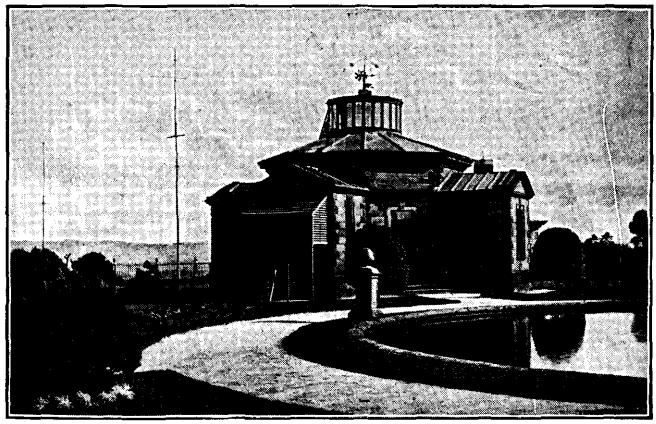
STONYHURST COLLEGE OBSERVATORY.

Lat. 53° 50′ 38·5″ N. Long. 9^{m} 52^{s}·88 W.
Height of the Barometer above the Sea, 381 feet.



(FOUNDED 1838.)

Results of Geophysical and Solar Observations,

1931.

With Report and Notes of the Director,

Rev. E. D. O'CONNOR, S.J., M.A., F.R.A.S., F.R.Met.Soc.

BLACKBURN:
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CONTENTS.

REPORT AND NOTES.

GENERAL.—The staff remains as last year, and consists, besides the Director, of Father J. P. Rowland, S.J., B.Sc. (Lond.), F.R.A.S., Father H. Macklin, S.J., B.Sc. (Oxon.), and Mr. Wilfrid Brown. The Rev. T. Corbishley, S.J., B.A. (Oxon), who is on the teaching staff of the College, assists in the preparation of the daily Weather Forecast, and Sergeant Wilkins, who is Bandmaster to the O.T.C., assists in the care of the Library and in the clerical work of the Observatory.

The Director and Father Rowland attended the centenary meeting of the British Association, held in London in September, and both gave a number of lectures to various scientific societies during the year. As in previous years, the boys at the School and visitors have been shown over the Observatory, and, as opportunity served, interesting celestial objects were viewed through the 15-in. Equatorial.

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 the year's weather were an abnormally dry March, heavy rains in January, February, June and November, and, with the exceptions of March and October, a general prevalence of clouds.

In March the rainfall was only 0·535 in., of which nearly half fell on the 13th. The mean March rainfall for the last 84 years is 3·286 in. The total fall for the year was 3·430 in. in excess of the mean. The days on which one or more inches of rain fell were : June 2nd, June 14th, August 19th, October 29th, November 3rd, and November 27th. Precipitation took place on 205 days. The driest months were March, October and December ; the wettest : January, February, June and November.

Sunshine was above the average in only four months of the year : January, March, August and October, of which January, March and October were notably sunny. In the whole year the total number of hours was 68·7 hours below the average, owing to a considerable deficit in June, July and September. Sunshine was recorded on 285 days.

Fine day periods of five days or more occurred as follows :

Mar. 1— 5	Mar. 14—19	Mar. 24—31
Aug. 25—31	Sept. 20—27	Oct. 13—18
	Dec. 16—22	

A total of seven periods, with an average of 6·7 days, as against seven periods of 7·3 days each in 1930.

Bright Sunshine for ten hours or more was recorded on :—

March 25th, 27th ; April 30th ; May 9th, 20th, 21st, 25th, 26th ; June 25th, 26th, 29th ; July 10th, 20th ; August 3rd, 4th, 9th, 18th, 24th, 26th, 27th, 30th, 31st ; September 6th, 8th. A total of 24 days, with an average of 11·8 hours each, as against 29 days, with an average of 11·8 hours each in 1930.

Days on which notable continuous sunshine occurred were : January 6th ; March 2nd, 12th, 25th, 26th, 27th ; May 4th, 21st ; June 25th ; August 4th, 30th ; October 13th, 25th ; December 30th. A total of 14 days, as against nine days in 1930.

The adopted mean temperature was 46°·6, 0°·4 below the normal. The highest shade temperature was 71°·2, on May 27th, 9°·9 below the normal ; the lowest 21°·5, on March 7th, 4°·9 above the normal. June, July and August were the warmest months ; January, February and March the coldest. March, 2°·6 below normal ; August, 1°·9 below normal ; and September, 1°·9 below normal, were relatively cold ; while November, 3°·6 above normal, and December, 2°·4 above normal, were very mild.

Six gales of 37 miles per hour or over were recorded : one in January, one in February, two in November, and two in December. The greatest hourly mean velocity of the wind, 49 miles per hour, in direction S. by W., was on November 3rd. The highest gust, 66 miles per hour, occurred on January 16th. September and October were exceptionally calm months, the totals of wind for these months being 30% and 20% below normal. The total mileage of wind for the year was 3,808 miles below the average for the last 64 years, which is equivalent to a deficit of 3·5%.

A Table showing the maximum gusts for each day, as recorded by the Dines Tube Anemometer, will be found at the end of these Notes. The maximum for each month is printed in heavy type.

SYNOPTIC METEOROLOGY.—The service has been continued throughout the year. A daily chart—for 0700 G.M.T.—was posted up at the College, and a daily forecast of local weather supplied to the *Lancashire Daily Post.*

MAGNETICAL.—Father Rowland reports:—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	...	·000481	C.G.S. „ „

Owing to the cumulative effect of secular variation in Declination, it has become impossible to maintain the Vertical Force Balance in the Magnetic Meridian, and accordingly the instrument was dismounted on June 11th, 1930, and has since remained out of action.

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 year showed a marked decline in magnetic activity from that of the previous year, by all the criteria by which the two years can be compared.

In Declination the Mean Daily Range fell from 16′·9, in 1930, to 13′·8, in 1931, and the Mean Monthly Range from 45 ·4 to 32′·3, the corresponding quantities

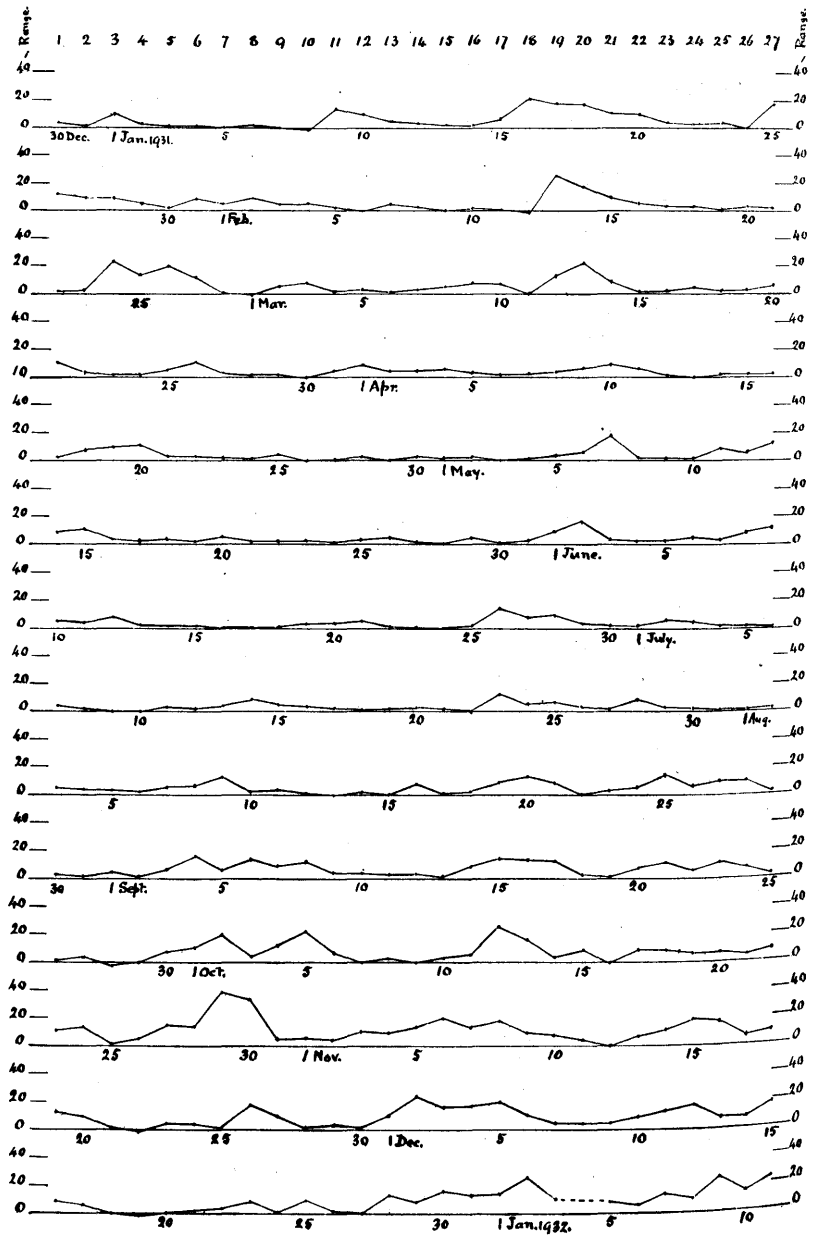
in Horizontal Force falling from 88·7γ to 59·5γ, and 246γ to 140γ respectively.

There were no disturbances classed as " very great," as against one last year, and only nine as " greater," compared with 48 in the previous year. The number of days of " moderate " disturbance fell from 138 to 118, whilst the days of " small " disturbance increased from 97 to 140, and of " calm," from 81 to 98.

We give again a Chart shewing the magnetic character of each day of the year, divided into 27 day periods, the ordinates representing the values of diurnal range from which our character letters are determined, as explained on pp. ix–x. A comparison of this Chart with that of last year shews at a glance the general decrease of magnetic activity, especially during the summer months, from April to September. The sequences of disturbed periods at approximately 27 days interval which prevailed in 1930 are no longer conspicuous, but the sequence which persisted from January 4th to December 20th, 1930, is still in evidence, though of a smaller and more restricted character, till June 2nd, 1931, after which it dies down, or assumes a more sporadic character. There is an appreciable increase of disturbance from September till the end of the year.

" Sudden Commencements " were noted on the dates and at the times shewn in the following Table :—

Date		*Time*
March 20th.	.....	16 h. 24 m.
June 1st.	.....	15 h. 30 m.
,, 21st.	.....	14 h. 35 m.
,, 26th.	.....	15 h. 0 m.
July 3rd.	.....	23 h. 22 m.



1931. DAILY MAGNETIC CHARACTER IN 27-DAY PERIODS.

The S.C. on June 26th was very large, and was followed immediately by an appreciable disturbance. That of July 23rd, which occurred after an interval of 26 d. 12·4 h., though smaller, was still very pronounced, but the magnets did not begin to be notably disturbed till about six hours later, and the maximum phase was delayed a further six hours, thus occurring exactly 27 days after that of June 26th. In both cases the disturbance only ranked as "moderate." It is noteworthy that in neither case was there any visible feature, either spots or faculæ, near the central meridian of the sun at the time of the disturbances, but a group of very small spots, in about 8° S. latitude, crossed the central meridian on May 30th—27 days before the first disturbance.

ASTRONOMICAL TIME SERVICE.—The rhythmic time signals from Rugby at 1000 G.M.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. On occasion, supplementary time signals have also been received. Time marks are made by the Synchronome Clock every minute on the Milne-Shaw Seismograph, and every two hours on the Magnetographs.

ASTRONOMICAL.—Of the 67 Lunar Occultations listed in the Nautical Almanac as visible at Greenwich, 59 were unobservable owing to rain or clouds. Eight were successfully observed, seven disappearances and one reappearance, and the results sent to Dr. Comrie.

SOLAR OBSERVATIONS.—Observations of the Solar surface were made on 257 days, as against 266 in 1930, and include 268 drawings, as against 264 drawings in

1930. Of the drawings, 245 are complete, and show all spots and faculæ; of the remaining 23, seven are complete for the spots.

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.

Through the kindness of Professor Brunner, the interchange of copies of the Zurich and Stonyhurst drawings has been continued, in order to supplement where possible, any gaps that may occur in our respective observations; 98 of such drawings have been received from Zurich during 1931.

Professor Favaro, of Catania, has also very kindly continued to place the Catania drawings at our disposal, sending all the Catania observations to Stonyhurst. Of these, 62 were copied for purposes of comparison, and 18 were used to supply gaps in our observations that still remained after the Zurich observations had been incorporated.

The observation days and daily projected areas in units 1/5000 of the disc, are recorded on pages 39 and 40. The horizontal lines on those pages indicate the commencement of a new solar rotation.

There were no spots on 46 days, including the Zurich and Catania observations, as against four in 1930.

The mean daily disc area of the spots, in units 1/5000 of the disc, works out at 1·26. From the Stonyhurst drawings alone it is the same, as compared with 2·26 in 1930, and 6·19 in 1929.

The Sun-Spot Statistics are given on pp. 41—46. The groups are numbered in the order of their appearance in the Stonyhurst drawings. Spots special to the Zurich or Catania drawings receive the same number with a ′ as the Stonyhurst group which is nearest to them. Thus Group 6 has co-ordinates, latitude $+0°\cdot7$, longitude $49°\cdot5$. The spotlet 6′, which was on the Zurich and Catania drawings for January 28—29, has co-ordinates, latitude $+3°\cdot5$, longitude $50°\cdot1$. It will be observed that all the spots not found on the Stonyhurst drawings were quite small, area $0\cdot1$, or less, and generally were only on the disc for one day.

Finally, a few of the values of maximum area were obtained from the Zurich or Catania drawings. These have been duly indicated.

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 but one gives the sum of the maximum projected areas of all the groups on the sun during the rotation in question. The rotations are numbered in accordance with the Greenwich Convention.

Rotation Beginning	Northern Hemisphere		Southern Hemisphere		Sum. of Max'm Areas	Daily Mean Areas
	No. of Groups	Max'm Areas	No. of Groups	Max'm Areas		
1034. Jan. 1·30	7	5·0	3	0·6	5·6	0·60
1035. Jan. 28·64	6	20·0	4	5·0	25·0	3·45
1036. Feb. 24·98	7	10·6	5	4·6	15·2	3·46
1037. Mar. 24·30	9	8·6	5	3·4	12·0	1·91
1038. April 20·57	6	3·4	4	0·8	4·2	1·11
1039. May 17·81	11	4·6	6	5·0	9·6	1·65
1040. June 14·01	2	1·2	4	1·4	2·6	0·43
1041. July 11·21	8	1·2	5	2·0	3·2	0·34
1042. Aug. 7·42	5	1·3	3	0·7	2·0	0·28
1043. Sept. 3·67	8	3·2	2	1·4	4·6	0·59
1044. Sept. 30·94	6	1·4	3	1·4	2·8	0·49
1045. Oct. 28·23	5	0·7	2	1·3	2·0	0·65
1046. Nov. 24·53	6	10·8	1	0·1	10·9	1·77
TOTALS	86	72·0	47	27·7	99·7	1·28

SEISMOLOGY.—Father Rowland reports :—The total number of earthquakes definitely recorded during the year was 87, as against 97 last year, distributed as follows :—

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
13	9	9	10	4	5	5	10	3*	11	7	1	87

* NOTE.—No record on many days owing to failure of motor clock.

The year was notable from the occurrence of two pronounced British Earthquakes, which aroused considerable public interest. The first of these occurred at 8 h. 26 m. G.M.T., on May 3rd, and was widely felt in the Manchester area, and did slight damage in the Swinton, Eccles and Patricroft districts, and was recorded as a very slight tremor on the Stonyhurst

seismogram. The other, which had its origin in the North Sea, and was felt throughout the greater part of Great Britain at about 0 h. 26 m. G.M.T. on June 7th, was of considerably greater intensity, but only slight damage was reported from a few places, chiefly on the East Coast. By taking four stations, two British and two Continental, at pairs of which the first phase was simultaneously recorded, Father Rowland deduced an epicentre at 53° 57′ N, 1° 25′ E, or about 65 miles E. by N. of Hull, a determination which was well confirmed by the observed times at some twenty-five other stations.

Of the recorded earthquakes the greatest, as measured by amplitude of displacement on our records were :—

May 20 ..... Atlantic Ocean—300 miles S.W. of Portugal.
Aug. 10 ..... Sin Kiang Province, China.

These are the greatest earthquakes recorded at this Observatory since the installation of the Milne-Shaw Seismograph in September, 1923, the range of displacement of the light spot exceeding seven inches in each case, that of the Chinese earthquake being slightly the greater.

Others of note were :—

Jan.	15	..... Mexico.
,,	27	..... Burma.
,,	28	..... Caroline Islands.
Feb.	2	..... New Zealand (Napier).
Mar.	8	..... Serbia.
,,	9	..... Japan.
,,	18	..... Pacific Ocean, near Chile.

Aug. 18	.....	Western Mangolia.
,, 24	.....	Baluchistan (Quetta).
,, 27	.....	,, ,,
Oct. 3	.....	Solomon Islands.
,, 10	.....	,, ,,
Nov. 2	.....	Japan.

Preliminary measurements of the principal shocks have been sent to the Official Centres, and complete bulletins are in preparation.

A number of original records or photographic copies of particular earthquakes have been supplied on request for special investigations.

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

Maximum Gusts for each Day of the Year, 1931.

Recorded by the Dines Tube Anemograph.

1931	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1931
DAY													DAY
1	13	31	43	40	30	20	22	15	31	36	28	9	1
2	24	38	26	30	17	22	37	29	19	47	37	44	2
3	12	34	25	15	18	25	28	34	37	37	**60**	58	3
4	24	13	38	35	29	33	32	**49**	**51**	24	58	60	4
5	11	20	31	36	31	**49**	19	37	38	33	26	47	5
6	10	23	**46**	18	33	31	22	23	26	32	32	45	6
7	15	25	38	18	26	20	18	29	20	40	19	40	7
8	18	40	38	28	26	27	29	35	30	36	24	38	8
9	21	32	27	11	13	28	32	32	24	35	38	38	9
10	25	44	27	19	30	35	22	36	12	22	40	47	10
11	36	57	28	28	38	40	26	29	26	26	28	23	11
12	24	59	22	30	28	24	28	28	31	24	33	24	12
13	40	38	31	35	32	17	26	24	23	24	21	26	13
14	32	24	29	36	**50**	40	19	28	14	24	29	35	14
15	43	35	19	24	26	43	22	24	23	10	25	28	15
16	**66**	36	33	39	21	40	28	37	22	13	24	15	16
17	65	**60**	32	38	16	33	35	38	26	29	34	11	17
18	33	30	24	**57**	18	45	38	26	18	30	14	10	18
19	36	18	26	54	30	33	32	30	26	24	23	5	19
20	36	36	22	45	22	27	29	30	24	34	32	10	20
21	27	38	16	27	28	40	26	28	26	16	34	10	21
22	39	29	19	29	24	40	**43**	12	14	16	22	18	22
23	58	30	24	39	30	30	30	15	25	13	43	27	23
24	51	42	40	39	27	28	19	41	22	46	40	51	24
25	53	40	40	32	37	15	17	27	14	18	33	28	25
26	38	44	22	26	26	22	27	18	16	9	41	34	26
27	28	24	19	51	27	32	36	24	26	19	39	50	27
28	46	25	34	32	36	26	39	40	18	29	23	**61**	28
29	37		34	17	22	29	27	35	22	**49**	16	43	29
30	32		32	29	29	19	25	33	30	32	12	36	30
31	42		35		20		12	19		20		12	31

METEOROLOGICAL REPORT.

JANUARY, 1931.

Results of Observations taken during the Month.		Mean for the last 84 years.
Mean Reading of the Barometer ..... inches	29·427	29·480
Highest ,, ,, on the 7th ..... ,,	30·109	30·122
Lowest ,, ,, on the 23rd ..... ,,	28·482	28·596
Range of Barometer Readings ..... ,,	1·627	1·526
Highest Reading of a Max. Therm. on the 16th...	48·1	51·4
Lowest Reading of a Min. Therm. on the 6th ...	22·3	22·0
Range of Thermometer Readings	25·8	29·4
Mean of Highest Daily Readings	42·1	42·5
Mean of Lowest Daily Readings	32·1	33·3
Mean Daily Range	10·0	9·2
Deduced Mean Temp. (from mean of Max. and Min.)	36·9	37·7
Mean Temperature from Dry Bulb	37·5	38·0
Adopted Mean Temperature	37·2	37·9
Mean Temperature of Evaporation	36·0	36·6
Mean Temperature of Dew Point	33·9	34·5
Mean elastic force of Vapour ..... inches	0·195	0·202
Mean weight of Vapour in a cub. ft. of air, grains	2·2	2·4
Mean additional weight required for saturation ,,	0·4	0·4
Mean degree of Humidity (saturation 100)	88	87
Mean weight of a cubic foot of air ..... grains	548·6	549·1
Mean amount of Cloud (0—10)	7·1	7·8
Fall of Rain ..... inches	6·792	4·447
Greatest Rainfall in one day (16th)..... ,,	0·980	0·826
No. of days on which ·005 in. or more Rain fell...	20	19·7

Wind:—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	2	1	1	2	6	16	0
Mean Velocity in miles per hr	7·2	2·4	2·5	13.1	7·4	8·4	12·5	0
Total No. of miles.....	518	116	61	315	357	1203	4796	0

		Mean*
Total No. of miles registered	7366	8291·2
Greatest hourly velocity (16th, at 2000 G.M.T., Dir. W.N.W.....	38	41·2

* *For the last* 64 *years.*

JANUARY, 1931.

DIFFERENCES.

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

Mean barometric pressure	—	0·053 in.
Monthly range ,, ...	+	0·101 in.
Mean of highest daily temperatures	—	0·4°
Mean of lowest ,, ,, ...	—	1·2°
Mean daily range	+	0·8°
Adopted mean temperature	—	0·7°
Total rainfall	+	2·345 in.

Ground Frost on the 1st—10th, 14th, 27th and 31st. Hoar Frost on the 2nd, 3rd, 5th—7th, and 27th. Snow on the 8th, 14th and 31st. Hail on the 24th—26th. Heavy Rain on the 11th, 16th, 18th, 27th and 28th. Gale on the 16th. Fog on the 2nd—6th, 8th, 10th and 20th. Solar Halo on the 19th. Lunar Halo on the 2nd. Rainbow on the 12th. Solar Pillar on the 9th.

EXTREME READINGS FOR JANUARY.

During 84 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, 1931.

Results of Observations taken during the Month.			Mean for the last 84 years.
Mean Reading of the Barometer	inches	29·384	29·491
Highest ,, ,, on the 3rd ...	,,	29·890	30·104
Lowest ,, ,, on the 16th...	,,	28·760	28·648
Range of Barometer Readings	,,	1·130	1·456
Highest Reading of a Max. Therm. on the 9th ...		49·5	52·1
Lowest Reading of a Min. Therm. on the 14th.....		29·7	22·8
Range of Thermometer Readings		19·8	29·3
Mean of Highest Daily Readings		41·3	43·8
Mean of Lowest Daily Readings		33·6	33·6
Mean Daily Range		7·7	10·2
Deduced Mean Temp. (from mean of Max. and Min.)		37·1	38·2
Mean Temperature from Dry Bulb		38·2	38·5
Adopted Mean Temperature		37·7	38·4
Mean Temperature of Evaporation		36·5	36·8
Mean Temperature of Dew Point		34·2	34·6
Mean elastic force of Vapour	inches	0·197	0·196
Mean weight of Vapour in a cub. ft. of air, grains		2·3	2·4
Mean additional weight required for saturation ,,		0·4	0·4
Mean degree of Humidity (saturation 100)		84	86
Mean weight of a cubic foot of air	grains	546·9	548·6
Mean amount of Cloud (0—10)		8·0	7·5
Fall of Rain	inches	6·162	3·547
Greatest Rainfall in one day (25th)	,,	0·820	0·759
No. of days on which ·005 in. or more Rain fell...		21	16·8

Wind:—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	2	0	2	1	9	9	3
Mean Velocity in miles per hr.	8·4	9·4	0	4·7	18·0	10·0	14·7	8·3
Total No. of miles.....	403	452	0	227	431	2170	3167	601

		Mean*
Total No. of miles registered	7451	7387·7
Greatest hourly velocity (12th, at 0330 G.M.T., Dir. W.).....	38	40·0

* *For the last* 64 *years.*

FEBRUARY, 1931.

DIFFERENCES.

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

Mean barometric pressure	—	0·107 in.
Monthly range ,, ...	—	0·326 in.
Mean of highest daily temperatures	—	2·5°
Mean of lowest ,, ,, ...		0·0°
Mean daily range	—	2·5°
Adopted mean temperature	—	0·7°
Total rainfall	+	2·615 in.

Ground Frost on the 2nd, 5th, 13th, 14th, 17th, 19th, 22nd, 24th and 28th. Hoar Frost on the 2nd. Snow on the 4th, 6th, 12th —14th, 16th, 17th, 22nd and 28th. Hail on the 12th, 16th, 21st and 22nd. Heavy Rain on the 9th, 15th, 24th, 25th and 28th (Snow). Gale on the 12th. Fog on the 5th—7th, 9th, 24th and 25th. Solar Halo on the 14th.

EXTREME READINGS FOR FEBRUARY,

During 84 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, 1931.

Results of Observations taken during the Month.		Mean for the last 84 years.
Mean Reading of the Barometer ..... inches	29·535	29·455
Highest ,, ,, on the 25th ... ,,	30·113	30·046
Lowest ,, ,, on the 13th ... ,,	29·053	28·659
Range of Barometer Readings ..... ,,	1·060	1·387
Highest Reading of a Max. Therm. on the 20th...	61·4	56·9
Lowest Reading of a Min. Therm. on the 7th ...	21·5	23·4
Range of Thermometer Readings	39·9	33·5
Mean of Highest Daily Readings	44·3	46·9
Mean of Lowest Daily Readings	31·9	34·4
Mean Daily Range	12·4	12·5
Deduced Mean Temp. (from mean of Max. and Min.)	37·1	39·8
Mean Temperature from Dry Bulb	37·8	40·4
Adopted Mean Temperature	37·5	40·1
Mean Temperature of Evaporation	34·4	38·2
Mean Temperature of Dew Point	30·1	35·8
Mean elastic force of Vapour ..... inches	0·168	0·210
Mean weight of Vapour in a cub. ft. of air, grains	2·0	2·4
Mean additional weight required for saturation ,,	0·7	0·5
Mean degree of Humidity (saturation 100)	71	85
Mean weight of a cubic foot of air ..... grains	550·8	546·1
Mean amount of Cloud (0—10)	6·0	7·5
Fall of Rain ..... inches	0·535	3·286
Greatest Rainfall in one day (13th)..... ,,	0·210	0·750
No. of days on which ·005 in. or more Rain fell...	6	16·5

Wind:—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of Days	3	7	12	1	1	1	5	1
Mean Velocity in miles per hr.	9·6	8·4	12·8	13·4	3·8	8·1	5·4	13·4
Total No. of miles.....	693	1417	3688	321	92	194	649	322

		Mean*
Total No. of miles registered	7376	8273·2
Greatest hourly velocity (6th, at 1100 G.M.T., Dir. E.	28	39·4

* *For the last* 64 *years.*

MARCH, 1931.

DIFFERENCES.

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

Mean barometric pressure	+	0·080 in.
Monthly range ,, ...	—	0·327 in.
Mean of highest daily temperatures	—	2·6°
Mean of lowest ,, ,, ...	—	2·5°
Mean daily range	—	0·1°
Adopted mean temperature	—	2·6°
Total rainfall	—	2·751 in.

Ground Frost on the 1st—13th, 15th—18th, 24th—27th and 29th. Hoar Frost on the 12th. Snow on the 1st, 6th—10th. Fog on the 21st—23rd. Lunar Halo on the 29th and 31st. Rainbow on the 21st.

EXTREME READINGS FOR MARCH,

During 84 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, 1931.

Results of Observations taken during the Month.		Mean for the last 84 years.
Mean Reading of the Barometer ..... inches	29·430	29·482
Highest ,, ,, on the 10th & 13th ,,	29·876	29·953
Lowest ,, ,, on the 25th ... ,,	28·681	28·800
Range of Barometer Readings ..... ,,	1·195	1·153
Highest Reading of a Max. Therm. on the 11th...	60·8	64·3
Lowest Reading of a Min. Therm. on the 1st ...	30·3	28·2
Range of Thermometer Readings	30·5	36·1
Mean of Highest Daily Readings	49·6	54·1
Mean of Lowest Daily Readings	39·5	37·9
Mean Daily Range	10·1	16·2
Deduced Mean Temp. (from mean of Max. and Min.)	43·1	43·9
Mean Temperature from Dry Bulb	44·9	44·7
Adopted Mean Temperature	44·0	44·3
Mean Temperature of Evaporation	41·8	41·6
Mean Temperature of Dew Point	38·2	38·2
Mean elastic force of Vapour ..... inches	0·231	0·234
Mean weight of Vapour in a cub. ft. of air, grains	2·7	2·7
Mean additional weight required for saturation ,,	0·7	0·7
Mean degree of Humidity (saturation 100)	75	80
Mean weight of a cubic foot of air ..... grains	540·8	542·0
Mean amount of Cloud (0—10)	7·1	6·8
Fall of Rain ..... inches	3·377	2·565
Greatest Rainfall in one day (2nd) ..... ,,	0·582	0·597
No. of days on which ·005 in. or more Rain fell...	19	14·9

Wind:—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	2	3	2	3	1	13	3
Mean Velocity in miles per hr.	9·9	14·9	12·0	11·0	11·4	2·3	11·4	12·5
Total No. of miles.....	710	717	863	529	818	54	3554	899

		Mean*
Total No. of miles registered	8144	7450·9
Greatest hourly velocity (27th, at 1600 G.M.T., Dir. W.N.W.)	31	35·8

* *For the last* **64** *years.*

APRIL, 1931.

DIFFERENCES.

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

Mean barometric pressure	—	0·052 in.
Monthly range ,, ...	+	0·042 in.
Mean of highest daily temperatures	—	4·5°
Mean of lowest ,, ,, ...	+	1·6°
Mean daily range	—	6·1°
Adopted mean temperature	—	0·3°
Total rainfall	+	0·812 in.

Ground Frost on the 1st, 4th and 6th. Hail on the 17th and 23rd. Heavy Rain on the 2nd and 16th. Fog on the 10th. Solar Halo on the 6th and 10th.

EXTREME READINGS FOR APRIL,

During 84 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, 1931.

Results of Observations taken during the Month.		Mean for the last 84 years.
Mean Reading of the Barometer ..... inches	29·419	29·537
Highest ,, ,, on the 9th ... ,,	29·836	29·982
Lowest ,, ,, on the 4th ... ,,	29·080	28·945
Range of Barometer Readings ..... ,,	0·756	1·037
Highest Reading of a Max. Therm. on the 27th...	71·2	71·7
Lowest Reading of a Min. Therm. on the 21st ...	35·3	32·1
Range of Thermometer Readings	35·9	39·6
Mean of Highest Daily Readings	58·5	59·3
Mean of Lowest Daily Readings	44·5	42·6
Mean Daily Range	14·0	16·7
Deduced Mean Temp. (from mean of Max. and Min.)	49·8	49·2
Mean Temperature from Dry Bulb	51·5	50·1
Adopted Mean Temperature	50·7	49·7
Mean Temperature of Evaporation	47·6	46·5
Mean Temperature of Dew Point	43·6	43·0
Mean elastic force of Vapour ..... inches	0·285	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	532·8	536·8
Mean amount of Cloud (0—10)	7·1	7·0
Fall of Rain ..... inches	2·059	2·451
Greatest Rainfall in one day (24th)..... ,,	0·387	0·647
No. of days on which ·005 in. or more Rain fell...	15	14·7

Wind:—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	8	3	3	5	8	3	0
Mean Velocity in miles per hr.	5·7	5·9	8·3	8·7	12·2	10·5	7·7	0
Total No. of miles.....	137	1127	594	623	1469	2024	556	0

		Mean*
Total No of miles registered	6530	6863·1
Greatest hourly velocity (14th, at 1200 G.M.T., Dir. S.W.)	30	32·2

* *For the last* 64 *years.*

MAY, 1931.

DIFFERENCES.

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

Mean barometric pressure	—	0·118 in.
Monthly range ,, ...	—	0·281 in.
Mean of highest daily temperatures	—	0·8°
Mean of lowest ,, ,, ...	+	1·9°
Mean daily range	—	2·7°
Adopted mean temperature	+	1·0°
Total rainfall	—	0·392 in.

Ground Frost on the 4th, 9th and 21st. Distant Thunder on the 25th. Solar Halo on the 3rd, 12th and 16th. Rainbow on the 13th and 16th.

EXTREME READINGS FOR MAY,

During 84 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, 1931.

Results of Observations taken during the Month.		Mean for the last 84 years.
Mean Reading of the Barometer ..... inches	29·558	29·560
Highest ,, ,, on the 25th ... ,,	29·979	29·938
Lowest ,, ,, on the 7th ... ,,	29·198	29·047
Range of Barometer Readings ..... ,,	0·781	0·891
Highest Reading of a Max. Therm. on the 14th .	69·3	76·4
Lowest Reading of a Min. Therm. on the 25th...	40·3	39·2
Range of Thermometer Readings	29·0	37·2
Mean of Highest Daily Readings	61·6	64·9
Mean of Lowest Daily Readings	49·5	48·2
Mean Daily Range	12·1	16·7
Deduced Mean Temp. (from mean of Max. and Min.)	53·8	54·7
Mean Temperature from Dry Bulb	54·7	55·3
Adopted Mean Temperature	54·3	55·0
Mean Temperature of Evaporation	51·4	51·7
Mean Temperature of Dew Point	48·2	48 2
Mean elastic force of Vapour ..... inches	0·331	0·345
Mean weight of Vapour in a cub. ft. of air, grains	3·9	3·8
Mean additional weight required for saturation ,,	1·0	1·0
Mean degree of Humidity (saturation 100)	79	78
Mean weight of a cubic foot of air ..... grains	531·6	531·4
Mean amount of Cloud (0—10)	8·2	7·2
Fall of Rain ..... inches	6·912	3·332
Greatest Rainfall in one day (2nd) ..... ,,	1·480	0·803
No. of days on which ·005 in. or more Rain fell...	21	15·2

Wind:—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	6	3	0	1	5	13	1
Mean Velocity in miles per hr.	7·8	8·6	7·2	0	15·1	12·8	8·4	12·1
Total No. of miles.....	186	1241	516	0	363	1537	2615	291

		Mean*
Total No. of miles registered	6749	6198·0
Greatest hourly velocity (16th, at 0900 G.M.T., Dir., S.)	27	29·2

* *For the last* 64 *years.*

JUNE, 1931.

DIFFERENCES.

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

Mean barometric pressure	—	0·002 in.
Monthly range ,, ...	—	0·110 in.
Mean of highest daily temperatures	—	3·3°
Mean of lowest ,, ,, ...	+	1·3°
Mean daily range	—	4·6°
Adopted mean temperature	—	0·7°
Total rainfall	+	3·580 in.

Heavy Rain on the 2nd, 5th and 14th. Fog on the 1st and 2nd. Thunder on the 1st and 14th. Lightning on the 14th.

EXTREME READINGS FOR JUNE,

During 84 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, 1931.

Results of Observations taken during the Month.			Mean for the last 84 years.
Mean Reading of the Barometer	inches	29·338	29·523
Highest ,, ,, on the 21st ...	,,	29·672	29·902
Lowest ,, ,, on the 25th ...	,,	29·040	29·002
Range of Barometer Readings	,,	0·632	0·900
Highest Reading of a Max. Therm. on the 22nd...		70·4	78·1
Lowest Reading of a Min. Therm. on the 29th...		49·0	43·0
Range of Thermometer Readings		21·4	35·1
Mean of Highest Daily Readings		63·4	67·2
Mean of Lowest Daily Readings		53·3	51·3
Mean Daily Range		10·1	15·9
Deduced Mean Temp. (from mean of Max. and Min.)		56·5	57·6
Mean Temperature from Dry Bulb		58·0	58·0
Adopted Mean Temperature		57·3	57·9
Mean Temperature of Evaporation		54·9	54·8
Mean Temperature of Dew Point		52·1	52·0
Mean elastic force of Vapour	inches	0·390	0·388
Mean weight of Vapour in a cub. ft. of air, grains		4·4	4·4
Mean additional weight required for saturation	,,	1·0	1·1
Mean degree of Humidity (saturation 100)		81	81
Mean weight of a cubic foot of air	grains	524·0	527·4
Mean amount of Cloud (0—10)		8·3	7·4
Fall of Rain	inches	4·234	4·054
Greatest Rainfall in one day (17th)	,,	0·843	0·886
No. of days on which ·005 in. or more Rain fell...		26	16·8

Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	2	0	0	2	9	17	1
Mean Velocity in miles per hr.	0	4·5	0	0	6·1	10·3	8·4	10·1
Total No. of Miles.....	0	216	0	0	293	2225	3412	242

		Mean*
Total No. of miles registered	6388	6307·7
Greatest hourly velocity (17th, at 2300 G.M.T., Dir. W.S.W. ; 22nd, at 1200 G.M.T., Dir. S.W.)	22	28·0

* *For the last* 64 *years.*

JULY, 1931.

DIFFERENCES.

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

Mean barometric pressure	—	0·185 in.
Monthly range ,, ...	—	0·268 in.
Mean of highest daily temperatures	—	3·8°
Mean of lowest ,, ,, ...	+	2·0°
Mean daily range	—	5·8°
Adopted mean temperature	—	0·6°
Total rainfall	+	0·180 in.

Heavy Rain on the 17th. Thunder on the 5th, 6th, 12th, 14th and 15th. Lightning on the 12th. Rainbow on the 12th and 17th.

EXTREME READINGS FOR JULY,

During 84 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, 1931.

Results of Observations taken during the Month.		Mean for the last 84 years
Mean Reading of the Barometer ..... inches	29·506	29·491
Highest ,, ,, on the 27th ... ,,	29·979	29·893
Lowest ,, ,, on the 19th ... ,,	28·802	28·943
Range of Barometer Readings ..... ,,	1·177	0·950
Highest Reading of a Max. Therm. on the 4th ...	70·5	75·9
Lowest Reading of a Min. Therm. on the 23rd ...	40·4	42·0
Range of Thermometer Readings	30·1	33·9
Mean of Highest Daily Readings	62·6	66·1
Mean of Lowest Daily Readings	50·2	50·9
Mean Daily Range	12·4	15·2
Deduced Mean Temp. (from mean of Max. and Min.)	54·7	56·8
Mean Temperature from Dry Bulb	56·0	57·7
Adopted Mean Temperature	55·4	57·3
Mean Temperature of Evaporation	52·5	54·5
Mean Temperature of Dew Point	49·2	51·8
Mean elastic force of Vapour ..... inches	0·353	0·386
Mean weight of Vapour in a cub. ft. of air, grains	4·0	4·3
Mean additional weight required for saturation ,,	1·1	0·9
Mean degree of Humidity (saturation 100)	78	82
Mean weight of a cubic foot of air ..... grains	529·4	527·2
Mean amount of Cloud (0—10)	7·2	7·3
Fall of Rain ..... inches	4·857	5·183
Greatest Rainfall in one day (19th) ..... ,,	1·172	1·085
No. of days on which ·005 in. or more Rain fell...	15	18·8

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	10	4	1	2	1	8	2
Mean Velocity in miles per hr.	9·1	7·8	9·3	7·0	12·9	3·3	8·2	8 0
Total No. of miles.....	654	1869	896	168	617	79	1567	386

		Mean*
Total No. of miles registered	6236	6325·4
Greatest hourly velocity (16th, at 2400 G.M.T., Dir., S.	26	30·3

* *For the last* 64 *years.*

AUGUST, 1931.

DIFFERENCES.

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

Mean barometric pressure	+	0·015 in.
Monthly range ,, ...	+	0·227 in.
Mean of highest daily temperatures	—	3·5°
Mean of lowest ,, ,, ...	—	0·7°
Mean daily range	—	2·8°
Adopted mean temperature	—	1·9°
Total rainfall	—	0·326 in.

Heavy Rain on the 5th, 9th, 14th and 19th. Fog on the 26th. Thunder on the 15th, 16th and 19th. Lightning on the 4th, 15th, 16th and 19th. Solar Halo on the 28th.

EXTREME READINGS FOR AUGUST,

During 84 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, 1931.

Results of Observations taken during the Month.		Mean for the last 84 years.
Mean Reading of the Barometer	inches 29·744	29·545
Highest ,, ,, on the 26th ...	,, 30·220	30·006
Lowest ,, ,, on the 4th ...	,, 29·973	28·889
Range of Barometer Readings	,, 1·247	1·117
Highest Reading of a Max. Therm. on the 1st ...	67·5	71·6
Lowest Reading of a Min. Therm. on the 13th ..	34·7	36·8
Range of Thermometer Readings	32·8	34·8
Mean of Highest Daily Readings	57·7	61·7
Mean of Lowest Daily Readings	46·8	47·4
Mean Daily Range	10·9	14·3
Deduced Mean Temp. (from mean of Max. and Min.)	51·0	53·3
Mean Temperature from Dry Bulb	52·8	54·2
Adopted Mean Temperature	51·9	53·8
Mean Temperature of Evaporation	49·8	51·0
Mean Temperature of Dew Point	46·9	48·3
Mean elastic force of Vapour	inches 0·321	0·339
Mean weight of Vapour in a cub. ft. of air, grains	3·7	3·9
Mean additional weight required for saturation ,,	0·9	0·8
Mean degree of Humidity (saturation 100)	79	82
Mean weight of a cubic foot of air	grains 537·0	532·6
Mean amount of Cloud (0—10)	7·2	6·7
Fall of Rain	inches 2·986	4·314
Greatest Rainfall in one day (2nd)	,, 0·655	0·962
No. of days on which ·005 in. or more Rain fell...	14	16·5

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	5	5	1	0	2	6	8	3
Mean Velocity in miles per hr.	6·9	5·2	3·3	0	9·6	4·2	5·6	7·6
Total No. of miles	822	617	80	0	461	600	1072	546

		Mean*
Total No. of miles registered	4198	6005·5
Greatest hourly velocity (4th, at 1600 G.M.T., Dir., N.)	22	31·5

* *For the last* **64** *years.*

SEPTEMBER, 1931.

DIFFERENCES.

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

Mean barometric pressure	+	0·199 in.
Monthly range ,, ...	+	0·130 in
Mean of highest daily temperatures	—	4·0°
Mean of lowest ,, ,, ...	—	0·6°
Mean daily range	—	3·4°
Adopted mean temperature	—	1·9°
Total rainfall	—	1·328 in.

Ground Frost on the 13th. Heavy Rain on the 2nd. Fog on the 1st, 2nd, 7th, 14th, 17th and 19th.

EXTREME READINGS FOR SEPTEMBER,

During 84 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, 1931.

Results of Observations taken during the Month.			Mean for the last 84 years.
Mean Reading of the Barometer	inches	29·690	29·447
Highest ,, ,, on the 15th ...	,,	30·217	30·024
Lowest ,, ,, on the 23rd ...	,,	29·055	28·688
Range of Barometer Readings	,,	1·162	1·336
Highest Reading of a Max. Therm. on the 2nd...		62·6	64·0
Lowest Reading of a Min. Therm. on the 26th...		24·0	29·8
Range of Thermometer Readings		38·6	34·2
Mean of Highest Daily Readings		53·3	54·4
Mean of Lowest Daily Readings		40·8	42·1
Mean Daily Range		12·5	12·3
Deduced Mean Temp. (from mean of Max. and Min.)		46·1	47·3
Mean Temperature from Dry Bulb		46·8	48·0
Adopted Mean Temperature		46·5	47·8
Mean Temperature of Evaporation		44·2	45·5
Mean Temperature of Dew Point		41·3	43·1
Mean elastic force of Vapour	inches	0·260	0·279
Mean weight of Vapour in a cub. ft. of air, grains		3·0	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	542·9	537·4
Mean amount of Cloud (0—10)		5·8	7·2
Fall of Rain	inches	3·334	4·934
Greatest Rainfall in one day (29th).....	,,	1·052	0·978
No. of days on which ·005 in. or more Rain fell...		12	18·8

Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	6	3	0	0	2	11	6	3
Mean Velocity in miles per hr.	5·8	4·5	0	0	8·6	8·3	7·7	7·7
Total No. of miles.....	833	323	0	0	411	2193	1113	551

		Mean*
Total No. of miles registered, ...	5424	6777·6
Greatest hourly velocity (29th, at 2100 G.M.T., Dir., W. by S.)	28	36·7

* *For the last* **64** *years.*

OCTOBER, 1931.

DIFFERENCES.

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

Mean barometric pressure	+	0·243 in.
Monthly range ,, ...	—	0·174 in.
Mean of highest daily temperatures	—	1·1°
Mean of lowest ,, ,, ...	—	1·3°
Mean daily range	+	0·2°
Adopted mean temperature	—	1·3°
Total rainfall	—	1·600 in.

Ground Frost on the 21st—27th and 31st. Hoar Frost on the 21st—26th. Heavy Rain on the 27th and 29th. Fog on the 4th, 17th, 19th, 26th and 31st. Thunder on the 7th. Lightning on the 7th. Lunar Halo on the 28th.

EXTREME READINGS FOR OCTOBER, During 84 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, 1931.

Results of Observations taken during the Month.		Mean for the last 84 years.
Mean Reading of the Barometer ..... inches	29·283	29·456
Highest ,, ,, on the 16th ... ,,	30·006	30·066
Lowest ,, ,, on the 10th ... ,,	28·214	28·565
Range of Barometer Readings ..... ,,	1·792	1·501
Highest Reading of a Max. Therm. on the 3rd ...	59·6	55·8
Lowest Reading of a Min. Therm. on the 22nd ...	32·3	25·6
Range of Thermometer Readings	27·3	30·2
Mean of Highest Daily Readings	49·3	47·1
Mean of Lowest Daily Readings	41·0	36·8
Mean Daily Range	8·3	10·3
Deduced Mean Temp. (from mean of Max. and Min.)	44·8	41·6
Mean Temperature from Dry Bulb	45·9	42·1
Adopted Mean Temperature	45·4	41·8
Mean Temperature of Evaporation	44·3	39·8
Mean Temperature of Dew Point	42·5	38·2
Mean elastic force of Vapour ..... inches	0·272	0·231
Mean weight of Vapour in a cub. ft. of air, grains	3·1	2·8
Mean additional weight required for saturation ,,	0·5	0·4
Mean degree of Humidity (saturation 100)	87	87
Mean weight of a cubic foot of air ..... grains	536·3	544·3
Mean amount of Cloud (0—10)	7·8	7·4
Fall of Rain ..... inches	6·500	4·521
Greatest Rainfall in one day (27th) ..... ,,	1·118	1·009
No. of days on which ·005 in. or more Rain fell ...	19	18·2

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	2	3	7	11	5	2	0
Mean Velocity in miles per hr.	0	4·5	5·3	9·0	13·8	11·8	7·8	0
Total No. of miles.....	0	214	384	1504	3640	1410	373	0

		Mean*
Total No. of miles registered	7525	7127·7
Greatest hourly velocity (3rd, at 1600 G.M.T., Dir., S. by W.)	49	41·0

* *For the last* **64** *years.*

NOVEMBER, 1931.

DIFFERENCES.

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

Mean barometric pressure	—	0·173 in.
Monthly range ,, ...	+	0·291 in.
Mean of highest daily temperatures	+	2·2°
Mean of lowest ,, ,, ...	+	4·2°
Mean daily range	—	2·0°
Adopted mean temperature	+	3·6°
Total rainfall	+	1·979 in.

Ground Frost on the 22nd. Heavy Rain on the 3rd, 11th, 14th, 23rd, 26th and 27th. Gale on the 3rd and 4th. Fog on the 7th, 19th, 22nd, 25th, 29th and 30th. Lunar Halo on the 19th.

EXTREME READINGS FOR NOVEMBER,

During 84 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, 1931.

Results of Observations taken during the Month			Mean for the last 84 years.
Mean Reading of the Barometer	inches	29·787	29·435
Highest ,, ,, on the 22nd ...	,,	30·274	30·071
Lowest ,, ,, on the 28th ...	,,	28·828	28·540
Range of Barometer Readings	,,	1·446	1·531
Highest Reading of a Max. Therm. on the 4th ...		53·3	52·7
Lowest Reading of a Min. Therm. on the 31st		22·1	21·7
Range of Thermometer Readings		31·2	31·0
Mean of Highest Daily Readings		46·1	43·4
Mean of Lowest Daily Readings		36·9	33·9
Mean Daily Range		9·2	9·5
Deduced Mean Temp. (from mean of Max. and Min.)		41·5	38·7
Mean Temperature from Dry Bulb		41·6	39·3
Adopted Mean Temperature		41·6	39·0
Mean Temperature of Evaporation		39·8	37·4
Mean Temperature of Dew Point		37·5	35·4
Mean elastic force of Vapour	inches	0·226	0·209
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)		84	87
Mean weight of a cubic foot of air	grains	550·6	547·0
Mean amount of Cloud (0—10)		7·9	7·7
Fall of Rain	inches	3·295	4·675
Greatest Rainfall in one day (23rd)	,,	0·547	0·833
No. of days on which ·005 in. or more Rain fell...		17	20·1

Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	7	0	0	3	3	15	3
Mean Velocity in miles per hr.	0	2·9	0	0	7·4	18·2	13·3	8·5
Total No. of miles.....	0	484	0	0	530	1313	4792	614

		*Mean
Total No. of miles registered	7733	7804·6
Greatest hourly velocity (3rd, at 0900 G.M.T., Dir. S. by W.)	44	41·9

* *For the last* 64 *years.*

DECEMBER, 1931.

DIFFERENCES.

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

Mean barometric pressure	+	0·352 in.
Monthly range ,, ...	—	0·085 in.
Mean of highest daily temperature	+	2·7°
Mean of lowest ,, ,, ...	+	3·0°
Mean daily range	—	0·3°
Adopted mean temperature	+	2·6°
Total rainfall	—	1·380 in.

Ground Frost on the 1st, 2nd, 7th, 18th—20th, 22nd, 23rd, 29th—31st. Hoar Frost on the 7th, 18th, 23rd, 30th and 31st. Snow on the 28th and 29th. Hail on the 28th. Heavy Rain on the 4th and 23rd. Gale on the 3rd and 28th. Fog on the 5th, 19th, 21st and 31st. Thunder on the 28th. Lightning on the 28th. Rainbow on the 4th.

EXTREME READINGS FOR DECEMBER,

During 84 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	10·597 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, 1931.

Results of Observations taken during the Year.		Mean for the last 84 Years.
Readings of Barometer in inches.		
Mean of the Year	29·508	29·492
Highest Monthly Mean (December)	29·787	29·745
Lowest ,, ,, (November)	29·283	29·225
Highest Reading (December 22nd)	30·274	30·294
Lowest ,, (November 10th)	28·214	28·209
Range	2·060	2·085
Thermometer, Fahrenheit.		
Highest Monthly Mean Temperature (July)	57·3	58·6
Lowest ,, ,, ,, (January)	37·2	35·8
Highest Reading of a Max. Therm. (May 27th)	71·2	81·1
Lowest ,, Min. ,, (March 7th)	21·5	16·6
Range of Thermometer Readings	49·7	64·5
Mean of Highest Daily ,,	52·5	54·3
Mean of Lowest Daily ,,	41·7	41·1
Mean Daily Range	10·8	13·2
Deduced Mean Temp. (from Mean of Max. and Min.)	46·0	46·7
Mean Temperature from Dry Bulb	47·1	47·2
Adopted Mean Temperature of the Year	46·6	47·0
Mean Temperature of Evaporation	44·4	44·6
Mean Temperature of Dew Point	41·4	42·1
Mean elastic force of Vapour ... inches	0·262	0·274
Mean weight of Vapour in a cub. ft. of air...grns.	3·0	3·2
Mean additional weight required for saturation ,,	0·7	0·7
Mean degree of Humidity (saturation 100)	79	84
Mean weight of a cubic foot of air ... grns.	539·2	539·0
Mean amount of Cloud (0—10)	7·3	7·3
Total fall of Rain ... inches	51·043	47·613
Greatest Monthly Rainfall (June)	6·912	7·631
Least ,, ,, (March)	0·535	1·238
Greatest Rainfall in one day (June 2nd)	1·480	1·659
No. of days per Month on which ·005 inch or more Rain fell	17·1	17·2

SUMMARY OF WIND, 1931.

Prevailing Direction	N	NE	E	SE	S	SW	W	NW
No. of days for each	27	56	30	17	35	65	115	20
Mean Velocity in miles per hour...	7·6	6·5	9·8	9·0	11·3	9·6	10·0	9·3
Total No. of miles for each Direction	4956	8793	7082	3687	9482	15002	27666	4452

		Mean for the last 64 years.
Total No. of miles registered	81120	84928·1
Greatest Monthly Total (April)	8144	9914·1
Least ,, ,, (September)	4198	4902·8
Greatest recorded hourly velocity (November 3)..	49	50·4
Prevailing Direction of Wind	W.	W.

DIFFERENCES, 1931.

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

Mean barometric pressure	+	0·016 in.
Yearly range ,, ...	—	0·025 in.
Mean of highest daily temperatures	—	1·8°
Mean of lowest ,, ,, ...	+	0·6°
Mean daily range	—	2·4°
Adopted mean temperature	—	0·4°
Total rainfall	+	3·430 in.

ABSOLUTE EXTREMES

FOR THE LAST 84 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 84 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.) ..... and 1918 (Dec.)	30
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.

1931	Frost	Hoar Frost	Snow	Hail	Heavy Rain
January	1-10, 14, 27, 31	2, 3, 5-7, 27	8, 14, 31	24-26	11, 16, 18, 27, 28
February	2, 5, 13, 14, 17, 19, 22, 24, 28	2	4, 6, 12-14, 16, 17, 22, 28	12, 16, 21, 22	9, 15, 24, 25, 28
March	1-13, 15-18, 24-27, 29	12	1, 6-10		
April	1, 4, 6			17, 23	2, 16
May	4, 9, 21				
June					2, 5, 14
July					17
August					5, 9, 14, 19
September	13				2
October	21-27, 31	21-26			27, 29
November	22				3, 11, 14, 23, 26, 27
December	1, 2, 7, 18-20, 22, 23, 29-31	7, 18, 23, 30, 31	28, 29	28	4, 23

1931	Gales of Wind	Fog	Thunder	Lightning	Lunar Halo	Solar Halo	Aurora Borealis
January	16	2-6, 8, 10, 20			2	19	
February	12	5-7, 9, 24, 25				14	
March		21-23			29, 31		
April		10				6, 10	
May			25			3, 12, 16	
June		1-2	1, 14	14			
July			5, 6, 12, 14, 15	12			
August		26	15, 16, 19	4, 15, 16, 19		28	
September		1, 2, 7, 14, 17, 19					
October		4, 17, 19, 26, 31	7	7	28		
November	3, 4	7, 19, 22, 25, 29, 30			19		
December	3, 28	5, 19, 21, 31	28	28			

MONTHLY TOTALS FOR EACH HOUR OF RECORDED SUNSHINE.

1931. 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 ...	...	...	...	...	2·0	8·9	10·6	11·5	9·1	10·5	7·5	1·1	...	...	...	...	...
February ...	...	...	...	0·7	3·2	3·9	2·9	4·6	5·9	6·1	3·4	2·3	1·5	0·1	...	...	...
March ...	...	...	1·0	10·5	14·8	16·2	18·6	17·6	15·1	15·3	15·9	13·2	7·7	2·0	...	...	...
April ...	...	1·1	7·2	8·7	10·4	11·0	11·9	11·1	12·2	9·3	9·5	9·6	8·1	3·4	1·9	...	...
May ...	0·7	8·3	12·0	13·7	14·2	14·6	16·9	14·7	15·9	14·1	12·4	11·5	9·1	10·8	6·9	0·9	...
June ...	1·1	3·6	4·9	5·0	7·4	8·9	9·4	10·0	12·1	13·1	11·5	11·7	10·1	10·0	7·3	3·5	...
July ...	...	1·5	5·1	6·7	7·4	8·0	9·3	8·9	10·3	10·3	10·9	10·5	12 3	12·8	9·6	2·6	...
August ...	0·3	6·3	12·6	14·1	12·8	14·3	15·9	14·2	12·7	12·8	12·8	14·1	13 4	11·8	4·5	0·1	...
September ..	...	...	2·7	7·7	10·0	10·6	12·0	10·7	8·1	7·4	5·0	4·6	4·1	2·4	...	...	...
October ...	...	...	...	3·5	12·0	16·4	15·1	14·9	16·2	15·8	14·5	12·5	5·4	...	...	...	...
November...	...	...	...	...	2·1	4·5	7·5	7·6	5·3	6·2	5·5	0·6	...	...	...	...	...
December ...	...	...	...	...	0.4	3·9	6·7	6·5	4·2	2·1	1·4	0·1	...	...	...	...	...
Sums ...	2·1	20·8	45·5	70·6	96·7	121·2	136·8	132·3	127·1	123·0	110·3	91·8	71·7	53·3	30·2	7·1	...

TOTAL AMOUNT OF SUNSHINE RECORDED ON EACH DAY.

1931	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
January ...	1·8	2·8	1·0	4·1	...	6·0	4·0	...	2·7	0·4	...	4·1	6·3	0·8	...	...	3·8
February ..	...	...	0·3	...	...	...	...	...	1·2	0·6	0·2	1·0	4·4	6·0	0·1	4·4	1·0
March ..	7·3	8·6	1·3	7·2	...	3·7	6·6	4·2	6·6	8·4	4·5	8·8	...	2·0	2·9	2·6	8·0
April ..	5·8	...	...	0·8	8·8	5·7	0·1	1·2	0·1	7·8	6·3	4·9	7·9	4·6	...	3·4	8·9
May ...	11·7	8·2	1·4	13·1	3·2	9·0	5·4	3·1	10·3	...	9·1	5·6	0·2	3·6	...	3·3	...
June ..	6·2	0·2	...	2·9	0·1	0·2	1·9	6·7	0·8	0·2	6·0	0·6	4·6	...	6·8	0·4	7·9
July ..	4·7	1·8	1·7	6·1	4·4	5·5	9·6	1·3	0·6	11·6	9·6	1·7	8·6	2·6	0·6	6·5	0·1
August ...	3·5	9·0	13·3	14·2	2·0	1·0	5·4	0·1	11·5	0·5	2·5	3·9	0·8	...	4·1	5·0	0·8
September ..	4·3	...	...	...	0·2	11·0	9·7	10·1	0·9	...	9·2	1·3	6·0	...	0·1	1·8	0·1
October ...	0·1	1·8	4·3	...	...	1·6	5·1	...	...	7·8	7·1	...	8·6	6·8	7·6	6·8	6·9
November..	2·1	...	...	4·1	4·6	3·3	0·8	...	...	0·6	0·4	0·1	3·9	...	...	0·1	0·1
December ...	0·1	...	0·9	0·1	...	2·0	1·5	...	...	0·3	...	...	...	...	...	...	1·5

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

1931	18	19	20	21	22	23	24	25	26	27	28	29	30	31	MONTHLY Total	MONTHLY Percen.
January ...	...	0·2	2·1	...	3·6	0·2	1·0	4·4	3·7	4·0	...	...	4·2	...	61·2	24·7
February ...	0·2	...	...	7·1	4·4	1·2	...	...	1·4	0·6	0·5	...	...	...	34·6	12·7
March .	3·4	3·8	1·8	0·5	7·5	2·4	5·5	10·6	9·6	10·3	...	...	...	9·8	147·9	40·4
April ...	3·1	0·8	2·2	5·7	1·2	0·1	2·7	1·4	...	7·2	7·5	7·2	10·0	...	115·4	27·5
May ...	4·7	7·9	12·3	13·7	0·1	...	1·2	10·0	11·4	8·7	...	7·3	9·7	2.5	176·7	35·8
June ...	1·7	1·9	8·3	4·3	6·5	0·1	8·5	14·0	14·1	0·8	7·0	13·8	3·1	...	129·6	25·5
July ..	1·1	3·7	11·9	0·4	6·4	2·6	1·7	0·1	9·5	4·7	1·2	1·5	4·4	0.1	126·3	24·8
August ...	12·7	1·2	2·8	0·2	2·9	3·1	10·8	7·5	10·9	10·0	0·8	8·1	12·2	11·9	172·7	37·8
September ..	...	...	9·1	6·4	5·4	0·2	0·5	0·9	...	1·3	2·4	4·4	...	...	85·3	22·5
October ...	0·1	...	7·3	7·8	6·7	7·5	5·8	9·0	1·9	0·5	7·8	...	7·4	...	126·3	38·7
November..	...	2·5	3·3	5·9	...	...	5·2	0·4	0·7	...	1·1	0·1	...	...	39·3	15·4
December ..	2·1	0·1	0·8	...	...	...	...	...	0·1	1·7	2·0	3·6	6·3	2.3	25·4	11·0

SUMMARY OF SUNSHINE.

	Bright Sunshine Recorded					
	1931			Mean for the last 51 years		
	Number of		Percentage of Possible Sunshine	Number of		Percentage of Possible Sunshine
	Days	Hours		Days	Hours	
January ...	21	61·2	24·7	14·6	33·1	13·4
February ...	17	34·6	12·7	17·6	55·8	20·3
March ...	26	147·9	40·4	24·4	104·0	28·4
April ...	26	115·4	27·5	26·5	145·3	34·7
May ...	26	176·7	35·8	27·8	183·8	37·3
June ...	28	129·6	25·5	28·0	185·4	36·6
July ...	31	126·3	24·8	28·4	167·6	33·0
August ...	30	172·7	37·8	27·6	147·2	32·2
September ..	22	85·3	22·5	25·5	123·6	32·5
October ...	23	126·3	38·7	23·7	87·2	26·7
November ..	19	39·3	15·4	18·0	47·4	18·6
December ...	16	25·4	11·0	13·9	27·1	11·7
Year ...	285	1240·7	27·8	276·0	1309·4	29·3

SUMMARY OF SUNSHINE—*Continued.*

EXTREMES FOR THE LAST 51 YEARS.

MONTH	Number of Days on which Sunshine was recorded				Number of Hours				Percentage of Possible Sunshine			
	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).

1931.	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					
	13° +						13° +	13° +	
	′	′	′	′	′	′	′	′	′
January ...	46·4	43·8	44·4	45·2	45·0	9·8	52·6	30·6	22·0
February ...	47·2	41·6	42·6	45·0	44·1	12·5	63·6	16·6	47·0
March	47·4	40·0	42·4	43·6	43·4	12·8	54·6	18·6	36·0
April	45·2	37·0	39·6	42·4	41·1	12·1	50·6	28·6	22·0
May	45·0	35·4	38·2	41·4	40·0	12·8	49·6	18·6	31·0
June	43·4	33·6	36·0	41·6	38·6	13·7	49·6	27·6	22·0
July	43·4	33·0	36·2	40·6	38·4	12·8	48·6	28·6	20·0
August ...	41·8	32·4	35·2	38·6	37·0	14·3	49·6	22·6	27·0
September ...	40·6	31·4	34·6	38·2	36·2	16·5	48·6	17·6	31·0
October ...	42·2	32·6	36·6	38·6	37·5	19·4	66·6	7·6	59·0
November ...	39·0	32·2	36·0	37·2	36·1	15·2	47·6	17·6	30·0
December ...	37·2	33·2	35·0	35·8	35·3	13·1	51·6	10·6	41·0
Means	43·2	35·5	38·1	40·7	39·4	13·8	52·8	20·4	32·3

Mean for the year ... ... 13° 39′·4 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.

1931	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					
	17000 +						17000 +		
January ...	212	196	205	203	204	44·3	234	113	121
February ...	206	189	199	200	199	45·6	264	126	138
March ...	205	174	197	198	194	49·9	246	148	98
April	202	168	192	190	188	52·9	234	105	129
May	201	162	186	192	185	57·2	255	117	138
June	202	150	178	184	179	71·8	276	79	197
July	190	146	172	178	172	64·9	234	94	140
August ...	186	145	162	162	164	61·1	212	100	112
September ...	178	141	164	165	162	65·8	216	94	122
October ...	187	148	173	168	169	80·4	281	58	223
November ...	192	166	181	179	179	63·2	242	100	142
December ...	187	173	179	182	180	56·3	230	105	125
Means	196	163	182	183	181	59·5	244	103	140

Mean for the year ... ... ·17181 C. G. S. Units.

* *For the 5 quietest days* † *Includes all days*

ABSOLUTE MEASURES—SUMMARY.

1931	DIRECTION		FORCE.		
	Declination Corrected	Inclination	Horizontal	Vertical	Total
	° ′	° ′	C. G. S. UNITS.		
	13 +	68 +	0·17000+	0·44000+	0·47000+
January ...	44·8	46·0	185	229	450
February ...	44·5	47·2	189	284	503
March ...	43·9	48·3	168	276	488
April	40·4	47·9	182	295	511
May	40·2	47·2	190	287	506
June	39·1	46·5	189	259	480
July	39·3	47·8	190	312	529
August ...	38·1	47·0	186	269	489
September ...	36·6	47·3	176	255	471
October ...	36·9	48·3	172	282	495
November ...	34·6	46·3	169	198	415
December ...	34·3	47·9	184	300	516
	° ′	° ′			
Means ...	13 39·4 W.	68 47·3	0·17183	0·44271	0·47488

DATES OF MAGNETIC DISTURBANCES.

The disturbances are divided generally into three classes, *small*, *moderate*, and *greater*; these are indicated by the initial letters of the classes, and the letter c denotes *calm*. Very great disturbances are marked v.g. The days are civil days.

1931	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1931
D.													D.
1	m	s	c	m	c	m	c	c	s	m	s	m	1
2	s	m	s	s	s	m	s	c	c	m	s	g	2
3	c	s	m	s	c	s	s	s	s	s	m	m	3
4	c	s	c	s	c	s	s	s	m	m	m	m	4
5	c	s	s	s	s	s	c	s	s	g	m	m	5
6	c	c	c	c	s	s	c	s	m	m	m	m	6
7	c	s	s	s	m	s	s	s	m	c	m	s	7
8	c	s	s	s	c	m	c	m	m	c	m	s	8
9	m	c	m	s	c	m	c	m	s	c	m	s	9
10	m	c	m	m	c	s	c	s	s	c	m	(m)	10
11	s	c	c	s	m	s	s	s	s	s	s	(m)	11
12	s	c	m	c	s	m	s	c	s	g	c	m	12
13	s	g	g	c	m	s	s	c	c	m	s	m	13
14	c	m	m	s	m	c	m	c	m	s	m	m	14
15	s	m	s	s	m	c	s	c	m	m	m	m	15
16	g	s	s	s	s	c	s	m	m	c	m	m	16
17	m	s	s	s	c	c	s	c	m	m	m	s	17
18	m	s	s	m	s	c	c	s	s	m	m	c	18
19	m	c	s	m	c	s	s	m	c	s	m	c	19
20	m	s	s	m	s	s	s	m	m	m	m	c	20
21	s	c	m	s	s	s	c	m	m	s	c	c	21
22	s	s	s	s	c	s	c	c	s	m	c	s	22
23	s	s	s	s	s	c	m	s	m	m	s	m	23
24	c	g	s	s	c	c	s	s	m	m	s	c	24
25	m	m	s	s	s	c	m	m	c	c	c	m	25
26	m	m	m	c	s	m	s	s	c	s	m	c	26
27	m	m	s	c	c	m	c	m	s	m	m	c	27
28	m	c	c	s	c	m	m	m	c	m	c	m	28
29	s		c	c	s	s	s	s	c	g	s	m	29
30	c		c	c	c	c	s	s	m	g	c	m	30
31	m		s		s		c	s		s		m	31
TOTAL c	9	8	7	7	13	9	11	8	7	6	6	7	98
TOTAL s	9	12	16	18	13	13	16	14	10	7	7	5	140
TOTAL m	12	6	7	5	5	8	4	9	13	14	17	18	118
TOTAL g	1	2	1	—	—	—	—	—	—	4	—	1	9
TOTAL vg	—	—	—	—	—	—	—	—	—	—	—	—	—

TOTALS

Note :—Character letters in brackets, indicates incomplete records.

DATES OF SOLAR OBSERVATIONS AND DISC AREAS OF SPOTS.

The unit is $\frac{1}{5000}$th of the Disc.
n—Note without a complete drawing at Stonyhurst.
Z—Area from copy of Zurich Drawing.
C—Area from Catania drawing.
Co—Area from copy of Coimbra Drawing.

1931	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1931
DAY													DAY
1	0·0	n *0·0*	2·3	2·2	0·5	1·2	1·7	0·7	0·7	Z *1·0*	0·1	1·1	1
2	0·0	Z *0·5*	2·9	Z *1·4*	0·4	nZ *1·7*	1·5	0·8	Z *0·7*	0·9	Z *0·1*	Z *0·4*	2
3	0·0	0·5	2·8	Z *0·9*	C *0·2*	Z *2·2*	Z *1·5*	0·4	Z *0·6*	0·3	Z *0·2*	0·0	3
4	0·2	C *0·7*	3·2	Co *0·5*	0·1	2·8	1·0	0·9	Z *0·4*	Z *0·5*	0·4	0·0	4
5	nC *0·4*	1·3	C *2·5*	1·2	0·0	nZ *2·5*	0·6	Z *0·6*	0·1	Z *0·5*	0·4	Z *0·0*	5
6	0·6	Z *2·5*	2·7	1·3	0·3	Z *2·2*	0·3	0·6	0·1	0·2	1·4	0·1	6
7	0·6	Z *2·0*	2·2	nZ *2·7*	0·5	3·1	0·6	0·2	0·1	0·1	0·7	0·9	7
8		Z *2·7*	1·5	nZ *3·1*	0·8	1·8	0·9	Z *0·1*	0·03	Z *0·1*	Z *0·5*	nZ *1·3*	8
9	0·5	1·9	1·3	Z *3·0*	1·0	1·1	Z *1·1*	0·0	0·2	Z *0·03*	Z *0·2*	Z *2·6*	9
10	Z *0·6*	1·6	2·3	1·9	Z *2·2*	Z *1·4*	0·7	0·0	Z *0·6*	0·0	0·0	2·5	10
11	Z *0·4*	1·0	4·8	1·6	2·5	0·3	0·6	0·1	1·3	0·04	Z *0·0*	Z *4·7*	11
12	0·2	0·4	6·6	1·4	2·2	0·03	0·4	0·0	0·9	Z *0·0*	Z *0·0*	Z *4·2*	12
13	0·4	0·7	Z *7·4*	1·9	Z *1·7*	0·0	0·3	Z *0·1*	0·6	0·1	0·0	Z *3·5*	13
14	0·3	0·2	6·0	2·6	1·4	0·1	0·2	C *0·01*	Z *1·3*	0·1	Z *0·0*	Z *2·3*	14

DATES OF SOLAR OBSERVATIONS & DISC AREAS OF SPOTS—CONTD.

1931	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1931
DAY													DAY
15	Z *1·4*	Z *0·9*	5·1	C *3·2*	Z *1·7*	0·0	0·1	0·0	Z *0·7*	0·1	C *0·0*	Z *1·0*	15
16	Z *4·0*	1·5	5·3	2·5	2·1	0·0	0·0	0·0	0·8	0·0	Z *0·0*	C *0·3*	16
17	2·6	1·3	5·2	4·4	C *2·2*	0·0	Z *0·1*	0·3	Z *0·9*	0·0	Z *0·1*	0·2	17
18	C *0·9*	Z *2·9*	4·1	3·3	1·5	C *0·1*	C *0·1*	0·4	Z *1·1*	n *0·0*	Z *0·1*	0·2	18
19	0·3	C *2·6*	3·0	nZ *2·7*	2·3	0·0	0·0	0·6	Z *1·3*	Z *0·5*	0·2	0·3	19
20	0·7		2·6	2·9	4·8	0·0	0·0	0·4	1·2	0·7	0·7	0·4	20
21		16·4	nZ *1·7*	3·4	4·2	0·0	Z *0·1*	Z *0·5*	0·9	1·0	0·5	Z *0·4*	21
22	0·5	17·8	1·4	2·2	3·2	0·0	0·2	0·0	0·6	1·1	Z *2·7*	Z *0·2*	22
23		18·6	0·9	C *1·3*	Z *2·9*	C *0·0*	0·1	0·0	Z *0·4*	1·3	Z *3·4*	Z *0·2*	23
24	0·2	Z *11·6*	1·0	1·3	1·5	0·0	0·1	0·0	Z *0·2*	1·4	3·9	Z *0·3*	24
25	0·1	Z *9·5*	0·6	nC *0·7*	0·9	0·0	Z *0·1*	0·0	Z *0·2*	1·0	4·3	Z *0·6*	25
26	0·02	3·2	0·9	C *0·4*	0·6	0·0	0·0	0·1	Z *0·04*	1·3	5·3	Z *0·9*	26
27	0·04	1·1	1·0	0·4	0·6	0·04	0·2	0·4	0·2	Z *0·9*	Z *4·1*	0·7	27
28	C *0·04*	nZ *1·8*	Z *1·1*	0·1	Z *0·3*	0·2	0·3	0·6	0·3	1·0	3·7	0·6	28
29	Z *0·1*		Z *1·7*	0·2	0·4	0·4	Z *0·4*	0·6	0·7	Z *0·5*	2·5	1·5	29
30	0·0		Z *1·2*	0·3	0·2	1·0	0·9	0·5	Z *0·8*	0·3	Z *1·7*	1·0	30
31	C *0·0*		1·3		0·7		1·1	1·0		Z *0·2*		0·9	31
Mean	0·54	3·90	2·79	1·82	1·42	0·71	0·49	0·32	0·60	0·49	1·24		

SUN-SPOT STATISTICS, 1931.

Any area less than 0·05 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, 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 or group of some magnitude.

III.—A train of spots of some magnitude.

IV.—A single large spot with or without small companions.

V.—Irregular group of larger spots.

Groups in Italics were not observed at Stonyhurst, but are taken from the Zurich or Catania drawings.

No. of Group	Date	Mean Latitude ○	Mean Longitude ○	Max. Area	Mean Type	Central Meridian
1	Jan. 4—5 ...	—12·1	250·0	0·1	I.s.	Jan. 9·6
2	,, 4—15 ...	—18·4	241·0	0·6	I.s.	,, 10·3
3	,, 13—18 ...	+ 7·5	213·8	†3·9	V.p.	,, 12·4
		+ 7·2	207·4		f.	,, 12·9
‡*3′*	,, *14*	*+ 2·6*	*232·3*	*0·0*	*I.f.*	,, *11·0*
4	,, 14—16 ...	+ 5·3	119·4	0·1	I.s.	,, 19·6
†*4′*	,, *15*	*— 5·4*	*111·5*	*0·0*	*I.s.*	,, *20·2*
5	,, 15—25 ...	+ 5·7	110·9	0·7	I.g.	,, 20·2
6	,, 20, 25 ...	+ 0·7	49·5	0·1	I.g.	,, 24·9
§*6′*	,, *28—29* ...	*+ 3·5*	*50·1*	*0·1*	*I.s.*	,, *24·8*
7	,, 24—27 ...	+11·7	1·3	0·1	I.s.	,, 28·5
‡*7′*	*Feb. 4*	*+ 9·7*	*337·2*	*0·0*	*I.s.*	,, *30·4*
8	,, 3–6, 8–9 ...	—14·4	241·3	0·1	I.g.	Feb. 6·7
9	,, 2—13 ...	+ 8·4	217·5	2·7	I, V.s.	,, 8·5
		+10·2	215·8		S_1.	,, 8·6
10	,, 9—11 ...	—12·4	253·2	0·4	I.g.	,, 5·8
11	,, 12—16 ...	+ 3·7	117·2	0·6	I.g.	,, 16·1
12	,, 15—19 ...	+10·6	134·6	0·6	I.g.	,, 14·8
13	,, 15—16 ...	—15·9	115·2	0·0	I.s.	,, 16·2
14	,, 15—27 ...	— 4·3	55·5	4·5	I, V, II.g.	,, 20·8
		— 3·3	59·0		p.	,, 20·5
		— 3·8	52·7		f.	,, 21·0

† Zurich Drawing. ‡ Catania Drawing. § Zurich and Catania Drawings.

SUN-SPOT STATISTICS, 1931—*Contd.*

No. of Group	Date	Mean Latitude °	Mean Longitude °	Max. Area	Mean Type	Central Meridian
15	Feb. 15—27 ...	+ 8·0	62·1	15·8	I, II.p.	Feb. 20·3
		+ 5·2	51·1		f.	,, 21·1
16	,, 22—Mar. 1	+10·6	346·9	1·1	I.g.	,, 26·0
		+ 9·0	350·3		p.	,, 25·7
17	,, 23—25, 28	+ 7·7	311·7	0·3	I.g.	,, 28·6
18	,, 26—Mar. 1	+10·9	14·6	0·3	I.g.	,, 23·9
19	,, 26–27, Mr.2	+ 6·8	293·1	0·2	I.g.	Mar. 2·1
20	,, 26—Mar. 9	— 7·4	275·3	2·7	I, II.p.	,, 3·4
		— 8·1	267·9		fg.	,, 4·0
21	Mar. 1	—11·3	292·0	0·1	I.g.	,, 2·1
22	,, 2—12 ...	— 9·3	228·5	1·3	I.p'.	,, 7·0
		— 9·1	225·5		p.	,, 7·2
		— 9·9	220·2		f'.	,, 7·6
		—10·1	214·6		f.	,, 8·0
23	,, 9—20 ...	+ 4·9	118·9	5·9	V.g.	,, 15·3
		+ 4·0	122·5		pg.	,, 15·0
		+ 4·2	115·4		fg.	,, 15·5
24	,, 11—18 ...	+ 8·1	102·5	0·5	I.g.	,, 16·5
		+ 7·5	105·6		s.	,, 16·3
25	,, 13—24 ...	+ 6·3	69·4	2·5	IV.s.	,, 19·0
26	,, 17—18 ...	— 3·0	164·0	0·2	I.p.	,, 11·9
		— 4·5	158·5		f.	,, 12·3
27	,, 19—22 ...	—19·4	58·0	0·3	I.g.	,, 19·9
28	,, 20—23 ...	+ 7·4	40·9	0·1	I.g.	,, 21·2
29	,, 24—Apl. 3	— 7·5	281·3	†1·6	IV.s.	,, 30·3
§*29′*	,, *28—30* ...	*—12·8*	*285·2*	*0·1*	*I.g.*	,, *30·0*
†*29″*	*Apl. 3*	*— 2·8*	*277·2*	*0·0*	*I.s.*	,, *30·6*
30	Mar. 26	+19·6	36·5	0·1	I.s.	,, 21·5
31	,, 31—Apl. 2	—14·8	327·5	0·5	I.p.	,, 26·8
		—15·5	321·9		f.	,, 27·2
32	,, 31—Apl. 9	+ 7·0	227·5	†0·8	I.g.	Apl. 3·3
		+ 3·0	226·3		p.	,, 3·4
		+ 2·9	218·8		f.	,, 4·0
33	April 1—13 ...	— 3·0	173·3	†1·2	I.s.	,, 7·4
		— 3·7	166·3		f.	,, 8·0
34	,, 6—12 ...	+ 4·3	134·4	†1·5	I.g.	,, 10·4

† Zurich Drawing. § Zurich and Catania Drawings.

SUN-SPOT STATISTICS, 1931—*Contd.*

No. of Group	Date.	Mean Latitude °	Mean Longitude °	Max. Area	Mean Type	Central Meridian
†34′	*Apl. 7 ... ...*	+ *8·0*	*124·9*	*0·0*	*I.s.*	*Apl. 11·1*
35	,, 11—22 ...	+ 7·2	54·3	‡2·7	IV.s.	,, 16·5
		+ 9·2	46·4		f_1.	,, 17·1
		+ 9·3	38·2		f_2.	,, 17·7
36	,, 12—17 ...	+22·7	39·0	0·3	I.s.	,, 17·6
		+17·4	33·0		f.	,, 18·1
37	,, 13—25 ...	+10·6	14·3	2·1	IV.s.	,, 19·5
		+11·6	10·7		f.	,, 19·8
38	,, 20—23 ...	+ 8·3	43·5	1·0	II.p.	,, 17·3
		+ 9·1	37·4		f.	,, 17·7
39	,, 22—23 ...	+11·5	27·8	0·1	I.g.	,, 18·5
40	,, 24—28 ...	+15·2	303·8	‡0·5	I.g.	,, 24·8
		+14·8	306·5		p.	,, 24·6
41	,, 24	—10·1	251·3	0·1	I.g.	,, 28·8
42	,, 24—May 1	+ 4·7	229·8	0·1	I.s.	,, 30·4
43	,, 29—May 3	+14·1	271·8	0·5	I.g.	,, 27·3
		+13·4	274·8		p.	,, 27·0
		+15·0	269·7		f.	,, 27·4
44	May 4	—11·8	232·2	0·1	I.s.	,, 30·3
45	,, 6— 8 ...	+11·2	155·6	0·2	I.p.	May 6·0
46	,, 6, 9—13	— 0·8	135·2	0·6	I.g.	,, 7·6
47	,, 7—19 ...	+ 6·2	62·3	2·0	II, V.p.	,, 13·1
		+ 8·0	59·6		s_1.	,, 13·3
		+ 9·6	62·0		s_2.	,, 13·1
		+ 9·9	56·0		s_3.	,, 13·6
48	,, 8	—12·6	147·6	0·0	I.g.	,, 6·7
49	,, 12—13 ...	+ 5·4	107·9	0·1	I.g.	,, 9·7
50	,, 15—25 ...	—15·1	324·9	4·8	V, II.g.	,, 20·5
		—14·3	328·2		p.	,, 20·2
		—15·8	322·1		f.	,, 20·7
51	,, 15—17 ...	+10·6	314·8	0·0	I.g.	,, 21·2
52	,, 19	+10·0	348·7	0·0	I.p.	,, 18·7
		+ 9·7	347·3		f.	,, 18·8
53	,, 22—26 ...	+10·5	286·5	0·2	I.g.	,, 23·4
54	,, 22—30 ...	+10·7	255·4	0·5	I.g.	,, 25·7
55	,, 26—29 ...	+ 4·4	281·2	0·3	I.g.	,, 23·8
56	,, 26	+16·5	250·1	0·0	I.s.	,, 26·1

† Zurich Drawing. ‡ Catania Drawing.

SUN-SPOT STATISTICS, 1931—*Contd.*

No. of Group	Date	Mean Latitude °	Mean Longitude °	Max Area	Mean Type	Central Meridian
57	May 27	+ 2·0	307·7	0·0	I.s.	May 21·8
58	,, 27	—10·0	254·8	0·0	I.g.	,, 25·8
†*58′*	*June 2— 3* ...	*— 8·2*	*193·0*	*0·1*	*I.g.*	,, *30·4*
59	May 31–June 11	+ 4·8	110·5	†1·8	II, IV.p.	June 5·7
		+ 8·0	105·1		f.	,, 6·1
60	June 2—10 ...	+ 6·0	123·4	1·6	II, IV.p.	,, 4·7
		+ 6·9	116·5		f.	,, 5·2
61	,, 8—12 ...	+11·8	73·0	0·2	I.g.	,, 8·5
§*61′*	,, *10*	+ *5·8*	*69·6*	*0·0*	*I.s.*	,, *8·8*
62	,, 8	— 1·8	65·2	0·0	I.s.	,, 9·1
§*62′*	,, *10*	— *7·3*	*67·0*	*0·0*	*I.s.*	,, *9·0*
63	,, 14	— 6·5	70·8	0·1	I.g.	,, 8·7
†*64′*	,, *10*	+ *8·8*	*359·5*	*0·0*	*I.s.*	,, *14·1*
‡*64″*	,, *18*	—*16·5*	*334·7*	*0·1*	*I.s.*	,, *15·9*
65	,, 27—30 ...	— 1·8	152·7	0·1	I.p.	,, 29·7
		— 2·2	149·1		f.	,, 29·9
66	,, 28—July 8	— 7·8	83·2	0·6	I.s.	July 4·9
67	,, 29— ,, 7	+ 7·6	84·2	1·2	III, Ip′.	,, 4·9
		+ 7·4	77·5		p.	,, 5·4
		+ 7·0	70·1		f.	,, 5·9
		+ 9·8	63·2		f′.	,, 6·4
68	July 7—14 ...	— 7·2	11·8	0·6	I.g.	,, 10·3
69	,, 7—11 ...	—21·2	343·9	†0·2	I.g.	,, 12·4
70	,, 8—15 ...	—11·2	317·6	†0·4	I.s.	,, 14·4
71	,, 10—14 ...	—18·3	356·3	0·1	I.g.	,, 11·5
72	,, 12—13 ...	+ 5·3	334·1	0·0	I.g.	,, 13·2
§*72′*	,, *17—18* ...	+ *7·8*	*281·1*	*0·1*	*I.g.*	,, *17·2*
73	,, 21—25 ...	+ 8·0	161·3	0·2	I.s.	,, 26·2
74	,, 27—Aug. 4	+ 7·7	83·8	0·6	I.p′.	Aug. 1·1
		+ 6·4	79·9		p.	,, 1·4
		+ 6·9	76·4		f.	,, 1·7
§*74′*	,, *29*	+ *6·2*	*109·6*	*0·0*	*I.s.*	*July 30·1*
§*74″*	,, *29*	+*14·4*	*84·6*	*0·0*	*I.s.*	*Aug. 1·0*
75	July 30—Aug. 5	— 5·1	87·4	0·6	I.p.	July 31·8
		— 5·0	83·6		f.	Aug. 1·1
76	Aug. 2— 8 ...	— 7·6	73·6	0·7	I.s.	,, 1·9

† Zurich Drawing. ‡ Catania Drawing.

§ Catania and Zurich Drawings

SUN-SPOT STATISTICS, 1931—*Contd.*

No. of Group	Date	Mean Latitude °	Mean Longitude °	Max. Area	Mean Type	Central Meridian
77	Aug. 2—5 ...	+ 5·5	11·9	0·2	I.s.	Aug. 6·5
78	,, 6— 7 ...	+11·3	14·4	0·1	I.s.	,, 6·3
79	,, 11	+ 4·4	342·8	0·1	I.p.	,, 8·7
		+ 4·2	340·6		f.	,, 8·9
§79′	,, *13—14* ...	+ *6·4*	*291·4*	*0·1*	*I.g.*	,, *12·1*
80	,, 17—21 ...	—10·5	240·0	0·6	I.g.	,, 16·5
		— 9·8	246·9		p.	,, 16·0
		—10·5	237·9		f.	,, 16·7
81	,, 26—29 ...	— 1·5	140·0	0·0	I.g.	,, 24·1
82	,, 27—29 ...	+ 5·3	87·8	0·1	I.g.	,, 28·0
83	,, 27—Sept. 7	+ 3·8	25·3	0·5	I.s.	Sep. 1·8
84	,, 26, 28—30	— 7·2	41·7	0·1	I.g.	Aug. 31·5
85	,, 30—Sept. 1	+ 4·1	345·6	0·0	I.p.	Sep. 4·8
		+ 4·1	337·5		f.	,, 5·4
86	,, 31—Sept. 6	+12·2	18·3	0·5	I.p.	,, 2·3
		+12·3	11·1		f.	,, 2·8
		+12·3	8·9		f′g.	,, 3·0
87	Sept. 2–4, 7–13	— 5·6	309·9	1·3	IV.g.	,, 7·5
		— 6·4	313·1		S_1.	,, 7·2
		— 4·9	304·9		S_2.	,, 7·8
88	,, 9—11 ...	— 8·5	240·8	0·1	I.s.	,, 12·7
89	,, 12—18 ...	+ 9·4	240·8	†1·2	I.p.	,, 12·7
		+ 8·6	238·1		f.	,, 12·9
90	,, 13—18 ...	+ 4·0	161·6	†0·2	I.p.	,, 18·7
91	,, 16—25 ...	+ 8·1	118·5	†1·3	I.s.	,, 22·0
92	,, 20—24 ...	+ 7·5	95·2	†0·3	I.g.	,, 23·7
†92′	,, *25*	+ *4·5*	*83·0*	*0·1*	*I.s.*	,, *24·6*
†92″	,, *26*	+*25·5*	*84·2*	*0·0*	*I.s.*	,, *24·6*
93	,, 27	+ 5·9	33·9	0·1	I.s.	,, 28·4
94	,, 27—Oct. 7	+18·8	320·1	†1·0	I.p.	Oct. 4·0
		+18·2	310·5		f.	,, 4·7
†94′	*Oct. 4— 5* ...	— *8·7*	*244·3*	*0·1*	*I.g.*	,, *9·7*
§94″	,, *8— 9* ...	—*11·7*	*239·4*	*0·1*	*I.g.*	,, *10·1*
95	,, 11	+ 0·2	201·5	0·0	I.s.	,, 12·9
96	,, 13—15 ...	+ 0·9	212·7	0·1	I.g.	,, 12·1
97	,, 19—31 ...	—15·3	37·1	1·3	IV.s.	,, 25·4

† Zurich Drawing. § Zurich and Catania Drawing.

SUN-SPOT STATISTICS, 1931 – *Contd.*

No. of Group	Date	Mean Latitude °	Mean Longitude °	Max Area	Mean Type	Central Meridian
98	Oct. 23	—16·3	116·9	0·0	I.s.	Oct. 19·4
99	,, 23—24 ...	+11·4	100·6	0·2	I.g.	,, 20·6
100	,, 31—Nov. 1	+10·2	19·2	0·1	I.g.	,, 26·8
†*100′*	,, *31*	+ *4·2*	*19·7*	*0·0*	*I.s.*	,, *26·7*
101	Nov. 2— 6 ...	+ 8·6	315·5	0·2	I.g.	,, 31·6
†*101′*	,, *2*	+ *0·5*	*291·9*	*0·0*	*I.g.*	*Nov. 2·4*
102	,, 3— 9 ...	— 0·3	224·4	1·2	I.g.	,, 7·5
§*102′*	,, *9*	— *9·3*	*254·5*	*0·1*	*I.s.*	,, *5·2*
103	,, 17—21 ...	+10·9	110·7	0·2	I.p.	,, 16·1
104	,, 20—Dec. 2	+ 9·9	333·8	5·1	II.p.	,, 26·5
		+10·2	325·0		f.	,, 27·2
105	,, 18, 21, 22	+10·1	16·1	0·2	I.g.	,, 23·3
106	,, 22—24 ...	+11·0	29·1	0·1	I.g.	,, 22·3
107	,, 24—26 ...	— 0·6	290·2	0·1	I.g.	,, 29·8
108	,, 26—Dec. 2	+12·6	315·2	0·8	I.p.	,, 27·9
		+13·6	311·9		p′.	,, 28·2
		+12·8	308·6		f.	,, 28·4
109	Dec. 6—17 ...	+11·5	133·3	†3·8	I, III.g.	Dec. 11·7
		+12·0	136·5		p.	,, 11·5
		+11·6	133·0		s.	,, 11·8
		+10·9	130·2		f.	,, 12·0
110	,, 11—17 ...	+ 4·6	111·4	1·0	I.g.	,, 13·4
		+ 4·2	113·7		p.	,, 13·2
		+ 4·9	109·6		f.	,, 13·5
§*110′*	,, *22*	— *8·4*	*33·5*	*0·1*	*I.g.*	,, *19·3*
§*110″*	,, *23—25* ...	+*14·4*	*26·8*	*0·1*	*I.g.*	,, *19·8*
111	,, 18—25 ...	+10·9	334·1	0·4	I.s.	,, 23·8
		§+ *9·9*	*329·4*		*fg.*	,, *24·2*
112	,, 27—28 ...	+11·7	321·0	0·1	I.p.	,, 24·8
		+10·4	318·1		f.	,, 25·0
113	,, 25—27 ...	— 2·4	249·7	0·1	I.g.	,, 30·2
114	,, 24—Jan. 5	—13·4	242·3	1·5	I.s.	,, 30·8
§*114′*	,, *26*	—*12·9*	*254·3*	*0·1*	*I.g.*	,, *29·9*
†*114″*	*Jan. 2*	— *5·8*	*229·9*	*0·02*	*I.s.*	,, *31·7*
†*115*	*Dec. 26*	— *8·2*	*304·2*	*0·04*	*I.g.*	,, *26·1*

† Zurich Drawing. § Zurich and Catania Drawings.