°8                            | Apr. 25       | -53°8                            | 1                         | 0             | 2           | 36°50                    | +20°30                  | A very small spot.                                                                                    |
| 392               | 3465          | 541       | Mar. 28       | -78°8                            | Apr. 9        | +80°0                            | 13                        | 26            | 139         | 21°88                    | +14°60                  | A large regular spot, with occasional small companions.                                               |
|                   | 3495          | 542       | Apr. 25       | -69°6                            | May 3         | +30°0                            | 9                         | 12            | 55          | 19°68                    | +15°53                  | A regular spot.                                                                                       |
| 393               | 3468          | 541       | Mar. 30       | +73°1                            | Mar. 31       | +82°4                            | 2                         | 11            | 60          | 145°85                   | -12°90                  | A pair of small spots, first seen near the W. Limb.                                                   |
|                   | 3486          | 542       | Apr. 14       | -86°5                            | Apr. 26       | +75°1                            | 13                        | 54            | 270         | 152°40                   | -13°29                  | A large regular spot, with occasional small companions.                                               |
|                   | 3520          | 543       | May 12        | -80°4                            | May 24        | +83°4                            | 13                        | 169           | 920         | 148°11                   | -12°69                  | A very large irregular variable group.                                                                |
| 394               | 3469          | 541       | Mar. 31       | +82°0                            | Mar. 31       | +82°0                            | 1                         | 0             | 91          | 144°00                   | -6°60                   | A pair of faint spots in the midst of bright faculae.                                                 |
|                   | 3487          | 542       | Apr. 15       | -70°2                            | Apr. 19       | -19°7                            | 5                         | 5             | 16          | 150°90                   | -6°14                   | A small regular spot, with an occasional small companion.                                             |
| 395               | 3473          | 542       | Apr. 3        | -17°6                            | Apr. 11       | +79°2                            | 9                         | 29            | 168         | 360°93                   | -27°41                  | A pair of small spots at first. A variable stream later.                                              |
|                   | 3496          | 543       | Apr. 26       | -83°0                            | May 8         | +71°9                            | 13                        | 116           | 677         | 352°04                   | -26°92                  | Two large irregular spots, with companions.                                                           |
| 396               | 3475          | 542       | Apr. 4        | -72°8                            | Apr. 14       | +57°2                            | 11                        | 15            | 66          | 294°96                   | +18°42                  | A regular spot, which by Apr. 15 coalesces with group 3478.                                           |
|                   | 3478          | 542       | Apr. 6        | -55°6                            | Apr. 16       | +79°4                            | 11                        | 90            | 620         | 288°10                   | +16°65                  | A fine broad stream. Preceding spots advance to meet 3475.                                            |
|                   | 3504          | 543       | May 1         | -81°6                            | May 12        | +69°2                            | 12                        | 61            | 298         | 292°83                   | +17°32                  | A considerable irregular variable group.                                                              |
|                   | 3544          | 544       | May 30        | -47°2                            | June 1        | -18°7                            | 3                         | 0             | 5           | 300°67                   | +16°30                  | A very small spot. [only of 3504.                                                                     |
| (396*)            | 3483          | 542       | Apr. 11       | +46°7                            | Apr. 11       | +46°7                            | 1                         | 1             | 6           | 322°20                   | -1°90                   | A very small spot.                                                                                    |
|                   | 3498          | 543       | Apr. 29       | -77°6                            | May 11        | +69°9                            | 13                        | 19            | 85          | 318°78                   | -3°80                   | Straggling unstable stream. Later a stream of normal type.                                            |
|                   | 3540          | 544       | May 28        | -56°9                            | June 2        | +8°0                             | 6                         | 6             | 36          | 320°17                   | -6°30                   | Irregularly scattered unstable spots.                                                                 |
|                   |               |           |               |                                  |               |                                  |                           |               |             |                          |                         | Note.—These groups indicate a wide region of intermittent disturbance rather than a persistent group. |
| 397               | 3485          | 542       | Apr. 12       | -72°3                            | Apr. 24       | +70°3                            | 13                        | 30            | 187         | 183°03                   | -14°94                  | A regular spot, with variable train which aggregates to a regular spot.                               |
|                   | 3518          | 543       | May 11        | -61°3                            | May 22        | +81°1                            | 12                        | 201           | 1101        | 181°03                   | -14°58                  | A very large complex irregular variable group.                                                        |
|                   | 3559          | 544       | June 5        | -80°8                            | June 17       | +76°8                            | 13                        | 67            | 391         | 186°71                   | -16°98                  | A large unstable group.                                                                               |
| 398               | 3488          | 542       | Apr. 19       | -83°2                            | May 2         | +78°7                            | 14                        | 90            | 485         | 85°72                    | -17°21                  | A regular spot, with train, whose leader becomes large.                                               |
|                   | 3525          | 543       | May 17        | -71°8                            | May 25        | +29°3                            | 9                         | 9             | 45          | 85°28                    | -17°49                  | A regular and diminishing spot, which has broken up by May 22.                                        |
| 399               | 3512          | 543       | May 6         | -26°0                            | May 12        | +55°5                            | 7                         | 8             | 32          | 280°56                   | -5°66                   | A very small spot, becoming a straggling unstable stream.                                             |
|                   | 3543          | 544       | May 29        | -71°0                            | June 3        | -6°2                             | 6                         | 3             | 11          | 290°63                   | -3°67                   | A small regular spot. Note.—3512 is not seen very close to the W. limb.                               |
| 400               | 3522          | 543       | May 14        | +6°3                             | May 20        | +76°9                            | 7                         | 26            | 121         | 204°61                   | -19°43                  | One or two small spots, becoming stream of normal type.                                               |
|                   | 3555          | 544       | June 4        | -75°4                            | June 11       | +21°1                            | 8                         | 6             | 19          | 209°63                   | -19°20                  | A diminishing nebulous spot.                                                                          |
| 401               | 3533          | 544       | May 24        | -72°1                            | June 4        | +72°1                            | 12                        | 110           | 531         | 357°03                   | +12°63                  | A very large regular spot, with occasional small companions.                                          |
|                   | 3581          | 545       | June 19       | -84°2                            | July 1        | +76°2                            | 13                        | 61            | 331         | 359°63                   | +12°75                  | A large regular spot, with occasional small companions.                                               |
|                   | 3637          | 546       | July 17       | -72°7                            | July 29       | +82°5                            | 13                        | 52            | 288         | 357°58                   | +12°71                  | Two large regular spots which approach. Small companions.                                             |
|                   | 3673          | 547       | Aug. 15       | -53°4                            | Aug. 15       | -53°4                            | 1                         | 2             | 11          | 355°60                   | +12°10                  | A small spot. Note.—3533 is seen as a notch on the limb on May 23.                                    |
| 402               | 3537          | 544       | May 26        | -82°0                            | June 7        | +74°0                            | 13                        | 90            | 491         | 314°51                   | +14°95                  | A very large regular spot, with small irregular companions.                                           |
|                   | 3585          | 545       | June 23       | -74°3                            | July 4        | +71°4                            | 12                        | 10            | 59          | 315°87                   | +16°34                  | A large irregular unstable spot. Occasional small companions.                                         |
| 403               | 3546          | 544       | May 31        | +4°2                             | June 5        | +77°2                            | 6                         | 13            | 62          | 342°52                   | -0°62                   | A straight stream, whose leader advances.                                                             |
|                   | 3583          | 545       | June 21       | -69°9                            | June 30       | +51°5                            | 10                        | 12            | 57          | 348°31                   | -1°19                   | A diminishing nebulous spot, with occasional small companions.                                        |
| 404               | 3565          | 544       | June 10       | -75°7                            | June 22       | +81°3                            | 13                        | 127           | 728         | 127°70                   | +9°05                   | A large regular spot, with train. Becoming nebulous composite spot.                                   |
|                   | 3613          | 545       | July 7        | -80°6                            | July 18       | +65°3                            | 12                        | 25            | 155         | 124°07                   | +9°94                   | A large regular spot, with small companions.                                                          |

Catalogue of Recurrent Groups of Sun Spots—*continued.*

| Reference Number.                                                                                                                     | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|--------------------------------------------------------------------------|
|                                                                                                                                       |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                          |
| 405                                                                                                                                   | 3573          | 544       | 1894. June 12 | -75°4                            | 1894. June 23 | +74°4                            | 12                        | 40            | 221         | 103°02                   | +10°09                  | A large spot which divides.                                              |
|                                                                                                                                       | 3615          | 545       | July 8        | -81°7                            | July 12       | -29°1                            | 5                         | 2             | 14          | 109°88                   | +9°94                   | A small spot.                                                            |
| 406                                                                                                                                   | 3574          | 544       | June 13       | +7°4                             | June 18       | +77°7                            | 6                         | 62            | 280         | 173°58                   | -18°92                  | An irregular group, increasing by June 17 to contain a large spot.       |
|                                                                                                                                       | 3604          | 545       | July 3        | -77°2                            | July 16       | +78°7                            | 14                        | 58            | 354         | 169°74                   | -19°01                  | Two large regular spots. Occasional companions.                          |
|                                                                                                                                       | 3654          | 546       | July 31       | -81°0                            | Aug. 6        | -9°0                             | 7                         | 13            | 78          | 163°49                   | -19°57                  | A regular diminishing spot. Occasional companions preceding.             |
| 407                                                                                                                                   | 3575          | 544       | June 14       | -73°9                            | June 25       | +73°2                            | 12                        | 192           | 1045        | 75°48                    | -14°41                  | A very large spot which divides, with irregular unstable train.          |
|                                                                                                                                       | 3624          | 545       | July 11       | -75°6                            | July 23       | +77°7                            | 13                        | 110           | 553         | 76°55                    | -12°35                  | Two large spots, with a number of unstable companions.                   |
|                                                                                                                                       | 3662          | 546       | Aug. 7        | -70°3                            | Aug. 18       | +73°0                            | 12                        | 18            | 91          | 82°47                    | -11°39                  | A large regular spot, with small companion on Aug. 16.                   |
|                                                                                                                                       | 3663          | 546       | Aug. 7        | -80°6                            | Aug. 19       | +71°8                            | 13                        | 15            | 89          | 71°25                    | -14°65                  | A large regular spot.                                                    |
| 408                                                                                                                                   | 3578          | 544       | June 17       | +62°4                            | June 18       | +76°6                            | 2                         | 4             | 24          | 173°95                   | +10°45                  | A regular spot, with small companion on June 18.                         |
|                                                                                                                                       | 3599          | 545       | July 2        | -85°3                            | July 14       | +74°8                            | 13                        | 54            | 310         | 185°84                   | +12°16                  | A large regular spot, with train, becoming stream of normal type.        |
|                                                                                                                                       | 3652          | 546       | July 29       | -81°9                            | Aug. 11       | +81°3                            | 14                        | 105           | 608         | 184°65                   | +10°31                  | Very large irregular scattered variable group.                           |
|                                                                                                                                       | 3689          | 547       | Aug. 26       | -83°9                            | Sept. 4       | +37°6                            | 10                        | 18            | 94          | 180°05                   | +9°55                   | A large regular diminishing spot, with a compact cluster following.      |
| 409                                                                                                                                   | 3610          | 545       | July 6        | -82°9                            | July 18       | +79°2                            | 13                        | 83            | 470         | 136°67                   | +9°14                   | A stream whose two large spots break up and coalesce.                    |
|                                                                                                                                       | 3658          | 546       | Aug. 2        | -77°1                            | Aug. 6        | -29°2                            | 5                         | 10            | 41          | 141°26                   | +7°30                   | A rapidly diminishing spot. Small companion on Aug. 5.                   |
| 410                                                                                                                                   | 3590          | 545       | June 27       | -15°0                            | July 2        | +55°6                            | 6                         | 25            | 155         | 324°62                   | -12°18                  | A small faint spot, becoming a regular spot, with broad train.           |
|                                                                                                                                       | 3640          | 546       | July 20       | -76°0                            | July 30       | +68°5                            | 11                        | 47            | 262         | 327°94                   | -8°74                   | A stream whose leader is large and regular and is left alone by July 27. |
|                                                                                                                                       | 3674          | 547       | Aug. 15       | -73°8                            | Aug. 24       | +45°3                            | 10                        | 13            | 66          | 336°42                   | -5°84                   | A regular diminishing spot. Very small scattered companions.             |
|                                                                                                                                       | 3714          | 548       | Sept. 11      | -67°0                            | Sept. 11      | -67°0                            | 1                         | 0             | 12          | 343°10                   | -5°70                   | A small spot.                                                            |
| <i>Note.</i> —3590 and 3714 do not appear to be genuine members of the series, but are distinct disturbances in the same region.      |               |           |               |                                  |               |                                  |                           |               |             |                          |                         |                                                                          |
| 411                                                                                                                                   | 3642          | 546       | July 21       | -76°8                            | Aug. 2        | +81°3                            | 13                        | 48            | 243         | 300°93                   | +18°38                  | A large regular spot, with occasional small companions.                  |
|                                                                                                                                       | 3679          | 547       | Aug. 17       | -85°4                            | Aug. 25       | +17°7                            | 9                         | 13            | 64          | 297°92                   | +17°86                  | A large regular but diminishing spot. Small companion on Aug. 20.        |
| 412                                                                                                                                   | 3661          | 546       | Aug. 7        | -6°2                             | Aug. 14       | +78°8                            | 8                         | 42            | 285         | 146°01                   | -12°83                  | Two streams enclosing oval space.                                        |
|                                                                                                                                       | 3669          | 546       | Aug. 12       | +43°1                            | Aug. 14       | +74°5                            | 3                         | 8             | 26          | 135°73                   | -10°93                  | A few very small spots.                                                  |
|                                                                                                                                       | 3694          | 547       | Aug. 30       | -70°6                            | Sept. 6       | +25°3                            | 8                         | 3             | 17          | 140°29                   | -10°81                  | A few small unstable spots irregularly scattered.                        |
| <i>Note.</i> —3661 and 3669 are together the progenitor of 3694. Also note that 3694 is intermittent, not being seen on 1894 Sept. 4. |               |           |               |                                  |               |                                  |                           |               |             |                          |                         |                                                                          |
| 413                                                                                                                                   | 3668          | 546       | Aug. 11       | -76°7                            | Aug. 23       | +79°8                            | 13                        | 212           | 1246        | 26°42                    | +6°35                   | Usually a very large irregular composite spot.                           |
|                                                                                                                                       | 3703          | 547       | Sept. 6       | -79°2                            | Sept. 13      | +13°7                            | 8                         | 7             | 34          | 36°75                    | +5°60                   | A diminishing spot. Occasional very small companions.                    |
|                                                                                                                                       | 3704          | 547       | Sept. 6       | -81°9                            | Sept. 14      | +20°7                            | 9                         | 20            | 105         | 34°71                    | +9°18                   | A regular spot. Occasional small companions.                             |
| <i>Note.</i> —3668 comes back as two groups 3703 and 3704.                                                                            |               |           |               |                                  |               |                                  |                           |               |             |                          |                         |                                                                          |
| 414                                                                                                                                   | 3697          | 547       | Sept. 3       | -56°3                            | Sept. 12      | +65°5                            | 10                        | 8             | 42          | 105°09                   | -15°72                  | Unstable spots, mostly small, becoming two straight streams.             |
|                                                                                                                                       | 3728          | 548       | Sept. 29      | -76°1                            | Oct. 7        | +19°7                            | 9                         | 24            | 195         | 96°16                    | -13°93                  | A long irregular stream, diminishing rapidly after Oct. 3.               |
| 415                                                                                                                                   | 3702          | 547       | Sept. 6       | -74°8                            | Sept. 18      | +84°2                            | 13                        | 54            | 263         | 42°00                    | +16°05                  | A large regular spot. Very small companions on Sept. 13.                 |
|                                                                                                                                       | 3734          | 548       | Oct. 3        | -84°2                            | Oct. 15       | +76°2                            | 13                        | 26            | 149         | 41°04                    | +18°05                  | A large regular spot. Occasional small companions.                       |
| 416                                                                                                                                   | 3726          | 548       | Sept. 28      | +34°5                            | Oct. 1        | +78°1                            | 4                         | 30            | 163         | 225°03                   | -11°13                  | A straight stream. Two principal spots alone remain by Sept. 30.         |
|                                                                                                                                       | 3752          | 549       | Oct. 18       | -59°5                            | Oct. 19       | -44°7                            | 2                         | 2             | 8           | 228°30                   | -10°90                  | A small spot.                                                            |
| 417                                                                                                                                   | 3732          | 548       | Oct. 2        | -80°6                            | Oct. 14       | +77°5                            | 13                        | 36            | 173         | 56°26                    | +13°31                  | A large regular spot, with occasional small companions.                  |
|                                                                                                                                       | 3776          | 549       | Oct. 29       | -84°8                            | Nov. 8        | +46°9                            | 11                        | 9             | 46          | 54°44                    | +11°97                  | A regular but diminishing spot.                                          |
| 418                                                                                                                                   | 3745          | 548       | Oct. 13       | +22°7                            | Oct. 18       | +79°0                            | 6                         | 38            | 219         | 10°97                    | -16°40                  | A stream of normal type. The final spot recedes rapidly.                 |
|                                                                                                                                       | 3781          | 549       | Nov. 2        | -74°9                            | Nov. 6        | -18°2                            | 5                         | 12            | 83          | 15°64                    | -15°28                  | Irregular stream of small unstable spots.                                |
|                                                                                                                                       | 3785          | 549       | Nov. 3        | -68°7                            | Nov. 8        | -5°3                             | 6                         | 2             | 9           | 3°80                     | -15°53                  | Small unstable spots in a disturbed area. None seen on Nov. 5 and 7.     |
| <i>Note.</i> —3785 is intermittent, not being seen on Nov. 5 and 7. 3745 returns, or perhaps revives, as two groups 3781 and 3785.    |               |           |               |                                  |               |                                  |                           |               |             |                          |                         |                                                                          |
| 419                                                                                                                                   | 3748          | 549       | Oct. 18       | +48°0                            | Oct. 20       | +77°4                            | 3                         | 1             | 8           | 337°30                   | -6°07                   | A cluster of very small spots.                                           |
|                                                                                                                                       | 3786          | 550       | Nov. 3        | -84°2                            | Nov. 14       | +59°9                            | 12                        | 29            | 135         | 349°56                   | -4°98                   | A large irregular spot, which divides. Small followers.                  |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                          |
|-------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                   |
| 420               | 3759          | 549       | 1894. Oct. 21 | -44.7                            | 1894. Oct. 29 | +63.9                            | 9                         | 8             | 34          | 202.63                   | + 4.70                  | A very small spot, increasing considerably, with unstable train.                                                                  |
|                   | 3800          | 550       | Nov. 15       | -63.5                            | Nov. 19       | -10.7                            | 5                         | 3             | 9           | 209.40                   | + 4.72                  | A small spot, with occasional very small companion.                                                                               |
| 421               | 3770          | 549       | Oct. 28       | -77.9                            | Nov. 9        | +82.0                            | 13                        | 39            | 224         | 77.37                    | +13.91                  | A large regular spot, with train, until Nov. 2.                                                                                   |
|                   | 3812          | 550       | Nov. 26       | -60.1                            | Dec. 6        | +78.2                            | 11                        | 38            | 187         | 76.57                    | +10.98                  | Irregular straggling unstable stream, becoming two large irregular spots.                                                         |
|                   | 3833          | 551       | Dec. 21       | -82.1                            | Dec. 30       | +38.9                            | 10                        | 13            | 67          | 82.63                    | + 8.53                  | A very close pair of spots.                                                                                                       |
| 422               | 3789          | 549       | Nov. 6        | - 6.8                            | Nov. 12       | +65.8                            | 7                         | 53            | 245         | 27.57                    | -11.69                  | Curved unstable stream forming on C.M.                                                                                            |
|                   | 3817          | 550       | Nov. 30       | -46.2                            | Dec. 10       | +84.0                            | 11                        | 37            | 197         | 31.81                    | -13.93                  | Very small spot, becoming a large stream of normal type.                                                                          |
|                   | 3836          | 551       | Dec. 25       | -79.1                            | 1895. Jan. 2  | +25.8                            | 9                         | 5             | 35          | 31.66                    | -15.03                  | A somewhat ill-defined spot.                                                                                                      |
|                   |               |           |               |                                  |               |                                  |                           |               |             |                          |                         | Note.—3789 does not appear to be a genuine member of the series, but is a distinct disturbance in the same region.                |
| 423               | 3827          | 551       | 1894. Dec. 10 | - 0.6                            | 1894. Dec. 16 | +80.7                            | 7                         | 111           | 705         | 308.43                   | -19.17                  | Scattered group, becoming large regular spot, with complex train.                                                                 |
|                   | 3847          | 552       | Dec. 31       | -81.8                            | 1895. Jan. 12 | +75.6                            | 12                        | 61            | 359         | 307.67                   | -17.53                  | A very large spot, generally with small companions.                                                                               |
|                   | 3883          | 553       | 1895. Jan. 28 | -80.0                            | Feb. 5        | +26.2                            | 9                         | 7             | 51          | 301.37                   | -18.64                  | A regular spot, slowly diminishing. Occasional unstable companions.                                                               |
| 424               | 3829          | 551       | 1894. Dec. 15 | -73.9                            | 1894. Dec. 26 | +75.9                            | 12                        | 115           | 773         | 167.93                   | -14.61                  | Broad straight stream of large nebulous variable spots. Leader [advances.                                                         |
|                   | 3859          | 552       | 1895. Jan. 11 | -67.8                            | 1895. Jan. 11 | -67.8                            | 1                         | 0             | 3           | 175.70                   | -14.30                  | A very small faint spot in the midst of bright faculae.                                                                           |
| 425               | 3872          | 552       | 1895. Jan. 21 | -68.9                            | 1895. Feb. 1  | +79.2                            | 12                        | 90            | 613         | 49.28                    | -10.48                  | A fine stream of normal type, becoming complex and irregular.                                                                     |
|                   | 3903          | 553       | Feb. 15       | -76.9                            | Feb. 25       | +63.2                            | 11                        | 42            | 212         | 73.50                    | -10.13                  | A large regular spot, with many unstable companions.                                                                              |
|                   | 3905          | 553       | Feb. 18       | -59.6                            | Feb. 28       | +75.5                            | 11                        | 13            | 99          | 48.96                    | -13.05                  | A small faint spot, becoming a nebulous cluster and then a stream.                                                                |
|                   | 3946          | 554       | Mar. 16       | -67.1                            | Mar. 27       | +80.3                            | 12                        | 74            | 531         | 59.23                    | -10.09                  | An irregular group, increasing to a wedge-shaped stream.                                                                          |
|                   | 3975          | 555       | Apr. 10       | -86.4                            | Apr. 22       | +71.2                            | 13                        | 26            | 172         | 66.02                    | - 9.73                  | Two variable unstable spots. Fresh outburst by Apr. 16.                                                                           |
|                   | 4011          | 556       | May 8         | -69.8                            | May 9         | -58.4                            | 2                         | 3             | 18          | 71.20                    | - 6.35                  | Two or three small spots.                                                                                                         |
|                   |               |           |               |                                  |               |                                  |                           |               |             |                          |                         | Note.—3872 returns as two groups 3903 and 3905, and 3946 in the next return partakes of elements of both these groups.            |
| 426               | 3882          | 553       | Jan. 28       | -55.2                            | Feb. 5        | +54.9                            | 9                         | 2             | 10          | 330.05                   | +12.53                  | One or two small spots, not seen on Feb. 4.                                                                                       |
|                   | 3911          | 554       | Feb. 23       | -65.9                            | Mar. 6        | +79.6                            | 12                        | 45            | 285         | 334.38                   | +12.88                  | A double spot, becoming the leader of an irregular stream.                                                                        |
|                   |               |           |               |                                  |               |                                  |                           |               |             |                          |                         | Note.—3882 is intermittent, not being seen on 1895 Feb. 4. It is not seen close to the W. limb; hence 3911 may be only a revival. |
| 427               | 3884          | 553       | Jan. 28       | -79.4                            | Feb. 9        | +82.6                            | 13                        | 71            | 405         | 302.76                   | +14.39                  | A large stream of normal type.                                                                                                    |
|                   | 3916          | 554       | Feb. 24       | -75.2                            | Mar. 7        | +71.6                            | 12                        | 32            | 184         | 308.79                   | +13.04                  | A large regular spot, with occasionally a very small companion.                                                                   |
|                   | 3955          | 555       | Mar. 24       | -71.3                            | Mar. 28       | -15.4                            | 5                         | 7             | 26          | 307.40                   | +12.50                  | A small regular spot.                                                                                                             |
| 428               | 3894          | 553       | Feb. 4        | -58.2                            | Feb. 14       | +78.1                            | 11                        | 10            | 101         | 232.63                   | +18.87                  | A small spot, increasing to a long straight stream.                                                                               |
|                   | 3928          | 554       | Mar. 1        | -75.1                            | Mar. 8        | +14.5                            | 8                         | 12            | 94          | 240.85                   | +19.44                  | A close and diminishing pair, with occasional small companions.                                                                   |
| 429               | 3906          | 553       | Feb. 18       | -81.2                            | Mar. 1        | +73.5                            | 12                        | 14            | 56          | 28.21                    | - 4.23                  | A large regular spot, steadily diminishing.                                                                                       |
|                   | 3924          | 553       | Mar. 1        | +66.9                            | Mar. 2        | +77.6                            | 2                         | 16            | 67          | 23.25                    | - 3.75                  | A pair of ill-defined spots.                                                                                                      |
|                   | 3949          | 554       | Mar. 19       | -65.3                            | Mar. 29       | +79.9                            | 11                        | 45            | 262         | 23.65                    | - 5.12                  | A pair of small spots, becoming large and variable.                                                                               |
|                   |               |           |               |                                  |               |                                  |                           |               |             |                          |                         | Note.—Probably 3924 alone is the progenitor of 3906; but also probably 3924 and 3906 should have been taken as one group.         |
| 430               | 3923          | 554       | Feb. 26       | -79.2                            | Mar. 9        | +71.8                            | 12                        | 42            | 260         | 286.08                   | - 5.97                  | A large regular spot, with wavy diminishing train.                                                                                |
|                   | 3958          | 555       | Mar. 26       | -64.5                            | Apr. 2        | +24.1                            | 8                         | 14            | 70          | 283.43                   | - 6.49                  | A small spot, becoming two variable streams.                                                                                      |
| 431               | 3933          | 554       | Mar. 6        | -72.5                            | Mar. 17       | +76.4                            | 12                        | 45            | 219         | 183.49                   | +13.93                  | A large regular spot, usually with small unstable companions.                                                                     |
|                   | 3964          | 555       | Apr. 2        | -75.8                            | Apr. 11       | +45.3                            | 10                        | 12            | 64          | 184.11                   | +12.21                  | A large regular spot, steadily diminishing.                                                                                       |
| 432               | 3957          | 555       | Mar. 26       | -62.7                            | Apr. 5        | +74.3                            | 11                        | 56            | 310         | 290.55                   | +18.16                  | A very small spot, becoming a fine and variable stream.                                                                           |
|                   | 3990          | 556       | Apr. 21       | -78.7                            | Apr. 25       | -21.2                            | 5                         | 5             | 42          | 289.68                   | +17.54                  | A very close pair of small spots.                                                                                                 |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group.                         | Rotation.                       | First Seen.                                         |                                           | Last Seen.                                        |                                           | No. of Days Photographed.  | Mean Area for                |                                 | Mean Longitude of Group.                  | Mean Latitude of Group.                       | REMARKS.                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------|---------------------------------------|---------------------------------|-----------------------------------------------------|-------------------------------------------|---------------------------------------------------|-------------------------------------------|----------------------------|------------------------------|---------------------------------|-------------------------------------------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |                                       |                                 | Date.                                               | Longitude from Central Meridian.          | Date.                                             | Longitude from Central Meridian.          |                            | Um-bra.                      | Whole Spot.                     |                                           |                                               |                                                                                                                                                                                                                                                                                                                                                                                                            |
| 433               | 3961<br>3995                          | 555<br>556                      | 1895.<br>Apr. 2<br>Apr. 24                          | -11°3<br>-81°0                            | 1895.<br>Apr. 7<br>May 3                          | +53°1<br>+34°4                            | 6<br>10                    | 14<br>12                     | 61<br>65                        | 247°78<br>244°34                          | -26°97<br>-25°01                              | Two streams of unstable spots, which merge into one stream.<br>A regular spot, with small companions.<br><i>Note.</i> —3995 is perhaps only a revival of 3961.                                                                                                                                                                                                                                             |
| 434               | 3968<br>4005<br>4044                  | 555<br>556<br>557               | Apr. 5<br>May 2<br>May 30                           | -82°4<br>-81°5<br>-65°3                   | Apr. 17<br>May 14<br>June 10                      | +77°1<br>+78°5<br>+77°5                   | 13<br>13<br>12             | 22<br>46<br>18               | 131<br>260<br>93                | 134°48<br>140°18<br>146°78                | -14°05<br>-13°71<br>-11°92                    | A large regular spot, usually with small companions.<br>A stream of normal type.<br>A disturbed area. Fresh outburst by June 5, forming two clusters.<br><i>Note.</i> —Group 4044 is intermittent, not being seen on 1895 June 1 [and 3.                                                                                                                                                                   |
| 435               | 3979<br>4012                          | 555<br>556                      | Apr. 11<br>May 8                                    | -75°3<br>-79°9                            | Apr. 22<br>May 12                                 | +70°8<br>-26°7                            | 12<br>5                    | 81<br>0                      | 480<br>9                        | 64°64<br>62°18                            | +11°00<br>+11°58                              | A fine stream of normal type.<br>A small spot, not seen on May 11.<br><i>Note.</i> —4012 is intermittent, not being seen on 1895 May 11.                                                                                                                                                                                                                                                                   |
| 436               | 3989<br>4024<br>(4057<br>4058         | 556<br>557<br>558<br>558        | Apr. 20<br>May 18<br>June 10<br>June 13             | -74°7<br>-68°1<br>-76°9<br>-85°6          | May 2<br>May 30<br>June 25<br>June 19             | +80°2<br>+83°9<br>+82°2<br>-8°0           | 13<br>13<br>13<br>7        | 134<br>113<br>22<br>11       | 673<br>690<br>121<br>82         | 301°98<br>298°26<br>309°25<br>301°59      | +23°85<br>+22°29<br>+21°42<br>+23°21          | A very large regular spot, with a distant large companion. [group.<br>A large regular diminishing spot, becoming a complex and irregular<br>A spot which becomes large and regular, with diminishing train.<br>A large irregular diminishing spot. Small spots increase preceding it.<br><i>Note.</i> —4024 comes back as two groups 4057 and 4058, which should really have been taken as a single group. |
| 437               | 3996<br>4025                          | 556<br>557                      | Apr. 25<br>May 18                                   | -17°5<br>-69°8                            | May 2<br>May 27                                   | +74°3<br>+47°3                            | 8<br>10                    | 27<br>7                      | 142<br>23                       | 294°63<br>298°33                          | -13°06<br>-13°05                              | A straight increasing stream. There is an acolyte stream from<br>A small regular diminishing spot. [Apr. 26-27.                                                                                                                                                                                                                                                                                            |
| 438               | 4002<br>4027                          | 556<br>557                      | May 1<br>May 19                                     | +24°4<br>-79°3                            | May 4<br>May 30                                   | +68°1<br>+71°0                            | 4<br>12                    | 9<br>25                      | 42<br>143                       | 260°30<br>280°24                          | +2°60<br>+2°49                                | Two or three small spots.<br>A large regular spot, usually with short train.<br><i>Note.</i> —This is probably a true case of a return, but the forward motion in longitude is unusually large.                                                                                                                                                                                                            |
| 439               | 4023<br>4055<br>4085                  | 557<br>558<br>559               | May 18<br>June 10<br>July 7                         | -26°0<br>-80°5<br>-72°3                   | May 26<br>June 22<br>July 14                      | +80°9<br>+80°1<br>+20°6                   | 9<br>13<br>8               | 22<br>82<br>14               | 151<br>500<br>93                | 344°54<br>348°25<br>354°53                | +9°64<br>+10°39<br>+12°86                     | Two close pairs of spots increasing to a stream.<br>Two regular but variable spots.<br>A large spot, which on July 11 suddenly breaks up.                                                                                                                                                                                                                                                                  |
| 440               | 4028<br>4061                          | 557<br>558                      | May 20<br>June 16                                   | -74°0<br>-71°2                            | May 31<br>June 25                                 | +78°5<br>+46°1                            | 12<br>10                   | 49<br>14                     | 262<br>66                       | 275°08<br>273°34                          | -23°99<br>-23°75                              | A small spot, which becomes large and regular, with irregular train.<br>A regular and diminishing spot. Occasional small companions                                                                                                                                                                                                                                                                        |
| 441               | 4049<br>4077                          | 557<br>558                      | June 3<br>June 30                                   | -75°6<br>-81°6                            | June 15<br>July 11                                | +81°2<br>+61°9                            | 13<br>12                   | 27<br>8                      | 156<br>28                       | 81°92<br>76°83                            | -17°88<br>-18°41                              | A large regular spot, with occasional very small companions.<br>A small regular spot. Occasional very small companions.                                                                                                                                                                                                                                                                                    |
| 442               | 4052<br>4080                          | 557<br>558                      | June 5<br>July 2                                    | -82°7<br>-82°7                            | June 17<br>July 9                                 | +78°5<br>+6°0                             | 13<br>8                    | 93<br>15                     | 526<br>127                      | 48°38<br>49°33                            | -15°53<br>-16°95                              | Fine compact stream, becoming one very large complex spot.<br>A large composite spot, becoming a straight unstable stream.                                                                                                                                                                                                                                                                                 |
| 443               | 4060<br>4086                          | 558<br>559                      | June 15<br>July 7                                   | -12°5<br>-75°5                            | June 22<br>July 16                                | +82°4<br>+39°3                            | 8<br>10                    | 77<br>2                      | 499<br>17                       | 348°34<br>349°36                          | +15°69<br>+17°67                              | Irregular and very variable complex stream.<br>A few small unstable spots, not seen on July 12.<br><i>Note.</i> —4086 is intermittent, not being seen on 1895 July 12.                                                                                                                                                                                                                                     |
| 444               | 4083<br>4104                          | 558<br>559                      | July 7<br>July 24                                   | +56°4<br>-72°0                            | July 9<br>Aug. 3                                  | +80°7<br>+54°5                            | 3<br>11                    | 9<br>15                      | 56<br>74                        | 122°20<br>127°16                          | -15°50<br>-12°67                              | Two spots. * Very small companion on July 7.<br>Irregular unstable stream, sharply inclined to Equator.                                                                                                                                                                                                                                                                                                    |
| 445               | 4084<br>4112                          | 558<br>559                      | July 7<br>Aug. 2                                    | -67°7<br>-79°0                            | July 18<br>Aug. 14                                | +79°9<br>+76°9                            | 12<br>13                   | 29<br>13                     | 167<br>67                       | 0°90<br>3°12                              | -6°16<br>-6°99                                | Two pairs of spots, developing into a large regular spot with train.<br>A regular spot, usually with one or two small companions.                                                                                                                                                                                                                                                                          |
| 446               | 4107<br>4133                          | 559<br>560                      | July 30<br>Aug. 24                                  | -51°7<br>-74°0                            | Aug. 9<br>Sept. 4                                 | +80°8<br>+72°5                            | 11<br>12                   | 86<br>16                     | 507<br>91                       | 75°35<br>79°23                            | -9°07<br>-8°39                                | A small spot, becoming a stream of normal type.<br>A regular spot, diminishing. Occasional small companions.                                                                                                                                                                                                                                                                                               |
| 447               | 4110<br>4139<br>4180<br>(4206<br>4207 | 559<br>560<br>561<br>562<br>562 | Aug. 1<br>Aug. 27<br>Sept. 24<br>Oct. 22<br>Oct. 22 | -78°0<br>-86°0<br>-77°3<br>-71°4<br>-73°5 | Aug. 13<br>Sept. 9<br>Oct. 6<br>Oct. 31<br>Nov. 2 | +82°6<br>+85°1<br>+78°4<br>+48°7<br>+78°7 | 13<br>14<br>13<br>10<br>12 | 136<br>127<br>72<br>18<br>29 | 840<br>622<br>365<br>132<br>159 | 22°08<br>27°56<br>26°11<br>25°38<br>26°78 | +10°45<br>+10°83<br>+11°48<br>+13°96<br>+9°22 | Irregular complex stream, whose leader becomes very large.<br>A very large regular diminishing spot. Small companions.<br>A large regular spot, with occasional small companions.<br>Irregular but compact cluster of unstable spots.<br>Irregular cluster, of which one spot becomes large and composite.<br><i>Note.</i> —4180 comes back as two groups 4206 and 4207.                                   |



Catalogue of Recurrent Groups of Sun Spots—*continued*.

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                |
|-------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Unbra.        | Whole Spot. |                          |                         |                                                                                                                                         |
| 448               | 4111          | 559       | 1895. Aug. 2  | -37°0                            | 1895. Aug. 10 | +76°4                            | 9                         | 41            | 240         | 48°88                    | -5°73                   | A short compact wedge-shaped variable group.                                                                                            |
|                   | 4135          | 560       | Aug. 25       | -80°2                            | Aug. 29       | -27°0                            | 5                         | 5             | 28          | 59°26                    | -5°44                   | A regular spot, rapidly diminishing.                                                                                                    |
| 449               | 4129          | 560       | Aug. 23       | +41°8                            | Aug. 25       | +69°9                            | 3                         | 20            | 103         | 208°33                   | -22°77                  | A very small spot, becoming an irregular stream.                                                                                        |
|                   | 4161          | 561       | Sept. 10      | -75°0                            | Sept. 14      | -21°2                            | 5                         | 5             | 36          | 215°16                   | -21°66                  | A regular diminishing spot.                                                                                                             |
| 450               | 4163          | 561       | Sept. 13      | +51°6                            | Sept. 16      | +86°6                            | 4                         | 42            | 237         | 300°00                   | +23°03                  | A straight compact stream suddenly appearing.                                                                                           |
|                   | 4189          | 562       | Sept. 30      | -79°8                            | Oct. 12       | +81°5                            | 13                        | 51            | 269         | 305°32                   | +21°28                  | A short broad nearly continuous variable stream.                                                                                        |
| 451               | 4171          | 561       | Sept. 16      | -78°6                            | Sept. 27      | +66°0                            | 12                        | 41            | 235         | 129°84                   | -14°93                  | A large spot, with double nucleus. Unstable companions.                                                                                 |
|                   | 4200          | 562       | Oct. 15       | -65°9                            | Oct. 17       | -39°0                            | 3                         | 4             | 26          | 120°20                   | -15°20                  | A diminishing spot. Small companion on Oct. 15.                                                                                         |
| 452               | 4185          | 561       | Sept. 26      | -53°7                            | Oct. 6        | +77°7                            | 11                        | 161           | 1059        | 24°29                    | -15°41                  | A few small spots, becoming a very large variable composite spot.                                                                       |
|                   | 4205          | 562       | Oct. 22       | -71°3                            | Nov. 2        | +71°5                            | 12                        | 53            | 316         | 24°42                    | -16°78                  | A large double spot, which divides.                                                                                                     |
|                   | 4226          | 563       | Nov. 18       | -75°5                            | Nov. 30       | +77°0                            | 13                        | 21            | 113         | 20°83                    | -15°57                  | A large regular spot, with very small companion on Nov. 27.                                                                             |
| 453               | 4201          | 562       | Oct. 19       | -67°5                            | Oct. 30       | +82°0                            | 12                        | 107           | 556         | 71°13                    | +10°90                  | A pair of small spots, becoming a stream of normal type.                                                                                |
|                   | 4220          | 563       | Nov. 14       | -76°0                            | Nov. 23       | +39°8                            | 10                        | 5             | 31          | 74°08                    | +11°91                  | Irregularly scattered unstable spots, not seen on Nov. 21.<br><i>Note.</i> —4220 is intermittent, not being seen on 1895 Nov. 21.       |
| 454               | 4208          | 563       | Oct. 24       | -73°5                            | Nov. 4        | +75°8                            | 12                        | 78            | 431         | 356°63                   | +17°68                  | A fine broken stream of two distinct clusters.                                                                                          |
|                   | 4229          | 564       | Nov. 20       | -74°0                            | Nov. 29       | +45°3                            | 10                        | 10            | 44          | 359°79                   | +18°85                  | A regular spot, with one or two very small companions.                                                                                  |
| 455               | 4210          | 563       | Oct. 28       | -54°7                            | Nov. 7        | +79°9                            | 11                        | 93            | 527         | 323°90                   | +9°42                   | A very small spot, becoming a fine stream of normal type.                                                                               |
|                   | 4230          | 564       | Nov. 22       | -76°3                            | Nov. 29       | +17°5                            | 8                         | 8             | 42          | 331°29                   | +8°64                   | An irregular diminishing spot, which becomes regular. Companions.                                                                       |
| 456               | 4211          | 563       | Oct. 29       | -79°3                            | Nov. 9        | +77°4                            | 12                        | 92            | 483         | 290°83                   | +11°41                  | Fine very large spot, with straight train. Very variable.                                                                               |
|                   | 4231          | 564       | Nov. 25       | -73°9                            | Dec. 5        | +62°0                            | 11                        | 29            | 131         | 297°13                   | +11°66                  | Two regular spots close together. Small companions.                                                                                     |
| 457               | 4234          | 564       | Dec. 2        | +29°4                            | Dec. 5        | +68°3                            | 4                         | 35            | 217         | 303°73                   | -13°75                  | An irregular fluctuating stream of normal type.                                                                                         |
|                   | 4256          | 565       | Dec. 21 1896. | -82°2                            | Jan. 2        | +77°5                            | 13                        | 94            | 562         | 302°89                   | -12°77                  | Fine diminishing stream, with three variable principal spots.                                                                           |
|                   | 4278          | 566       | Jan. 18 1896. | -71°6                            | Jan. 29       | +72°3                            | 12                        | 11            | 49          | 303°95                   | -13°97                  | A regular spot, with occasionally a small companion.                                                                                    |
| 458               | 4241          | 564       | 1895. Dec. 7  | -78°1                            | 1895. Dec. 19 | +76°5                            | 13                        | 49            | 260         | 124°43                   | +18°89                  | Three large variable spots, connected by very small spots in a stream.                                                                  |
|                   | 4270          | 565       | 1896. Jan. 6  | -53°5                            | 1896. Jan. 7  | -39°4                            | 2                         | 4             | 16          | 122°45                   | +17°65                  | A small spot, with a very small companion on Jan. 7.<br><i>Note.</i> —4270 is not seen close to the E. limb, and may be only a revival. |
| 459               | 4247          | 564       | 1895. Dec. 12 | -25°5                            | 1895. Dec. 19 | +69°8                            | 8                         | 39            | 224         | 118°39                   | +4°31                   | Fine group of normal type appearing suddenly near the C.M.                                                                              |
|                   | 4271          | 565       | 1896. Jan. 6  | -64°5                            | 1896. Jan. 7  | -51°0                            | 2                         | 1             | 48          | 111°15                   | +6°40                   | One or two unstable spots.                                                                                                              |
| 460               | 4255          | 565       | 1895. Dec. 20 | -78°3                            | 1896. Jan. 1  | +83°4                            | 13                        | 64            | 361         | 321°44                   | -10°34                  | A large-regular spot, with sparse diminishing train.                                                                                    |
|                   | 4277          | 566       | 1896. Jan. 16 | -80°7                            | Jan. 28       | +82°5                            | 13                        | 20            | 118         | 323°70                   | -10°58                  | A large regular spot, with occasionally a very small companion.                                                                         |
| 461               | 4268          | 565       | 1896. Jan. 6  | +5°4                             | 1896. Jan. 10 | +64°3                            | 5                         | 8             | 28          | 184°50                   | -20°52                  | Straight stream appearing suddenly. The leader is alone left by                                                                         |
|                   | 4283          | 566       | Jan. 28       | -60°7                            | Jan. 30       | -36°1                            | 3                         | 5             | 46          | 180°03                   | -19°87                  | A few small spots. [Jan. 8.]                                                                                                            |
| 462               | 4285          | 566       | Feb. 2        | +49°2                            | Feb. 5        | +82°4                            | 4                         | 105           | 631         | 224°93                   | -15°25                  | An irregular stream appearing suddenly.                                                                                                 |
|                   | 4296          | 567       | Feb. 19       | -79°0                            | Mar. 2        | +76°8                            | 13                        | 79            | 574         | 230°92                   | -14°31                  | A long straight unstable stream, with large irregular spots.                                                                            |
| 463               | 4293          | 566       | Feb. 15       | +68°2                            | Feb. 16       | +78°6                            | 2                         | 36            | 177         | 75°60                    | +11°60                  | Two principal spots and small companion appearing suddenly.                                                                             |
|                   | 4304          | 567       | Mar. 2        | -74°1                            | Mar. 7        | -12°3                            | 6                         | 1             | 26          | 80°43                    | +13°50                  | A small spot, usually with two very small companions.                                                                                   |
| 464               | 4295          | 567       | Feb. 18       | -75°0                            | Feb. 29       | +75°7                            | 12                        | 110           | 699         | 256°34                   | +15°98                  | A magnificent straight stream. The component spots change con-                                                                          |
|                   | 4314          | 568       | Mar. 16       | -65°1                            | Mar. 21       | -2°7                             | 6                         | 6             | 24          | 262°63                   | +13°45                  | A small spot. [tinually.]                                                                                                               |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                 |
|-------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Umbr.         | Whole Spot. |                          |                         |                                                                                                                                                                          |
| 465               | 4300          | 567       | 1896. Feb. 22 | -81°1'                           | 1896. Mar. 5  | +77°7'                           | 13                        | 20            | 121         | 192°23'                  | -21°28'                 | A large regular diminishing spot. Small companions. A small spot.                                                                                                        |
|                   | 4317          | 568       | Mar. 20       | -81°7'                           | Mar. 24       | -24°5'                           | 5                         | 5             | 29          | 199°80'                  | -19°58'                 |                                                                                                                                                                          |
| 466               | 4305          | 567       | Mar. 3        | +9°8'                            | Mar. 8        | +80°2'                           | 6                         | 26            | 182         | 155°05'                  | -16°50'                 | Irregular stream, whose leader remains alone by Mar. 8. A small regular spot, with a very small companion on Mar. 27.                                                    |
|                   | 4320          | 568       | Mar. 23       | -75°1'                           | Mar. 29       | -2°8'                            | 7                         | 4             | 19          | 160°03'                  | -15°63'                 |                                                                                                                                                                          |
| 467               | 4310          | 567       | Mar. 10       | +2°4'                            | Mar. 14       | +59°8'                           | 5                         | 8             | 39          | 58°30'                   | -11°80'                 | Small unstable spots, becoming a short compact stream by Mar. 13. A large composite spot, which divides.                                                                 |
|                   | 4326          | 568       | Mar. 30       | -79°9'                           | Apr. 10       | +70°7'                           | 12                        | 12            | 66          | 66°00'                   | -11°88'                 |                                                                                                                                                                          |
| 468               | 4311          | 567       | Mar. 14       | +61°9'                           | Mar. 15       | +77°7'                           | 2                         | 7             | 80          | 61°65'                   | -19°20'                 | One or two small spots. A large regular spot.                                                                                                                            |
|                   | 4327          | 568       | Mar. 30       | -81°2'                           | Apr. 11       | +76°3'                           | 13                        | 22            | 134         | 63°63'                   | -17°87'                 |                                                                                                                                                                          |
| 469               | 4315          | 567       | Mar. 18       | +53°1'                           | Mar. 19       | +70°3'                           | 2                         | 2             | 40          | 0°20'                    | -6°75'                  | A few small spots in a cluster. One or two small spots.                                                                                                                  |
|                   | 4335          | 568       | Apr. 5        | -69°2'                           | Apr. 6        | -56°6'                           | 2                         | 2             | 19          | 0°75'                    | -7°15'                  |                                                                                                                                                                          |
| 470               | 4348          | 569       | Apr. 30       | -4°8'                            | May 6         | +83°5'                           | 7                         | 11            | 114         | 96°06'                   | -10°71'                 | An irregular stream of unstable spots. A regular and diminishing spot. Occasional followers.                                                                             |
|                   | 4359          | 570       | May 21        | -72°8'                           | May 29        | +36°9'                           | 9                         | 8             | 47          | 106°66'                  | -9°62'                  |                                                                                                                                                                          |
| 471               | 4368          | 571       | June 9        | -43°0'                           | June 18       | +82°7'                           | 10                        | 41            | 251         | 250°23'                  | -16°41'                 | A small spot, becoming large and composite, with a train. A small spot, with a close companion on July 7.                                                                |
|                   | 4384          | 572       | July 4        | -65°0'                           | July 7        | -26°2'                           | 4                         | 4             | 24          | 251°08'                  | -14°83'                 |                                                                                                                                                                          |
| 472               | 4369          | 571       | June 9        | -75°5'                           | June 20       | +81°9'                           | 12                        | 94            | 515         | 217°63'                  | -15°39'                 | Irregular, variable, and complex group. A regular spot, usually with a very small companion.                                                                             |
|                   | 4386          | 572       | July 6        | -75°8'                           | July 14       | +34°1'                           | 9                         | 13            | 73          | 216°48'                  | -14°56'                 |                                                                                                                                                                          |
| 473               | 4376          | 571       | June 22       | -1°9'                            | June 28       | +74°0'                           | 7                         | 90            | 533         | 116°67'                  | -20°37'                 | A stream of two clusters, appearing suddenly near the C.M. Fine cluster of small spots, changing from day to day.                                                        |
|                   | 4399          | 572       | July 14       | -71°7'                           | July 25       | +73°3'                           | 12                        | 41            | 272         | 111°45'                  | -21°99'                 |                                                                                                                                                                          |
| 474               | 4395          | 572       | July 13       | -73°5'                           | July 24       | +72°0'                           | 12                        | 87            | 483         | 123°99'                  | -20°55'                 | A very large nearly regular spot. Occasional small companions. A large regular spot, with occasional very small companions.                                              |
|                   | 4407          | 573       | Aug. 9        | -80°8'                           | Aug. 21       | +77°4'                           | 12                        | 39            | 235         | 120°74'                  | -20°10'                 |                                                                                                                                                                          |
| 475               | 4416          | 574       | Aug. 26       | -43°2'                           | Sept. 4       | +76°2'                           | 10                        | 66            | 377         | 293°60'                  | -10°64'                 | Fine straight continuous stream of variable spots. Broad irregular stream. A pair of large spots lead. A small spot, which has disappeared by Oct. 22. Small companions. |
|                   | 4435          | 575       | Sept. 19      | -78°7'                           | Sept. 30      | +67°7'                           | 12                        | 75            | 440         | 298°15'                  | -12°11'                 |                                                                                                                                                                          |
|                   | 4446          | 576       | Oct. 17       | -65°7'                           | Oct. 23       | +15°8'                           | 7                         | 4             | 17          | 304°40'                  | -11°40'                 |                                                                                                                                                                          |
| (475*)            | 4425          | 574       | Sept. 9       | +44°7'                           | Sept. 12      | +78°0'                           | 4                         | 23            | 158         | 192°95'                  | -15°75'                 | Two clusters, which coalesce. A few small unstable spots in a sparse stream. Note.—4440 is probably only a revival of 4425.                                              |
|                   | 4440          | 575       | Sept. 29      | -48°2'                           | Oct. 4        | +11°6'                           | 6                         | 2             | 24          | 193°25'                  | -15°33'                 |                                                                                                                                                                          |
| 476               | 4443          | 575       | Oct. 14       | +16°9'                           | Oct. 17       | +56°0'                           | 4                         | 12            | 85          | 65°65'                   | -15°68'                 | An irregular variable stream of unstable spots. A large regular diminishing spot, with unstable companions. Note.—4457 is perhaps only a revival of 4443.                |
|                   | 4457          | 576       | Nov. 3        | -79°9'                           | Nov. 12       | +36°1'                           | 10                        | 17            | 97          | 64°55'                   | -15°44'                 |                                                                                                                                                                          |
| 477               | 4456          | 576       | Nov. 3        | -68°9'                           | Nov. 14       | +75°9'                           | 12                        | 143           | 710         | 76°17'                   | -15°43'                 | A very large regular spot. Small companions. A large regular spot, which becomes a straight stream. Small companions.                                                    |
|                   | 4473          | 577       | Nov. 29       | -84°8'                           | Dec. 9        | +45°5'                           | 11                        | 32            | 197         | 77°84'                   | -16°70'                 |                                                                                                                                                                          |
| 478               | 4464          | 576       | Nov. 14       | +80°4'                           | Nov. 14       | +80°4'                           | 1                         | 15            | 247         | 81°50'                   | +9°80'                  | Two large spots appearing suddenly in a faculose region. A large regular spot, with a straight train.                                                                    |
|                   | 4472          | 577       | Nov. 29       | -71°4'                           | Dec. 10       | +72°1'                           | 12                        | 45            | 238         | 91°23'                   | +9°05'                  |                                                                                                                                                                          |
| 479               | 4478          | 577       | Dec. 7        | -19°2'                           | Dec. 14       | +71°5'                           | 8                         | 16            | 112         | 39°86'                   | -14°96'                 | A very small spot, with train, whose final spot remains alone by [Dec. 13. A large regular spot usually followed by a straight stream.                                   |
|                   | 4491          | 578       | Dec. 29       | -76°5'                           | 1897. Jan. 10 | +77°6'                           | 13                        | 23            | 133         | 49°02'                   | -12°95'                 |                                                                                                                                                                          |
| 480               | 4486          | 578       | 1896. Dec. 19 | -76°0'                           | 1896. Dec. 29 | +64°1'                           | 11                        | 9             | 49          | 187°37'                  | -11°06'                 | Irregularly scattered small unstable spots, not seen on Dec. 24. A spot with a small companion on Jan. 15. Note.—4486 is intermittent, not being seen on 1896 Dec. 24.   |
|                   | 4502          | 579       | 1897. Jan. 15 | -67°6'                           | 1897. Jan. 18 | -32°1'                           | 4                         | 3             | 22          | 194°48'                  | -9°90'                  |                                                                                                                                                                          |

Catalogue of Recurrent Groups of Sun Spots—*continued*.

| Reference Number | No. of Group. | Rotation. | First Seen.  |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                    |
|------------------|---------------|-----------|--------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|                  |               |           | Date.        | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um. bra.      | Whole Spot. |                          |                         |                                                                                                                                             |
| 481              | 4497          | 579       | 1897. Jan. 3 | -75°6                            | 1897. Jan. 15 | +80°0                            | 13                        | 341           | 2132        | 342°80                   | -6°88                   | Two very large spots, with unstable train.                                                                                                  |
|                  | 4518          | 580       | Jan. 30      | -79°1                            | Feb. 11       | +75°8                            | 12                        | 181           | 855         | 347°27                   | -5°36                   | Three large spots, with small companions.                                                                                                   |
|                  | 4535          | 581       | Feb. 26      | -81°5                            | Mar. 10       | +75°2                            | 13                        | 52            | 279         | 347°77                   | -7°85                   | A large regular spot, with occasional small companions.                                                                                     |
| 482              | 4505          | 579       | Jan. 20      | -2°7                             | Jan. 26       | +76°5                            | 7                         | 79            | 457         | 199°17                   | +7°11                   | A cluster appearing suddenly near the C.M.                                                                                                  |
|                  | 4526          | 580       | Feb. 10      | -72°8                            | Feb. 21       | +77°7                            | 12                        | 64            | 329         | 211°96                   | +6°51                   | A large regular steady spot. Occasional companions.                                                                                         |
|                  | 4541          | 581       | Mar. 8       | -78°5                            | Mar. 20       | +75°5                            | 13                        | 57            | 324         | 217°23                   | +4°72                   | A group of considerable unstable spots.                                                                                                     |
|                  | 4559          | 582       | Apr. 4       | -71°8                            | Apr. 14       | +66°6                            | 11                        | 8             | 50          | 232°54                   | +5°45                   | A regular spot, which breaks up. Occasional small companions.                                                                               |
|                  | (4573)        | 583       | May 1        | -74°5                            | May 12        | +70°4                            | 12                        | 24            | 148         | 232°88                   | +3°66                   | A large regular diminishing spot. Small companions.                                                                                         |
| 483              | 4517          | 579       | Jan. 28      | -76°2                            | Feb. 8        | +78°2                            | 11                        | 34            | 246         | 23°05                    | -2°33                   | A very small spot, becoming a stream of normal type.                                                                                        |
|                  | (4532)        | 580       | Feb. 23      | -74°9                            | Mar. 7        | +80°6                            | 13                        | 52            | 288         | 34°79                    | -0°78                   | A large regular spot. 4533 merges in this group.                                                                                            |
|                  | (4533)        | 580       | Feb. 24      | -78°0                            | Mar. 4        | +40°5                            | 9                         | 15            | 101         | 24°63                    | -4°64                   | Unstable spots merging in 4532.                                                                                                             |
|                  | 4549          | 581       | Mar. 22      | -77°4                            | Apr. 1        | +58°4                            | 11                        | 15            | 76          | 41°20                    | -2°13                   | Large regular diminishing spot. Occasional companions.                                                                                      |
| 484              | 4523          | 579       | Feb. 2       | +6°3                             | Feb. 7        | +81°0                            | 5                         | 42            | 251         | 37°98                    | +13°26                  | Small spots, becoming a stream of normal type.                                                                                              |
|                  | 4531          | 580       | Feb. 22      | -79°0                            | Mar. 6        | +78°6                            | 13                        | 85            | 452         | 45°91                    | +12°08                  | A large double spot, with occasional companions.                                                                                            |
|                  | 4551          | 581       | Mar. 24      | -44°2                            | Mar. 26       | -15°1                            | 3                         | 3             | 28          | 43°37                    | +12°30                  | Several small unstable spots.<br><i>Note.</i> —4551 is not seen close to the E. limb. It may therefore be only a revival of 4531.           |
| 485              | 4542          | 581       | Mar. 9       | +16°3                            | Mar. 13       | +73°6                            | 5                         | 11            | 55          | 307°18                   | +4°94                   | A cluster of small spots.                                                                                                                   |
|                  | 4554          | 582       | Mar. 28      | -75°8                            | Apr. 9        | +82°1                            | 13                        | 24            | 131         | 318°26                   | +4°08                   | A large stable regular spot, with occasional small companions.                                                                              |
|                  | 4570          | 583       | Apr. 25      | -63°6                            | Apr. 28       | -22°9                            | 4                         | 1             | 12          | 319°77                   | +4°90                   | A few small spots, not seen on Apr. 27.<br><i>Note.</i> —4570 is intermittent, not being seen on 1897 Apr. 27.                              |
| 486              | 4560          | 582       | Apr. 4       | -80°1                            | Apr. 16       | +80°5                            | 13                        | 75            | 364         | 224°28                   | +3°30                   | Small spots. By Apr. 7 an outburst of five considerable spots.                                                                              |
|                  | 4573          | 583       | May 1        | -74°5                            | May 12        | +70°4                            | 12                        | 24            | 148         | 232°88                   | +3°66                   | A large regular diminishing spot. Small companions.                                                                                         |
| 487              | 4579          | 584       | May 25       | -77°0                            | June 6        | +78°5                            | 13                        | 90            | 409         | 270°38                   | -9°10                   | A large regular spot. Small varying companions.                                                                                             |
|                  | 4588          | 585       | June 21      | -79°1                            | July 3        | +78°5                            | 13                        | 27            | 161         | 271°43                   | -8°67                   | A large regular spot. Occasionally a small companion.                                                                                       |
|                  | 4599          | 586       | July 18      | -81°2                            | July 21       | -46°1                            | 4                         | 6             | 51          | 271°70                   | -9°35                   | A single spot, rapidly diminishing.                                                                                                         |
| 488              | 4592          | 585       | July 3       | -78°4                            | July 14       | +68°9                            | 12                        | 17            | 104         | 115°93                   | -10°97                  | A large regular spot, with a small companion on July 8.                                                                                     |
|                  | 4604          | 586       | July 31      | -62°4                            | Aug. 3        | -19°4                            | 4                         | 10            | 59          | 120°85                   | -8°78                   | A few small spots.                                                                                                                          |
| 489              | 4594          | 585       | July 7       | -74°3                            | July 17       | +57°7                            | 11                        | 21            | 105         | 66°65                    | -5°66                   | Large irregular unstable spot. The group diminishes throughout.                                                                             |
|                  | 4605          | 586       | Aug. 2       | -83°4                            | Aug. 15       | +81°8                            | 14                        | 112           | 817         | 68°31                    | -5°56                   | A large irregular spot, with a train, which disappears.                                                                                     |
|                  | 4615          | 587       | Aug. 30      | -73°2                            | Sept. 11      | +82°7                            | 13                        | 34            | 191         | 70°85                    | -5°56                   | A large regular spot, diminishing gradually. Small companions.                                                                              |
|                  | 4634          | 588       | Sept. 26     | -75°4                            | Oct. 7        | +72°6                            | 12                        | 22            | 122         | 72°97                    | -6°18                   | A large regular spot. Occasional small companions.<br><i>Note.</i> —4594 is very small indeed on July 17. 4605 may be only a revival of it. |
| 490              | 4601          | 586       | July 21      | -64°8                            | July 31       | +76°2                            | 11                        | 61            | 365         | 255°01                   | -8°73                   | Several irregular spots of considerable size.                                                                                               |
|                  | 4611          | 587       | Aug. 16      | -72°0                            | Aug. 27       | +74°1                            | 12                        | 19            | 116         | 258°77                   | -7°25                   | A large regular spot, with occasionally a small companion.                                                                                  |
| 491              | 4609          | 586       | Aug. 12      | +14°2                            | Aug. 16       | +70°2                            | 5                         | 26            | 147         | 38°88                    | -8°18                   | Two streams inclined to the Equator.                                                                                                        |
|                  | 4619          | 587       | Sept. 2      | -70°2                            | Sept. 13      | +78°1                            | 12                        | 127           | 687         | 35°52                    | -10°48                  | A fine stream of irregular variable spots.                                                                                                  |
| 492              | 4663          | 591       | Dec. 6       | -83°7                            | Dec. 18       | +73°6                            | 13                        | 68            | 373         | 210°78                   | +9°75                   | A fine large composite spot, usually with small companions.                                                                                 |
|                  | 4674          | 592       | 1898. Jan. 3 | -78°0                            | 1898. Jan. 15 | +79°6                            | 13                        | 25            | 130         | 209°05                   | +9°88                   | A large regular spot, often with small companions.                                                                                          |
| 493              | 4679          | 592       | Jan. 18      | -2°5                             | Jan. 24       | +80°5                            | 7                         | 16            | 98          | 90°43                    | -7°79                   | Two very small spots, becoming a straight stream.                                                                                           |
|                  | 4688          | 593       | Feb. 9       | -72°3                            | Feb. 20       | +78°5                            | 12                        | 103           | 576         | 89°46                    | -8°36                   | Small irregular stream, becoming a fine one of normal type.                                                                                 |
| 494              | 4681          | 593       | Jan. 19      | -82°4                            | Jan. 31       | +82°0                            | 13                        | 51            | 327         | 357°69                   | +4°38                   | A large composite spot, followed by two streams enclosing a space.                                                                          |
|                  | 4692          | 594       | Feb. 15      | -77°6                            | Feb. 26       | +70°6                            | 12                        | 24            | 127         | 363°14                   | +5°15                   | A large regular spot, with very small companions on Feb. 23.                                                                                |
| 495              | 4684          | 593       | Feb. 4       | -53°8                            | Feb. 13       | +75°9                            | 10                        | 7             | 55          | 175°25                   | -8°41                   | An irregular variable stream of unstable small spots.                                                                                       |
|                  | 4698          | 594       | Feb. 28      | -76°8                            | Mar. 12       | +79°2                            | 13                        | 20            | 96          | 190°04                   | -8°22                   | Two regular spots, of which the following has died by Mar. 9.                                                                               |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                                                          |
|------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                                                                   |
| 496              | 4687          | 593       | 1898.<br>Feb. 7  | -84°2                            | 1898.<br>Feb. 19 | +74°5                            | 13                        | 28            | 150         | 100°56                   | -7°09                   | A large regular spot. A very small companion on Feb. 15.                                                                                                                                                                                                                          |
|                  | 4704          | 594       | Mar. 7           | -70°4                            | Mar. 18          | +75°5                            | 12                        | 43            | 210         | 104°14                   | -7°86                   | A large regular spot, usually with a small unstable companion.                                                                                                                                                                                                                    |
| 497              | 4702          | 594       | Mar. 6           | -75°3                            | Mar. 17          | +75°9                            | 12                        | 187           | 970         | 119°51                   | -13°17                  | A very fine straight stream, with variable components.                                                                                                                                                                                                                            |
|                  | 4713          | 595       | Mar. 31          | -86°4                            | Apr. 13          | +83°1                            | 14                        | 50            | 261         | 128°42                   | -11°39                  | Two large spots. The leader soon breaks up.                                                                                                                                                                                                                                       |
|                  | 4714          | 595       | Apr. 6           | -22°5                            | Apr. 9           | +19°7                            | 4                         | 0             | 10          | 117°83                   | -13°70                  | A few faint unstable spots. Really a continuation of 4713.                                                                                                                                                                                                                        |
|                  | 4723          | 596       | Apr. 29          | -61°5                            | May 1            | -39°5                            | 3                         | 1             | 10          | 130°27                   | -11°27                  | A small spot.                                                                                                                                                                                                                                                                     |
| 498              | 4722          | 596       | Apr. 28          | +24°3                            | May 2            | +79°3                            | 5                         | 69            | 377         | 238°18                   | -11°86                  | A few small spots, becoming a straight stream of normal type.                                                                                                                                                                                                                     |
|                  | 4732          | 597       | May 17           | -75°1                            | May 28           | +70°3                            | 12                        | 19            | 109         | 244°65                   | -13°63                  | A large spot, which divides. Occasional companions.                                                                                                                                                                                                                               |
| 499              | 4737          | 597       | May 26           | -28°8                            | June 3           | +73°8                            | 9                         | 0             | 9           | 167°73                   | -12°72                  | A very small spot, not seen on May 27-29.                                                                                                                                                                                                                                         |
|                  | 4749          | 598       | June 20          | -66°2                            | June 30          | +78°4                            | 11                        | 11            | 66          | 169°74                   | -10°42                  | A regular spot advancing rapidly. Small companions.<br>Note.—Group 4737 is intermittent, not being seen on 1898 May 27-29.                                                                                                                                                        |
| 500              | 4765          | 600       | July 31          | -74°2                            | Aug. 11          | +77°6                            | 12                        | 60            | 320         | 333°81                   | +10°88                  | A large elliptical spot. Usually with very small companions.                                                                                                                                                                                                                      |
|                  | 4778          | 601       | Aug. 27          | -69°1                            | Sept. 7          | +81°8                            | 12                        | 23            | 134         | 341°37                   | +11°28                  | A large regular spot.                                                                                                                                                                                                                                                             |
| 501              | 4771          | 600       | Aug. 11          | -17°8                            | Aug. 16          | +46°8                            | 6                         | 4             | 19          | 239°08                   | -11°45                  | A few spots, mostly very small, in a straight stream.                                                                                                                                                                                                                             |
|                  | 4781          | 601       | Sept. 3          | -74°1                            | Sept. 15         | +81°0                            | 13                        | 245           | 1556        | 238°96                   | -12°07                  | Very fine composite spot, with a train which becomes very complex.                                                                                                                                                                                                                |
|                  | 4791          | 602       | Sept. 30         | -80°4                            | Oct. 12          | +80°5                            | 13                        | 94            | 625         | 240°48                   | -12°11                  | Principal spot large and composite, with train.                                                                                                                                                                                                                                   |
|                  | 4804          | 603       | Oct. 28          | -70°0                            | Nov. 1           | -14°3                            | 5                         | 4             | 19          | 239°30                   | -13°25                  | A single spot not seen on Oct. 31.                                                                                                                                                                                                                                                |
|                  | 4805          | 603       | Oct. 29          | -67°6                            | Nov. 6           | +44°4                            | 9                         | 9             | 54          | 235°47                   | -10°83                  | Irregularly arranged unstable spots. Leader is largest and most [stable].<br>Note.—4771 is not seen close to the W. limb. Its very small spots may be masked by fore-shortening, but 4781 is probably a revival only of it. 4804 is intermittent, not being seen on 1898 Oct. 31. |
| (501*)           | 4792          | 602       | Oct. 4           | +3°5                             | Oct. 7           | +44°9                            | 4                         | 3             | 27          | 272°00                   | +8°60                   | Short straight stream of small spots.                                                                                                                                                                                                                                             |
|                  | 4802          | 603       | Oct. 25          | -75°3                            | Nov. 3           | +47°6                            | 10                        | 12            | 50          | 278°76                   | +6°59                   | A composite spot, which becomes regular, with scattered train.<br>Note.—4792 is not seen near to the W. limb, and 4802 is probably a revival only.                                                                                                                                |
| 502              | 4807          | 603       | Nov. 1           | -50°5                            | Nov. 10          | +67°6                            | 10                        | 88            | 483         | 205°65                   | +6°74                   | Large composite spot, with straggling and very variable train.                                                                                                                                                                                                                    |
|                  | 4816          | 604       | Nov. 27          | -66°7                            | Dec. 2           | +2°9                             | 6                         | 2             | 16          | 211°57                   | +4°92                   | A very small spot, becoming an irregular unstable cluster.                                                                                                                                                                                                                        |
| 503              | 4841          | 607       | 1899.<br>Feb. 27 | +2°6                             | 1899.<br>Mar. 4  | +69°7                            | 6                         | 30            | 149         | 147°08                   | -4°83                   | Straight stream of faint spots, whose leader becomes large.                                                                                                                                                                                                                       |
|                  | 4846          | 608       | Mar. 20          | -74°3                            | Mar. 28          | +32°8                            | 9                         | 11            | 55          | 154°42                   | -4°63                   | A regular diminishing spot. Occasional small companions.                                                                                                                                                                                                                          |
| 504              | 4845          | 608       | Mar. 15          | -74°3                            | Mar. 27          | +83°1                            | 13                        | 67            | 438         | 217°45                   | -9°01                   | A pair of small spots. Later, a stream, with large composite leader.                                                                                                                                                                                                              |
|                  | 4852          | 609       | Apr. 12          | -58°9                            | Apr. 15          | -22°0                            | 4                         | 5             | 36          | 222°78                   | -10°80                  | Irregular stream of unstable small spots.                                                                                                                                                                                                                                         |
| 505              | 4848          | 608       | Mar. 27          | -75°9                            | Apr. 7           | +71°1                            | 12                        | 50            | 276         | 61°38                    | -12°86                  | A large regular spot. Small companions Mar. 30-Apr. 4.                                                                                                                                                                                                                            |
|                  | 4855          | 609       | Apr. 23          | -74°4                            | May 4            | +69°9                            | 12                        | 26            | 131         | 61°21                    | -12°68                  | A large regular spot. Small companions                                                                                                                                                                                                                                            |
|                  | 4857          | 610       | May 20           | -75°5                            | June 1           | +80°0                            | 13                        | 11            | 69          | 61°15                    | -12°84                  | A regular spot, with small unstable companions.                                                                                                                                                                                                                                   |
| 506              | 4860          | 611       | June 12          | -9°5                             | June 17          | +59°6                            | 6                         | 3             | 20          | 186°40                   | -9°84                   | Straight stream of small spots, not seen on June 13.                                                                                                                                                                                                                              |
|                  | 4865          | 612       | July 4           | -85°4                            | July 16          | +75°8                            | 13                        | 53            | 296         | 179°76                   | -10°22                  | A large regular spot. Small companions usually.                                                                                                                                                                                                                                   |
|                  | 4871          | 613       | Aug. 1           | -68°3                            | Aug. 2           | -54°3                            | 2                         | 0             | 7           | 185°35                   | -10°75                  | A small faint spot.<br>Note.—4860 is intermittent, not being seen on 1899 June 13. In the previous rotation 4856 is the same group, and shows the same feature of intermitting not being seen from May 14-17 inclusive, but seen on May 12-18 and May 18-21.                      |
| 507              | 4915          | 621       | 1900.<br>Mar. 6  | +13°1                            | 1900.<br>Mar. 11 | +79°2                            | 6                         | 101           | 522         | 288°23                   | -12°05                  | Two large regular spots. Smaller companions until Mar. 8.                                                                                                                                                                                                                         |
|                  | 4917          | 622       | Mar. 26          | -79°9                            | Apr. 7           | +80°7                            | 13                        | 31            | 175         | 292°13                   | -11°14                  | A large composite spot, becoming regular. Occasional companions.                                                                                                                                                                                                                  |
| 508              | 4926          | 623       | Apr. 29          | -13°6                            | May 5            | +70°8                            | 7                         | 17            | 82          | 273°09                   | +4°57                   | A large diminishing spot. A companion on May 2.                                                                                                                                                                                                                                   |
|                  | 4929          | 624       | May 21           | -75°3                            | June 1           | +68°7                            | 12                        | 21            | 104         | 272°45                   | +4°13                   | A large spot, which breaks up.                                                                                                                                                                                                                                                    |



Catalogue of Recurrent Groups of Sun Spots—*continued.*

| Reference Number. | No of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                 |
|-------------------|--------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |              |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                          |
| 509               | 4930         | 624       | 1900.<br>May 27  | -27°8                            | 1900.<br>June 3  | +78°5                            | 7                         | 8             | 42          | 244°63                   | -8°20                   | A cluster of small spots.                                                                                                                                                                |
|                   | 4932         | 625       | June 19          | -65°3                            | June 26          | +21°5                            | 8                         | 10            | 35          | 256°74                   | -7°18                   | A single spot, with a small companion on June 24.                                                                                                                                        |
| 510               | 4933         | 625       | June 29          | +57°8                            | July 1           | +80°5                            | 3                         | 290           | 525         | 250°17                   | -6°87                   | A very large spot, which divides near the W. limb.                                                                                                                                       |
|                   | 4935         | 626       | July 15          | -74°0                            | July 25          | +61°4                            | 11                        | 23            | 88          | 267°87                   | -6°24                   | A large spot, at first composite, then regular. Small followers.<br><i>Note.</i> —4935 is certainly a return of 4933.                                                                    |
| 511               | 4934         | 625       | July 3           | +66°3                            | July 4           | +78°1                            | 2                         | 25            | 74          | 206°25                   | +10°50                  | Two or three small spots.                                                                                                                                                                |
|                   | 4936         | 626       | July 20          | -64°6                            | July 23          | -26°9                            | 4                         | 4             | 13          | 210°03                   | +10°68                  | A small spot.                                                                                                                                                                            |
| 512               | 4943         | 629       | Oct. 16          | -78°9                            | Oct. 27          | +68°0                            | 12                        | 21            | 79          | 116°83                   | -5°00                   | A large regular diminishing spot, advancing in longitude.                                                                                                                                |
|                   | 4946         | 630       | Nov. 13          | -68°0                            | Nov. 14          | -55°1                            | 2                         | 2             | 11          | 116°50                   | -7°15                   | A small spot.                                                                                                                                                                            |
| 513               | 4953         | 637       | 1901.<br>May 19  | -78°1                            | 1901.<br>May 31  | +82°6                            | 13                        | 186           | 497         | 162°09                   | +8°73                   | Two large spots; the following spot breaks up.                                                                                                                                           |
|                   | 4955         | 638       | June 16          | -62°6                            | June 26          | +75°7                            | 11                        | 19            | 92          | 168°75                   | +9°98                   | A regular spot. Small faint companions.                                                                                                                                                  |
| 514               | 4986         | 656       | 1902.<br>Oct. 22 | -34°4                            | 1902.<br>Oct. 30 | +82°6                            | 9                         | 35            | 235         | 167°80                   | -20°60                  | Three close pairs becoming a fine straight stream.                                                                                                                                       |
|                   | 4991         | 657       | Nov. 15          | -73°0                            | Nov. 16          | -54°6                            | 2                         | 4             | 16          | 172°55                   | -20°60                  | A small spot.                                                                                                                                                                            |
| 515               | 4990         | 657       | Nov. 14          | -79°3                            | Nov. 26          | +79°8                            | 13                        | 48            | 336         | 181°68                   | +14°65                  | A small pair becoming a variable group.                                                                                                                                                  |
|                   | 4995         | 658       | Dec. 12          | -52°7                            | Dec. 12          | -52°7                            | 1                         | 0             | 20          | 192°40                   | +16°50                  | A small spot.<br><i>Note.</i> —4995 is not seen close to E. limb, but being small is probably lost through foreshortening.                                                               |
| (515*)            | 5008         | 661       | 1903.<br>Feb. 23 | -75°2                            | 1903.<br>Mar. 5  | +49°3                            | 11                        | 16            | 97          | 285°25                   | +18°94                  | A large regular spot, with occasional small companion.                                                                                                                                   |
|                   | 5014         | 662       | Mar. 22          | -77°7                            | Mar. 27          | -8°9                             | 6                         | 3             | 66          | 290°52                   | +20°32                  | An irregular diminishing cluster, not seen on Mar. 26.<br><i>Note.</i> —5014 is intermittent, not being seen on Mar. 26.                                                                 |
| 516               | 5013         | 662       | Mar. 21          | -75°4                            | Apr. 2           | +81°6                            | 13                        | 45            | 230         | 306°53                   | +21°28                  | A large well-defined spot, with occasional companions.                                                                                                                                   |
|                   | 5020         | 663       | Apr. 19          | -51°1                            | Apr. 22          | -14°6                            | 4                         | 2             | 13          | 305°63                   | +21°95                  | One or two small spots.<br><i>Note.</i> —5020 is possibly masked by faculae on Apr. 18.                                                                                                  |
| (516*)            | 5015         | 662       | Mar. 26          | -86°6                            | Apr. 5           | +48°5                            | 11                        | 22            | 210         | 228°91                   | -16°35                  | A large composite unstable spot, usually with companions.                                                                                                                                |
|                   | 5023         | 663       | Apr. 22          | -83°0                            | May 1            | +33°5                            | 10                        | 16            | 95          | 236°54                   | -14°07                  | A large regular spot, with occasional small companions.<br><i>Note.</i> —5023 is a revival only of 5015.                                                                                 |
| 517               | 5017         | 662       | Apr. 2           | -83°5                            | Apr. 14          | +74°3                            | 12                        | 65            | 416         | 140°55                   | -19°82                  | A very large spot, usually with small companions.                                                                                                                                        |
|                   | 5030         | 663       | Apr. 30          | -76°0                            | May 1            | -67°1                            | 2                         | 4             | 17          | 137°00                   | -20°00                  | A small spot.                                                                                                                                                                            |
| 518               | 5024         | 663       | Apr. 24          | -69°1                            | May 5            | +79°1                            | 12                        | 35            | 241         | 227°98                   | +20°04                  | A long scattered stream, which becomes compact.                                                                                                                                          |
|                   | 5035         | 664       | May 20           | -70°8                            | May 26           | +11°4                            | 7                         | 6             | 48          | 239°09                   | +18°29                  | Two or three very variable spots.                                                                                                                                                        |
| 519               | 5036         | 664       | May 21           | -50°9                            | May 30           | +66°8                            | 10                        | 0             | 7           | 247°26                   | +17°28                  | An occasional small spot, not seen May 22-24 and again May 28-29.                                                                                                                        |
|                   | 5047         | 665       | June 16          | -69°6                            | June 27          | +75°6                            | 10                        | 18            | 94          | 242°61                   | +19°75                  | An irregular cluster of very variable small spots.<br><i>Note.</i> —5036 is a very intermittent group, not being seen on May 22-24 and 28-29, or five days out of the ten of its course. |
| 520               | 5044         | 664       | June 10          | -6°2                             | June 16          | +77°4                            | 7                         | 1             | 33          | 26°76                    | -20°42                  | A straight stream of very small spots, not seen on June 13-14.                                                                                                                           |
|                   | 5053         | 665       | June 30          | -86°8                            | July 11          | +59°5                            | 12                        | 56            | 326         | 39°99                    | -19°45                  | A large regular spot; an acolyte stream forms to the south.                                                                                                                              |
|                   | 5065         | 666       | July 29          | -57°5                            | Aug. 5           | +35°9                            | 8                         | 0             | 8           | 43°95                    | -17°20                  | A few small faint spots, not seen on Aug. 3-4.                                                                                                                                           |
|                   | 5066         | 666       | July 29          | -63°6                            | July 29          | -63°6                            | 1                         | 0             | 5           | 38°5                     | -17°8                   | A very small faint spot.<br><i>Note.</i> —Both 5044 and 5065 are intermittent, the first not being seen on June 13-14 and the second on Aug. 3-4.                                        |
| 521               | 5057         | 666       | July 15          | -5°0                             | July 21          | +75°3                            | 5                         | 1             | 21          | 283°00                   | -21°83                  | Straight stream, not seen on July 16, probably owing to defective [photograph.                                                                                                           |
|                   | 5069         | 667       | Aug. 6           | -80°7                            | Aug. 13          | +14°0                            | 8                         | 6             | 65          | 277°15                   | -22°48                  | A short irregular stream of small spots.                                                                                                                                                 |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number | No. of Group. | Rotation. | First Seen.    |                                  | Last Seen.     |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                          |
|------------------|---------------|-----------|----------------|----------------------------------|----------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |               |           | Date.          | Longitude from Central Meridian. | Date.          | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                   |
| 522              | 5086          | 668       | 1903. Sept. 15 | +35°3                            | 1903. Sept. 16 | +49°2                            | 2                         | 5             | 16          | 223°95                   | -23°40                  | A short stream of small spots.                                                                                                                                                                                    |
|                  | 5092          | 669       | Oct. 4         | -81°1                            | Oct. 13        | +34°3                            | 10                        | 13            | 82          | 214°66                   | -21°54                  | A regular spot, with an occasional small companion.<br><i>Note.</i> —5092 is possibly only a revival of 5086, but the place of the spot is occupied by bright faculae on Sept. 17 and 18.                         |
| 523              | 5088          | 668       | Sept. 23       | +1°8                             | Sept. 29       | +84°5                            | 7                         | 36            | 232         | 90°74                    | +12°21                  | A short straight stream, becoming of normal type.                                                                                                                                                                 |
|                  | 5095          | 669       | Oct. 14        | -77°4                            | Oct. 26        | +84°1                            | 13                        | 31            | 177         | 92°04                    | +14°56                  | A fine regular spot, with a small companion on Oct. 25.                                                                                                                                                           |
| 524              | 5091          | 669       | Oct. 2         | -80°4                            | Oct. 14        | +74°7                            | 13                        | 47            | 297         | 243°37                   | +13°37                  | A large regular spot, with diminishing train.                                                                                                                                                                     |
|                  | 5099          | 670       | Oct. 29        | -80°0                            | Nov. 5         | +12°7                            | 8                         | 5             | 18          | 248°53                   | +15°51                  | A small regular spot, with a very small companion on Nov. 3.                                                                                                                                                      |
| 525              | 5093          | 669       | Oct. 5         | -78°1                            | Oct. 18        | +78°7                            | 14                        | 186           | 1726        | 202°59                   | -21°30                  | An immense irregular spot, which divides into two composite spots.                                                                                                                                                |
|                  | 5102          | 670       | Nov. 2         | -76°2                            | Nov. 12        | +51°6                            | 11                        | 12            | 84          | 198°65                   | -22°98                  | A large spot, diminishing. Afterwards widely scattered spots.                                                                                                                                                     |
|                  | 5103          | 670       | Nov. 3         | -73°8                            | Nov. 13        | +55°9                            | 11                        | 25            | 157         | 189°72                   | -21°95                  | A large spot, which behaves like 5102.                                                                                                                                                                            |
|                  | 5117          | 671       | Dec. 1         | -77°0                            | Dec. 12        | +65°0                            | 12                        | 8             | 38          | 178°47                   | -20°35                  | A regular diminishing spot, not seen on Dec. 11.                                                                                                                                                                  |
|                  | 5122          | 671       | Dec. 3         | -42°2                            | Dec. 3         | -42°2                            | 1                         | 0             | 7           | 187°40                   | -23°00                  | A few very small faint spots.                                                                                                                                                                                     |
|                  | (5140)        | 672       | Dec. 28        | -72°4                            | 1904. Jan. 3   | +5°0                             | 7                         | 16            | 99          | 188°40                   | -21°99                  | A pair of regular spots. A small companion on Dec. 29.<br><i>Note.</i> —5117 is intermittent, not being seen on Dec. 11, and therefore 5140 is probably only a revival of 5117. 5122 is an acolyte group to 5117. |
|                  |               |           |                |                                  | 1903. Nov. 12  | +78°7                            | 14                        | 138           | 739         | 232°72                   | +17°06                  | A fine stream of normal type.                                                                                                                                                                                     |
| 526              | 5100          | 670       | Oct. 30        | -81°6                            | Nov. 12        | +78°7                            | 14                        | 138           | 739         | 232°72                   | +17°06                  | A fine stream of normal type.                                                                                                                                                                                     |
|                  | 5116          | 671       | Nov. 27        | -76°8                            | Dec. 8         | +64°3                            | 12                        | 38            | 211         | 229°75                   | +16°43                  | Two large regular spots, with occasional companions.                                                                                                                                                              |
|                  | 5139          | 672       | Dec. 24        | -75°7                            | Dec. 24        | -75°7                            | 1                         | 0             | 13          | 237°60                   | +17°50                  | A small spot in a mass of faculae.                                                                                                                                                                                |
| 527              | 5104          | 670       | Nov. 4         | -79°0                            | Nov. 17        | +80°2                            | 14                        | 95            | 687         | 163°98                   | -24°64                  | Fine compact stream, becoming one of normal type.                                                                                                                                                                 |
|                  | 5120          | 671       | Dec. 2         | -80°4                            | Dec. 11        | +27°0                            | 10                        | 16            | 90          | 154°65                   | -27°82                  | A large double spot, which breaks up by Dec. 10.                                                                                                                                                                  |
| 528              | 5104*         | 670       | Nov. 6         | -54°7                            | Nov. 16        | +75°7                            | 11                        | 22            | 177         | 169°22                   | -21°62                  | Small spots, becoming a fine straight stream, whose leader advances.                                                                                                                                              |
|                  | 5104†         | 670       | Nov. 16        | +57°0                            | Nov. 16        | +57°0                            | 1                         | 2             | 6           | 150°50                   | -18°40                  | A close pair of very small spots.                                                                                                                                                                                 |
|                  | 5119          | 671       | Dec. 2         | -80°3                            | Dec. 14        | +65°0                            | 13                        | 41            | 313         | 153°27                   | -20°31                  | Two streams at right angles, becoming three large spots.<br><i>Note.</i> —5104† is an acolyte group to 5104*.                                                                                                     |
| 529              | 5129          | 671       | Dec. 8         | -75°4                            | Dec. 20        | +81°5                            | 13                        | 51            | 307         | 86°88                    | +19°55                  | A large regular spot, with occasional small companions.                                                                                                                                                           |
|                  | 5146          | 672       | 1904. Jan. 4   | -79°6                            | 1904. Jan. 16  | +77°0                            | 12                        | 25            | 134         | 84°07                    | +18°08                  | A large regular spot, with occasional small companions.                                                                                                                                                           |
| 530              | 5154          | 673       | Jan. 20        | -24°1                            | Jan. 28        | +82°1                            | 9                         | 58            | 393         | 294°48                   | -14°01                  | A very small spot, becoming a fine stream of normal type.                                                                                                                                                         |
|                  | 5167          | 674       | Feb. 11        | -82°7                            | Feb. 13        | -54°4                            | 3                         | 0             | 8           | 304°30                   | -15°15                  | A small spot in bright faculae, not seen on Feb. 12.<br><i>Note.</i> —5167 is intermittent, not being seen on Feb. 12.                                                                                            |
| 531              | 5163          | 673       | Feb. 4         | -68°1                            | Feb. 14        | +65°0                            | 11                        | 10            | 61          | 49°23                    | +19°64                  | A few small spots, not seen on Feb. 7. Later, a sparse stream.                                                                                                                                                    |
|                  | 5175          | 674       | Mar. 3         | -62°3                            | Mar. 3         | -62°3                            | 1                         | 4             | 13          | 48°90                    | +19°80                  | Two very small spots.<br><i>Note.</i> —5163 is intermittent, not being seen on Feb. 7.                                                                                                                            |
| 532              | 5174          | 674       | Mar. 2         | +2°8                             | Mar. 6         | +55°7                            | 5                         | 40            | 224         | 125°78                   | -13°70                  | A pair of small spots, greatly increased by Mar. 3.                                                                                                                                                               |
|                  | 5188          | 675       | Mar. 22        | -81°6                            | Mar. 30        | +18°8                            | 9                         | 0             | 16          | 135°53                   | -15°53                  | A few small unstable spots, not seen on Mar. 26 and 27.<br><i>Note.</i> —No photograph is available for Mar. 7. 5188 is intermittent, not being seen on Mar. 26-27.                                               |
| 533              | 5179          | 674       | Mar. 8         | +25°9                            | Mar. 12        | +74°1                            | 5                         | 21            | 133         | 68°12                    | +16°22                  | Two small double spots, which increase in size.                                                                                                                                                                   |
|                  | 5197          | 675       | Mar. 28        | -60°1                            | Apr. 1         | -8°2                             | 5                         | 2             | 14          | 77°48                    | +13°76                  | A small spot.                                                                                                                                                                                                     |
|                  | 5198          | 675       | Mar. 29        | -65°8                            | Apr. 5         | +26°5                            | 8                         | 2             | 12          | 60°56                    | +17°28                  | A small spot, with an occasional small companion.                                                                                                                                                                 |
| 534              | (5173)        | 674       | Feb. 26        | +36°7                            | Feb. 28        | +59°8                            | 3                         | 2             | 17          | 221°20                   | +9°83                   | One or two small spots.                                                                                                                                                                                           |
|                  | 5183          | 675       | Mar. 15        | -73°7                            | Mar. 26        | +74°6                            | 12                        | 26            | 164         | 236°69                   | +9°29                   | A large regular spot, usually with small companions.                                                                                                                                                              |
|                  | 5204          | 676       | Apr. 10        | -80°8                            | Apr. 19        | +38°8                            | 10                        | 9             | 57          | 244°83                   | +6°56                   | A large regular spot.<br><i>Note.</i> —It is doubtful whether 5173 is a member of the series or an independent formation; probably the latter.                                                                    |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                |
|-------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                         |
| 535               | 5190          | 675       | 1904.<br>Mar. 24 | +52°5                            | 1904.<br>Mar. 26 | +77°3                            | 3                         | 7             | 48          | 243°03                   | -20°63                  | One or two small spots.                                                                                                                                                                                                                 |
|                   | 5203          | 676       | Apr. 10          | -69°5                            | Apr. 11          | -57°1                            | 2                         | 0             | 8           | 256°40                   | -20°05                  | One or two very small spots.<br><i>Note.</i> —5203 is probably the same group as 5190, though as both groups were seen for so short a time and the difference in longitude is considerable, the identity cannot be regarded as certain. |
| 536               | 5195          | 675       | Mar. 25          | -76°7                            | Apr. 5           | +71°8                            | 12                        | 15            | 95          | 105°40                   | +15°17                  | A regular spot.                                                                                                                                                                                                                         |
|                   | 5210          | 676       | Apr. 21          | -82°0                            | May 3            | +78°4                            | 13                        | 51            | 362         | 106°80                   | +12°83                  | A fine irregular stream, whose leader is a large double spot.                                                                                                                                                                           |
| 537               | 5202          | 676       | Apr. 8           | -74°7                            | Apr. 21          | +83°7                            | 14                        | 100           | 746         | 275°79                   | -15°87                  | A large double spot, with a large cluster following.                                                                                                                                                                                    |
|                   | 5221          | 677       | May 7            | -52°0                            | May 11           | +3°5                             | 5                         | 0             | 21          | 283°76                   | -14°18                  | Two or more unstable small spots.<br><i>Note.</i> —5221 is probably the same formation as 5202, but it is not seen on May 5 and 6, bright faculae occupying its place.                                                                  |
| 538               | 5218          | 676       | May 4            | -12°3                            | May 11           | +79°3                            | 8                         | 17            | 135         | 0°56                     | -20°53                  | A pair of spots, becoming an irregular unstable stream.                                                                                                                                                                                 |
|                   | 5240          | 677       | May 26           | -76°6                            | June 6           | +71°5                            | 12                        | 16            | 120         | 6°32                     | -21°12                  | A large composite spot, which breaks up to form a stream.                                                                                                                                                                               |
| 539               | 5222          | 676       | May 8            | +60°6                            | May 8            | +60°6                            | 1                         | 2             | 9           | 18°40                    | +9°80                   | A small spot in a mass of bright faculae.                                                                                                                                                                                               |
|                   | 5239          | 677       | May 25           | -73°8                            | May 30           | -10°3                            | 6                         | 6             | 33          | 15°17                    | +7°93                   | A small regular spot.                                                                                                                                                                                                                   |
| 540               | 5224          | 677       | May 8            | +17°8                            | May 12           | +75°8                            | 5                         | 4             | 33          | 337°35                   | -23°18                  | A small spot, not seen on May 9.                                                                                                                                                                                                        |
|                   | 5243          | 678       | May 28           | -79°3                            | May 31           | -33°2                            | 4                         | 5             | 45          | 341°15                   | -22°23                  | Two or three scattered unstable spots.<br><i>Note.</i> —5224 is intermittent, not being seen on May 9.                                                                                                                                  |
| 541               | 5230          | 677       | May 16           | +74°2                            | May 16           | +74°2                            | 1                         | 0             | 85          | 285°80                   | +21°50                  | A spot, forming suddenly near the west limb.                                                                                                                                                                                            |
|                   | 5246          | 678       | June 3           | -68°2                            | June 11          | +46°5                            | 9                         | 13            | 70          | 274°08                   | +19°72                  | An irregular stream of unstable small spots.                                                                                                                                                                                            |
| 542               | 5241          | 677       | May 27           | +51°1                            | May 28           | +59°6                            | 2                         | 5             | 19          | 116°00                   | -20°15                  | One or two small spots.                                                                                                                                                                                                                 |
|                   | 5252          | 678       | June 13          | -76°5                            | June 25          | +77°9                            | 13                        | 10            | 78          | 120°35                   | -16°15                  | An irregular unstable stream.                                                                                                                                                                                                           |
|                   | 5254          | 678       | June 14          | -80°0                            | June 19          | -10°2                            | 6                         | 7             | 39          | 109°60                   | -21°70                  | A small regular spot. Acolyte group to 5252.                                                                                                                                                                                            |
| 543               | 5249          | 678       | June 5           | -60°5                            | June 14          | +62°3                            | 10                        | 5             | 40          | 250°46                   | +13°66                  | Very small spots, not seen on June 6.                                                                                                                                                                                                   |
|                   | 5262          | 679       | June 30          | -74°8                            | July 11          | +71°3                            | 12                        | 12            | 97          | 260°86                   | +16°03                  | An irregular and quickly changing stream.<br><i>Note.</i> —5249 is intermittent, not being seen on June 6.                                                                                                                              |
| 544               | 5264          | 679       | July 8           | -78°1                            | July 20          | +72°4                            | 13                        | 38            | 308         | 145°35                   | +13°07                  | A fine stream of normal type.                                                                                                                                                                                                           |
|                   | 5285          | 680       | Aug. 4           | -77°2                            | Aug. 15          | +70°0                            | 12                        | 28            | 204         | 156°08                   | +13°13                  | A large composite spot, which breaks up, with a train.                                                                                                                                                                                  |
| 545               | 5269          | 679       | July 15          | -77°7                            | July 27          | +81°2                            | 13                        | 53            | 420         | 58°35                    | -19°05                  | A fine stream, with large variable leader.                                                                                                                                                                                              |
|                   | 5291          | 680       | Aug. 11          | -77°8                            | Aug. 19          | +23°8                            | 9                         | 16            | 108         | 58°56                    | -18°28                  | A regular spot.                                                                                                                                                                                                                         |
| 546               | 5299          | 681       | Aug. 25          | -36°1                            | Sept. 2          | +64°0                            | 9                         | 15            | 98          | 275°42                   | +18°98                  | A straight stream of small unstable spots.                                                                                                                                                                                              |
|                   | 5315          | 682       | Sept. 20         | -65°8                            | Sept. 24         | -11°1                            | 5                         | 4             | 24          | 266°36                   | +19°12                  | One or two unstable spots.                                                                                                                                                                                                              |
| 547               | 5313          | 682       | Sept. 18         | -18°7                            | Sept. 25         | +76°5                            | 8                         | 26            | 201         | 342°08                   | -20°99                  | A few small spots which become a straight stream.                                                                                                                                                                                       |
|                   | 5327          | 683       | Oct. 11          | -71°0                            | Oct. 18          | +20°1                            | 8                         | 1             | 9           | 346°47                   | -18°87                  | One or two small spots, not seen on Oct. 15 and 17.<br><i>Note.</i> —5327 is intermittent, not being seen on Oct. 15 or 17.                                                                                                             |
| 548               | 5317          | 682       | Sept. 22         | +15°0                            | Sept. 26         | +73°5                            | 5                         | 40            | 301         | 325°00                   | -24°18                  | A fine stream of normal type, suddenly appearing.                                                                                                                                                                                       |
|                   | 5329          | 683       | Oct. 13          | -66°9                            | Oct. 21          | +32°6                            | 9                         | 5             | 20          | 320°53                   | -22°98                  | A small regular spot, with occasionally a small companion.                                                                                                                                                                              |
| 549               | 5321          | 682       | Oct. 5           | -9°1                             | Oct. 11          | +76°5                            | 7                         | 33            | 217         | 132°61                   | +16°71                  | A stream whose leader is large and regular.                                                                                                                                                                                             |
|                   | 5342          | 683       | Oct. 27          | -64°4                            | Oct. 30          | -23°4                            | 4                         | 4             | 21          | 142°13                   | +15°18                  | A short stream of small spots.                                                                                                                                                                                                          |
| 550               | 5322          | 682       | Oct. 6           | -71°6                            | Oct. 17          | +80°5                            | 12                        | 45            | 294         | 53°28                    | -17°22                  | A large regular spot, followed by two clusters which break up.                                                                                                                                                                          |
|                   | 5351          | 683       | Nov. 1           | -80°9                            | Nov. 12          | +62°3                            | 12                        | 15            | 92          | 59°88                    | -16°02                  | A regular spot, with occasional small companions.                                                                                                                                                                                       |
| 551               | 5331          | 683       | Oct. 17          | -40°1                            | Oct. 26          | +83°8                            | 10                        | 12            | 116         | 297°58                   | -22°47                  | A few small unstable spots.                                                                                                                                                                                                             |
|                   | 5356          | 684       | Nov. 10          | -80°2                            | Nov. 21          | +66°5                            | 12                        | 25            | 163         | 300°49                   | -22°54                  | A large regular spot, with occasional small companions.                                                                                                                                                                                 |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group.                         | Rotation.                       | First Seen.                                                      |                                           | Last Seen.                                                            |                                         | No. of Days Photographed. | Mean Area for             |                                | Mean Longitude of Group.                       | Mean Latitude of Group.                        | REMARKS.                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------|---------------------------------------|---------------------------------|------------------------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------|---------------------------|---------------------------|--------------------------------|------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |                                       |                                 | Date.                                                            | Longitude from Central Meridian.          | Date.                                                                 | Longitude from Central Meridian.        |                           | Um-bra.                   | Whole Spot.                    |                                                |                                                |                                                                                                                                                                                                                                                                                                                                                                                                               |
| 552               | 5339<br>5360                          | 683<br>684                      | 1904.<br>Oct. 24<br>Nov. 16                                      | -24°2<br>-83°3                            | 1904.<br>Nov. 1<br>Nov. 27                                            | +75°3<br>+61°5                          | 9<br>12                   | 71<br>20                  | 534<br>108                     | 216°54<br>218°92                               | +11°36<br>+10°56                               | A stream of spots undergoing continual change.<br>A large regular spot.                                                                                                                                                                                                                                                                                                                                       |
| 553               | {5357<br>5363<br>5381                 | 684<br>684<br>685               | Nov. 11<br>Nov. 19<br>Dec. 4                                     | -23°1<br>+77°0<br>-74°0                   | Nov. 12<br>Nov. 19<br>Dec. 15                                         | -15°3<br>+77°0<br>+71°3                 | 2<br>1<br>12              | 1<br>0<br>32              | 36<br>52<br>183                | 341°85<br>341°00<br>351°90                     | +19°40<br>+18°20<br>+20°83                     | An irregular stream of small faint spots.<br>A spot, evidently a revival in the same rotation of 5357.<br>A large regular spot, with occasional small companions.<br><i>Note.</i> —5357 and 5363 form a single intermittent group, not being [seen Nov. 13–18 inclusive.                                                                                                                                      |
| 554               | 5366<br>5396                          | 684<br>685                      | Nov. 22<br>Dec. 12                                               | +19°9<br>-75°2                            | Nov. 27<br>Dec. 20                                                    | +83°1<br>+26°8                          | 6<br>9                    | 68<br>17                  | 615<br>164                     | 244°95<br>239°60                               | +28°52<br>+28°49                               | A pair of very small spots, becoming one large composite spot.<br>A large composite spot, which breaks up by Dec. 19. Occasional [small companions.                                                                                                                                                                                                                                                           |
| 555               | {5368<br>5370<br>5399                 | 684<br>684<br>685               | Nov. 25<br>Nov. 26<br>Dec. 13                                    | +61°6<br>+59°3<br>-69°2                   | Nov. 26<br>Nov. 28<br>Dec. 16                                         | +73°5<br>+83°4<br>-24°2                 | 2<br>3<br>4               | 6<br>20<br>14             | 24<br>111<br>99                | 245°75<br>230°10<br>238°48                     | -17°55<br>-15°37<br>-16°38                     | Two small spots.<br>A stream following 5368 and forming one group with it.<br>A large spot, with a small companion.                                                                                                                                                                                                                                                                                           |
| 556               | 5390<br>5420                          | 685<br>686                      | Dec. 9<br>1905.<br>Jan. 7                                        | -81°2<br>-69°5                            | Dec. 22<br>1905.<br>Jan. 16                                           | +77°2<br>+44°2                          | 14<br>10                  | 65<br>11                  | 493<br>76                      | 268°17<br>263°26                               | +16°71<br>+17°43                               | A fine irregular unstable stream whose principal spot is central.<br>A large regular spot, with occasionally a very small companion.                                                                                                                                                                                                                                                                          |
| 557               | 5413<br>5434<br>5469                  | 685<br>686<br>687               | 1904.<br>Dec. 25<br>1905.<br>Jan. 21<br>Feb. 17                  | -72°5<br>-73°1<br>-76°6                   | Jan. 6<br>Feb. 1<br>Feb. 27                                           | +84°5<br>+70°9<br>+56°9                 | 12<br>12<br>11            | 31<br>6<br>7              | 228<br>43<br>44                | 75°47<br>77°72<br>78°77                        | -15°13<br>-16°43<br>-14°83                     | Small unstable spots, not seen on Dec. 29. Afterwards a stream of [normal type.<br>An irregular cluster of small unstable spots.<br>A regular spot, with a short train.<br><i>Note.</i> —5413 is intermittent, not being seen on Dec. 29                                                                                                                                                                      |
| 558               | 5416<br>5441<br>5471<br>5489          | 686<br>687<br>688<br>689        | Jan. 5<br>Jan. 29<br>Feb. 25<br>Mar. 25                          | -39°2<br>-79°2<br>-79°1<br>-82°0          | Jan. 14<br>Feb. 11<br>Mar. 10<br>Apr. 5                               | +77°7<br>+80°5<br>+85°1<br>+70°2        | 10<br>14<br>14<br>12      | 11<br>332<br>121<br>59    | 77<br>2500<br>934<br>406       | 322°87<br>328°25<br>329°36<br>324°54           | -17°89<br>-15°30<br>-16°76<br>-15°38           | An irregular stream of unstable spots.<br>A very magnificent composite spot, greatest on Feb. 4.<br>A very large composite spot, followed after Mar. 4 by two large spots.<br>A wide area of disturbance. An irregular unstable stream.                                                                                                                                                                       |
| 559               | 5421<br>5447                          | 686<br>687                      | Jan. 7<br>Feb. 4                                                 | -78°4<br>-75°8                            | Jan. 19<br>Feb. 10                                                    | +73°5<br>+9°8                           | 13<br>7                   | 24<br>17                  | 146<br>107                     | 254°62<br>253°81                               | +21°03<br>+21°83                               | A large regular spot, with occasionally a companion.<br>A compact cluster of small spots.                                                                                                                                                                                                                                                                                                                     |
| 560               | 5424<br>5448                          | 686<br>687                      | Jan. 10<br>Feb. 5                                                | -78°5<br>-75°4                            | Jan. 22<br>Feb. 11                                                    | +81°9<br>+7°2                           | 13<br>7                   | 126<br>3                  | 934<br>63                      | 224°96<br>239°21                               | +9°37<br>+6°60                                 | A fine stream, with three chief variable spots.<br>A short stream of small spots.                                                                                                                                                                                                                                                                                                                             |
| 561               | 5426<br>5453                          | 686<br>687                      | Jan. 14<br>Feb. 8                                                | -48°5<br>-75°7                            | Jan. 24<br>Feb. 13                                                    | +78°0<br>-13°3                          | 11<br>6                   | 4<br>12                   | 25<br>131                      | 194°17<br>197°90                               | +13°26<br>+15°03                               | An irregular stream of unstable spots.<br>An irregular group of small spots.                                                                                                                                                                                                                                                                                                                                  |
| 562               | 5427<br>5457                          | 686<br>687                      | Jan. 14<br>Feb. 9                                                | -71°3<br>-81°8                            | Jan. 25<br>Feb. 18                                                    | +73°5<br>+32°2                          | 12<br>10                  | 41<br>13                  | 310<br>88                      | 170°60<br>175°97                               | -12°27<br>-14°01                               | A compact cluster becoming a fine stream of normal type.<br>A long irregular stream of small unstable spots.                                                                                                                                                                                                                                                                                                  |
| (562*)            | 5429<br>5445                          | 686<br>687                      | Jan. 16<br>Feb. 4                                                | +55°5<br>-50°0                            | Jan. 17<br>Feb. 4                                                     | +69°5<br>-50°0                          | 2<br>1                    | 7<br>2                    | 27<br>6                        | 275°95<br>279°80                               | -16°40<br>-16°20                               | A pair of small spots.<br>A very small spot.                                                                                                                                                                                                                                                                                                                                                                  |
| 563               | 5430<br>5446                          | 686<br>687                      | Jan. 18<br>Feb. 4                                                | +58°0<br>-78°7                            | Jan. 18<br>Feb. 13                                                    | +58°0<br>+35°4                          | 1<br>10                   | 0<br>5                    | 19<br>45                       | 246°60<br>249°12                               | -25°50<br>-27°53                               | A pair of small spots.<br>A compact cluster of unstable spots.                                                                                                                                                                                                                                                                                                                                                |
| 564               | 5431<br>5444                          | 686<br>687                      | Jan. 19<br>Feb. 3                                                | +78°0<br>-79°6                            | Jan. 19<br>Feb. 15                                                    | +78°0<br>+70°9                          | 1<br>13                   | 0<br>35                   | 33<br>199                      | 258°60<br>258°18                               | -24°60<br>-28°79                               | A pair of small spots.<br>A large regular spot, usually followed by a small companion.                                                                                                                                                                                                                                                                                                                        |
| 565               | (5389<br>5417<br>5418<br>5442<br>5473 | 685<br>686<br>686<br>687<br>688 | 1904.<br>Dec. 8<br>1905.<br>Jan. 6<br>Jan. 7<br>Feb. 2<br>Mar. 1 | -85°3<br>-73°1<br>-47°4<br>-75°2<br>-80°8 | 1904.<br>Dec. 19<br>1905.<br>Jan. 15<br>Jan. 11<br>Feb. 14<br>Mar. 13 | +64°8<br>+49°3<br>0°0<br>+78°6<br>+70°8 | 12<br>10<br>5<br>13<br>13 | 39<br>5<br>3<br>81<br>158 | 242<br>33<br>22<br>508<br>1762 | 290°41<br>277°48<br>284°68<br>279°02<br>271°42 | +12°53<br>+12°41<br>+12°58<br>+12°46<br>+10°48 | A large regular spot, breaking up to form a stream.<br>One or two small unstable spots.<br>A short stream of small spots. Acolyte group to 5417.<br>A large regular spot, which divides into two, with a train.<br>A magnificent composite spot, which breaks up to form a fine stream.<br><i>Note.</i> —5389 and 5417 are probably formations distinct from 5442 and 5473, which alone belong to the series. |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.   |                                  | Last Seen.    |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                         |
|-------------------|---------------|-----------|---------------|----------------------------------|---------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.         | Longitude from Central Meridian. | Date.         | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                                  |
| 566               | 5466          | 687       | 1905. Feb. 16 | -58°4                            | 1905. Feb. 25 | +54°5                            | 10                        | 11            | 82          | 108°99                   | -22°58                  | An irregular variable stream.                                                                                                                                                                                                                    |
|                   | 5481          | 688       | Mar. 14       | -74°5                            | Mar. 25       | +66°0                            | 12                        | 6             | 46          | 109°58                   | -22°65                  | A regular spot, with occasionally a small companion.                                                                                                                                                                                             |
|                   | 5501          | 689       | Apr. 10       | -77°2                            | Apr. 21       | +72°8                            | 12                        | 40            | 217         | 117°09                   | -20°70                  | A stream, whose leader becomes regular and large.                                                                                                                                                                                                |
|                   | 5502          | 689       | Apr. 10       | -82°0                            | Apr. 18       | +26°8                            | 9                         | 16            | 106         | 108°91                   | -21°12                  | A compact cluster, becoming a composite spot.                                                                                                                                                                                                    |
|                   | 5525          | 690       | May 7         | -77°5                            | May 11        | -27°2                            | 5                         | 6             | 25          | 113°52                   | -21°28                  | An isolated spot.                                                                                                                                                                                                                                |
| 567               | 5491          | 689       | Mar. 29       | -48°7                            | Apr. 7        | +66°9                            | 10                        | 3             | 20          | 298°91                   | +17°93                  | An irregular stream of unstable small spots, not seen on Apr. 4 and 6.                                                                                                                                                                           |
|                   | 5513          | 690       | Apr. 23       | -74°6                            | Apr. 27       | -22°5                            | 5                         | 17            | 87          | 307°00                   | +18°22                  | A regular spot, with a very small companion on Apr. 26.<br>Note.— Two distinct groups have been confused together in the group numbered 5491. In the entry above they have been separated. 5491 is intermittent, not being seen on Apr. 4 and 6. |
| 568               | 5524          | 690       | May 7         | -35°0                            | May 15        | +75°6                            | 9                         | 41            | 336         | 160°40                   | +13°08                  | A fine stream appearing suddenly, whose leader advances.                                                                                                                                                                                         |
|                   | 5542          | 691       | May 31        | -71°6                            | June 11       | +72°3                            | 12                        | 45            | 310         | 167°28                   | +10°53                  | A straight stream, whose two principal members are large and                                                                                                                                                                                     |
|                   | 5543          | 691       | May 31        | -76°3                            | June 8        | +33°8                            | 9                         | 4             | 26          | 161°38                   | +14°10                  | A short stream of unstable spots. [composite.                                                                                                                                                                                                    |
| 569               | 5529          | 690       | May 11        | -75°8                            | May 22        | +72°7                            | 12                        | 113           | 700         | 63°78                    | -15°18                  | A fine stream, with three chief variable spots.                                                                                                                                                                                                  |
|                   | 5550          | 691       | June 7        | -77°5                            | June 18       | +74°0                            | 12                        | 22            | 123         | 69°86                    | -15°66                  | A large regular spot, with two very small companions on June 7.                                                                                                                                                                                  |
|                   | 5585          | 692       | July 5        | -57°3                            | July 7        | -32°2                            | 3                         | 2             | 24          | 72°03                    | -16°70                  | One or two small faint spots.<br>Note.—This series is derived from 5529.                                                                                                                                                                         |
| 570               | 5529          | 690       | May 11        | -75°8                            | May 22        | +72°7                            | 12                        | 113           | 700         | 63°78                    | -15°18                  | A fine stream, with three chief variable spots.                                                                                                                                                                                                  |
|                   | 5553          | 691       | June 8        | -76°2                            | June 19       | +69°5                            | 12                        | 31            | 165         | 52°26                    | -14°93                  | A large regular spot, usually with a small train.                                                                                                                                                                                                |
|                   | 5586          | 692       | July 5        | -77°1                            | July 17       | +78°7                            | 13                        | 101           | 802         | 52°36                    | -15°19                  | A fine compact variable stream.                                                                                                                                                                                                                  |
|                   | 5608          | 693       | July 31       | -83°4                            | Aug. 11       | +65°1                            | 12                        | 19            | 114         | 66°73                    | -12°41                  | A large regular spot, followed by a few small companions.                                                                                                                                                                                        |
|                   | 5611          | 693       | Aug. 1        | -76°2                            | Aug. 12       | +71°8                            | 12                        | 95            | 701         | 60°81                    | -16°32                  | A fine group of 5608. A very large regular spot, with companions.                                                                                                                                                                                |
|                   | 5639          | 694       | Aug. 28       | -78°7                            | Sept. 9       | +80°6                            | 13                        | 63            | 419         | 61°01                    | -18°52                  | A very large spot, with some close companions.<br>Note.—This series is derived from 5529 c. 5608 and 5611 are both derived from 5586, but 5611 returns again in 5639.                                                                            |
| 571               | 5540          | 691       | May 25        | -28°5                            | June 1        | +76°2                            | 8                         | 12            | 99          | 293°75                   | +5°50                   | A very small spot, becoming a continuous stream of unstable spots.                                                                                                                                                                               |
|                   | 5562          | 692       | June 16       | -77°8                            | June 22       | -2°7                             | 7                         | 0             | 5           | 306°55                   | +5°23                   | A small spot, not seen on June 19-21 inclusive.<br>Note.—5562 is intermittent, not being seen on June 19, 20, or 21.                                                                                                                             |
| 572               | 5546*         | 691       | June 14       | +57°6                            | June 15       | +68°2                            | 2                         | 3             | 20          | 108°25                   | -18°80                  | One or two small unstable spots.                                                                                                                                                                                                                 |
|                   | 5574          | 692       | July 1        | -70°4                            | July 4        | -35°0                            | 4                         | 3             | 12          | 114°55                   | -17°60                  | A small spot.                                                                                                                                                                                                                                    |
| 573               | 5564          | 692       | June 20       | -71°1                            | July 2        | +86°6                            | 13                        | 104           | 724         | 259°25                   | +6°45                   | A few small spots, becoming a fine stream whose chief spot is central.                                                                                                                                                                           |
|                   | 5595          | 693       | July 15       | -82°6                            | July 27       | +61°6                            | 13                        | 25            | 230         | 264°77                   | +7°67                   | Two short compact streams becoming a single stream.                                                                                                                                                                                              |
| 574               | 5569          | 692       | June 24       | +11°2                            | June 30       | +81°0                            | 7                         | 17            | 130         | 285°46                   | -13°20                  | A short variable stream of small spots.                                                                                                                                                                                                          |
|                   | 5594          | 693       | July 14       | -73°3                            | July 25       | +66°9                            | 12                        | 11            | 63          | 296°86                   | -14°84                  | A regular spot, usually with very small companions.                                                                                                                                                                                              |
| 575               | 5589          | 693       | July 10       | -85°8                            | July 22       | +71°3                            | 13                        | 256           | 1838        | 342°22                   | +12°99                  | A magnificent stream, whose leader is composite.                                                                                                                                                                                                 |
|                   | 5620          | 694       | Aug. 6        | -79°9                            | Aug. 18       | +79°5                            | 13                        | 85            | 788         | 346°63                   | +12°21                  | A very large composite spot, with small companions.                                                                                                                                                                                              |
| 576               | 5590          | 692       | July 11       | +25°2                            | July 14       | +66°9                            | 4                         | 4             | 22          | 75°88                    | +15°00                  | A pair of small spots.                                                                                                                                                                                                                           |
|                   | 5607          | 693       | July 31       | -73°5                            | Aug. 11       | +73°9                            | 12                        | 26            | 173         | 77°13                    | +15°98                  | A large composite spot, with a small train.                                                                                                                                                                                                      |
|                   | 5641          | 694       | Aug. 29       | -60°2                            | Sept. 8       | +83°6                            | 11                        | 29            | 180         | 73°23                    | +13°91                  | A compact stream whose leader becomes large.<br>Note.—5641 may be only a revival of 5607.                                                                                                                                                        |
| 577               | 5596          | 692       | July 16       | +74°0                            | July 16       | +74°0                            | 1                         | 0             | 6           | 58°30                    | +16°80                  | A very small spot.                                                                                                                                                                                                                               |
|                   | 5610          | 693       | Aug. 1        | -70°0                            | Aug. 8        | +23°3                            | 8                         | 1             | 20          | 66°81                    | +18°11                  | A short stream of small spots.                                                                                                                                                                                                                   |
| 578               | 5597          | 693       | July 18       | -1°2                             | July 25       | +84°9                            | 8                         | 76            | 512         | 318°99                   | +13°95                  | A few small spots, becoming a fine stream of normal type.                                                                                                                                                                                        |
|                   | 5622          | 694       | Aug. 8        | -80°6                            | Aug. 20       | +76°8                            | 13                        | 47            | 272         | 323°07                   | +14°50                  | A large regular spot, which becomes a stream of normal type.                                                                                                                                                                                     |
|                   | 5653          | 695       | Sept. 4       | -83°5                            | Sept. 12      | +28°5                            | 9                         | 10            | 60          | 326°02                   | +12°67                  | A regular spot, with occasional small companions.                                                                                                                                                                                                |
| 579               | 5628          | 694       | Aug. 18       | +0°8                             | Aug. 24       | +77°2                            | 7                         | 38            | 262         | 271°23                   | +5°16                   | A stream appearing suddenly on the C.M.                                                                                                                                                                                                          |
|                   | 5655          | 695       | Sept. 7       | -77°6                            | Sept. 18      | +68°1                            | 12                        | 15            | 96          | 286°25                   | +2°38                   | A regular spot, with occasional small companions.                                                                                                                                                                                                |

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number | No. of Group.                        | Rotation.                       | First Seen.                                          |                                           | Last Seen.                                       |                                           | No. of Days Photographed. | Mean Area for              |                                 | Mean Longitude of Group.                  | Mean Latitude of Group.                   | REMARKS.                                                                                                                                                                                                                                                                        |
|------------------|--------------------------------------|---------------------------------|------------------------------------------------------|-------------------------------------------|--------------------------------------------------|-------------------------------------------|---------------------------|----------------------------|---------------------------------|-------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |                                      |                                 | Date.                                                | Longitude from Central Meridian.          | Date.                                            | Longitude from Central Meridian.          |                           | Um-bra.                    | Whole Spot.                     |                                           |                                           |                                                                                                                                                                                                                                                                                 |
| (579*)           | 5654*<br>5668                        | 694<br>695                      | 1905.<br>Sept. 7<br>Sept. 27                         | +49°0<br>-50°2                            | 1905.<br>Sept. 8<br>Oct. 3                       | +61°3<br>+28°3                            | 2<br>7                    | 2<br>12                    | 8<br>52                         | 52°95<br>56°94                            | -13°30<br>-14°43                          | A small spot.<br>A short stream, consisting chiefly of three spots.                                                                                                                                                                                                             |
| 580              | 5669<br>5682<br>5712                 | 695<br>696<br>697               | Sept. 28<br>Oct. 14<br>Nov. 10                       | +64°2<br>-74°5<br>-72°8                   | Sept. 29<br>Oct. 26<br>Nov. 21                   | +79°2<br>+78°2<br>+66°7                   | 2<br>13<br>12             | 8<br>222<br>21             | 91<br>2336<br>179               | 152°65<br>161°88<br>167°64                | +12°45<br>+13°75<br>+12°84                | A large spot near west limb.<br>An immense spot of most intricate structure.<br>An irregular cluster of small and unstable spots.                                                                                                                                               |
| 581              | 5673<br>5685<br>5687<br>5720<br>5721 | 695<br>696<br>696<br>697<br>697 | Sept. 30<br>Oct. 21<br>Oct. 25<br>Nov. 18<br>Nov. 21 | -23°9<br>-84°1<br>-42°6<br>-79°7<br>-56°5 | Oct. 8<br>Nov. 3<br>Nov. 2<br>Nov. 30<br>Nov. 30 | +75°2<br>+83°9<br>+53°8<br>+77°5<br>+69°4 | 9<br>14<br>9<br>13<br>10  | 94<br>228<br>6<br>59<br>33 | 632<br>1283<br>42<br>407<br>194 | 39°82<br>58°05<br>43°92<br>59°44<br>46°04 | +6°00<br>+6°55<br>+7°07<br>+5°37<br>+6°65 | Small spots in a ring, becoming a fine stream.<br>An immense regular spot.<br>A few unstable spots. This group is acolyte to 5685.<br>A large regular spot, which becomes composite and breaks up.<br>An irregular stream, becoming one of normal type. Acolyte group [to 5720. |
| 582              | 5680<br>5703                         | 696<br>697                      | Oct. 8<br>Nov. 4                                     | -85°1<br>-84°8                            | Oct. 20<br>Nov. 16                               | +80°7<br>+72°4                            | 13<br>13                  | 51<br>28                   | 319<br>189                      | 235°66<br>239°48                          | +12°68<br>+13°53                          | A large regular spot, with a train.<br>An irregular stream, undergoing change.                                                                                                                                                                                                  |
| 583              | 5681<br>5690                         | 696<br>697                      | Oct. 9<br>Oct. 28                                    | +24°9<br>-72°9                            | Oct. 13<br>Oct. 31                               | +81°4<br>-29°5                            | 5<br>4                    | 12<br>5                    | 130<br>37                       | 334°80<br>340°53                          | +12°58<br>+13°25                          | A small spot, not seen on Oct. 10.<br>An ill-defined spot, with a very small companion on Oct. 30.<br>Note.—5681 is intermittent, not being seen on Oct. 10.                                                                                                                    |
| 584              | 5684<br>5702<br>5736                 | 696<br>697<br>698               | Oct. 18<br>Nov. 4<br>Dec. 2                          | +58°1<br>-78°0<br>-72°3                   | Oct. 18<br>Nov. 16<br>Dec. 5                     | +58°1<br>+82°7<br>-30°8                   | 1<br>13<br>4              | 0<br>20<br>6               | 29<br>121<br>43                 | 242°60<br>248°34<br>242°40                | +7°80<br>+8°11<br>+6°80                   | A cluster of very small spots.<br>A large regular spot, with occasional very small companions.<br>A double spot, with very small companions.                                                                                                                                    |
| 585              | 5704<br>5733                         | 697<br>698                      | Nov. 6<br>Nov. 26                                    | +32°9<br>-72°8                            | Nov. 10<br>Dec. 7                                | +77°8<br>+70°9                            | 5<br>12                   | 0<br>28                    | 10<br>203                       | 323°12<br>320°39                          | -13°88<br>-13°72                          | Very small faint spots in a cluster of bright faculae.<br>A fine compact cluster.                                                                                                                                                                                               |
| 586              | 5706<br>5740                         | 697<br>698                      | Nov. 7<br>Dec. 4                                     | -80°5<br>-77°4                            | Nov. 19<br>Dec. 12                               | +78°8<br>+30°3                            | 13<br>9                   | 91<br>8                    | 721<br>40                       | 203°16<br>210°42                          | +6°35<br>+5°16                            | A very large compact unstable cluster.<br>A small regular spot, with very small companions.                                                                                                                                                                                     |
| 587              | 5707<br>5738                         | 697<br>698                      | Nov. 8<br>Dec. 4                                     | -44°7<br>-67°3                            | Nov. 16<br>Dec. 8                                | +66°5<br>-14°9                            | 9<br>5                    | 18<br>6                    | 95<br>37                        | 229°20<br>221°28                          | -24°63<br>-24°02                          | A very scattered stream, becoming suddenly of normal type.<br>A small regular spot.                                                                                                                                                                                             |
| 588              | 5710<br>5737                         | 697<br>698                      | Nov. 10<br>Dec. 3                                    | -13°5<br>-72°0                            | Nov. 17<br>Dec. 13                               | +78°0<br>+60°4                            | 8<br>11                   | 23<br>5                    | 134<br>54                       | 229°53<br>232°39                          | +9°20<br>+9°70                            | A straight stream, which does not conform to usual type and diminishes.<br>An irregular cluster of unstable spots, not seen on Dec. 11 and 12.<br>Note.—5737 is intermittent, not being seen on Oct. 11 and 12. It may be merely a revival of 5710.                             |
| 589              | 5713<br>5745                         | 697<br>698                      | Nov. 11<br>Dec. 8                                    | -74°5<br>-76°8                            | Nov. 23<br>Dec. 13                               | +83°1<br>-13°7                            | 13<br>6                   | 25<br>3                    | 148<br>41                       | 157°25<br>157°50                          | -17°10<br>-17°77                          | A large composite spot, which becomes regular.<br>Two spots.                                                                                                                                                                                                                    |
| 590              | 5717<br>5746                         | 697<br>698                      | Nov. 16<br>Dec. 12                                   | -69°5<br>-75°6                            | Nov. 26<br>Dec. 14                               | +69°5<br>-51°1                            | 11<br>3                   | 24<br>6                    | 153<br>41                       | 100°27<br>106°20                          | +13°53<br>+14°33                          | Scattered group, becoming large spot, with unstable train.<br>A regular spot.                                                                                                                                                                                                   |
| 591              | 5739<br>5768                         | 698<br>699                      | Dec. 4<br>Jan. 2                                     | -71°6<br>-49°7                            | Dec. 16<br>Jan. 2                                | +83°6<br>-49°7                            | 13<br>1                   | 14<br>0                    | 102<br>5                        | 214°46<br>215°50                          | -25°39<br>-25°90                          | A regular spot. New spots form, making a stream of normal type.<br>A very small spot.<br>Note.—5768 may possibly be only a revival, but more probably it is masked by faculae on Dec. 31 and Jan. 1.                                                                            |
| 592              | 5747<br>5775<br>5798                 | 698<br>699<br>700               | 1905.<br>Dec. 12<br>1906.<br>Jan. 8<br>Feb. 4        | -85°1<br>-84°5<br>-82°0                   | 1905.<br>Dec. 24<br>1906.<br>Jan. 20<br>Feb. 15  | +77°4<br>+73°9<br>+59°1                   | 13<br>13<br>12            | 83<br>66<br>26             | 427<br>364<br>166               | 98°45<br>103°97<br>106°99                 | +8°13<br>+8°18<br>+8°59                   | A regular spot, with train.<br>A regular spot, with train.<br>A regular spot, with companions.                                                                                                                                                                                  |
| 593              | 5762<br>5764<br>5778                 | 698<br>698<br>699               | 1905.<br>Dec. 22<br>Dec. 24<br>1906.<br>Jan. 12      | -1°7<br>+29°2<br>-80°1                    | 1905.<br>Dec. 28<br>Dec. 28<br>1906.<br>Jan. 18  | +72°0<br>+82°4<br>+0°6                    | 7<br>5<br>7               | 23<br>37<br>4              | 165<br>235<br>31                | 46°76<br>53°68<br>53°14                   | +16°94<br>+15°26<br>+18°17                | A small spot, becoming a regular spot, with companions.<br>A regular spot, with train.<br>A regular spot, with an occasional companion.                                                                                                                                         |

## CATALOGUE OF RECURRENT GROUPS OF SUN SPOTS FOR THE YEARS 1874 TO 1906.

## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number. | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.      |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                        |
|-------------------|---------------|-----------|------------------|----------------------------------|-----------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |               |           | Date.            | Longitude from Central Meridian. | Date.           | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                 |
| 594               | 5766          | 699       | 1905.<br>Dec. 26 | -75°6                            | 1906.<br>Jan. 6 | +69°5                            | 12                        | 75            | 517         | 279°22                   | -8°58                   | A fine stream of normal type.                                                                                                                                                   |
|                   | 5788          | 700       | 1906.<br>Jan. 22 | -76°2                            | Feb. 2          | +73°1                            | 12                        | 14            | 90          | 286°90                   | -7°36                   | A regular spot.                                                                                                                                                                 |
| 595               | 5767          | 699       | 1905.<br>Dec. 29 | +0°8                             | Jan. 3          | +54°0                            | 5                         | 6             | 38          | 319°82                   | +14°78                  | Small unstable spots, becoming a straight stream.                                                                                                                               |
|                   | 5783          | 700       | 1906.<br>Jan. 20 | -69°4                            | Jan. 29         | +64°6                            | 10                        | 10            | 84          | 326°08                   | +12°25                  | A straggling stream of small spots.                                                                                                                                             |
| 596               | 5785          | 700       | Jan. 21          | -45°0                            | Jan. 30         | +78°1                            | 10                        | 71            | 550         | 332°41                   | -11°40                  | A very fine stream, with two chief spots.                                                                                                                                       |
|                   | 5802          | 701       | Feb. 14          | -76°8                            | Feb. 26         | +76°9                            | 13                        | 24            | 137         | 338°96                   | -10°82                  | A regular spot, with companions.                                                                                                                                                |
|                   | 5820*         | 702       | Mar. 14          | -71°7                            | Mar. 15         | -57°5                            | 2                         | 0             | 5           | 339°95                   | -11°80                  | A very small spot.                                                                                                                                                              |
| 597               | 5790          | 700       | Jan. 23          | -54°6                            | Feb. 1          | +75°6                            | 10                        | 17            | 99          | 301°25                   | +15°19                  | Irregular straggling stream, becoming one of normal type.                                                                                                                       |
|                   | 5803          | 701       | Feb. 17          | -76°2                            | Feb. 28         | +76°5                            | 12                        | 32            | 234         | 308°71                   | +13°25                  | A regular spot, with train.                                                                                                                                                     |
|                   | 5806          | 701       | Feb. 18          | -71°1                            | Feb. 28         | +65°9                            | 11                        | 12            | 83          | 298°25                   | +16°31                  | A regular spot, with an unstable stream near.                                                                                                                                   |
|                   | 5821          | 702       | Mar. 16          | -72°0                            | Mar. 27         | +72°3                            | 12                        | 55            | 512         | 312°88                   | +16°56                  | Scattered spots coalescing to form a very large spot.<br>Note.—5821 is perhaps a fresh outbreak of 5803.                                                                        |
| 598               | 5794          | 700       | Jan. 31          | +11°8                            | Feb. 4          | +70°8                            | 5                         | 10            | 58          | 257°20                   | +7°44                   | A small spot, with distant attendants.                                                                                                                                          |
|                   | 5807*         | 701       | Feb. 22          | -51°8                            | Feb. 22         | -51°8                            | 1                         | 0             | 5           | 263°80                   | +6°60                   | A very small faint spot.<br>Note.—5807* may possibly be only a revival of 5794, but more probably is hidden by bright faculae on Feb. 20 and 21.                                |
| 599               | 5809          | 701       | Feb. 27          | +36°3                            | Mar. 2          | +71°9                            | 4                         | 0             | 42          | 283°20                   | -6°63                   | A few spots in a small cluster.                                                                                                                                                 |
|                   | 5822          | 702       | Mar. 17          | -77°8                            | Mar. 27         | +56°9                            | 11                        | 23            | 161         | 294°60                   | -8°00                   | A short stream, almost at right angles to the equator.                                                                                                                          |
| 600               | 5810          | 701       | Feb. 28          | +26°9                            | Mar. 4          | +79°4                            | 5                         | 12            | 117         | 260°08                   | +13°96                  | A short stream.                                                                                                                                                                 |
|                   | 5828          | 702       | Mar. 19          | -78°7                            | Mar. 27         | +22°7                            | 9                         | 15            | 159         | 261°89                   | +15°24                  | A regular spot, which breaks up.                                                                                                                                                |
| 601               | 5817          | 701       | Mar. 8           | -24°4                            | Mar. 16         | +79°5                            | 9                         | 41            | 294         | 105°19                   | +19°97                  | A few small spots, becoming a large compact stream.                                                                                                                             |
|                   | 5843          | 702       | Mar. 31          | -79°0                            | Apr. 12         | +81°7                            | 13                        | 33            | 212         | 106°46                   | +19°08                  | A large regular spot, with occasional small companions.                                                                                                                         |
| 602               | 5820          | 701       | Mar. 14          | -3°6                             | Mar. 19         | +66°2                            | 6                         | 11            | 64          | 50°15                    | +22°77                  | A straight unstable stream.                                                                                                                                                     |
|                   | 5849          | 702       | Apr. 5           | -72°2                            | Apr. 17         | +80°4                            | 13                        | 53            | 374         | 42°69                    | +24°01                  | A fine stream, whose chief spots are in the rear.                                                                                                                               |
| 603               | 5826          | 702       | Mar. 18          | -80°2                            | Mar. 30         | +75°5                            | 13                        | 103           | 598         | 275°20                   | +13°99                  | A very fine pair of regular spots, which coalesce.                                                                                                                              |
|                   | 5855          | 703       | Apr. 14          | -81°7                            | Apr. 26         | +70°3                            | 13                        | 50            | 341         | 274°40                   | +15°91                  | A close pair of regular spots in a cluster.                                                                                                                                     |
| 604               | 5842          | 702       | Apr. 1           | -11°6                            | Apr. 7          | +75°3                            | 7                         | 11            | 65          | 164°69                   | +12°23                  | An irregular stream of small spots.                                                                                                                                             |
|                   | 5858          | 703       | Apr. 23          | -80°0                            | Apr. 30         | +14°5                            | 8                         | 11            | 83          | 159°79                   | +11°59                  | An irregular stream of small spots, not seen on Apr. 29.<br>Note.—5858 is intermittent, not being seen on Apr. 29.                                                              |
| 605               | 5852          | 702       | Apr. 7           | -70°6                            | Apr. 18         | +71°0                            | 12                        | 12            | 77          | 19°99                    | -19°23                  | A dwindling irregular stream. Fresh outbreak on Apr. 16.                                                                                                                        |
|                   | 5866          | 703       | May 4            | -85°3                            | May 17          | +79°5                            | 14                        | 45            | 397         | 5°80                     | -21°14                  | A very fine regular spot, with close train.                                                                                                                                     |
|                   | 5881          | 704       | June 2           | -70°0                            | June 10         | +29°9                            | 9                         | 9             | 73          | 0°27                     | -25°13                  | Small scattered unstable spots.                                                                                                                                                 |
| 606               | 5854          | 702       | Apr. 10          | -50°6                            | Apr. 18         | +54°9                            | 9                         | 8             | 38          | 2°64                     | +11°28                  | A small spot, not seen on Apr. 11. Then a straggling stream.                                                                                                                    |
|                   | 5865          | 703       | May 4            | -80°5                            | May 16          | +80°2                            | 13                        | 22            | 151         | 15°65                    | +7°18                   | A large regular spot, with occasional companions.<br>Note.—5854 is intermittent, not being seen on Apr. 11. It is not seen on Apr. 19 or 20, but bright faculae mark the place. |
| 607               | 5859          | 703       | Apr. 25          | -42°4                            | May 4           | +80°4                            | 10                        | 36            | 273         | 173°95                   | +11°97                  | An irregular and very variable stream.                                                                                                                                          |
|                   | 5870          | 704       | May 18           | -84°3                            | May 31          | +83°8                            | 14                        | 68            | 505         | 181°54                   | +9°46                   | A long irregular stream.                                                                                                                                                        |
|                   | 5888*         | 705       | June 15          | -67°0                            | June 18         | -32°9                            | 4                         | 0             | 6           | 187°75                   | +9°90                   | A very small spot, not seen on June 16 and 17.<br>Note.—5888* is intermittent, not being seen on June 16 and 17.                                                                |



## Catalogue of Recurrent Groups of Sun Spots—continued.

| Reference Number | No. of Group. | Rotation. | First Seen.  |                                  | Last Seen.   |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                               |
|------------------|---------------|-----------|--------------|----------------------------------|--------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------|
|                  |               |           | Date.        | Longitude from Central Meridian. | Date.        | Longitude from Central Meridian. |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                        |
| 608              | 5869          | 704       | 1906. May 11 | -59°0                            | 1906. May 22 | +80°1                            | 12                        | 79            | 545         | 303°93                   | +14°28                  | A very variable group, not seen on May 12.                                                                             |
|                  | 5885          | 705       | June 5       | -79°8                            | June 17      | +73°5                            | 13                        | 34            | 200         | 305°47                   | +14°15                  | A regular spot, with followers.                                                                                        |
|                  | 5903*         | 706       | July 3       | -72°3                            | July 8       | -8°7                             | 6                         | 2             | 19          | 304°82                   | +13°92                  | A few small faint spots, not seen on July 7.                                                                           |
|                  |               |           |              |                                  |              |                                  |                           |               |             |                          |                         | Note.—5869 is intermittent, not being seen on May 12. 5903* is also intermittent, not being seen on July 7.            |
| 609              | 5871          | 704       | May 23       | -73°3                            | June 4       | +84°1                            | 13                        | 79            | 528         | 131°35                   | +11°91                  | Two large spots, with small companions.                                                                                |
|                  | 5889          | 705       | June 19      | -68°1                            | June 30      | +72°6                            | 12                        | 9             | 58          | 135°29                   | +11°59                  | A regular spot, with occasional companions.                                                                            |
|                  | 5922          | 706       | July 16      | -70°7                            | July 25      | +49°4                            | 10                        | 10            | 77          | 133°74                   | +8°82                   | An irregular cluster.                                                                                                  |
| 610              | 5878          | 704       | May 31       | -72°1                            | June 10      | +66°8                            | 11                        | 12            | 99          | 30°43                    | +15°06                  | A curved stream, becoming one of normal type.                                                                          |
|                  | 5894          | 705       | June 26      | -67°5                            | July 7       | +80°4                            | 12                        | 29            | 201         | 44°54                    | +12°21                  | A cluster becoming a stream almost at right angles to equator.                                                         |
|                  | 5897          | 705       | June 27      | -67°5                            | July 4       | +24°6                            | 8                         | 11            | 78          | 31°41                    | +16°78                  | A regular spot, with companions.                                                                                       |
|                  | 5928          | 706       | July 22      | -78°4                            | July 30      | +28°2                            | 9                         | 5             | 32          | 48°24                    | +9°01                   | A regular spot, with occasional companions.                                                                            |
|                  |               |           |              |                                  |              |                                  |                           |               |             |                          |                         | Note.—The leading and the following spots of 5878 give rise to 5894 and 5897 respectively. 5928 is the return of 5894. |
| 611              | 5886          | 705       | June 8       | +14°7                            | June 14      | +82°0                            | 7                         | 49            | 337         | 361°94                   | +20°69                  | A short broad stream.                                                                                                  |
|                  | 5898          | 706       | June 28      | -75°5                            | July 11      | +85°3                            | 14                        | 134           | 725         | 366°36                   | +20°96                  | A very large regular spot, with companions.                                                                            |
|                  | 5931          | 707       | July 25      | -83°2                            | Aug. 7       | +84°8                            | 14                        | 85            | 458         | 361°20                   | +21°97                  | A large regular spot, with companions.                                                                                 |
|                  | 5931*         | 707       | July 27      | -51°8                            | July 27      | -51°8                            | 1                         | 0             | 29          | 368°70                   | +23°70                  | Two small very faint spots. Acolyte group to 5931.                                                                     |
|                  | 5946          | 708       | Aug. 22      | -83°9                            | Sept. 4      | +78°9                            | 14                        | 35            | 232         | 354°16                   | +22°71                  | A large regular spot, with companions.                                                                                 |
|                  | 5971          | 709       | Sept. 20     | -69°2                            | Sept. 22     | -41°5                            | 3                         | 0             | 7           | 347°67                   | +20°53                  | One or two small faint spots.                                                                                          |
| 612              | 5888          | 705       | June 19      | -32°0                            | June 27      | +70°1                            | 9                         | 5             | 38          | 171°33                   | +9°23                   | A cluster of small spots, not seen on June 25 and 26.                                                                  |
|                  | 5913          | 706       | July 12      | -80°3                            | July 24      | +78°9                            | 13                        | 24            | 167         | 177°81                   | +8°65                   | A regular spot, with unstable companions.                                                                              |
|                  |               |           |              |                                  |              |                                  |                           |               |             |                          |                         | Note.—5888 is intermittent, not being seen on June 25 and 26.                                                          |
| 613              | 5893          | 705       | June 24      | -75°8                            | July 5       | +78°5                            | 12                        | 39            | 255         | 66°03                    | +6°13                   | A regular spot, with dwindling train.                                                                                  |
|                  | 5926          | 706       | July 20      | -80°1                            | July 27      | +13°7                            | 8                         | 7             | 53          | 74°23                    | +5°74                   | An irregular cluster of small spots.                                                                                   |
| 614              | 5895          | 705       | June 26      | -69°9                            | July 7       | +76°2                            | 12                        | 73            | 438         | 41°13                    | -9°59                   | A large double spot, with train.                                                                                       |
|                  | 5929          | 706       | July 23      | -69°0                            | July 25      | -42°1                            | 3                         | 6             | 34          | 44°30                    | -9°30                   | A small spot.                                                                                                          |
| 615              | 5903          | 706       | July 3       | -36°4                            | July 12      | +81°1                            | 10                        | 46            | 311         | 341°75                   | +21°33                  | A regular spot, with train.                                                                                            |
|                  | 5931†         | 707       | July 27      | -77°8                            | July 27      | -77°8                            | 1                         | 0             | 47          | 342°70                   | +23°90                  | A faint diffused marking.                                                                                              |
| 616              | 5912          | 706       | July 11      | -78°4                            | July 22      | +73°4                            | 12                        | 33            | 219         | 201°36                   | +17°93                  | A large regular spot, with companions.                                                                                 |
|                  | 5935          | 707       | Aug. 7       | -74°0                            | Aug. 19      | +80°2                            | 13                        | 15            | 81          | 199°82                   | +18°51                  | A regular spot, with occasional companion.                                                                             |
| 617              | 5933          | 706       | July 27      | -38°2                            | Aug. 5       | +83°3                            | 10                        | 110           | 901         | 24°32                    | -15°26                  | A sudden outburst, becoming a very large regular spot with train.                                                      |
|                  | 5944          | 707       | Aug. 21      | -68°3                            | Sept. 1      | +77°6                            | 12                        | 44            | 275         | 24°31                    | -16°69                  | Two spots, with companions, forming stream inclined to the equator.                                                    |
| 618              | 5936          | 707       | Aug. 6       | -80°9                            | Aug. 17      | +71°6                            | 12                        | 6             | 35          | 214°06                   | +17°34                  | Unstable spots, not seen on Aug. 7 and 12. Later a regular spot.                                                       |
|                  | 5960          | 708       | Sept. 1      | -86°8                            | Sept. 12     | +55°6                            | 12                        | 9             | 79          | 217°10                   | +18°79                  | A regular diminishing spot, becoming a straight stream.                                                                |
|                  |               |           |              |                                  |              |                                  |                           |               |             |                          |                         | Note.—5936 is very intermittent, not being seen on Aug. 7 and again [on Aug. 12.                                       |
| 619              | 5938          | 707       | Aug. 9       | -57°9                            | Aug. 18      | +64°2                            | 10                        | 8             | 51          | 195°05                   | -17°18                  | A short dwindling stream.                                                                                              |
|                  | 5961          | 708       | Sept. 4      | -74°7                            | Sept. 15     | +77°1                            | 12                        | 21            | 148         | 197°62                   | -21°18                  | An irregular cluster, becoming a straight stream.                                                                      |
|                  |               |           |              |                                  |              |                                  |                           |               |             |                          |                         | Note.—5961 has a very small area at the E. limb, and is therefore possibly only a revival of 5938.                     |
| (619*)           | 5942          | 707       | Aug. 18      | -30°6                            | Aug. 25      | (+61°8)                          | 8                         | 18            | 119         | 104°61                   | +11°53                  | Small spots, becoming a straight stream of normal type.                                                                |
|                  | 5945          | 707       | Aug. 20      | -17°9                            | Aug. 25      | (+42°0)                          | 6                         | 4             | 23          | 87°17                    | +5°62                   | Very small spots. Acolyte group to 5942.                                                                               |
|                  | 5968          | 708       | Sept. 11     | -82°0                            | Sept. 24     | -85°8                            | 14                        | 49            | 336         | 93°33                    | +8°36                   | Small spots, becoming a fine stream.                                                                                   |
|                  |               |           |              |                                  |              |                                  |                           |               |             |                          |                         | Note.—5968 appears to be a revival rather than a return of the two groups 5942 and 5945.                               |
| 620              | 5950          | 707       | Aug. 24      | -31°8                            | Sept. 1      | +78°7                            | 9                         | 49            | 352         | 22°84                    | -4°87                   | A fine stream of normal type.                                                                                          |
|                  | 5970          | 708       | Sept. 16     | -74°5                            | Sept. 19     | -38°4                            | 4                         | 5             | 41          | 36°83                    | -7°28                   | A few very small unstable spots.                                                                                       |



Catalogue of Recurrent Groups of Sun Spots--*continued.*

| Reference Number | No. of Group. | Rotation. | First Seen.      |                                  | Last Seen.       |                                  | No. of Days Photographed. | Mean Area for |             | Mean Longitude of Group. | Mean Latitude of Group. | REMARKS.                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------|---------------|-----------|------------------|----------------------------------|------------------|----------------------------------|---------------------------|---------------|-------------|--------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |               |           | Date.            | Longitude from Central Meridian. | Date.            | Longitude from Central Meridian. |                           |               |             |                          |                         |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                  |               |           |                  |                                  |                  |                                  |                           | Um-bra.       | Whole Spot. |                          |                         |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (620*)           | 5956          | 708       | 1906.<br>Aug. 29 | -76°2                            | 1906.<br>Sept. 8 | +64°5                            | 11                        | 20            | 139         | 273°82                   | + 5°31                  | A double spot, breaking up to form a compact stream.<br>Unstable small spots.<br><i>Note.</i> —5976 is almost certainly a revival of 5956 and not a continuation.                                                                                                                                                                                                                                                  |
|                  | 5976          | 709       | Sept. 24         | -76°4                            | Sept. 29         | -18°7                            | 6                         | 1             | 9           | 283°77                   | + 6°20                  |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 621              | (5990         | 709       | Oct. 8           | + 8°3                            | Oct. 11          | +39°8                            | 4                         | 1             | 13          | 185°58                   | +14°30)                 | A small spot. Very small followers on Oct. 9.<br>A fine stream of normal type, dividing after passing the C.M.<br>A large regular spot, with companions.<br>A small spot, with occasional companions.<br>A small stream.<br><i>Note.</i> —These three groups, 6024, 6030, and 6027, seem derived from the leading, the central, and the rear spots respectively of 6001. 6001 is a revival, not a return, of 5990. |
|                  | 6001          | 710       | Oct. 29          | -80°0                            | Nov. 10          | +78°5                            | 13                        | 20            | 127         | 182°75                   | +15°75                  |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                  | 6024          | 711       | Nov. 25          | -74°1                            | Dec. 6           | +77°7                            | 12                        | 44            | 258         | 196°13                   | +17°08)                 |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                  | 6027          | 711       | Nov. 26          | -77°4                            | Dec. 3           | +19°2                            | 8                         | 5             | 47          | 179°51                   | +17°78                  |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                  | 6030          | 711       | Nov. 26          | -70°6                            | Dec. 4           | +38°8                            | 9                         | 4             | 50          | 186°92                   | +15°44)                 |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 622              | 6004          | 710       | Nov. 8           | -73°3                            | Nov. 19          | +73°4                            | 12                        | 56            | 370         | 60°69                    | -10°63                  | A large composite spot, with companions.<br>A regular spot, with occasional companions.                                                                                                                                                                                                                                                                                                                            |
|                  | 6034          | 711       | Dec. 5           | -70°2                            | Dec. 12          | +22°5                            | 8                         | 7             | 32          | 62°79                    | -12°49                  |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 623              | 6019          | 711       | Nov. 22          | + 7°6                            | Nov. 27          | +76°1                            | 6                         | 6             | 61          | 315°50                   | +14°32                  | A stream of small spots.<br>A regular spot, with occasional companions.<br>A regular spot.<br><i>Note.</i> —See "Observatory" for May 1907, pp. 209 and 210, for 6074.                                                                                                                                                                                                                                             |
|                  | 6045          | 712       | Dec. 12          | -78°1                            | Dec. 25          | +86°8                            | 14                        | 20            | 153         | 322°62                   | +13°84                  |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                  | 6074          | 713       | 1907.<br>Jan. 8  | .....                            | 1907.<br>Jan. 14 | .....                            | 7                         |               |             | 326°                     | +13°                    |                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 624              | 6026          | 711       | 1906.<br>Nov. 26 | -33°4                            | 1906.<br>Dec. 4  | +78°1                            | 9                         | 31            | 202         | 225°04                   | +20°32                  | An irregular stream.<br>A regular spot, with small distant unstable companions.<br><i>Note.</i> —6052 is a return of the rear part of 6026.                                                                                                                                                                                                                                                                        |
|                  | 6052          | 712       | Dec. 21          | -66°4                            | Dec. 25          | -16°8                            | 5                         | 7             | 41          | 219°12                   | +19°62                  |                                                                                                                                                                                                                                                                                                                                                                                                                    |

*Correction.*—Group 762 and Group 779, appearing under Reference Number 90 on page 12, should each be enclosed in brackets in this place; since, though they form part of the same general disturbance as Group 705 and Group 735, they do not form an uninterrupted continuation of the two earlier groups. They are correctly given, under Reference Number 96, as forming a distinct series.