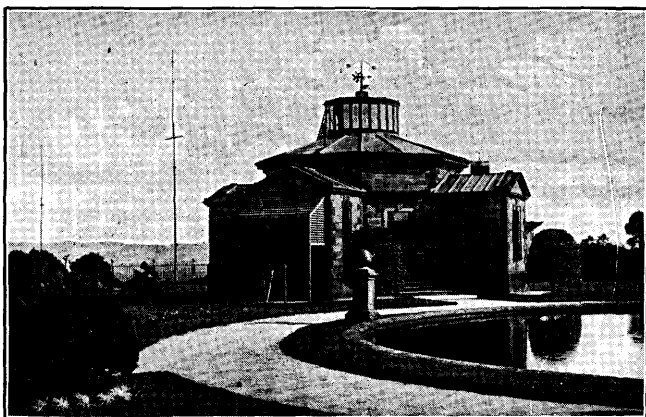


STONYHURST COLLEGE OBSERVATORY.

Lat. $53^{\circ} 50' 38.5''$ N. Long. $9^{\circ} 52' 38''$ W.
Height of the Barometer above the Sea, 381 feet.

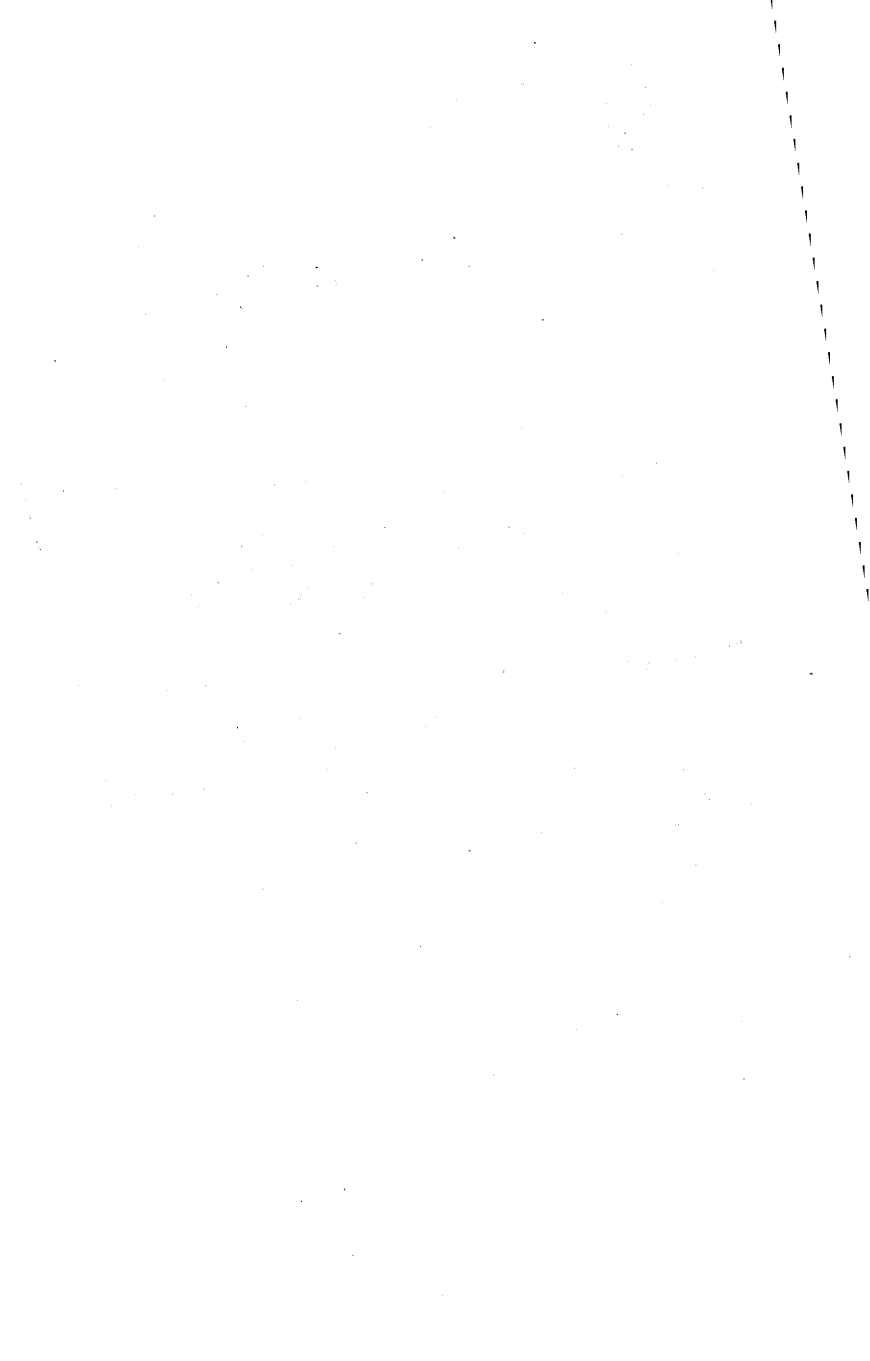


(FOUNDED 1838.)

Results of Geophysical and Solar Observations, 1929.

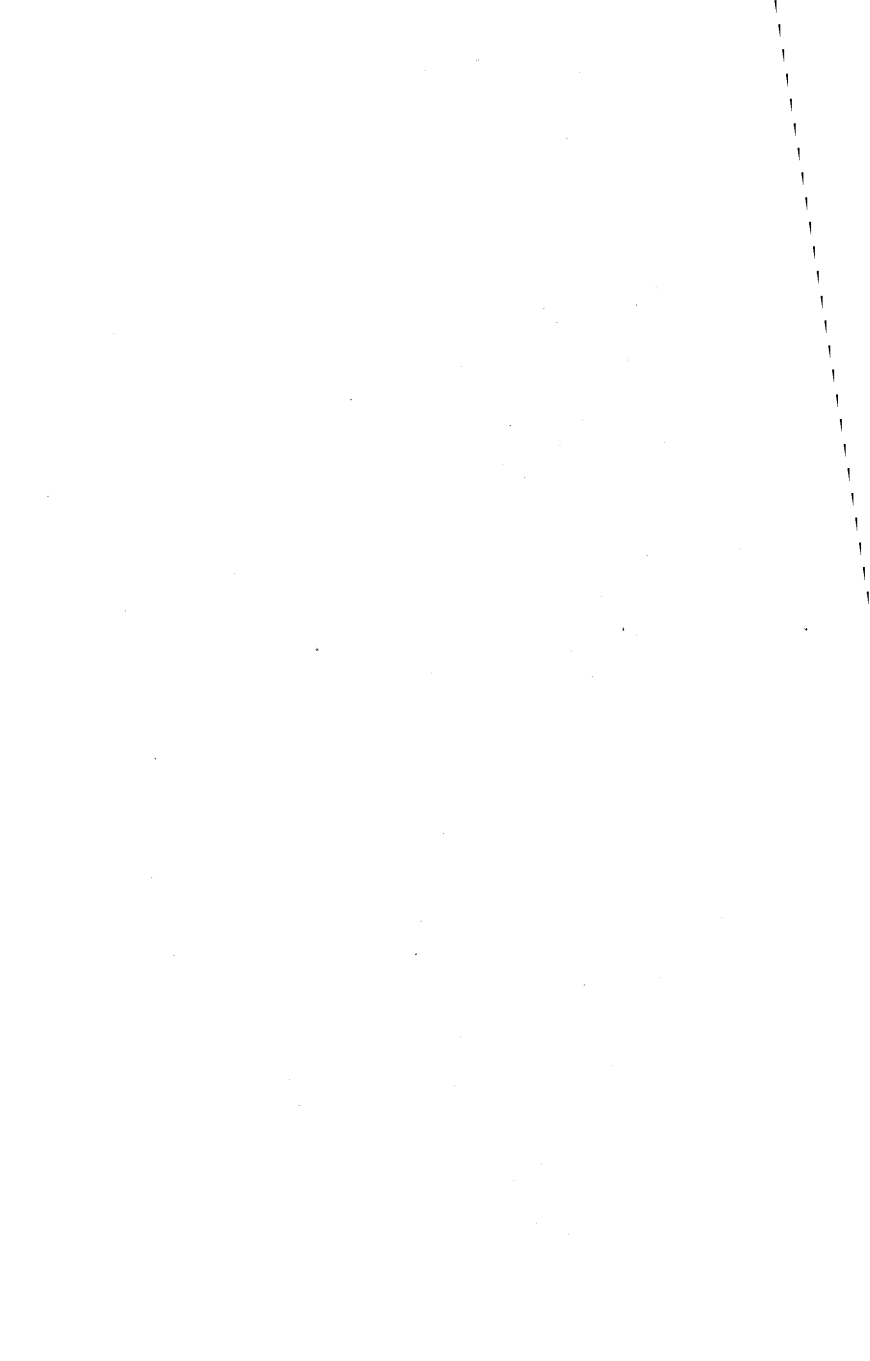
With Report and Notes of the Director,
Rev. E. D. O'CONNOR, S.J., M.A., F.R.A.S.

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REPORT AND NOTES.

GENERAL.—We are pleased to welcome Father Macklin back on the Staff of the Observatory. The remainder of the Staff is as last year.

On every Friday afternoon small parties of six or eight boys from the College have been conducted over the Observatory and the use of the instruments explained to them. Visits on a number of fine evenings were also arranged, when interesting celestial objects were viewed through the 15" equatorial.

In addition to Meteorological charts, various interesting records, with explanatory notes, have been posted up periodically at the College on a large board specially put up for the purpose.

The mast for the new *Dines Tube Anemograph*, supplied by Messrs. R. W. Munro, Ltd., was erected on April 12th. The remainder of the month was devoted to adjustments and tests. The vein stands 55 feet above the ground. The details for the fixing of the mast, guy ropes, etc., were designed by Father Rowland, who was also in charge of the erection and setting up of the whole instrument.

The instrument has been in regular use since May 1st, and below is printed a table of maximum gusts for each day. The maximum for each month is printed in heavier type.

VI.

MAXIMUM GUSTS FOR EACH DAY OF THE YEAR, 1929,
 BEGINNING FROM MAY 1ST, RECORDED BY THE
 DINES TUBE ANEMOGRAPH.

1929	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1929
DAY									DAY
1	19	29	19	37	41	44	2	23	1
2	25	44	15	24	23	45	29	55	2
3	24	40	22	36	20	48	35	35	3
4	46	29	15	41	20	24	30	40	4
5	33	19	30	29	17	49	43	68	5
6	45	31	32	23	18	44	24	55	6
7	49	36	24	24	18	43	30	63	7
8	34	34	28	25	24	30	35	57	8
9	22	31	29	23	25	42	50	57	9
10	45	34	38	23	17	45	50	39	10
11	34	28	33	37	25	48	57	53	11
12	31	35	23	31	15	36	36	56	12
13	41	40	23	30	21	29	28	44	13
14	50	30	17	27	23	35	10	41	14
15	40	42	23	32	15	25	28	33	15
16	27	57	31	25	13	50	39	21	16
17	24	28	25	37	11	37	17	18	17
18	27	20	20	26	29	21	48	17	18
19	26	30	22	23	41	9	50	28	19
20	17	40	25	18	47	32	42	46	20
21	23	34	18	27	57	18	26	56	21
22	34	41	38	23	36	24	38	20	22
23	30	45	29	47	28	46	40	38	23
24	26	40	25	36	15	42	38	44	24
25	26	25	20	30	10	22	66	64	25
26	27	30	25	20	25	27	40	49	26
27	30	26	24	20	22	18	24	30	27
28	35	21	26	37	30	35	25	33	28
29	38	29	36	41	26	42	18	61	29
30	34	30	36	18	33	35	17	42	30
31	26		40	31		20		34	31

At first considerable difficulty was experienced in keeping the pens adequately supplied with ink. This was remedied by using the method of double-quill pens, suggested by Mr. C. Vaughan Starr and described in the November number of the *Meteorological Magazine*.

METEOROLOGICAL.—The meteorological continuous records have been uninterrupted during the year, the results being forwarded, as usual, to the Meteorological Office, London, at the end of each week and of each month.

The outstanding features of this year's weather were, the abnormal drought during the first six months, the low temperatures in January, February and March, and the heavy gales in December. With the exception of the first fortnight of May, when 3·126 ins. of rain were recorded, the total for the remainder of the six months was only 7·851 ins. The mean for the same period during the previous 81 years is 22·683 ins.

An exceptionally heavy fall of rain, 2·350 ins., occurred on August 23rd, constituting a record for that month. Other heavy falls of one inch or more were recorded on September 28th, November 11th and 26th. There was precipitation on 189 days. August, November and December were the wettest months; February, March and April the driest.

Sunshine was above the average in 9 of the 12 months of the year; 178·9 hours on 30 days in March constituting a double record for the past 49 years. In May there was some sunshine each day, another record. During the whole year there were 1533·4 hours distributed over 299 days, only one day less than the record number of days in 1905.

VIII.

Fine day periods of five days or more :—

Jan. 20—26	Feb. 16—20	Feb. 28—Mar. 9
Mar. 26—30	Apl. 10—16	May 16—20
May 27—31	June 25—July 2	July 13—17
Sept. 4—11	Nov. 13—17	

A total of eleven periods, with an average of 7·3 days each.

Bright sunshine for ten hours or more :—

March 28, 29 ; April 6, 11, 29 ; May 9, 16, 17, 18, 19, 20, 21, 25, 26, 28, 29, 31 ; June 9, 10, 11, 18, 20, 23, 24, 25, 26, 27, 28 ; July 13, 14, 15, 16, 17, 20, 23, 25 ; August 2, 12, 25 ; September 8, 13.

A total of 41 days, with an average of 12·1 hours each.

Days of notable continuous sunshine :—

January 16 ; March 10, 11, 12, 28, 29, 30 ; April 1, 6, 11, 29 ; May 17, 20, 21, 25, 29, 31 ; June 11, 27, 28 ; July 14, 15, 16, 20 ; August 2 ; September 7, 8, 13, 18.

The adopted mean temperature was 46°·5, 0°·4 below the normal. The highest shade temperature was 81°·8, on July 15, 0°·6 above the normal ; the lowest 13°·0, on February 14, 3°·6 below the normal. July August and September were the warmest months ; January, February and December the coldest.

Ten gales of 37 miles per hour or over were recorded : Two in November, and eight in December. The greatest mean velocity of the wind, 57 miles per hour, in direction S.S.E., was on December 5.

Synopsis of the Monthly Weather :—

January.—Cold and dry.

Rainfall, 46·5% of the average. Wettest period, 27th—31st, when 1·271 ins. was registered. The remainder, ·790 in., fell between the 6th and 19th, chiefly in small amounts.

Sunshine recorded on only 14 days; but total amount, 20·8% above the mean. A dull period from the 4th to the 11th, during which no sunshine.

Adopted mean temperature, 2°·9 below the normal; and ground frost recorded on 23 days. Coldest period of month, 20th—28th.

Total wind mileage, 61% of the average. Gale force never reached.

February.—Exceptionally cold and dry, rather dull.

Rainfall, 28·4% of the average, on 9 days, and half the total amount, on the 5th. Wettest period, 1st—9th.

Sunshine, 72·8% of the average; but 5 hours or more of sunshine on 10th, 14th, 17th and 18th.

Adopted mean temperature, 6°·0 below the normal. A very cold period between 11th and 17th, with maximum shade temperature for each day below 30°.

Total wind mileage, 64·5% of the average. Gale force never reached.

March.—Sunny, calm, dry and cold at night.

Rainfall, 50·1% of the average, on 6 days. No rain till the 20th, and half the total amount registered fell on the 24th.

Bright sunshine, 176·1% of the average, on 30 days. Two specially sunny periods: 8th—15th, with an average of 8·3 hours each day, 26th—31st, with an average of 9·5 hours.

Adopted mean temperature, 1°·6 above normal; ground frost on 20 days.

Total wind mileage 53% of the average, was the lowest for the past 62 years.

April.—Dry, sunny, rather cold.

Rainfall, 50% of the average on 7 days, fairly evenly distributed throughout the month.

Bright sunshine, 114% of the average, on 29 days. Ten hours or more on the 6th, 11th and 29th.

Adopted mean temperature 1°·6 below the normal, with ground frost on 8 days.

Total wind mileage 77·8% of the average.

May.—First fortnight wet and mild; remainder dry, warm and sunny.

Rainfall, 130·2% of the average, on 14 days. Of the total 3·176 ins., 3·126 ins. fell in the first fortnight.

Bright sunshine, 134·2% of the average, on 31 days. From the 16th—31st there were 11 days with 10 hours or more of sunshine.

Adopted mean temperature, $+0^{\circ}\cdot9$ above the normal.

Total wind mileage 107% of the average.

June.—Dry, sunny, rather mild.

Rainfall, 55·5% of the average, on 14 days. Rainiest period, 1st—12th; driest 22nd—30th.

Bright sunshine, 117·8% of the average, on 30 days. An average of 12·2 hours each day during the period 23rd—29th.

Adopted mean temperature $-1^{\circ}\cdot9$ below normal.

Total wind mileage 110·9% of the average.

July.—Normal.

Rainfall, 97·5% of the average, in three periods, 3rd—12th, 21st—22nd, 28th—31st.

Bright sunshine, 108·1% of the average. Brightest period, 13th—25th; on 8 of these days there were 10 hours or more of sunshine.

August.—Wet, otherwise normal.

Rainfall, 155·8% of the average, on 24 days fairly evenly distributed, but with a record fall for the month of 2·350 ins. on the 23rd.

Bright sunshine, 94·3% of the average, on 29 days, and evenly distributed.

September.—Sunny, warm, dry and calm.

Rainfall, 39·2% of the average—in spite of a heavy fall of 1·050 ins. on the 28th—on 7 days. From 1st—18th

only 0·215 in. registered, of which 0·210 fell on the 12th.

Bright sunshine, 123·9% of the average, on 27 days.

Adopted mean temperature, 2°·2 above the average.

Total wind mileage, 78·1% of the average.

October.—Wet, rather windy, otherwise normal.

Rainfall, 137·7% of the average, on 23 days.

Wettest period, 23rd—29th, with 2·656 ins. of rain.

Total wind mileage, 114·8% of the average, but gale force never reached.

November.—Very wet, dull, rather stormy.

Rainfall, 176·8% of the average, on 22 days. The driest period was 13th—21st, with 0·928 ins. of rain.

Bright sunshine, 82·4% of the average, distributed in small amounts on 18 days.

Total wind mileage, 105·6% of the average. Gales on the 11th (44 m/h, at 12h. 30m.), and 25th (51 m/h, at 19h.).

December.—Very wet and stormy, mild.

Rainfall, 186·1% of the average, on 27 days. Wettest period, 6th—10th, with 3·157 ins; driest period, 15th—22nd.

Bright sunshine, 134·8% of the average, or 20 days.

Total wind mileage, 147·6% of the average. Eight gales recorded, the most severe on the 5th, with a velocity of 57 m/h, between 5h. and 6h.

SYNOPTIC METEOROLOGY.—The work on Synoptic Meteorology has been continued. A daily chart—that for 0700 G.M.T.—has been constructed and posted up at the College, and a daily forecast of local weather conditions supplied to the *Lancashire Daily Post*.

The wireless installation has been replaced by a more elaborate one, designed by the National Physical Laboratory. This, together with the separate L.F. amplifier used, employs in all nine valves, and operates a Creed undulator for the automatic recording of signals. This greatly facilitates the work of preparing the synoptic charts.

MAGNETICAL.—Absolute measures of Horizontal Magnetic Force have been made once each month by the method of Vibration and Deflection. The constants of the magnetometer needles were described in our 1921 Annual Report (*p.* vii). The Inclination is also measured, once each month, by two needles, with Dover's Circle, No. 159. The Declination is observed each week, and usually at about 16 hours. The Differential Instruments, or Photo-Magnetographs, which have been in practically continuous action since the year 1866, are of the Kew Observatory pattern, except that the radial distances between the centres of the magnets and the surfaces of the respective cylinders are somewhat shorter, being 152.4 Cms. The time-scale is provided by cutting off the light every two hours, by means of an electro-magnet actuated from the Synchronome Clock. The scale values of the instruments are as follows :—

For the Unifilar	...	11.28'	per Cm. of Ordinate.
„ Bifilar	...	.000496	C.G.S. „ „

The Vertical Force Balance does not give sufficiently consistent readings to allow of numerical values being safely quoted, and the interpretation of its record is confined to estimates of greater or less disturbance.

Four daily readings are measured on the curves, the highest, the lowest, and those at the hours 4 and 16. The Base-line values are determined from the measures of the curve ordinates at the times of the absolute observations, the adopted value for each month being, in the case of Declination, the mean of the four or five observations of the month, and in the case of the Horizontal Force, the single value obtained from the observation about the middle of the month.

In the Tabular Summary on p. 37 the Absolute Measures of Horizontal Direction and Force are corrected by the difference between the curve ordinate at the time of observation and the monthly mean of the four daily readings on the five quietest days of the month, according to the rule stated on page xii of our Report for 1908.

The Vertical and Total Forces are deduced from the measures of the Horizontal Force, and the angle of Inclination or Dip.

In the Table of Magnetic Disturbances (page 38) the intention is that a *calm* (c) shall mean a smooth curve ; *small* (s) a disturbance noteworthy only as opposed to a calm ; *moderate* (m) a disturbance not to be neglected for any comparison with other phenomena, solar or terrestrial ; *greater* (g) a marked disturbance ; and *very great* (v.g.) a decided storm.

The rule followed in assigning these letters to denote the magnetic character of a day is as follows:—

From the measured ranges of D and H in minutes of arc on the five quietest days of a month a mean value is obtained of D and H combined. Similarly for each day of the month a mean value in minutes of arc of the range of D and H combined is set down. The excess of this mean daily range over the mean for the five quietest days gives the magnetic character of the day. Till the year 1927, inclusive, the following values of the excess were adopted for the table of magnetic disturbances:— 0 to 2 calm, 3 to 7 small, 8 to 15 moderate, 16 to 20 great, above 20 very great.

It has, however, been felt for some time (*cf.* Report 1925, p. xxiv) that the ranges assigned for the higher character letters were too low, and accordingly a change was made in 1928 and the following scale adopted: (c) 0–2, (s) 3–7, (m) 8–20, (g) 21–65, (v.g.) over 65.

It follows from the nature of the process that these indications are not absolute, but relative to the mean amount of disturbance on the quiet days.

Corresponding tabulations are sent quarterly to the Meteorological Institute at De Bilt (Holland), for the International Committee on Terrestrial Magnetism. In these the significant notes are restricted to three— 0 (quiet), 1 (moderately disturbed), and 2 (highly disturbed). The character figures are assigned according to the scheme detailed in the *Annuaire* for 1918 of the Royal Dutch Meteorological Institute. The civil day is used for both the international figures and for our own characteristic letters.

The greatest magnetic disturbances of the year occurred on the dates and with the ranges shewn in the accompanying table :—

DATE	RANGE	
	D.	H.
Feb. 27—28	95	519
Mar. 11—12	62	396
July 10	21	321
Aug. 14	27	264

Brilliant Aurora, observed throughout England as far South as South Devon, accompanied the great disturbance of February 27th—28th.

“ Sudden commencements ” were noted on the dates and at the times indicated in the following table :

DATE	TIME	
	h.	m.
Jan. 8	21	28
Mar. 11	13	54
Apl. 4	9	24
July 31	21	5
Oct. 16	11	16
„ 17	16	20
Nov. 8	21	48

ASTRONOMICAL TIME SERVICE.—The rhythmic time signals from Rugby at 1000 G.C.T. have been regularly taken throughout the year, and the errors and rates of the sidereal and mean time clocks and chronometers determined from them. Time marks are made by the Synchronome Clock every minute on the Milne-Shaw Seismograph, and every two hours on the Magnetograph.

ASTRONOMICAL.—At the beginning of May, Dr. L. J. Comrie, of H.M. Nautical Almanac Office, requested the co-operation of the Director in securing the times of as many occultations of stars by the Moon as possible. Although every available opportunity was utilised, weather conditions were frequently adverse, and only ten disappearances and four reappearances were observed ; as also an occultation, 1st and 2nd contact, of Venus. The results have been sent to Dr. Comrie.

In determining the time of the occultation, at first reliance was placed on the error and rate of the Chronometer, as found at the morning comparison with the Rugby rhythmic signals. But it was realised, after a time, that the rate did not remain sufficiently constant, and varied with changes of both pressure and temperature ; further, there was reason to suspect that the rate was sometimes affected by taking the chronometer to and from the Dome. The practice now is to compare the Chronometer with the Synchronome Clock, near which it stands, just before and just after the Occultation ; and, in addition to the usual morning signals to check the behaviour of the Synchronome by comparing it with other radio signals during the 24 hours.

In conjunction with Father Hagen, of the Vatican Observatory, visual observations have been made, with the 15" Equatorial, of Baxendell's Nebulosity N.G.C. 7088; and of the nebulosity about ϵ Orionis. Using a power of 50, and with a field of 42' diameter, there appeared to be no doubt of the objectivity of these nebulosities.

A systematic survey of the Herschel Fields has been started.

SOLAR OBSERVATIONS.—Observations of the Solar surface were made on 266 days, and include 272 drawings, as against 269 days last year and 275 drawings. Of the drawings 230 are complete, and show all spots and faculæ; of the remaining 42, 17 are complete for the spots. The observation days and daily projected areas are recorded on page 39. The horizontal lines on that page indicate the commencement of a new Solar rotation.

The mean daily disc area of the spots in units $1/5000$ th of the disc, stands at 6.19, as compared with 7.19 in 1928, and 5.15 in 1927.

The following Table shows the distribution of spot groups in the Northern and Southern Hemispheres at each rotation, with their maximum projected areas. The last column gives the sum of the maximum areas of all the groups on the Sun during the rotation in question. The rotations are numbered in accordance with the Greenwich convention.

XIX.

Rotation	Northern Hemisphere		Southern Hemisphere		Sum. of Max'm Areas	Daily Mean Areas
	No. of Groups	Max'm Areas	No. of Groups	Max'm Areas		
1007. Dec. 25·86	9	17·4	7	8·8	26·2	6·15
1008. Jan. 22·19	7	5·7	8	14·3	20·0	5·98
1009. Feb. 18·53	7	2·6	9	19·9	22·5	7·63
1010. Mar. 17·86	3	5·0	8	13·2	18·2	3·96
1011. April 14·15	9	16·1	8	10·8	26·9	4·90
1012. May 11·39	13	12·6	10	1·9	14·5	3·62
1013. June 7·60	10	11·6	16	20·7	32·3	7·68
1014. July 4·80	10	3·7	12	25·0	28·7	5·95
1015. Aug. 1·01	12	5·8	14	16·8	22·6	4·18
1016. Aug. 28·24	11	2·0	11	6·1	8·1	1·05
1017. Sept. 24·51	7	13·2	7	13·2	26·4	4·65
1018. Oct. 21·80	12	28·3	6	13·6	41·9	10·74
1019. Nov. 18·09	8	36·9	7	14·2	51·1	15·69
1020. Dec. 15·42	16	37·1	5	12·4	49·5	12·23
TOTALS	134	198·0	128	190·9	388·9	6·23

There were no spotless days during the year.

The Sun-spot statistics, as derived from our drawings, are given on pp. 40-50. In the last column is given the day and decimal thereof on which the centre of the spot or group actually passed the central meridian, or would have done so if on the solar surface on the day in question. The dates entered in column two are the first and last dates on which the group in question was *actually* seen.

Sun-spot statistics have been sent regularly to Professor Brunner, of Zurich, for the preparation of the "Sun-spot Numbers" published in the quarterly Bulletin under the auspices of the I.A.U.

SEISMOLOGY.—The total number of definite earthquakes recorded during the year was 129, as against 115 last year. They were distributed throughout the year as follows :—

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
12	7	12	6	16	19	19	13	9	7	4	5	129

Of the recorded earthquakes, about 20 would rank as large ones on our record. The most notable were as follows :—

Jan. 13.—Sea of Okhotsk.

Feb. 1.—Turkestan. Destructive at Kuliab.

Mar. 7.—Aleutian Islands.

May 1.—Turkestan. Destructive near Persian frontier.

June 16.—New Zealand. Destructive.

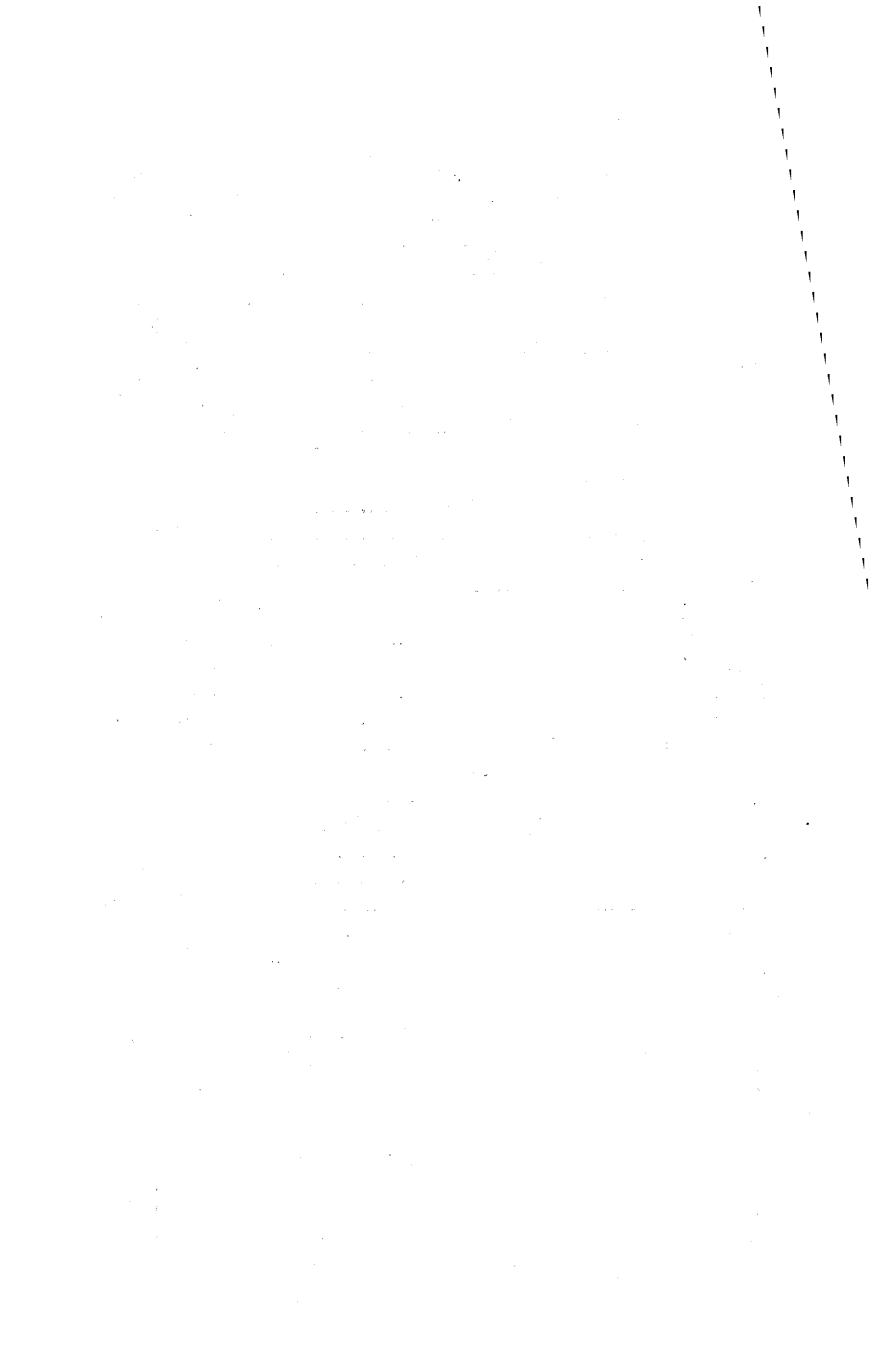
June 27.—Region of Sandwich Islands (?).

July 7.—Aleutian Islands.

Nov. 18—19.—Newfoundland.

Our grateful thanks are tendered to the Governments, Institutions, Observatories, and individuals who have kindly contributed presentations to the Library during the year.





METEOROLOGICAL REPORT.

JANUARY, 1929.

Results of Observations taken during the Month.								Mean for the last 82 years.	
Mean Reading of the Barometer	inches	29·847						29·484	
Highest „ „ on the 8th	„	30·364						30·126	
Lowest „ „ on the 31st	„	29·349						28·600	
Range of Barometer Readings	„	1·015						1·526	
Highest Reading of a Max. Therm. on the 30th...		52·2						51·4	
Lowest Reading of a Min. Therm. on the 29th ...		22·7						21·9	
Range of Thermometer Readings		29·5						29·5	
Mean of Highest Daily Readings		38·7						42·5	
Mean of Lowest Daily Readings		30·4						33·3	
Mean Daily Range		8·3						9·2	
Deduced Mean Temp. (from mean of Max. and Min.)		34·4						37·7	
Mean Temperature from Dry Bulb		35·4						38·0	
Adopted Mean Temperature		34·9						37·8	
Mean Temperature of Evaporation		34·2						36·6	
Mean Temperature of Dew Point		32·3						34·5	
Mean elastic force of Vapour	inches	0·184						0·201	
Mean weight of Vapour in a cub. ft. of air, grains		2·1						2·4	
Mean additional weight required for saturation „		0·3						0·4	
Mean degree of Humidity (saturation 100)		88						88	
Mean weight of a cubic foot of air	grains	558·9						549·2	
Mean amount of Cloud (0—10)		7·4						7·8	
Fall of Rain	inches	2·061						4·399	
Greatest Rainfall in one day (9th)	„	0·375						0·826	
No. of days on which ·005 in. or more Rain fell...		12						19·7	
Wind:—Direction.....	N	NE	E	SE	S	SW	W	NW	
No. of days.....	8	8	2	2	4	2	3	2	
Mean Velocity in miles per hr.	5·4	7·4	4·9	10·7	5·8	4·5	5·8	9·8	
Total No. of miles.....	1028	1413	233	511	557	218	419	473	
Total No. of miles registered					5092				Mean*
Greatest hourly velocity (29th, at 0230 G.M.T., Dir. S E)					25				8296·8
									41·2

* For the last 62 years.

JANUARY, 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the
MONTHLY average.

Mean barometric pressure	...	...	...	+	0.363 in.
Monthly range	..	..	..	—	0.511 in.
Mean of highest daily temperatures	...	...	...	—	3.8°
Mean of lowest	..	..	..	—	2.9°
Mean daily range	...	...	...	—	0.9°
Adopted mean temperature	...	...	...	—	2.9°
Total rainfall	...	...	...	—	2.338 in.

Ground Frost on the 1st—5th, 7th—9th, 12th, 14th—18th, 21st—28th Hoar Frost on the 16th, 21st, 22nd and 27th. Snow on the 5th, 6th, 7th, 9th, 17th, 18th, 27th and 28th. Hail on the 9th. Fog on the 8th, 10th, 18th—22nd, 27th and 28th. Lunar Halo on the 26th.

EXTREME READINGS FOR JANUARY.

During 82 Years.

Highest reading of Barometer	...	1896 (9th)	.....	30.597 in.
Lowest	..	1884 (26th)	.....	27.803 in.
Highest temperature	...	1877 (7th)	.....	59.9°
Lowest	..	1881 (15th)	.....	4.6°
Highest adopted mean temperature	...	1916	.....	44.7°
Lowest	..	1881	.....	29.2°
Greatest fall of rain	...	1928	.....	12.267 in.
Least	..	1881	.....	0.472 in.
Greatest fall of rain in one day	...	1914 (8th)	.....	2.074 in.
Greatest No. of days on which .005 in. or more rain fell	...	1890	.....	30
Least	..	†1850	.....	8
*Greatest hourly velocity of wind	...	1899 (12th)	.....	63 mls.
*Greatest No. of miles registered	...	1890	.....	11661
*Least	..	1881	.....	4352

* Since 1867 only.

† And in other years.

FEBRUARY, 1929.

Results of Observations taken during the Month.		Mean for the last 82 years.						
Mean Reading of the Barometer	inches 29·642	29·489						
Highest „ „ on the 28th...	„ 30·340	30·104						
Lowest „ „ on the 1st ...	„ 29·117	28·649						
Range of Barometer Readings	„ 1·223	1·455						
Highest Reading of a Max. Therm. on the 1st ...	49·5	52·1						
Lowest Reading of a Min. Therm. on the 14th ...	13·0	22·6						
Range of Thermometer Readings	36·5	29·5						
Mean of Highest Daily Readings	36·7	43·9						
Mean of Lowest Daily Readings	28·3	33·4						
Mean Daily Range	8·4	10·5						
Deduced Mean Temp. (from mean of Max. and Min.)	32·1	38·2						
Mean Temperature from Dry Bulb	32·6	38·5						
Adopted Mean Temperature	32·4	38·4						
Mean Temperature of Evaporation	30·9	36·9						
Mean Temperature of Dew Point	27·4	34·6						
Mean elastic force of Vapour	inches 0·149	0·197						
Mean weight of Vapour in a cub. ft. of air, grains	1·8	2·4						
Mean additional weight required for saturation „	0·4	0·4						
Mean degree of Humidity (saturation 100)	82	86						
Mean weight of a cubic foot of air	grains 558·3	548·5						
Mean amount of Cloud (0—10)	6·9	7·5						
Fall of Rain	inches 1·015	3·553						
Greatest Rainfall in one day (8th).....	„ 0·460	0·765						
No. of days on which ·005 in. or more Rain fell...	9	16·9						
Wind:—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	3	15	2	3	0	3	1
Mean Velocity in miles per hr.	2·7	6·3	8·9	9·5	5·1	0	2·4	3·9
Total No. of miles.....	65	454	3205	456	369	0	169	93
Total No. of miles registered	4811	Mean*						
Greatest hourly velocity (11th, at 1530 G.M.T., Dir. E. by S.)	25	7431·5	40·3					

* For the last 62 years.

FEBRUARY, 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the
MONTHLY average.

Mean barometric pressure	...	...	...	+	0.153 in.
Monthly range	..	...	...	—	0.232 in.
Mean of highest daily temperatures	...	...	...	—	7.2°
Mean of lowest	..	..	...	—	5.1°
Mean daily range	...	...	...	—	2.1°
Adopted mean temperature	...	...	...	—	6.0°
Total rainfall	...	...	...	—	2.538 in.

Ground Frost on the 4th, 7th, 8th, 10th—20th, and 25th—28th. Hoar Frost on the 13th, 14th, 17th and 18th. Snow on the 10th, 15th, 16th, 26th and 27th. Hail on the 21st, 23rd and 25th. Fog on the 1st, 4th, 5th, 6th, 21st, 22nd and 28th.

EXTREME READINGS FOR FEBRUARY,

During 82 Years.

Highest reading of Barometer	...	1902 (1st)	.....	30.476 in.		
Lowest	..	..	...	1900 (19th)	.....	27.870 in.
Highest temperature	...	...	...	1877 (8th)	.....	58.3°
Lowest	..	.....	...	1902 (11th)	.....	5.0°
Highest adopted mean temperature	...	1869	.....	44.0°		
Lowest	..	..	...	1855	.....	28.6°
Greatest fall of rain	.....	1848	.....	8.882 in.		
Least	..	.....	...	1858	.....	0.306 in.
Greatest fall of rain in one day	...	1909 (3rd)	.....	2.000 in.		
Greatest No. of days on which						
.005 or more rain fell	.....	1910	.....	27		
Least	..	..	...	1855	.....	4
*Greatest hourly velocity of wind	..	1903 (27th)	.....	60 mls.		
*Greatest No. of miles registered	...	1868	.....	12577		
*Least	..	..	...	1917	.....	3160

* Since 1867 only.

MARCH, 1929.

Results of Observations taken during the Month.								Mean for the last 82 years.	
Mean Reading of the Barometer	inches	29·895						29·455	
Highest " " on the 1st ...	"	30·369						30·044	
Lowest " " on the 21st ...	"	29·479						28·653	
Range of Barometer Readings	"	0·890						1·391	
Highest Reading of a Max. Therm. on the 28th...		67·9						56·9	
Lowest Reading of a Min. Therm. on the 1st ...		19·8						23·5	
Range of Thermometer Readings		48·1						33·4	
Mean of Highest Daily Readings		52·2						47·0	
Mean of Lowest Daily Readings		33·4						34·5	
Mean Daily Range		18·8						12·5	
Deduced Mean Temp. (from mean of Max. and Min.)		41·8						39·8	
Mean Temperature from Dry Bulb		41·6						40·4	
Adopted Mean Temperature		41·7						40·1	
Mean Temperature of Evaporation		39·0						38·3	
Mean Temperature of Dew Point		35·8						35·9	
Mean elastic force of Vapour	inches	0·210						0·210	
Mean weight of Vapour in a cub. ft. of air, grains		2·4						2·4	
Mean additional weight required for saturation ..		0·6						0·5	
Mean degree of Humidity (saturation 100)		78						85	
Mean weight of a cubic foot of air	grains	552·7						546·1	
Mean amount of Cloud (0—10)		4·7						7·5	
Fall of Rain	inches	1·675						3·325	
Greatest Rainfall in one day (24th).....	"	0·750						0·760	
No. of days on which ·005 in. or more Rain fell...		6						16·7	
Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW	
No. of Days	6	5	1	0	3	10	6	0	
Mean Velocity in miles per hr.	6·6	5·6	5·1	0	6·6	4·9	7·3	0	
Total No. of miles.....	946	669	122	0	477	1166	1057	0	
Total No. of miles registered	4437								Mean*
Greatest hourly velocity (31st, at 1500 G.M.T., Dir. W.	30								8301·4
									39·7

* For the last 62 years.

MARCH, 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the MONTHLY average.

Mean barometric pressure	...	...	...	+	0.440 in.
Monthly range	"	...	...	—	0.501 in.
Mean of highest daily temperatures	...	...	...	+	5.2°
Mean of lowest	"	"	...	—	1.1°
Mean daily range	...	...	...	+	6.3°
Adopted mean temperature	...	...	...	+	1.6°
Total rainfall	...	...	...	—	1.650 in.

Ground Frost on the 1st—12th, 14th—18th, 27th, 28th and 30th. Hoar Frost on the 1st, 2nd, 5th, 7th, 8th, 11th, 12th, 14th, 15th, 17th, 18th, 27th. Heavy Rain on the 24th. Fog on the 5th, 6th, 7th, 17th, 18th, 19th, 20th, 25th and 30th. Lunar Halo on the 25th.

EXTREME READINGS FOR MARCH,

During 82 Years.

Highest reading of Barometer	...	1854 (4th)	.....	30.452 in.
Lowest	"	1876 (10th)	.....	28.100 in.
Highest temperature	.....	1871 (25th)	.....	68.0°
Lowest	"	1874 (10th)	.....	11.1°
Highest adopted mean temperature	.....	1920	.....	44.2°
Lowest	"	1883	.....	34.4°
Greatest fall of rain	.....	1912	.....	7.205 in.
Least	"	1852	.....	0.352 in.
Greatest fall of rain in one day	...	1898 (17th)	.....	1.540 in.
Greatest No. of days on which				
.005 in. or more rain fell	...	†1861	.....	28
Least	"	1852	.....	3
*Greatest hourly velocity of wind	.....	1905 (15th)	.....	57 mls.
*Greatest No. of miles registered	...	1903	.....	12773
*Least	"	1929	.....	4437

* Since 1867 only.

† And 1914.

APRIL, 1929.

Results of Observations taken during the Month.		Mean for the last 82 years.						
Mean Reading of the Barometer	inches 29.582	29.483						
Highest ,, ,, on the 11th ...	,, 29.923	29.956						
Lowest ,, ,, on the 28th ...	,, 29.133	28.800						
Range of Barometer Readings	,, 0.790	1.156						
Highest Reading of a Max. Therm. on the 19th...	58.0	64.4						
Lowest Reading of a Min. Therm. on the 21st ...	27.3	28.2						
Range of Thermometer Readings	30.7	36.2						
Mean of Highest Daily Readings	49.6	54.1						
Mean of Lowest Daily Readings	36.6	37.8						
Mean Daily Range	13.0	16.3						
Deduced Mean Temp. (from mean of Max. and Min.)	41.6	43.9						
Mean Temperature from Dry Bulb	43.7	44.7						
Adopted Mean Temperature	42.7	44.3						
Mean Temperature of Evaporation	39.9	41.6						
Mean Temperature of Dew Point	35.4	38.2						
Mean elastic force of Vapour	inches 0.207	0.234						
Mean weight of Vapour in a cub. ft. of air, grains	2.4	2.7						
Mean additional weight required for saturation ,,	0.9	0.7						
Mean degree of Humidity (saturation 100)	69	80						
Mean weight of a cubic foot of air	grains 544.5	542.1						
Mean amount of Cloud (0—10)	6.8	6.8						
Fall of Rain	inches 1.280	2.560						
Greatest Rainfall in one day (4th)	,, 0.420	0.600						
No. of days on which .005 in. or more Rain fell...	7	14.9						
Wind:—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	5	9	1	0	1	5	7	2
Mean Velocity in miles per hr.	6.7	7.7	12.8	0	5.4	8.6	9.3	6.7
Total No. of miles.....	798	1659	308	0	130	1031	1564	323
Total No of miles registered	5813	Mean*		7444.5				
Greatest hourly velocity (24th, at 1200 G.M.T., Dir., W.N.W.)	25	36.0						

* For the last 62 years.

APRIL, 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the MONTHLY average.

Mean barometric pressure	...	...	...	+	0.099 in.
Monthly range	"	...	...	—	0.366 in.
Mean of highest daily temperatures	...	...	...	—	4.5°
Mean of lowest	"	"	...	—	1.2°
Mean daily range	...	...	...	—	3.3°
Adopted mean temperature	...	...	...	—	1.6°
Total rainfall	...	...	...	—	1.280 in.

Ground Frost on the 2nd, 3rd, 6th, 10th, 12th, 17th, 20th, 21st, 24th, 25th and 27th. Hoar Frost on the 6th and 21st. Hail on the 24th. Lunar Halo on the 22nd.

EXTREME READINGS FOR APRIL,

During 82 Years.

Highest reading of Barometer	...	1906 (8th)	.....	30.317 in.	
Lowest	"	"	...	1919 (14th)	28.250 in.
Highest temperature	.....	1852 (14th)	.....	74.1°
Lowest	"	1917 (2nd)	13.6°	
Highest adopted mean temperature	.....	1865	.....	48.5°
Lowest	"	"	...	1917	39.8°
Greatest fall of rain	.....	1867	.....	5.672 in.
Least	"	1852	0.478 in.	
Greatest fall of rain in one day	...	1923 (12th)	.....	1.260 in.	
Greatest No. of days on which						
.005 in. or more rain fell	.....	1920	.....	27
Least	"	"	1852	4
*Greatest hourly velocity of wind	..	1911 (19th)	.....	53 mls.	
*Greatest No. of miles registered	...	1904	.....	11016	
*Least	"	"	...	1884	5047

* Since 1867 only.

MAY, 1929.

Results of Observations taken during the Month.		Mean for the last 82 years.						
Mean Reading of the Barometer	inches 29.529	29.538						
Highest ,, ,, on the 30th ...	,, 30.072	29.985						
Lowest ,, ,, on the 6th ...	,, 28.753	28.943						
Range of Barometer Readings	,, 1.319	1.042						
Highest Reading of a Max. Therm. on the 23rd...	71.5	71.8						
Lowest Reading of a Min. Therm. on the 3rd ...	34.4	32.0						
Range of Thermometer Readings	37.1	39.8						
Mean of Highest Daily Readings	59.5	59.3						
Mean of Lowest Daily Readings	43.6	42.6						
Mean Daily Range	15.9	16.7						
Deduced Mean Temp. (from mean of Max. and Min.)	49.9	49.2						
Mean Temperature from Dry Bulb	51.2	50.1						
Adopted Mean Temperature	50.6	49.7						
Mean Temperature of Evaporation	47.3	46.5						
Mean Temperature of Dew Point	43.3	43.0						
Mean elastic force of Vapour	inches 0.281	0.280						
Mean weight of Vapour in a cub. ft. of air, grains	3.2	3.2						
Mean additional weight required for saturation ,,	1.1	0.8						
Mean degree of Humidity (saturation 100)	73	77						
Mean weight of a cubic foot of air	grains 535.1	536.9						
Mean amount of Cloud (0—10)	5.4	7.0						
Fall of Rain	inches 3.176	2.449						
Greatest Rainfall in one day (4th)	,, 0.990	0.645						
No. of days on which .005 in. or more Rain fell...	14	14.7						
Wind:—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	6	6	0	.6	4	9	0
Mean Velocity in miles per hr.	0	7.7	7.6	0	13.1	13.4	9.2	0
Total No. of miles.....	0	1093	1079	0	1899	1288	1979	0
Total No of miles registered	7338	Mean*						
Greatest hourly velocity (14th, at 0600 G.M.T., Dir., S.	31	6871.0						
		32.3						

* For the last 62 years.

MAY, 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the MONTHLY average.

Mean barometric pressure	..	...	...	—	0·009 in.
Monthly range	..	...	...	+	0·277 in.
Mean of highest daily temperatures	...	...	...	+	0·2°
Mean of lowest	..	..	...	+	1·0°
Mean daily range	...	...	...	—	0·8°
Adopted mean temperature	...	...	...	+	0·9°
Total rainfall	...	...	...	+	0·727 in.

Ground Frost on the 3rd and 10th. Hail on the 7th. Heavy Rain on the 4th. Fog on the 9th. Lunar Halo on the 19th.

EXTREME READINGS FOR MAY,

During 82 Years.

Highest reading of Barometer	...	1881 (10th)	.....	30·332 in.
Lowest	..	1887 (28th)	.....	28·559 in.
Highest temperature	.....	1864 (19th)	.....	82·5°
Lowest	..	1855 (4th)	.....	23·5°
Highest adopted mean temperature	.....	1848	.....	55·1°
Lowest	..	1855	.....	45·0°
Greatest fall of rain	.....	1924	.....	6·765 in.
Least	..	1859	.....	0·249 in.
Greatest fall of rain in one day	...	1881 (5th)	.....	1·647 in.
Greatest No. of days on which				
·005 in. or more rain fell	...	†1860	.....	22
Least	..	†1848	.....	4
*Greatest hourly velocity of wind...	...	1888 (2nd)	.....	49 mls.
*Greatest No. of miles registered	...	1888	.....	9648
*Least	..	1918	.....	5113

* Since 1867 only.

† And in other years.

JUNE, 1929.

Results of Observations taken during the Month.		Mean for the last 82 years.
Mean Reading of the Barometer	inches 29·555	29·560
Highest „ „ on the 21st ... „	30·002	29·937
Lowest „ „ on the 6th ... „	28·898	29·044
Range of Barometer Readings	1·104	0·893
Highest Reading of a Max. Therm. on the 12th .	71·3	76·5
Lowest Reading of a Min. Therm. on the 5th ...	38·0	39·2
Range of Thermometer Readings	33·3	37·3
Mean of Highest Daily Readings	61·1	64·9
Mean of Lowest Daily Readings	47·4	48·1
Mean Daily Range	13·7	16·8
Deduced Mean Temp. (from mean of Max. and Min.)	52·5	54·7
Mean Temperature from Dry Bulb	53·7	55·2
Adopted Mean Temperature	53·1	55·0
Mean Temperature of Evaporation	49·6	51·7
Mean Temperature of Dew Point	45·6	48·2
Mean elastic force of Vapour	inches 0·305	0·345
Mean weight of Vapour in a cub. ft. of air, grains	3·5	3·8
Mean additional weight required for saturation „	1·2	1·0
Mean degree of Humidity (saturation 100)	74	78
Mean weight of a cubic foot of air	grains 532·9	531·4
Mean amount of Cloud (0—10)	6·1	7·2
Fall of Rain	inches 1·770	3·290
Greatest Rainfall in one day (1st)	„ 0·280	0·796
No. of days on which ·005 in. or more Rain fell...	14	15·1
Wind:—Direction	N NE E SE S SW W NW	
No. of days.....	0 2 3 0 0 6 14 5	
Mean Velocity in miles per hr.	0 6·7 8·7 0 0 8·5 10·0 10·3	
Total No. of miles.....	0 321 623 0 0 1320 3369 1232	
Total No. of miles registered	6865	Mean* 6204·3
Greatest hourly velocity (16th, at 1300 G.M.T., Dir., W.)	29	29·3

* For the last 62 years.

JUNE, 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the MONTHLY average.

Mean barometric pressure	...	...	...	—	0.005 in.
Monthly range	..	...	...	+	0.211 in.
Mean of highest daily temperatures	...	...	...	—	3.8°
Mean of lowest	..	..	...	—	0.7°
Mean daily range	...	...	...	—	3.1°
Adopted mean temperature	...	...	...	—	1.9°
Total rainfall	...	...	...	—	1.520 in.

Fog on the 6th. Thunder on the 8th, 13th, 14th, 22nd and 24th.
Lightning on the 8th, 13th, 14th and 22nd.

EXTREME READINGS FOR JUNE,

During 82 Years.

Highest reading of Barometer	...	1874 (15th)	.....	30.219 in.
Lowest	..	1862 (12th)	.....	28.632 in.
Highest temperature	.....	1893 (18th)	.....	88.7°
Lowest	..	1902 (9th)	.....	32.0°
Highest adopted mean temperature	.....	1896	.....	59.3°
Lowest	..	1907	.....	51.5°
Greatest fall of rain	.....	1907	.....	8.705 in.
Least	..	1925	.....	0.282 in.
Greatest fall of rain in one day	...	1857 (8th)	.....	2.093 in.
Greatest No. of days on which				
.005 in. or more rain fell	...	†1907	.....	27
Least	..	1887	.....	4
*Greatest hourly velocity of wind...	...	1897 (16th)	.....	45 mls.
*Greatest No. of miles registered	...	1877	.....	8384
*Least	..	1915	.....	3967

* Since 1867 only.

† And 1912.

JULY, 1929.

Results of Observations taken during the Month.								Mean for the last 82 years.
Mean Reading of the Barometer	inches	29·577						29·526
Highest „ „ on the 13th ...	„	30·009						29·905
Lowest „ „ on the 31st ...	„	28·630						29·003
Range of Barometer Readings	„	1·379						0·902
Highest Reading of a Max. Therm. on the 15th...		81·8						78·3
Lowest Reading of a Min. Therm. on the 8th...		40·2						42·8
Range of Thermometer Readings		41·6						35·5
Mean of Highest Daily Readings		66·0						67·3
Mean of Lowest Daily Readings		51·7						51·3
Mean Daily Range		14·3						16·0
Deduced Mean Temp. (from mean of Max. and Min.)		57·0						57·6
Mean Temperature from Dry Bulb		59·3						58·0
Adopted Mean Temperature		58·2						57·9
Mean Temperature of Evaporation		55·6						54·8
Mean Temperature of Dew Point		52·3						52·0
Mean elastic force of Vapour	inches	0·407						0·388
Mean weight of Vapour in a cub. ft. of air, grains		4·5						4·4
Mean additional weight required for saturation „		0·9						1·1
Mean degree of Humidity (saturation 100)		78						81
Mean weight of a cubic foot of air	grains	527·9						527·5
Mean amount of Cloud (0—10)		6·8						7·4
Fall of Rain	inches	3·929						4·028
Greatest Rainfall in one day (28th)	„	0·870						0·884
No. of days on which ·005 in. or more Rain fell...		13						16·6
Wind :—Direction.....	N ^o	NE	E	SE	S	SW	W	NW
No. of days.....	3	0	1	1	1	10	14	1
Mean Velocity in miles per hr.	6·2	0	10·3	6·4	7·2	9·1	6·2	8·9
Total No. of Miles.....	448	0	246	153	173	2176	2087	214
Total No. of miles registered						5497		
Greatest hourly velocity (10th, at 1700 G.M.T., Dir., S.S.W.)						24		
								Mean*
								6313·0
								28·2

* For the last 62 years.

JULY 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the MONTHLY average.

Mean barometric pressure	...	...	...	...	+	0·051 in.
Monthly range	..	..	..	..	+	0·477 in.
Mean of highest daily temperatures	...	...	...	...	—	1·3°
Mean of lowest	..	..	..	..	+	0·4°
Mean daily range	...	...	...	...	—	1·7°
Adopted mean temperature	...	...	...	...	+	0·3°
Total rainfall	...	...	...	...	—	0·099 in.

Heavy Rain on the 28th and 31st. Thunder on the 4th, 5th and 31st. Lightning on the 4th, 5th and 31st.

EXTREME READINGS FOR JULY,

During 82 Years.

Highest reading of Barometer	...	1911 (10th)	.....	30·203 in.	
Lowest	1922 (6th)	28·493 in.
Highest temperature	.....	1901 (20th)	.....	89·0°
Lowest	1857 (1st)	36·0°	
Highest adopted mean temperature	.....	1901	.....	63·2°
Lowest	1922	54·0°	
Greatest fall of rain	.....	1888	.....	8·475 in.
Least	1868	0·669 in.	
Greatest fall of rain in one day	...	1888 (2nd)	.....	2·482 in.	
Greatest No. of days on which						
·005 in. or more rain fell	...	†1920	.....	28	
Least	†1863	8
*Greatest hourly velocity of wind	..	1892 (8th)	.....	44 mls.	
*Greatest No. of miles registered	...	1879	.....	8288	
*Least	1913	4577

* Since 1867 only.

† And in other years.

AUGUST, 1929.

Results of Observations taken during the Month.		Mean for the last 82 years						
Mean Reading of the Barometer	inches 29·507	29·491						
Highest „ „ on the 19th ...	„ 29·825	29·892						
Lowest „ „ on the 1st ...	„ 28·927	28·945						
Range of Barometer Readings	„ 0·898	0·947						
Highest Reading of a Max. Therm. on the 27th ...	71·6	75·9						
Lowest Reading of a Min. Therm. on the 8th ...	41·5	42·0						
Range of Thermometer Readings	30·1	33·9						
Mean of Highest Daily Readings	63·4	66·2						
Mean of Lowest Daily Readings	51·8	50·9						
Mean Daily Range	11·6	15·3						
Deduced Mean Temp. (from mean of Max. and Min.)	55·9	56·9						
Mean Temperature from Dry Bulb	57·6	57·7						
Adopted Mean Temperature	56·8	57·3						
Mean Temperature of Evaporation	54·5	54·5						
Mean Temperature of Dew Point	51·7	51·8						
Mean elastic force of Vapour	inches 0·384	0·387						
Mean weight of Vapour in a cub. ft. of air, grains	4·3	4·3						
Mean additional weight required for saturation „	1·0	0·9						
Mean degree of Humidity (saturation 100)	81	82						
Mean weight of a cubic foot of air	grains 527·5	527·4						
Mean amount of Cloud (0—10)	7·8	7·3						
Fall of Rain	inches 7·983	5·160						
Greatest Rainfall in one day (23rd)	„ 2·350	1·085						
No. of days on which ·005 in. or more Rain fell...	24	18·7						
Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	0	0	0	4	8	16	1
Mean Velocity in miles per hr.	6·3	0	0	0	9·4	9·8	8·1	9·5
Total No. of miles.....	304	0	0	0	902	1874	3093	228
Total No. of miles registered	6401						Mean* 6317·3	
Greatest hourly velocity (3rd, at 1800 G.M.T., Dir., S.S.W.)	25						30·4	

* For the last 62 years.

AUGUST, 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the MONTHLY average.

Mean barometric pressure	...	...	...	+	0·016 in.
Monthly range	"	...	...	—	0·049 in.
Mean of highest daily temperatures	...	...	...	—	2·8°
Mean of lowest	"	"	...	+	0·9°
Mean daily range	...	...	...	—	3·7°
Adopted mean temperature	...	...	...	—	0·5°
Total rainfall	...	...	...	+	2·823 in.

Heavy Rain on the 4th, 5th, 22nd and 23rd. Thunder on the 1st, 4th and 6th. Lightning on the 4th, 27th and 31st. Solar Halo on the 27th.

EXTREME READINGS FOR AUGUST,

During 82 Years.

Highest reading of Barometer	...	1874 (21st)	.....	30·114 in.	
Lowest	"	"	...	1917 (28th)	28·156 in.
Highest temperature	.....	1868 (2nd)	.....	88·0°
Lowest	"	1887 (13th)	33·4°	
Highest adopted mean temperature	.....	1911	.....	62·1°
Lowest	"	"	1848	52·5°
Greatest fall of rain	.....	1891	.....	9·869 in.
Least	"	1871	2·085 in.	
Greatest fall of rain in one day	...	1929 (23rd)	.....	2·350 in.	
Greatest No. of days on which						
·005 in. or more rain fell	...	1891	.....	27	
Least	"	"	...	1880	6
*Greatest hourly velocity of wind...	...	1903 (31st)	.....	45 mls.	
*Greatest No. of miles registered	...	1903	.....	8486	
*Least	"	"	...	1915	3918

* Since 1867 only.

SEPTEMBER, 1929.

Results of Observations taken during the Month.	Mean for the last 82 years.	
Mean Reading of the Barometer inches	29·666	29·543
Highest , , on the 25th ... , ,	30·075	30·004
Lowest , , on the 20th ... , ,	29·155	28·894
Range of Barometer Readings	0·920	1·110
Highest Reading of a Max. Therm. on the 11 & 12	71·0	71·7
Lowest Reading of a Min. Therm. on the 14th...	38·4	36·7
Range of Thermometer Readings	32·6	35·0
Mean of Highest Daily Readings	63·7	61·7
Mean of Lowest Daily Readings	49·5	47·3
Mean Daily Range	14·2	14·4
Deduced Mean Temp. (from mean of Max. and Min.)	55·3	53·3
Mean Temperature from Dry Bulb	56·7	54·2
Adopted Mean Temperature	56·0	53·8
Mean Temperature of Evaporation	53·7	51·0
Mean Temperature of Dew Point	50·9	48·3
Mean elastic force of Vapour inches	0·373	0·339
Mean weight of Vapour in a cub. ft. of air, grains	4·2	3·9
Mean additional weight required for saturation , ,	1·0	0·8
Mean degree of Humidity (saturation 100)	82	82
Mean weight of a cubic foot of air grains	531·3	532·5
Mean amount of Cloud (0—10)	5·1	6·7
Fall of Rain inches	2·580	4·340
Greatest Rainfall in one day (28th) , ,	1·050	0·971
No. of days on which ·005 in. or more Rain fell...	8	16·5

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	3	0	1	2	3	16	5
Mean Velocity in miles per hr.	0	3·5	0	5·5	5·4	6·1	6·4	9·9
Total No. of miles	0	255	0	132	261	443	2446	1193

Total No. of miles registered	4730	Mean* 6032·3
Greatest hourly velocity (20th, at 0130 G.M.T., Dir., W.S.W.)	24	31·5

* For the last 62 years.

SEPTEMBER, 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the MONTHLY average.

Mean barometric pressure	...	...	...	...	+	0·123 in.
Monthly range	..	..	..	..	—	0·190 in.
Mean of highest daily temperatures	...	...	...	...	+	2·0°
Mean of lowest	..	..	..	..	+	2·2°
Mean daily range	...	...	...	...	—	0·2°
Adopted mean temperature	...	...	...	...	+	2·2°
Total rainfall	...	...	...	...	—	1·760 in.

Heavy Rain on the 20th and 28th. Fog on the 4th, 5th, 6th 7th and 8th. Thunder on the 12th. Lightning on the 3rd and 12th. Solar Halo on the 3rd, 18th, 27th and 29th.

EXTREME READINGS FOR SEPTEMBER,

During 82 Years.

Highest reading of Barometer	...	1851 (15th)	.....	30·247 in.
Lowest	..	1918 (23rd)	.....	28·210 in.
Highest temperature	.....	1868 (6th)	.....	85·0°
Lowest	.....	†1885 (25th)	.....	29·8°
Highest adopted mean temperature	.....	1865	.....	59·1°
Lowest	..	1863	.....	50·9°
Greatest fall of rain	.....	1918	.....	12·620 in.
Least	.....	1910	.....	0·652 in.
Greatest fall of rain in one day	...	1889 (26th)	.....	2·060 in.
Greatest No. of days on which				
·005 in. or more rain fell	...	1918	.....	29
Least	..	†1851	.....	6
*Greatest hourly velocity of wind	..	1875 (26th)	.....	53 mls.
*Greatest No. of miles registered	...	1869	.....	9053
*Least	..	1888	.....	3261

* Since 1867 only.

† And in other years.

OCTOBER, 1929.

Results of Observations taken during the Month.		Mean for the last 82 years.						
Mean Reading of the Barometer	inches 29·314	29·446						
Highest " " on the 31st ...	" 30·036	30·021						
Lowest " " on the 6th ...	" 28·614	28·685						
Range of Barometer Readings	" 1·422	1·336						
Highest Reading of a Max. Therm. on the 14th..	60·0	64·0						
Lowest Reading of a Min. Therm. on the 27th...	28·5	29·9						
Range of Thermometer Readings	31·5	34·1						
Mean of Highest Daily Readings	52·5	54·4						
Mean of Lowest Daily Readings	42·7	42·1						
Mean Daily Range	9·8	12·3						
Deduced Mean Temp. (from mean of Max. and Min.)	46·6	47·3						
Mean Temperature from Dry Bulb	47·7	48·0						
Adopted Mean Temperature	47·2	47·7						
Mean Temperature of Evaporation	45·1	45·5						
Mean Temperature of Dew Point	42·2	43·1						
Mean elastic force of Vapour	inches 0·269	0·279						
Mean weight of Vapour in a cub. ft. of air, grains	3·1	3·2						
Mean additional weight required for saturation ..	0·7	0·6						
Mean degree of Humidity (saturation 100)	80	84						
Mean weight of a cubic foot of air	grains 534·9	537·4						
Mean amount of Cloud (0—10)	6·9	7·2						
Fall of Rain	inches 6·736	4·916						
Greatest Rainfall in one day (23rd).....	" 0·790	0·969						
No. of days on which ·005 in. or more Rain fell...	23	18·8						
Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	1	0	0	2	13	11	3
Mean Velocity in miles per hr.	3·6	2·8	0	0	10·1	11·3	11·2	8·8
Total No. of miles.....	90	68	0	0	484	3537	2962	614
Total No. of miles registered,	7755						Mean* 6764·7	
Greatest hourly velocity (24th, at 0450 G.M.T., Dir., S.W.).....	32						36·9	

* For the last 62 years.

OCTOBER, 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the MONTHLY average.

Mean barometric pressure	...	...	...	—	0.132 in.
Monthly range	„	„	„	+	0.086 in.
Mean of highest daily temperatures	...	...	...	—	1.9°
Mean of lowest	„	„	„	+	0.6°
Mean daily range	...	...	...	—	2.5°
Adopted mean temperature	...	...	...	—	0.5°
Total rainfall	...	...	...	+	1.820 in.

Ground Frost on the 19th, 26th, 27th, 28th and 31st. Hoar Frost on the 26th and 27th. Hail on the 3rd. Heavy Rain on the 5th, 10th, 20th, 23rd and 24th. Fog on the 12th. Thunder on the 2nd, 3rd and 24th. Lightning on the 2nd, 3rd and 24th.

EXTREME READINGS FOR OCTOBER,

During 82 Years.

Highest reading of Barometer	...	1884 (5th)	.....	30.306 in.
Lowest	„	1862 (19th)	.....	28.139 in
Highest temperature	.....	1890 (12th)	.....	74.0°
Lowest	„	1895 (28th)	.....	17.8°
Highest adopted mean temperature	.....	1921	.....	53.8°
Lowest	„	1895	.....	42.8°
Greatest fall of rain	.....	1870	.....	13.437 in
Least	„	1922	.....	0.918 in.
Greatest fall of rain in one day	...	1870 (8th)	.....	2.529 in.
Greatest No. of days on which				
.005 ins or more rain fell	...	1903 and 1923	.....	29
Least	„	1920	.....	8
*Greatest hourly velocity of wind	..	1877 (15th)	.....	52 mls.
*Greatest No. of miles registered	...	1874	.....	9818
*Least	„	1915	.....	3965

* Since 1867 only.

NOVEMBER, 1929.

Results of Observations taken during the Month.		Mean for the last 82 years.						
Mean Reading of the Barometer	inches 29·193	29·459						
Highest " " on the 1st ...	" 29·982	30·065						
Lowest " " on the 11th ...	" 28·628	28·571						
Range of Barometer Readings	" 1·354	1·494						
Highest Reading of a Max. Therm. on the 10th ...	55·4	55·8						
Lowest Reading of a Min. Therm. on the 14th ...	36·3	25·5						
Range of Thermometer Readings	19·1	30·3						
Mean of Highest Daily Readings	48·8	47·9						
Mean of Lowest Daily Readings	37·7	36·8						
Mean Daily Range	11·1	11·1						
Deduced Mean Temp. (from mean of Max. and Min.)	42·9	41·6						
Mean Temperature from Dry Bulb	43·5	42·0						
Adopted Mean Temperature	43·2	41·8						
Mean Temperature of Evaporation	41·8	39·8						
Mean Temperature of Dew Point	39·8	38·1						
Mean elastic force of Vapour	inches 0·246	0·231						
Mean weight of Vapour in a cub. ft. of air, grains	2·8	2·7						
Mean additional weight required for saturation "	0·4	0·4						
Mean degree of Humidity (saturation 100)	86	87						
Mean weight of a cubic foot of air	grains 537·4	544·5						
Mean amount of Cloud (0—10)	7·6	7·4						
Fall of Rain	inches 7·848	4·480						
Greatest Rainfall in one day (11th)	" 1·360	1·006						
No. of days on which ·005 in. or more Rain fell ...	22	19·2						
Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	2	0	4	4	6	5	4
Mean Velocity in miles per hr.	5·6	7·1	0	9·0	19·4	16·5	5·6	10·2
Total No. of miles.....	406	340	0	866	1865	2384	674	983
Total No. of miles registered	7518						Mean* 7125·6	
Greatest hourly velocity (25th, at 1900 G.M.T., Dir., S. by W.)	51						40·9	

* For the last 82 years.

NOVEMBER, 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the MONTHLY average.

Mean barometric pressure	...	...	...	—	0.266 in.
Monthly range	..	..	..	—	0.140 in.
Mean of highest daily temperatures	...	...	...	+	0.9°
Mean of lowest	..	..	..	+	0.9°
Mean daily range	...	...	...		0.0°
Adopted mean temperature	...	...	...	+	1.4°
Total rainfall	...	...	...	+	3.368 in.

Ground Frost on the 1st, 7th, 13th—18th. Hoar Frost on the 1st and 14th. Snow on the 12th and 13th. Hail on the 9th, 10th, 12th and 13th. Heavy Rain on the 7th, 9th, 11th, 25th and 26th. Gales of Wind on the 11th and 25th. Fog on the 2nd, 4th, 6th, 13th, 14th, 15th, 18th and 25th. Lightning on the 12th. Lunar Halo on the 14th and 16th.

EXTREME READINGS FOR NOVEMBER,

During 82 Years.

Highest reading of Barometer	...	1922 (15th)	.....	30.375 in.
Lowest	..	1891 (11th)	.....	27.938 in.
Highest temperature	.....	1900 (1st)	.....	62.4°
Lowest	..	1901 (15th)	.....	17.5°
Highest adopted mean temperature	†	1881	.....	47.0°
Lowest	..	1915	.....	36.3°
Greatest fall of rain	.....	1866	.....	9.026 in.
Least	..	1855	.....	1.158 in.
Greatest fall of rain in one day	...	1866 (16th)	.....	3.700 in.
Greatest No. of days on which				
.005 in. or more rain fell	...	1913	.....	28
Least	..	1848	.....	6
*Greatest hourly velocity of wind...	...	1887 (1st)	.....	62 mls.
*Greatest No. of miles registered....	...	1888	.....	12813
*Least	..	1915	.....	4893

* Since 1867 only.

† And in other years.

DECEMBER, 1929.

Results of Observations taken during the Month		Mean for the last 82 years.						
Mean Reading of the Barometer	inches 29·124	29·432						
Highest „ „ on the 17th ...	„ 30·282	30·068						
Lowest „ „ on the 6th ...	„ 28·149	28·536						
Range of Barometer Readings	„ 2·133	1·532						
Highest Reading of a Max. Therm. on the 13th ...	53·0	52·7						
Lowest Reading of a Min. Therm. on the 16th.....	30·1	21·7						
Range of Thermometer Readings	22·9	31·0						
Mean of Highest Daily Readings	44·9	43·4						
Mean of Lowest Daily Readings	37·2	33·9						
Mean Daily Range	7·7	9·5						
Deduced Mean Temp. (from mean of Max. and Min.)	41·1	38·6						
Mean Temperature from Dry Bulb	41·6	39·2						
Adopted Mean Temperature	41·3	38·9						
Mean Temperature of Evaporation	39·7	37·4						
Mean Temperature of Dew Point	37·2	35·4						
Mean elastic force of Vapour	inches 0·224	0·208						
Mean weight of Vapour in a cub. ft. of air, grains	2·6	2·4						
Mean additional weight required for saturation „	0·5	0·4						
Mean degree of Humidity (saturation 100)	83	87						
Mean weight of a cubic foot of air	grains 538·3	546·9						
Mean amount of Cloud (0—10)	7·7	7·7						
Fall of Rain	inches 8·663	4·705						
Greatest Rainfall in one day (28th)	„ 0·895	0·841						
No. of days on which ·005 in. or more Rain fell...	27	20·2						
Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	0	1	3	4	8	12	3
Mean Velocity in miles per hr.	0	0	4·6	17·7	12·1	18·2	16·5	5·6
Total No. of miles.....	0	0	110	1273	1163	3783	4759	405
Total No. of miles registered	11493	*Mean						
Greatest hourly velocity (5th, at 0530 G.M.T., Dir., S.S.E.)	57	7848·2	41·9					

* For the last 62 years.

DECEMBER, 1929.

DIFFERENCES.

The signs + and — mean respectively above and below the
MONTHLY average.

Mean barometric pressure	...	...	...	—	0·308 in.
Monthly range	„	„	„	+	0·601 in.
Mean of highest daily temperature	...	...	...	+	1·5°
Mean of lowest	„	„	„	+	3·3°
Mean daily range	...	...	...	—	1·8°
Adopted mean temperature	...	...	...	+	2·4°
Total rainfall	...	...	...	+	3·958 in.

Ground Frost on the 10th, 16th, 17th, 19th—23rd, and 28th.
Hoar Frost on the 16th, 17th, 19th and 22nd. Snow on the 9th,
10th, 20th. Hail on the 8th and 27th. Heavy Rain on the 6th,
7th, 8th, 9th, 28th and 29th. Gales of Wind on the 2nd, 5th, 6th,
7th, 12th, 21st, 25th and 29th. Fog on the 9th, 17th, 22nd and
24th. Thunder on the 2nd. Lightning on the 2nd. Lunar Halo on
the 14th.

EXTREME READINGS FOR DECEMBER,

During 82 Years.

Highest reading of Barometer	...	1905 (12th)	.....	30·484 in.
Lowest	„	1886 (8th)	.....	27·350 in.
Highest temperature	.....	1876 (9th)	.....	58·1°
Lowest	„	1860 (24th)	.....	6·7°
Highest adopted mean temperature	.....	1857	.....	44·6°
Lowest	„	1878	.....	30·3°
Greatest fall of rain	.....	1918	.....	10·595 in.
Least	„	1890	.....	0·550 in.
Greatest fall of rain in one day	...	1870 (19th)	.....	1·962 in.
Greatest No. of days on which ·005 in. or more rain fell	...	1918	.....	30
Least	„	†1853	.....	8
*Greatest hourly velocity of wind...	...	1894 (22nd)	.....	72 mls.
*Greatest No. of miles registered	...	1929	.....	11493
*Least	„	1916	.....	4517

* Since 1867 only.

† And in other years.

Summary of Observations, 1929.

Results of Observations taken during the Year.	Mean for the last 82 Years.	
<i>Readings of Barometer in inches.</i>		
Mean of the Year	29·536	29·493
Highest Monthly Mean (March)	29·895	29·745
Lowest " " (December)	29·124	29·223
Highest Reading (March 1st)	30·369	30·294
Lowest " " (December 6th).....	28·149	28·207
Range	2·220	2·087
<i>Thermometer, Fahrenheit.</i>		
Highest Monthly Mean Temperature (July)	58·2	58·6
Lowest " " " (February).....	32·4	35·7
Highest Reading of a Max. Therm. (July 15th)....	81·8	81·2
Lowest " " Min. " (Feb, 14th) ...	13·0	16·5
Range of Thermometer Readings	68·8	64·7
Mean of Highest Daily " 	53·1	54·3
Mean of Lowest Daily " 	40·9	41·1
Mean Daily Range	12·2	13·2
Deduced Mean Temp. (from Mean of Max. and Min.)	45·9	46·7
Mean Temperature from Dry Bulb.....	47·1	47·2
Adopted Mean Temperature of the Year	46·5	46·9
Mean Temperature of Evaporation	44·3	44·6
Mean Temperature of Dew Point	41·2	42·1
Mean elastic force of Vapour	0·270	0·275
Mean weight of Vapour in a cub. ft. of air...grns.	3·1	3·2
Mean additional weight required for saturation ..	0·8	0·7
Mean degree of Humidity (saturation 100).....	79	84
Mean weight of a cubic foot of air	540·0	539·1
Mean amount of Cloud (0—10)	6·6	7·3
Total fall of Rain	48·716	47·515
Greatest Monthly Rainfall (December).....	8·663	7·635
Least " " " (February)	1·015	1·257
Greatest Rainfall in one day (August 23rd).....	2·350	1·661
No. of days per Month on which ·005 inch or more Rain fell	15·8	17·2

SUMMARY OF WIND, 1929.

Prevailing Direction	N	NE	E	SE	S	SW	W	NW
No. of days for each	29	39	30	13	34	75	116	27
Mean Velocity in miles per hour...	6.9	6.7	8.0	10.9	10.1	10.7	8.8	9.3
Total No. of miles for each Direction	4085	6272	5926	3391	8280	19220	24578	5998

		Mean for the last 62 years.
Total No. of miles registered	77750	85068.2
Greatest Monthly Total (December).....	11493	9958.5
Least " " (March)	4437	4918.8
Greatest recorded hourly velocity (December 5)..	57	50.5
Prevailing Direction of Wind	W.	W.

DIFFERENCES, 1929.

The signs + and — mean respectively above and below the
YEARLY average.

Mean barometric pressure	...	...	...	+	0.043 in.
Yearly range	"	...	...	+	0.133 in.
Mean of highest daily temperatures	...	...	...	—	1.2°
Mean of lowest " "	"	"	...	—	0.2°
Mean daily range	...	...	...	—	1.0°
Adopted mean temperature	...	...	...	—	0.4°
Total rainfall	...	...	...	+	1.201 in.

**ABSOLUTE EXTREMES
FOR THE LAST 82 YEARS.**

Readings of Barometer, in inches.

Highest monthly mean	1891 (Feb.)	29.997
Lowest " "	1868 (Dec.)	28.984
Highest yearly "	1921	29.615
Lowest " "	1872	29.319
Greatest monthly range	1886 (Dec.)	2.795
Least " "	1852 (July)	0.505
Highest reading	1896 (Jan. 9th)	30.597
Lowest "	1886 (Dec. 8th)	27.350
Extreme range.....		3.247

Thermometer, Fahrenheit.

Highest monthly mean temperature ...	1901 (July)	63.2
Lowest " " "	1855 (Feb.)	28.6
Highest yearly " "	1921	49.4
Lowest " " "	1879	44.1
Highest reading "	1901 (July 20th)	89.0
Lowest " "	1881 (Jan. 15th)	4.6

Weight of Vapour in a cubic foot of air (grains).

Greatest monthly mean	1852 and 1927 (July)	5.1
Least " "	†1855 (Feb.)	1.4

† And on other dates.

ABSOLUTE EXTREMES
FOR THE LAST 82 YEARS—Continued.

Rainfall, in inches.

Greatest Rainfall in one day	1866 (Nov. 16) ..	3·700
Greatest " " month	1870 (Oct.)	13·437
Least " " "	1859 (May)	0·249
Greatest " " year	1923	63·558
Least " " "	1887	31·250

Days on which ·005 in. or more Rain fell :

Greatest No. in one month	1890 (Jan.)	} 30
	and 1918 (Dec.)	
Least " "	1852 (Mar.)	3
Greatest " year	1872	281
Least " "	1855	135

* *Wind.*

Greatest hourly velocity, in miles	1894 (Dec. 22) ...	72
Greatest No. of miles registered in a month	1888 (Nov.)	12813
Least " " "	1917 (Feb.)	3160
Greatest Mean No. " "	March	8301
Least " " "	September	6032
Greatest No. " " year..	1868	102395
Least " " " "	1915	70623

* Record dates from 1867 only.

DATES OF OCCASIONAL PHENOMENA.

1929	Frost	Hear Frost	Snow	Hail	Heavy Rain
January	1-5, 7-9, 12, 14-18, 21-28	16, 21, 22, 27	5, 6, 7, 9, 17, 18, 27, 28	9	...
February	4, 7, 8, 10-20, 25-28	13, 14, 17, 28	10, 15, 16, 26, 27	21, 23, 25	...
March	1-12, 14-18, 27, 28, 30	1, 2, 5, 7, 8, 11, 12, 14, 15, 17, 18, 27	...	24	24
April	2, 3, 6, 10, 12, 17, 20, 21, 24, 25, 27	6, 21	...	24	...
May	3, 10	...	...	7	4
June	...	...	...	...	...
July	...	...	...	...	...
August	...	...	...	...	28, 31
September	...	...	...	...	4, 5, 22, 23
October	19, 26, 27, 28, 31	26, 27	...	3	5, 10, 20, 23, 24
November	1, 7, 13-18	1, 14	12, 13	9, 10, 12, 13, 7, 9, 11, 25, 26	26
December	10, 16, 17, 19-23, 28	16, 17, 19, 22	9, 10, 20	8, 27	6, 7, 8, 9, 28, 29

1929	Gales of Wind	Fog	Thunder	Lightning	Lunar Halo	Solar Halo	Aurora Borealis
January	...	8, 10, 18-22, 27, 28	...	...	26	...	...
February	...	1, 4, 5, 6, 21, 22-28	...	...	25	...	...
March	...	5, 6, 7, 17, 18, 19, 20, 25, 30	...	...	22	...	...
April	19	...	...
May	...	9	...	...	...	...	...
June	...	6	8, 13, 14, 22-24	8, 13, 14, 22	...	...	...
July	4, 5, 31	4, 5, 31	...	...	...
August	1, 4, 6	4, 27, 31	...	27	...
September	...	4, 5, 6, 7, 8	12	3, 12	...	3, 18, 27, 29	...
October	...	12	2, 3, 24	2, 3, 24	...	...	...
November	11, 25	2, 4, 6, 13, 14, 15, 18, 25	...	12	14, 16	...	...
December	2, 5, 6, 7, 12, 21, 25, 29	9, 17, 22, 24	2	2	14	...	...

MONTHLY TOTALS FOR EACH HOUR OF RECORDED SUNSHINE.

1929. Local apparent time	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9
January ...	...	...	...	...	1.9	5.8	8.1	8.8	6.2	5.0	2.7	0.4	...	...	...	...	...
February ...	...	...	...	0.5	3.5	5.5	6.3	6.2	6.2	6.0	4.4	1.9	0.2	...	...	...	...
March ...	...	...	0.7	9.1	16.2	19.9	21.7	21.3	22.6	22.6	20.0	16.0	7.9	2.0	...	...	...
April ...	...	1.1	8.0	11.9	18.0	20.0	16.8	17.7	15.8	15.1	15.5	13.0	8.8	6.9	1.5	...	...
May ...	1.1	9.2	13.3	15.0	16.9	20.0	21.3	20.6	22.3	19.2	19.3	18.1	17.1	15.4	13.0	2.9	...
June ...	2.1	8.1	11.3	13.9	15.0	16.1	14.3	14.8	16.7	16.3	16.9	18.6	18.9	15.9	13.6	6.0	...
July ...	1.4	7.1	9.9	11.8	13.7	14.2	13.9	14.3	14.8	15.6	14.5	15.1	12.6	13.1	8.4	2.2	...
August ...	0.1	3.3	8.4	9.8	9.8	9.5	11.7	11.7	11.0	10.0	13.3	13.9	11.7	9.2	4.9	0.1	...
September ..	...	...	0.9	7.8	11.8	16.2	17.2	17.2	16.5	15.5	14.8	13.9	12.4	8.4	0.6	...	...
October ...	...	...	...	1.3	8.6	10.7	14.1	14.0	13.1	12.8	9.3	6.3	2.1	...	...	...	...
November...	...	...	...	0.1	1.1	4.7	7.0	6.5	7.0	7.6	4.3	0.9	...	...	...	...	...
December ...	...	...	...	...	...	1.8	6.4	7.9	9.5	6.7	3.6	0.1	...	...	...	...	...
Sums ...	4.7	28.8	52.5	81.2	116.5	114.4	158.8	161.2	160.4	152.4	138.6	118.2	91.7	70.9	42.0	11.2	...

TOTAL AMOUNT OF SUNSHINE RECORDED ON EACH DAY.

1929	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
January ...	3.7	3.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.4	1.0	1.9	6.6	0.0
February ...	...	0.1	...	...	...	...	0.3	...	1.1	5.6	...	4.2	1.7	5.7	0.1	1.7	5.8
March ...	4.2	4.3	7.5	2.0	0.2	0.5	5.6	8.5	8.4	9.7	9.8	9.0	6.5	8.0	6.6	1.0	7.8
April ...	9.1	5.7	0.9	2.2	6.6	10.2	5.7	3.6	9.0	4.2	10.6	6.0	8.0	3.2	0.2	9.1	1.3
May ...	1.8	2.0	9.0	5.0	5.8	1.0	8.9	5.0	11.6	2.0	5.1	7.3	5.7	4.4	7.2	13.4	10.7
June ...	8.0	0.5	2.7	4.2	2.9	2.0	7.1	4.0	12.6	11.4	14.4	4.6	5.8	2.8	4.4	3.1	6.5
July ...	7.2	0.2	4.9	0.1	3.7	1.8	7.5	6.8	...	...	1.5	4.8	12.4	14.4	14.5	10.9	11.7
August ...	2.1	13.7	...	0.7	4.9	2.0	2.9	5.5	0.5	2.1	5.7	10.2	0.8	9.3	8.8	6.9	5.3
September ...	2.1	9.3	2.7	6.2	1.2	8.5	9.8	10.2	4.6	6.5	3.5	2.4	10.8	2.7	9.5	7.2	7.5
October ...	4.4	6.0	5.9	5.0	2.7	2.9	6.6	1.7	7.2	0.1	6.5	4.2	0.1	0.4	...	2.4	0.3
November ...	3.2	...	3.8	...	...	0.2	...	4.0	0.5	4.0	...	1.4	5.2	0.4	..	1.8	4.2
December ...	1.7	...	4.1	0.8	1.5	2.6	...	0.1	...	1.1	...	1.0	0.1	...	3.5	4.8	2.1

TOTAL AMOUNT OF SUNSHINE RECORDED ON EACH DAY—(continued).

1929	18	19	20	21	22	23	24	25	26	27	28	29	30	31	MONTHLY	
															Total	Per cent.
January ...	0·0	0·0	4·6	1·1	0·0	0·0	4·7	4·5	4·3	0·0	0·0	0·0	0·2	0·0	38·9	15·7
February ...	6·0	1·4	...	...	0·3	...	...	...	...	1·3	5·4	...	...	...	40·7	15·0
March ..	4·0	6·2	2·0	...	2·9	5·1	0·7	1·3	8·3	8·5	11·2	10·8	9·8	8·5	178·9	48·9
April ...	...	8·6	9·6	5·8	7·4	6·0	4·3	9·2	0·3	6·2	0·5	11·0	5·6	...	170·1	40·6
May ...	11·0	11·7	13·9	12·9	1·0	5·3	1·0	14·6	10·3	8·5	12·4	15·0	9·4	12·1	245·0	49·7
June ..	11·3	7·9	10·7	3·3	1·8	10·1	10·1	13·8	12·7	15·0	14·2	9·3	1·2	...	218·4	43·0
July ..	0·6	6·7	13·6	9·4	1·6	11·7	4·7	10·5	3·7	7·7	...	6·6	0·1	3·2	182·5	35·9
August ...	3·8	3·0	0·6	0·2	2·1	...	5·1	10·8	8·8	3·9	8·6	7·4	1·8	0·7	138·2	30·2
September .	9·1	3·0	6·2	4·1	...	0·1	...	7·0	8·3	6·2	1·0	3·0	...	...	153·2	40·4
October ...	5·3	1·8	1·0	5·5	0·4	...	...	1·2	3·1	7·4	0·4	0·1	6·3	3·4	92·3	28·3
November...	0·2	...	0·2	2·7	0·2	0·3	2·9	...	...	4·0	...	...	...	...	39·2.	15·3
December ..	...	2·3	0·1	0·5	...	...	1·8	...	2·3	2·2	...	0·1	...	3·3	36·0	15·6

SUMMARY OF SUNSHINE.

	BRIGHT SUNSHINE RECORDED					
	1929			Mean for the last 49 years		
	Number of		Percentage of Possible Sunshine	Number of		Percentage of Possible Sunshine
	Days	Hours		Days	Hours	
January ...	14	38.9	15.7	14.4	32.3	13.0
February ...	15	40.7	15.0	17.6	55.9	20.4
March ...	30	178.9	48.9	24.4	103.2	28.2
April ...	29	170.1	40.6	26.5	146.8	35.0
May ...	31	245.0	49.7	27.8	183.8	37.3
June ...	30	218.4	43.0	28.1	186.0	36.7
July ...	28	182.5	35.9	28.4	169.1	33.3
August ...	29	138.2	30.2	27.5	146.4	32.0
September ..	27	153.2	40.4	25.7	124.2	32.8
October ...	28	92.3	28.3	23.7	86.2	26.4
November ..	18	39.2	15.3	18.0	47.4	18.5
December ...	20	36.0	15.6	13.9	27.3	11.8
Year ...	299	1533.4	34.4	275.8	1310.7	29.3

SUMMARY OF SUNSHINE—Continued.
EXTREMES FOR THE LAST 49 YEARS.

MONTH	Number of Days				Number of Hours				Percentage of Possible Sunshine			
	on which Sunshine was recorded											
	Greatest		Least		Greatest		Least		Greatest		Least	
Jan.	21	1881	8	1898	64.2	1881	12.3	1913	25.9	1881	5.0	1913
Feb.	24	1895	11	1882	89.3	1887	29.6	1882	32.8	1887	10.9	1882
Mar.	30	1929	17	1904	178.9	1929	56.8	1912	48.9	1929	15.5	1912
April	30	*1909	22	1920	223.7	1893	80.7	1920	53.4	1893	19.3	1920
May	31	1929	22	1886	266.6	1881	79.7	1906	54.1	1881	16.2	1906
June	30	*1896	24	*1888	272.5	1887	85.2	1912	53.6	1887	16.8	1912
July	31	*1882	24	1920	263.4	1911	98.0	1888	51.7	1911	19.3	1888
Aug.	31	*1886	23	1894	235.2	1899	74.1	1912	51.5	1899	16.2	1912
Sept.	30	1914	21	1897	176.5	1914	62.9	1896	46.6	1914	16.6	1896
Oct.	28	*1891	17	1889	134.9	1899	50.0	1889	41.4	1899	15.3	1889
Nov.	24	1925	9	1897	89.9	1925	18.5	1891	33.8	1915	7.2	1891
Dec.	20	*1917	6	1882	60.1	1886	7.4	1912	26.0	1886	3.2	1912
Year	300	1905	251	1903	1613.7	1887	927.6	1912	36.1	1887	20.7	1912

*And in other years.

HORIZONTAL MAGNETIC DIRECTION.

Horizontal Magnetic Direction, West of North (from daily measures of the continuous curves).

1929.	MEANS OF *					Mean daily range †	Highest reading of the month	Lowest reading of the month	Monthly range
	Highest readings	Lowest readings	4 a. m. readings	4 p. m. readings	Mean for the month *				
	14° +								
January ...	11.1	6.5	8.3	9.3	8.8	11.2	17.5	45.5	32.0
February ...	12.3	4.7	7.3	9.1	8.4	20.1	50.5	15.5	95.0
March ...	13.7	0.9	5.7	8.7	7.3	19.2	37.5	35.5	62.0
April ...	12.0	0.2	3.8	8.4	6.1	15.0	23.6	51.6	32.0
May ...	9.6	-0.2	4.2	6.8	5.1	14.2	16.6	48.6	28.0
June ...	8.6	-3.2	1.6	5.8	3.2	15.3	15.6	47.6	28.0
July ...	8.0	-3.2	-0.4	5.0	2.4	16.2	21.6	43.6	38.0
August ...	6.0	-4.0	-2.0	1.8	0.5	15.1	16.6	43.6	33.0
September ...	4.8	-5.2	-2.4	0.4	-0.6	15.9	14.6	38.6	36.0
October ...	3.6	-5.2	-2.6	0.2	-1.0	19.1	18.6	21.6	57.0
November ...	1.6	-4.4	-2.0	-0.2	-1.2	15.5	15.6	25.6	50.0
December ...	2.2	-4.4	-2.2	-0.2	-1.1	16.7	25.6	34.6	51.0
Means ...	7.8	-1.5	1.6	4.6	3.1	16.1	22.8	37.6	45.2

Mean for the year ... † 14° 3'.1 W.

* For the 5 quietest days.

† Includes all days.

HORIZONTAL MAGNETIC FORCE.

Horizontal Magnetic Force in C. G. S. Units (from daily measures of the continuous curves).

The figures in the columns are entered to the unit 10^{-5} C.G.S.

1929	MEANS OF *					Mean for the month †	Mean daily range †	Highest reading of the month	Lowest reading of the month	Monthly range
	Highest readings	Lowest readings	4 a.m. readings	4 p.m. readings	Mean for the month *					
	17000 +									
January ...	220	199	213	212	211	41.4	235	90	145	
February ...	221	191	216	217	208	89.8	327	-192	519	
March ...	216	178	203	201	200	83.2	358	—	396	
April ...	240	191	227	230	222	65.6	292	152	140	
May ...	247	190	223	221	220	82.3	275	147	128	
June ...	225	179	205	213	206	77.0	297	138	159	
July ...	214	166	195	201	192	93.7	446	103	343	
August ...	211	172	191	196	193	76.1	372	86	286	
September ...	200	158	185	182	182	74.4	257	103	154	
October ...	208	173	198	193	193	80.1	248	28	220	
November ...	204	177	195	193	192	60.7	284	68	216	
December ...	202	178	189	191	190	60.7	240	6	234	
Means ...	217	179	203	204	201	73.8	303	58	245	

Mean for the year ... 17201 C. G. S. Units.

* For the 5 quietest days.

† Includes all days.

ABSOLUTE MEASURES—SUMMARY.

DIRECTION			FORCE.		
1929	Declination Corrected	Inclination	Horizontal	Vertical	Total
	° /	° /	C. G. S. UNITS.		
	14 +	68 +	0·17000+	0·44000+	0·47000+
January ...	9·0	45·2	202	242	468
February ...	8·2	47·8	212	368	589
March ...	7·2	48 1	204	361	581
April	5·6	44·9	215	262	492
May	4·2	44·9	218	269	499
June	3·2	45·6	215	294	522
July	2·9	46·9	199	298	519
August ..	1·3	47·4	196	311	530
September ...	—0·4	45·1	191	211	435
October ...	—1·3	49·3	197	386	601
November ...	—1·1	44·0	180	141	366
December ...	—0·9	44·7	175	153	376
Means ...	° / 14 3·1 W.	° / 68 46·2	0·17200	0·44275	0·47498

DATES OF SOLAR OBSERVATIONS, AND DISC AREAS OF SPOTS AS MEASURED FROM THE DRAWINGS.

The unit is $\frac{1}{5000}$ th of the visible surface.

n = note without a complete drawing.

1929	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1929
D.													D.
1	3.7		1.8	3.6	5.5	3.7	5.9	2.7	0.2	3.8	12.2	29.2	1
2	4.4		2.8	3.3				2.6	0.2	3.5			2
3	n		4.9	n	7.2	0.9	7.3		0.4	4.7	14.1	24.5	3
4			6.5	n	6.6	0.8			0.3	6.0		19.9	4
5				3.1	6.4	1.8	4.0	2.4	2.5	5.4		12.9	5
6			10.3	5.7		3.4		n	3.1	4.9	15.7	8.6	6
7		3.5	12.5	7.3	6.5	4.2	4.2	3.4	2.6	5.1			7
8			12.9	5.8	4.0	5.6	3.1	2.8	2.3	7.5	15.6		8
9			12.9	5.8	3.4	6.3	n		1.1	9.6	12.4		9
10	1.6	11.6	13.1		2.7	n		3.9	0.7		11.1	13.7	10
11	n		14.2	7.4	5.0	6.0	10.3	4.0	0.4	15.7			11
12	3.4	9.7	13.7	8.3	4.3	4.7	12.0	3.7	0.3	17.3	n	23.4	12
13	5.1	10.1	10.4	6.1	6.5	4.8	10.9		0.6		13.0		13
14	6.6	10.2	8.4	6.1	6.1	3.8	10.6	7.1	0.4		12.3		14
15	10.7	n	6.7		4.0	n	9.6	8.9	0.5			29.3	15
16	14.1	5.0	3.9	5.5	2.4		8.9	9.7	0.9		10.3	24.2	16
17		3.2	3.9		2.3	2.1	7.2	n	1.0		7.1	21.4	17
18		1.5	3.2		2.1	3.4		7.3	1.5		n		18
19		1.1	3.1	5.3	1.5	7.3	6.6	5.1		1.6		16.1	19
20	9.4		3.1	7.9	0.7	9.6	7.2	4.3	2.4	0.6	n	10.6	20
21	9.4			5.4	0.6	10.4	5.6		2.7	0.6	3.9		21
22	7.0		2.9	3.5	1.0	n	n	3.5			5.6	7.3	22
23			2.6	2.3	2.2	14.2	2.4		n				23
24	6.3		2.9	n	n	15.7	1.5	2.5			12.6	16.9	24
25	4.4		2.4	3.4	7.5	14.4	2.3	2.8	0.5	1.5			25
26	3.8		2.7		5.7	12.2	2.3	1.9	0.1	3.0		16.5	26
27		2.5	2.3	2.6	6.9	10.5	3.9	0.8	0.2	7.2	18.3	14.1	27
28		2.4	2.2		6.6	8.4		0.5	0.4				28
29			1.9	3.9	5.4	6.9	2.5	0.3	0.9				29
30	1.4		2.4		4.5	5.3		0.3		13.5			30
31			3.0		4.6		2.9	0.03		12.1		4.1	31
Daily Means	6.1	5.5	6.0	5.1	4.4	6.7	6.0	3.5	1.1	6.5	11.7	17.2	

SUN-SPOT STATISTICS, 1929.

Any area less than 0.1 is entered as 0.0. The points for which the co-ordinates were measured are indicated as follows:—
 s—centre of chief spot, g—centre of group, p—centre of preceding spot, f—centre of following spot. In the last column is entered the day and decimal thereof on which the centre of the spot or group actually passed the central meridian, or would have done so if on the Solar Surface on the day in question. The "TYPES" are:—

- I.—One or more small spots.
- II.—A double spot of some magnitude.
- III.—A train of spots.
- IV.—A single large spot with or without small companions.
- V.—Irregular group of larger spots.

No. of Group	Date	Mean Latitude °	Mean Longitude °	Max. Area	Mean Type	Central Meridian
1	Jan. 2—3 ...	— 9.2	268.0	0.5	I. g.	Jan. 1.8
2	„ 2—13 ...	+11.2	175.3	0.8	IV. s.	„ 8.9
		+10.4	200.1	0.4	p.	„ 7.0
3	„ 10—13 ...	—12.6	154.2	0.4	I. pg.	„ 10.5
		—20.6	145.6		f.	„ 11.1
4	„ 10—16 ...	+17.6	99.2	1.0	IV. s.	„ 14.7
5	„ 11—22 ...	+ 7.1	62.3	10.2	II, III. g.	„ 17.5
		+ 6.3	65.3		p.	„ 17.2
		+ 7.9	59.0		f.	„ 17.7
6	„ 12—16 ...	—10.3	116.4	2.3	I. pg.	„ 13.3
		—14.8	101.5		fg.	„ 14.5
7	„ 13—14 ...	+ 4.3	144.5	0.2	I. g.	„ 11.2
8	„ 14—16 ...	—22.5	109.3	0.5	I. g.	„ 13.9
9	„ 16 ...	— 8.7	58.3	0.1	I. g.	„ 17.8
10	„ 16 ...	+ 6.2	38.1	0.1	I. s.	„ 19.3
11	„ 16—26 ...	—12.0	3.5	4.5	III. g.	„ 21.9
		—11.4	8.7		p.	„ 21.5
12	„ 20—26 ...	+ 4.9	325.6	1.3	I. g.	„ 24.8
13	„ 20—30 ...	+ 5.8	299.4	2.8	III, IV. g.	„ 26.8
		+ 8.8	299.1		s.	„ 26.8
		+ 2.9	305.5		p.	„ 26.3
14	„ 30 ...	— 5.1	251.1	0.8	I. g.	„ 30.5
15	Feb. 7—12 ...	+ 6.9	157.5	1.0	IV. s.	Feb. 6.6

SUN-SPOT STATISTICS, 1929—Contd.

No. of Group	Date	Mean Latitude °	Mean Longitude °	Max. Area	Mean Type	Central Meridian
16	Feb. 7—13 ...	— 9.4	114.8	1.3	I. s.	Feb. 9.8
17	„ 7—18 ...	— 9.5	91.6	7.2	II. p.	„ 11.6
		—11.8	81.8		f.	„ 12.3
		—11.8	74.7		f'g.	„ 12.9
18	„ 7—18 ...	— 4.6	81.5	3.0	II, III. p.	„ 12.3
		— 5.1	70.7		fg.	„ 13.2
		— 5.1	75.5		fp.	„ 13.2
19	„ 10 ...	+19.2	153.1	0.0	I. s.	„ 6.9
20	„ 10 ...	+ 5.2	119.6	0.3	I. fg.	„ 9.5
21	„ 10—12 ...	—18.2	68.2	0.2	I. g.	„ 13.4
22	„ 10—18 ...	—13.0	47.1	1.0	IV, I. s.	„ 15.0
23	„ 12 ...	— 5.8	28.4	0.0	I. s.	„ 16.4
24	„ 14 ...	—11.4	124.2	0.8	IV. s.	„ 9.1
25	„ 16—19 ...	+ 5.2	321.5	0.7	I. s.	„ 21.5
26	„ 17—18 ...	+ 6.2	68.2	0.2	I. g.	„ 13.4
27	„ 18—Mar 1	—15.6	304.9	0.7	I. p.	„ 22.7
		—17.0	288.8		f.	„ 23.9
		—16.4	295.4		p ₂	„ 23.4
28	„ 19 ...	+ 5.1	39.9	0.3	I. g.	„ 15.5
29	„ 27—Mar. 1	—15.2	245.5	0.1	I. s.	„ 27.2
29a	Mar. 2 ...	— 6.3	245.6	0.0	I. s.	„ 27.2
30	Feb. 27—Mar. 4	+ 5.4	241.4	0.6	I. p.	„ 27.5
		+ 5.6	235.4		f.	„ 28.0
31	„ 27—Mar. 4	— 9.5	219.7	1.4	IV. s.	Mar. 1.2
32	Mar. 1—13 ...	—16.5	139.4	5.5	III, IV. p.	„ 7.3
		—10.6	129.9		s ₁	„ 8.0
		— 7.7	125.3		s ₂	„ 8.3
		— 9.1	118.7		s ₃	„ 8.8
33	„ 3— 4 ...	+14.9	223.2	0.5	I. p.	Feb. 28.9
34	„ 3 ...	—18.5	176.4	0.1	I. g.	Mar. 4.5
35	„ 4—16 ...	— 9.7	90.1	9.8	IV. g.	„ 11.0
		— 9.7	93.8		s.	„ 10.7
36	„ 7—13 ...	+ 6.1	55.3	0.2	I. s.	„ 13.7
36a	„ 14 ...	+ 6.7	50.1	0.1	I. g.	„ 14.1
37	„ 8 ...	+14.9	180.0	0.2	I. s.	„ 4.2
38	„ 9—14 ...	+22.9	42.3	0.3	I. g.	„ 14.7
39	„ 10—17 ...	— 7.9	39.2	1.6	I, II. p.	„ 14.9

SUN-SPOT STATISTICS, 1929—Contd.

No. of Group	Date.	Mean Latitude °	Mean Longitude °	Max. Area	Mean Type	Central Meridian
39	Mar. 10—17 ...	— 7.9	28.5		f.	Mar. 15.7
40	„ 11—16 ...	—14.2	24.1	0.1	I. g.	„ 16.0
41	„ 15—18 ...	—13.9	72.3	0.5	I. p.	„ 12.4
		—15.1	67.5		f.	„ 12.7
42	„ 15—27 ...	+ 7.8	309.3	3.5	IV. s.	„ 21.7
43	„ 22—Apl. 2	—12.7	215.2	2.2	I, IV. g.	„ 28.8
		—13.2	220.2		s.	„ 28.5
44	„ 27 ...	— 5.7	241.0	0.1	I. g.	„ 26.9
45	„ 30 ...	+11.9	258.0	0.2	I. g.	„ 25.6
46	„ 30—Apl. 2	+ 9.7	219.6	1.3	I, IV. s.	„ 28.5
47	„ 30— „ 2	— 3.2	120.9	0.2	I. g.	Apl. 5.0
48	„ 31— „ 12	—11.0	95.5	2.6	IV, V. s.	„ 6.9
49	Apl. 5—14 ...	— 9.3	83.1	5.5	II, III. p.	„ 7.8
		—10.6	77.8		f.	„ 8.3
50	„ 6— 8 ...	—17.4	94.4	0.4	I. g.	„ 7.0
51	„ 9—21 ...	+ 4.5	342.6	3.0	II, IV. p.	„ 15.5
		+ 6.7	334.7		f.	„ 16.1
52	„ 11—16 ...	—19.8	45.7	2.1	II, I. p.	„ 10.7
		—21.9	41.5		f.	„ 11.0
53	„ 12—23 ...	+ 7.7	312.7	1.4	IV. s.	„ 17.7
54	„ 13—23 ...	— 8.7	290.4	1.1	IV, I. p.	„ 19.4
		— 9.7	280.6		fg.	„ 20.2
55	„ 14 ...	—10.4	53.8	0.1	I. p.	„ 10.1
		—10.7	49.8		f.	„ 10.4
56	„ 16—23 ...	+ 4.3	309.1	3.7	III. g.	„ 18.0
		+ 3.9	315.1		s ₁	„ 17.5
		+ 3.9	311.7		s ₂	„ 17.8
		+ 4.8	305.9		s ₃	„ 18.2
57	„ 20—27 ...	+ 7.2	245.7	2.9	I, IV. p.	„ 22.8
58	„ 22—23 ...	+12.6	227.9	0.1	I. s.	„ 24.1
59	„ 25—27 ...	— 7.2	239.6	0.1	I. g.	„ 23.3
60	„ 25—29 ...	+12.8	138.3	1.4	IV, II, I. p.	„ 30.9
		+12.9	135.7		f.	May 1.1
60a	„ 29—May 5	+ 9.0	140.0	0.0	I. f.	Apl. 30.8
61	„ 27— „ 9	— 9.4	97.4	2.6	II. p.	May 4.0
		— 9.8	89.5		f.	„ 4.6
62	„ 29— „ 9	— 1.4	106.3	3.5	II. p.	„ 3.3

SUN-SPOT STATISTICS, 1929—Contd.

No. of Group	Date	Mean Latitude °	Mean Longitude °	Max Area	Mean Type	Central Meridian
62	Apl. 29—May 9	— 2.7	100.2		f.	May 3.8
63	May 1— 8 ...	—20.8	88.5	0.9	I. g.	" 4.7
64	" 3— 9 ...	+13.6	103.9	2.3	II. p.	" 3.5
		+16.0	96.0		f.	" 4.1
65	" 3	+12.4	66.5	0.0	I. g.	" 6.4
66	" 4	—21.4	37.3	0.0	I. s.	" 8.6
67	" 5—16 ...	+13.3	11.0	1.3	IV. s.	" 10.6
68	" 7—15 ...	—10.8	23.8	2.5	I, V. g.	" 9.6
69	" 7—17 ...	+ 2.9	350.7	0.6	I. s.	" 12.1
70	" 8—20 ...	+ 3.7	320.8	2.4	IV. s.	" 14.3
71	" 13—16 ...	— 9.8	2.4	0.1	I. g.	" 11.2
72	" 13	—10.5	287.9	0.1	I. g.	" 16.8
73	" 13—19 ...	— 6.2	256.1	0.3	I. g.	" 19.2
74	" 14—23 ...	+ 9.9	248.0	0.5	I. g.	" 19.9
75	" 15—19 ...	+19.4	246.5	0.1	I. s.	" 20.0
76	" 15—16 ...	+ 3.3	308.1	0.1	I. g.	" 15.3
77	" 16—22 ...	+10.0	272.6	0.9	I. p.	" 18.0
		+ 8.0	264.4		f.	" 18.6
78	" 20	—11.5	290.9	0.0	I. g.	" 16.6
79	" 22—June 3	+12.8	137.5	5.6	III, IV. s ₁	" 28.2
		+12.6	134.4		s ₂	" 28.4
		+11.7	129.9		s ₃	" 28.8
		+11.5	125.4		s ₄	" 29.1
80	" 23—May 25	— 7.0	248.8	0.2	I. g.	" 19.8
81	" 24—31 ...	+19.2	164.1	1.5	III. g.	" 26.2
		+19.8	168.5		p.	" 25.9
82	" 25—31 ...	+12.3	109.9	0.5	I. p.	" 30.3
		+15.8	98.6		f.	" 31.2
83	" 26	+12.8	205.3	0.1	I. g.	" 23.1
84	" 28	+14.4	176.2	0.0	I. s.	" 25.3
85	" 28	— 5.6	114.9	0.0	I. s.	" 29.9
86	" 31	—15.0	95.5	0.2	I. g.	" 31.4
87	" 31—June 9	+12.8	18.3	0.1	I. g.	June 6.2
88	June 1	— 9.2	122.4	0.0	I. g.	May 29.3
89	" 3— 7 ...	—18.8	26.0	0.1	I. g.	June 5.6
89a	" 5— 7 ...	—10.8	29.9	0.2	I. g.	" 5.3
90	" 4— 5 ...	+ 9.2	71.6	0.2	I. s.	" 2.2

SUN-SPOT STATISTICS, 1929—Contd.

No. of Group	Date	Mean Latitude °	Mean Longitude °	Max. Area	Mean Type	Central Meridian
91	June 4—8 ...	—17.9	75.8	0.8	I. g.	June 1.9
		—18.0	79.3		p.	„ 1.6
		—18.0	73.5		f.	„ 2.0
92	„ 4—15 ...	— 8.6	332.4	4.3	IV, V, II.g.	„ 9.7
		— 7.6	336.7		p.	„ 9.4
		— 9.7	329.4		f.	„ 9.9
93	„ 4—15 ...	+ 4.4	323.7	1.4	III, I. s ₁	„ 10.3
		+ 6.6	318.3		s ₂	„ 10.8
		+ 8.0	310.7		s ₃	„ 11.3
		+ 8.2	312.2		s ₄	„ 11.2
		+ 9.0	304.3		s ₅	„ 11.8
		+ 9.8	307.5		I. fg.	„ 11.6
		—19.0	294.5		1.0	IV. s.	„ 12.5
94	„ 6—15 ...	—19.0	294.5	1.0	IV. s.	„ 12.5
95	„ 9—15 ...	— 5.3	261.8	0.2	I. g.	„ 15.0
96	„ 10—18 ...	— 7.4	289.2	0.4	I. g.	„ 12.9
97	„ 11—23 ...	+12.3	232.4	1.6	IV, I. g.	„ 17.2
		+13.3	232.4		s.	„ 17.2
		+ 8.8	242.5		p ₁	„ 16.5
		+ 9.0	239.0		p ₂	„ 16.7
		+13.7	224.1		f ₁	„ 17.9
		+15.6	219.4		f ₂	„ 18.2
		—11.1	228.8		0.5	I. s.	„ 17.5
98	„ 11—18 ...	—11.1	228.8	0.5	I. s.	„ 17.5
99	„ 13—23 ...	—15.7	197.5	0.7	I. s.	„ 19.9
100	„ 15—20 ...	+ 8.3	272.9	0.5	I. g.	„ 14.2
101	„ 15 ...	— 9.7	247.6	0.0	I. s.	„ 16.1
102	„ 17—29 ...	— 8.2	133.0	8.2	III, IV. g.	„ 24.7
		— 9.2	143.8		s ₁	„ 23.9
103	„ 18—30 ...	+12.9	135.9	4.9	IV. s.	„ 24.5
104	„ 20—21 ...	— 8.2	243.5	0.2	I. g.	„ 16.4
105	„ 21 ...	+ 8.7	170.0	0.0	I. g.	„ 22.0
106	„ 21—26 ...	+13.6	164.2	0.3	I. g.	„ 22.4
107	„ 21—26 ...	—17.4	187.2	1.3	I, IV. g.	„ 20.7
108	„ 22—July 3	—16.6	82.1	2.3	IV. s.	„ 28.6
109	„ 25—June 27	—12.1	48.2	0.1	I. s.	July 1.2
110	„ 26—29 ...	—17.0	32.4	0.4	I. p.	„ 2.3
		—17.4	26.8		f.	„ 2.8

SUN-SPOT STATISTICS, 1929 -Contd.

No. of Group	Date	Mean Latitude °	Mean Longitude °	Max Area	Mean Type	Central Meridian
111	June 27—July 3	+ 7.1 + 8.2	37.6 33.8	0.9	I. s. f.	July 2.0 " 2.2
112	" 28—29 ...	+ 7.6	140.5	0.2	I. g.	June 24.2
113	" 28	+ 1.7	109.0	0.1	I. g.	" 26.6
114	" 29—July 8	+ 6.3 + 5.7	4.9 8.7	1.7	IV. g. s.	July 4.4 " 4.1
115	" 29— " 1	- 9.8	4.5	0.2	I. g.	" 4.5
116	" 30— " 3	-12.1	40.2	0.1	I. g.	" 1.8
116a	July 5— 8 ...	-13.4 -20.2	37.1 31.0	0.8	I. pg. fg.	" 2.0 " 2.5
117	June 30—July 11	- 8.1 - 8.8	341.6 335.8	4.8	II, IV. p. f.	July 6.2 " 6.6
118	July 5—14 ...	+ 8.2 + 5.7	280.3 278.5	0.6	I. p. f.	" 10.8 " 11.0
119	" 7— 8 ...	- 7.7	305.4	0.1	I. g.	" 8.9
120	" 7—16 ...	- 6.5	254.1	0.2	I. s.	" 12.8
121	" 11—17 ...	- 5.3 - 3.4 - 7.1	280.1 284.4 275.8	9.2	V, III. g. p. f.	" 10.8 " 10.5 " 11.2
122	" 11—23 ...	-16.1	197.5	4.6	IV. s.	" 17.1
123	" 13—17 ...	+15.2	236.5	0.4	I. g.	" 14.1
124	" 14—16 ...	+ 7.1	210.7	0.1	I. g.	" 16.1
125	" 15—25 ...	+ 6.4 + 6.1 + 9.4	148.8 147.2 140.5	1.2	IV, I. g. s. f.	" 20.8 " 20.9 " 21.4
126	" 15—26 ...	- 9.7	149.3	2.1	IV. s.	" 20.7
127	" 15—24 ...	- 4.3	141.8	0.3	I. s.	" 21.3
128	" 15—20 ...	+14.5	133.0	0.2	I. s.	" 22.0
129	" 19—20 ...	+14.4	166.9	0.1	I. g.	" 19.4
130	" 20—27 ...	-14.7	81.7	0.2	I. g.	" 25.8
131	" 21—23 ...	+ 3.5	108.5	0.2	I. g.	" 23.8
132	" 21—Aug. 1	+ 6.9	67.5	0.7	I. s.	" 26.9
133	" 23	- 3.8	119.3	0.2	I. g.	" 23.0
134	" 24—Aug. 2	-20.8 -19.4 -21.8	33.0 38.8 31.3	1.3	I. g. p. fs.	" 29.5 " 29.1 " 29.6

SUN-SPOT STATISTICS, 1929—Contd.

No. of Group	Date	Mean Latitude °	Mean Longitude °	Max Area	Mean Type	Central Meridian
135	July 26—Aug. 2	—10.5 —12.5	53.9 47.7	2.1	IV, I. p. fg.	July 27.9 " 28.4
135a	Aug. 1	—10.7	37.6	0.0	I. s.	" 29.2
136	July 27	+ 7.5	17.0	0.0	I. s.	" 30.7
137	" 31—Aug. 2	+20.8	344.1	0.4	I. s.	Aug. 2.2
138	" 31	— 8.2	333.4	0.0	I. g.	" 3.0
139	" 31—Aug 11	— 4.3 — 3.4	293.0 288.0	2.1	II, IV. p. f.	" 6.1 " 6.5
140	Aug. 1— 2 ...	+ 9.3	20.3	0.2	I. g.	July 30.5
141	" 2	+12.9	319.2	0.1	I. g.	Aug. 4.1
142	" 2	— 9.5	343.3	0.1	I. g.	" 2.3
143	" 5— 7	— 2.7	272.8	0.5	I. p.	" 7.6
144	" 5—11	—20.0 —22.4	232.0 224.7	0.4	I. p. f.	" 10.7 " 11.2
145	" 6—17	— 9.3	216.0	2.2	IV. s.	" 11.9
146	" 7—10	+12.4 +12.5	313.1 308.5	0.1	I. p. f.	" 4.6 " 4.9
147	" 7—18	—15.5	200.7	1.1	IV. s.	" 13.1
148	" 8—11	+ 7.1	285.9	0.2	I. p.	" 6.6
149	" 10—18	+ 3.5 + 2.3 + 2.9	155.1 157.5 152.9	1.3	I, V. g. pg. fg.	" 16.5 " 16.3 " 16.7
150	" 10—20	— 8.5 — 8.5	161.8 154.9	5.7	I, II. p. f.	" 16.0 " 16.5
151	" 11—12	+10.0	223.2	0.4	I. p.	" 11.4
152	" 14—20	—17.2 —21.4	185.7 180.0	0.9	I, II. p. f.	" 14.2 " 14.6
152a	" 12	—19.7	172.2	0.0	I. s.	" 15.2
153	" 14—19	+21.8	195.2	0.7	I. s.	" 13.5
154	" 15—16	+17.6	155.6	0.1	I. g.	" 16.5
155	" 15—25	— 5.8	93.3	0.3	I. s.	" 21.2
156	" 16—20	+12.1	184.8	0.8	I. s.	" 14.3
157	" 16—20	+ 1.9 + 1.3 + 2.2	84.6 89.8 81.7	0.5	I g p. f.	" 21.8 " 21.4 " 22.1
158	" 16—26	—13.3 —13.5	90.9 79.6	0.8	I, IV. p. f.	" 21.4 " 22.2

SUN-SPOT STATISTICS, 1929—Contd.

No. of Group	Date	Mean Latitude o	Mean Longitude o	Max Area	Mean Type	Central Meridian
159	Aug. 19—26 ...	+14.0	103.2	1.2	I. g.	Aug 20.4
		+14.3	106.8		p.	" 20.2
160	" 19—28 ...	— 6.0	70.3	0.9	I, IV. g.	" 22.9
161	" 19—28 ...	—18.5	76.6	1.8	I, II. p.	" 22.4
		—19.4	70.0		f.	" 22.9
162	" 24 ...	+10.4	15.6	0.0	I. s.	" 27.1
163	" 26—30 ...	— 7.3	355.9	0.3	I. g.	" 28.6
164	" 29 ...	— 5.7	303.9	0.0	I. s.	Sep. 1.5
165	" 31 ...	—14.9	355.7	0.0	I. s.	Aug 28.6
166	Sept. 1— 4 ...	—12.0	283.7	0.1	I. g.	Sep. 3.0
167	" 1— 4 ...	+ 4.8	291.1	0.1	I. g.	" 2.5
168	" 3 ...	+12.4	230.2	0.0	I. s.	" 7.1
169	" 3—13 ...	+20.7	195.1	0.5	I. s.	" 9.7
170	" 5—10 ...	— 5.4	262.6	2.4	IV. g.	" 4.6
		— 4.0	265.8		p.	" 4.4
*171	" 5 ...	+12.1	220.7	0.0	I. s.	" 7.8
172	" 5—13 ...	— 9.4	168.0	0.3	I. s.	" 11.8
173	" 6— 7 ...	—12.0	243.8	0.1	I. p.	" 6.0
		—13.6	240.2		fg.	" 6.3
174	" 7— 8 ...	+ 9.9	272.8	0.2	I. g.	" 3.8
*175	" 7— 9 ...	+13.1	218.5	0.2	I. g.	" 8.0
176	" 9—16 ...	+15.5	174.3	0.2	I. g.	" 11.3
177	" 10—17 ...	+ 4.8	116.8	0.3	I. pg.	" 15.7
		+ 5.1	109.0		fg.	" 16.3
178	" 12—13 ...	+15.7	85.1	0.1	I. s.	" 18.1
179	" 13 ...	+ 6.1	219.4	0.1	I. s.	" 7.9
180	" 14—21 ...	— 7.7	58.8	0.5	I. s.	" 20.1
181	" 17—21 ...	—13.7	97.0	0.4	I. g.	" 17.2
182	" 17—27 ...	—20.7	24.9	1.8	IV. s.	" 22.6
183	" 20—21 ...	+21.2	88.1	0.2	I. g.	" 17.8
184	" 21 ...	+ 3.1	12.1	0.1	I. g.	" 23.6
185	" 21, ...	—24.5	12.7	0.2	I. g.	" 23.5
186	" 26—29 ...	+12.2	264.9	0.1	I. g.	Oct. 1.7
187	" 27—Oct. 6	+ 9.2	277.4	2.6	I, III, IIg.	Sep. 30.8
		+11.1	285.8		p.	" 30.1
		+ 9.7	274.1		f.	Oct. 1.0

*Groups 171, 175 identical.

SUN-SPOT STATISTICS, 1929—*Contd.*

No. of Group	Date	Mean Latitude o	Mean Longitude o	Max Area	Mean Type	Central Meridian
188	Sept. 29—Oct. 9	+10.9 +10.3 +12.1	222.6 228.8 213.4	5.0	III. g. p. f.	Oct. 4.9 " 4.5 " 5.6
189	Oct. 2—3 ...	+12.3	316.3	0.1	I. g.	Sep. 27.8
190	" 3—8 ...	+13.6	187.5	0.5	I. g.	Oct. 7.6
191	" 6—11 ...	-8.3 -7.1 -7.6	169.2 162.4 170.2	0.2	I. g. fg. p.	" 9.0 " 9.5 " 8.9
192	" 6—12 ...	-19.4	144.8	6.6	I, V. g.	" 10.8
193	" 7—12 ...	+4.2 +4.2 +4.6	116.8 119.9 112.7	4.9	I, III. g. p. f.	" 12.9 " 12.7 " 13.2
194	" 7—19 ...	-10.6	111.3	5.7	IV. s.	" 13.4
195	" 12 ...	+16.4	173.0	0.0	I. s.	" 8.7
196	" 19—21 ...	-11.1	52.2	0.4	I. g.	" 17.8
197	" 19—21 ...	-9.2	38.6	0.2	I. g.	" 18.9
198	" 21 ...	-7.7	16.3	0.1	I. s.	" 20.6
199	" 21 ...	-13.6	8.8	0.0	I. s.	" 21.1
200	" 21—27 ...	+10.6	288.2	0.2	I. g.	" 27.2
201	" 25—27 ...	+8.7	323.3	0.9	I, IV. g.	" 24.6
202	" 25—Nov. 3	+9.4 +8.8 +16.5 +9.2	237.6 242.6 224.0 237.2	9.3	III. g. p. f. s.	" 31.1 " 30.7 Nov. 1.1 Oct. 31.1
203	" 27—Nov. 3	+11.9 +13.9	266.7 259.0	3.9	II. p. f.	" 28.9 " 29.4
204	" 30—Nov 10	+14.6 +13.9 +13.6	185.9 194.9 183.2	9.1	I, II. g. p. f.	Nov. 4.0 " 3.3 " 4.2
205	" 30—31 ...	+3.5	175.2	0.0	I. s.	" 4.8
206	Nov. 3—14 ...	-11.4	111.3	6.7	IV. s.	" 9.7
207	" 6—9 ...	+5.0	161.9	0.3	I. g.	" 5.8
207a	" 10—12 ...	+12.7	159.4	0.0	I. g.	" 6.0
208	" 6—18 ...	-11.6	71.8	3.0	IV. s.	" 12.6
209	" 8—18 ...	-10.5	47.8	0.5	I, IV. s.	" 14.5
210	" 9 ...	-19.0	109.3	0.0	I. s.	" 9.8

SUN-SPOT STATISTICS, 1929—*Ccntd.*

No. of Group	Date	Mean Latitude o	Mean Longitude o	Max Area	Mean Type	Central Meridian
211	Nov. 9—21 ...	+ 6.9	29.2	3.9	IV. g.	Nov 15.9
		+ 4.9	36.0		p.	„ 15.4
		+ 7.5	24.7		fg.	„ 16.2
212	„ 10 ...	+ 4.3	139.5	0.1	I. g.	„ 7.5
213	„ 10 ...	— 7.6	98.7	0.0	I. s.	„ 10.6
214	„ 10 ...	+ 16.2	49.8	0.0	I. s.	„ 14.3
215	„ 10—22 ...	— 6.6	25.6	3.4	I, IV. g.	„ 16.2
		— 7.3	26.0		s ₁	„ 16.1
		— 7.1	19.3		s ₂	„ 16.6
216	„ 13—17 ...	+ 10.6	40.4	0.6	I. g.	„ 15.0
217	„ 16—27 ...	+ 9.6	308.7	2.6	III, IV. g.	„ 22.0
		+ 9.5	311.8		p.	„ 21.8
		+ 9.9	304.3		f.	„ 22.3
218	„ 20 ...	— 3.9	328.4	0.1	I. p.	„ 20.5
		— 8.4	322.3		f.	„ 21.0
219	„ 20 ...	— 13.9	279.4	0.2	I. g.	„ 24.2
220	„ 21—Dec. 4	+ 10.5	236.4	6.8	III. g.	„ 27.5
		+ 8.5	240.7		p.	„ 27.1
		+ 12.3	233.0		f ₁	„ 27.7
		+ 10.7	227.0		f ₂	„ 28.2
221	„ 24—Dec. 5	— 21.6	215.2	1.6	IV. s.	„ 29.1
222	„ 24— „ 6	+ 14.4	185.7	23.6	III. g.	Dec. 1.3
		+ 15.2	183.2		g ₁	„ 1.5
		+ 15.4	197.3		s.	Nov 30.4
		+ 9.3	209.6		p.	„ 29.5
		+ 11.8	178.1		f ₁	Dec. 1.9
		+ 16.0	166.3		f ₂	„ 2.8
		+ 15.6	162.2		f ₃	„ 3.1
223	Dec. 1 ...	+ 4.0	182.7	0.3	I. g.	„ 1.5
224	„ 1— 3 ...	+ 5.9	155.4	0.6	I. s.	„ 3.6
225	„ 1—12 ...	— 13.7	110.0	1.4	IV. s.	„ 7.1
226	„ 4— 6 ...	+ 4.3	166.7	0.3	I. s.	„ 2.8
227	„ 4— 6 ...	— 8.6	122.7	1.0	I. g.	„ 6.1
228	„ 4 ...	— 11.4	73.2	0.0	I. s.	„ 9.9
229	„ 6—17 ...	+ 3.8	43.4	2.6	IV. s.	„ 12.1

SUN-SPOT STATISTICS, 1929—*Contd.*

No. of Group	Date	Mean Latitude °	Mean Longitude °	Max Area	Mean Type	Central Meridian
230	Dec. 6—17 ...	— 6.9	37.7	9.9	II. g.	Dec. 12.6
		— 5.0	45.5		p.	„ 12.0
		— 8.6	31.3		f.	„ 13.0
230a	„ 12 ...	— 5.6	51.5	0.1	I. s.	„ 11.5
231	„ 10—22 ...	+ 5.7	343.5	12.9	II. g.	„ 16.7
		+ 5.6	349.4		p.	„ 16.2
		+ 6.5	338.9		fg.	„ 17.0
232	„ 12 ...	+ 2.1	82.5	0.1	I. g.	„ 9.2
233	„ 12—20 ...	+ 19.7	342.0	0.5	I. s.	„ 16.8
234	„ 12—19 ...	+ 12.4	340.7	0.7	I. s.	„ 16.9
235	„ 12—22 ...	— 4.3	341.0	8.8	III. g.	„ 16.9
		— 4.3	349.2		s ₁	„ 16.2
		— 3.8	344.3		s ₂	„ 16.6
		— 3.0	342.2		s ₃	„ 16.8
		— 3.5	332.8		s ₄	„ 17.5
236	„ 12—19 ...	— 11.8	351.6	0.4	I. pg.	„ 16.1
		— 12.3	340.8		fg.	„ 16.9
237	„ 15—24 ...	+ 8.5	316.3	2.1	I, III. p.	„ 18.7
		+ 13.6	300.0		f	„ 20.0
		+ 13.1	311.7		f ₁	„ 19.1
		+ 13.8	304.7		f ₂	„ 19.6
238	„ 15—26 ...	— 4.6	287.6	0.6	I. s.	„ 20.9
239	„ 16—27 ...	+ 9.4	274.0	0.5	I. s.	„ 21.9
240	„ 19—22 ...	+ 9.7	291.1	1.0	I. p.	„ 20.6
		+ 9.4	286.0		f.	„ 21.0
240a	„ 24 ...	+ 8.7	281.0	0.0	I. g.	„ 21.4
241	„ 19—24 ...	+ 8.4	248.2	0.5	I. s.	„ 23.9
242	„ 19—27 ...	+ 14.2	234.2	1.0	I. s.	„ 25.0
243	„ 20—Jan. 2	+ 12.5	200.8	13.5	g.	„ 27.5
		+ 10.0	211.3		III, IV. pg.	„ 26.7
		+ 13.6	195.7		fg.	„ 27.9
244	„ 22—31 ...	+ 0.7	201.2	1.2	I. pg.	„ 27.5
		+ 3.3	188.5		fg.	„ 28.4
245	„ 24—27 ...	+ 11.7	261.8	1.2	I. g.	„ 22.9
246	„ 27 ...	+ 14.3	173.4	0.0	I. s.	„ 29.6
247	„ 31—Jan. 2	+ 10.1	143.7	0.4	I. g.	„ 31.8



