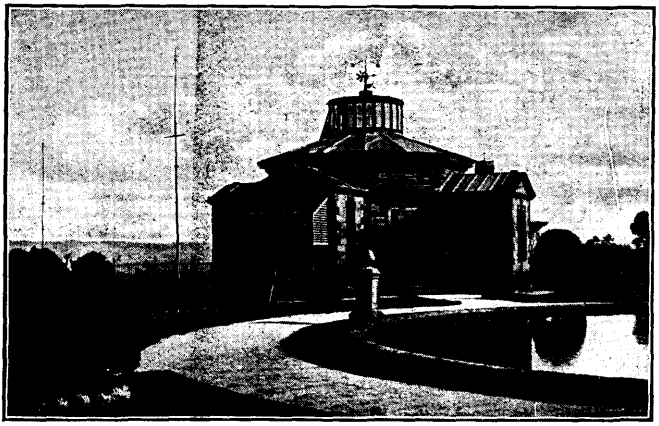
STONYHURST COLLEGE OBSERVATORY.

Lat. 53° 50′ 40″ N. Long. 9$^{m.}$ 52$^{s.}$.68 W.
Height of the Barometer above the Sea, 381 feet.



(FOUNDED 1838.)

Results of Geophysical and Solar Observations,

1921.

With Report and Notes of the Director,

REV. A. L. CORTIE, S.J., F.R.A.S., F. Inst P.

BLACKBURN:
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CONTENTS.

REPORT AND NOTES.

GENERAL.—The Staff consists, besides the Director, of Father J. Rowland, S.J., B.Sc. (Lond.), F.R.A.S., and the Rev. H. Macklin, S.J. B.Sc. (Oxon). Mr. Joseph Burns performs the duties of Meteorological Clerk. During the year Father M. Burgaud, S.J., of the China Missions, made himself familiar with the processes of observation with the magnetic instruments. All the instruments, which are under the care of Father Rowland, are in good working order.

The magnetic chamber and the adjoining photographic room were replastered, coloured, and generally overhauled, and the leaden covering of the roof was repaired and rendered watertight.

METEOROLOGICAL.—The Meteorological continuous records have been uninterrupted during the year. For a description of the instruments, and their constants, reference can be made to our Report for 1920, pp. v—vii.

The weather for the greater part of the year was very mild and dry. (*See* Summary, p. 25). July and August were the warmest, and February and November were the coldest months. There was much bright sunshine, 13·5 per cent. in excess of the normal, and, with the exception of January, March, and August, the record for each month was in excess of the average. In

contrast to the conditions of drought that prevailed over the greater part of England, especially in the South-East, the rainfall for the year was 1·4 inches above the average. The excess was due to the heavy precipitation of the months of January, the end of July and August, and of December. The rainfall of January was the greatest recorded during the last 74 years. The months of February and of June were very dry months, and the periods with deficiency of precipitation were May to near the end of July, and September, October, and November. If, however, the curve of accumulated rainfall be compared with that of the average, it was below the latter in only one month—November.

Heavy falls of rain, one inch or over in 24 hours, occurred on only four days of the year, viz., July 25th, August 22nd, December 21st and 27th.

The adopted mean temperature of the year was 49·4°, or two degrees above the average. Shade temperatures reached 70° or over on 32 days, as compared with seven days for the preceding year. These days were distributed as follows : one in May, eight in June, fourteen in July, four in August, three in September, and two in October.

Fine dry periods of five days or over were recorded as follows :—February 2nd—7th, 16th—23rd, April 17th—21st, May 20th—26th, June 4th—8th, 13th—18th, 26th—30th, July 1st—14th, 16th—20th, September 2nd—8th, 14th—20th, 24th—30th, November 6th—12th. Total 13 periods, with average duration seven days.

Bright sunshine, 10 hours or over, was registered on nine days in April, eight in May, thirteen in June,

nine in July, four in August, and four in September, total 47 days. The sunniest days of the year were June 28th, 29th, each with 15 hours duration.

The prevailing direction of the wind was Westerly. Only two gales were registered, one on February 16th, and the other on December 17th, the velocity of the wind in each case being not greater than 37 miles per hour.

MAGNETICAL.—Absolute measures of Horizontal Magnetic Force have been made once each month, by the method of Vibration and Deflection. In these observations the same collimator magnet had been employed from the beginning of the series in March, 1863, until March, 1919. The old magnet having been broken, a new magnet was obtained from Messrs. Casella & Co., which was first used in March, 1919. The constants were determined at Kew in December, 1919. The suspensions of the mirror magnet were also at the same time altered and improved. The collimator magnet is marked 182, the mirror magnet 9. The angular value of one scale division=2·26′. The temperature coefficients are q=0·000272, q′=0·00000189. The induction coefficient μ=6·89, and at 0° C log π^2K= 3·51329. The Inclination is also measured once each month by two needles with Dover's Circle, No. 159. The Declination is observed four times each month, at nearly equal intervals, usually at 16 hours. The Differential Instruments, or Photo-Magnetographs, which have been in practically continuous action since the year 1866, are of the same pattern as those at the Kew Observatory, 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 hand screens, cutting off the light at noted times, usually at 10 hours and 16 hours. The times are controlled by the wireless signals from Paris. The scale values of the instruments are as follows :—

For the Unifilar	..	11·28′	per Cm. of Ordinate.
,, Bifilar	..	·000497 C.G.S.	,, ,,
,, Balance	..	·000683	,, ,, ,,

Four daily readings are measured on the curves, the highest, the lowest, and those at the hours 4 and 16.

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, according to the rule stated on page xii of our Report, 1908 ; but the month means are now taken from the readings on the five quietest days of the month.

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.

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, 1, 2.

The character figures are assigned according to the scheme detailed in the Annuaire for 1918 of the Royal Dutch Meteorological Institute. In general the figure 0 corresponds to the letter c, and the figure 2 to the letters g, and v.g. The figure 1 corresponds to s generally, and to m sometimes, which same letter also does not unfrequently correspond to the figure 2. The civil day is used for both the international figures, and for our own characteristic letters. 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. The following values of the excess are adopted for the table of magnetic disturbances :—0 to 2 calm, 2 to 7 small, 7 to 15 moderate, 15 to 20 great, above 20 very great. Further, an inspection of the curves helps to settle the magnetic character of the day in doubtful cases.

The mean daily ranges of the Declination and of the Horizontal Force Magnets were almost identical with the values for 1920, whether the means be considered for all days, or for the five quiet days of each month. But the excess of the ranges for all days of D and H over those for the quiet days, shows a gradual decrease in amplitude since 1919 corresponding to the decrease in the mean daily disc-areas of sun-spots.

The violent magnetic storms of 1919, August 11th

—12th, and 1920, March 22nd—23rd, had their counterpart in the storm of May 13th—15th of the present year. The magnets continued in a disturbed state throughout the days May 16th—17th, and after a lull on May 18th, great activity was resumed on May 20th—21st. This storm accompanied the passage of a large active spot across the sun's disc. The maximum ranges in the elements were greater than 129′ in D, greater than 700 units in H, as the spot of light went beyond the limits of registration, and greater than 500 in V. The storm was remarkable for the number of days over which it extended. To find a parallel in our records we must go back to the protracted storm of 1882, November 11th —21st, which also accompanied the passage of a great spot across the sun's disc. A full description of the storm was communicated to *Nature* for June 2nd, 1921. The researches at present in hand are concerned with the relations between terrestrial magnetic and solar activity, and on the mode of propagation of the influence from the sun which is a condition for a magnetic storm. Papers on these subjects have appeared in the Monthly Notices R.A.S., and in the Report of the British Association.

Astronomical.—The wireless time-signals have been taken regularly during the year from the Eiffel Tower, and the errors and daily rates of the standard chronometers and sidereal clock have been determined by their means. The Brown relay has worked most effectively. The time-service is in charge of Father Rowland, the chief assistant.

Observations of the solar surface were made on 232 days, and include 232 drawings. Of these drawings

211 are complete, and show all spots and faculæ; the remaining 21 are complete for the spots, but not for the faculæ.

The mean daily disc-area of the spots (in units 1/5000th of the visible surface), stands at 3·14. A comparison of the mean disc-area of the spots, with the mean daily range of magnetic Declination in minutes of arc, and of Horizontal Force in units 10^{-5} C. G. S., is set forth as follows :—

Year	1916	1917	1918	1919	1920	1921
Spot-Area	4·52	12·1	7·9	8·4	4·05	3·14
Declination Range	12·1	11·8	12·4	12·7	11·2	11·4
Horizontal Force Range	63	59	69	66	57	54

The sun-spot activity shows a steady decline. There was only one great spot, No. 40, which had a maximum area of 16·5 units. It made its first appearance, and reached its maximum activity on May 8th—21st, in latitude + 1·2°, and longitude 2·8°, reappearing much diminished in area in the two following rotations. Other spots of moderately great activity were No. 16, February 18th—23rd, with an area of 7·2 units, No. 55, June 25th—July 5th, with an area of 9·6 units, No. 73, August 23rd—31st, with an area of 8·4 units, and No. 85, October 24th—November 1st, with an area of 7·1 units.

The distribution of the spots in latitude is shown in the following table :—

January—March :

In positive latitude 14 groups of an area of 13·5 units. In negative latitude 17 groups of an area of 34·1 units.

April—June :

In positive latitude 14 groups of an area of 34·5 units.
In negative latitude 11 groups of an area of 17·9 units.

July—September :

In positive latitude 12 groups of an area of 33·4 units.
In negative latitude 13 groups of an area of 15·4 units.

October—December :

In positive latitude 13 groups of an area of 24·3 units.
In negative latitude 1 group of an area of 5·7 units.

This shows that the greater activity passed gradually to the sun's N. hemisphere.

In the whole year there were in N. latitude 53 groups with an area of 105·7 units, and in S. latitude 42 groups with an area of 73·2 units. There were 29 spotless days in 1921, mainly in September, October, and November, as against four spotless days in 1920. Faint polar faculæ were observed during the year, also indicating the approach of a sun-spot minimum.

A new feature of our solar report this year are two Tables, drawn up by the Rev. H. Macklin, who has charge of the reductions of the solar drawings. The first contains a list of all the spot-groups observed, with their mean latitudes and longitudes, and their greatest disc-areas. The second is a list of the disturbed areas on the sun during the year, in several cases the sun-spot groups being recurrent.

The spectra of a few sun-spots were observed, to continue our record. The essential constancy of the spectrum, as first noted at this observatory in 1889

(Monthly Notices R.A.S. 49, 410), is still maintained, at least in the red end of the spectrum. The partial solar eclipse of 1921, April 7th, was well observed, and the flash spectrum was held for considerable intervals at the maximum phase. The contacts were also observed over the chromosphere. (Ibid. 81, 485, and 82, 54).

A study of the red end spectrum of γ Cassiopeiæ, with spectrograms made with the Hilger direct vision spectroscope, is in progress. Spectrograms of the stars α Cygni, and γ Orionis, have also been obtained with the same instrument. Spectra in the blue and violet portions of the spectrum have been secured with the Thorp prismatic camera.

The occultation of Venus by the Moon, 1921, July 1st, was well observed. The results have been incorporated with those of other observers. (Monthly Notices, R.A.S., 82, 55).

Seismological.—The following is Father Rowland's Report: A short account of the Seismograph is given on page xiii of our Annual, 1909. It is of the Milne photographic pattern, with horizontal pendulum, or boom, mounted in the astronomical meridian. A copy of its register is sent monthly to the Secretary of the Seismological Committee of the British Association for the advancement of Science, and bulletins are despatched at regular intervals to the Seismic Stations at home and abroad.

The instrument was dismounted from November 1st to 26th, owing to repairs to the building being in progress, but apart from this interval it has worked

satisfactorily throughout the year—the record having been lost from accidental causes on only four days.

Modifications made in the electro-magnetic timing device have resulted in greatly improved reliability of this all-important accessory, and the time of operation is checked daily from the Paris time signals to within one second. Unfortunately the character of the record yielded by this type of instrument does not admit of reading to this degree of accuracy, and the times of phases are only quoted to 0·1 minute. Even this degree of precision is rarely justified, as owing to the very gradual emergence of most disturbances, the assignment of the point of commencement is a matter of considerable uncertainty.

The most notable earthquakes recorded during the year were on February 4th, 27th; March 28th; April 2nd; August 23rd; and September 11th.

The distribution of all disturbances irrespective of size throughout the year is exhibited in the following table :—

Jan	Feb	Mar	Apl	May	June	July	Aug	Sept	Oct	Nov	Dec	Tl.
10	18	15	4	9	5	12	8	10	9	*	5	105

*Instrument dismounted.

The following papers have been published during the year :—

1. Sun-Spot Areas and Terrestrial Magnetic Horizontal Ranges and Disturbances. *The Observatory*, 44, No. 562.

2. Dissymetry in Sun-Spots. *Ibid* 44, No. 563.

3. The Clusters h and χ Persei. Monthly Notices R.A.S., 81, 400.

4. Note on the Magnitude Curves in Mr. Macklin's paper on the Clusters h and χ Persei. *Ibid* 81, 407.

5. The Ultra-Violet Spectrum of Nova Aquilæ, 1918, June 10th. *Ibid* 81, 438.

6. The Partial Eclipse of the Sun, 1921, April 7th: Spectroscopic Observations of the Reversing Layer. *Ibid* 81, 485.

7. The Sun-Spot Group and the Magnetic Disturbances 1921, May 8th—21st. *Ibid* 81, 515.

8. The Magnetic Storms of the Present Solar Cycle. Annual Report British Association. 1921, 416.

9. Sir Norman Lockyer. Obituary Notice. Astrophysical Journal, 53, 233.

10. New Stars. Science Progress, 60, 613.

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

METEOROLOGICAL REPORT.

JANUARY, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·416	29·483
Highest ,, ,, on the 15 th & 16th ,,	29·937	30·127
Lowest ,, ,, on the 12th ..... ,,	28·655	28·578
Range of Barometer Readings..... ,,	1·282	1·549
Highest Reading of a Max. Therm. on the 9th ...	54·0	51·3
Lowest Reading of a Min. Therm. on the 15th	26·6	21·5
Range of Thermometer Readings	27·4	29·8
Mean of Highest Daily Readings	47·9	42·4
Mean of Lowest Daily Readings	40·0	33·1
Mean Daily Range	7·9	9·3
Deduced Mean Temp. (from mean of Max. and Min.)	43·8	37·5
Mean Temperature from Dry Bulb	44·2	37·8
Adopted Mean Temperature	44·0	37·7
Mean Temperature of Evaporation	42·5	36·4
Mean Temperature of Dew Point	40·7	34·3
Mean elastic force of Vapour.....inches	0·255	0·200
Mean weight of Vapour in a cub. ft. of air, grains	2·9	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	541·0	549·4
Mean amount of Cloud (0—10)	9·1	7·8
Fall of Rain ..... inches	8·589	4·289
Greatest Rainfall in one day (17th) ..... ,,	0·900	0·828
No. of days on which ·005 in. or more Rain fell...	28	19·3

Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	1	0	0	2	9	16	0
Mean Velocity in miles per hr.	4·8	10·8	0	0	6·9	12·0	17·9	0
Total No. of miles	348	259	0	0	332	2583	6884	0

		Mean*
Total No. of miles registered	10406	8260·5
Greatest hourly velocity (9th, 18th & 19th, Dir. W.S.W., W.N.W. & W. respectively	35	41·2

* *For the last* 54 *years.*

JANUARY, 1921.

DIFFERENCES.

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

Mean barometric pressure	—	0·067 in.
Monthly range ,, ...	—	0·267 in.
Mean of highest daily temperatures	+	5·5°
Mean of lowest ,, ,, ...	+	6·9°
Mean daily range	—	1·4°
Adopted mean temperature	+	6·3°
Total rainfall	+	4·300 in.

Ground Frost on 8th, 14th, 15th, 16th. Heavy Rain on 1st, 12th, 16th, 17th, 24th, and 25th. Hail on 11th and 18th. Snow on 14th and 18th. Fog on 25th.

EXTREME READINGS FOR JANUARY,

During 74 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	1921	.....	8·589 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, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·862	29·498
Highest ,, ,, on the 26th... ,,	30·420	30·105
Lowest ,, ,, on the 1st ... ,,	28·880	28·659
Range of Barometer Readings..... ,,	1·540	1·446
Highest Reading of a Max. Therm. on the 23rd	53·5	51·9
Lowest Reading of a Min. Therm. on the 10th ..	29·6	22·5
Range of Thermometer Readings	23·9	29·4
Mean of Highest Daily Readings	45·0	44·0
Mean of Lowest Daily Readings	36·3	33·6
Mean Daily Range	8·7	10·4
Deduced Mean Temp. (from mean of Max. & Min.)	40·3	38·2
Mean Temperature from Dry Bulb	40·6	38·5
Adopted Mean Temperature	40·5	38·4
Mean Temperature of Evaporation	38·6	36·8
Mean Temperature of Dew Point	36·2	34·6
Mean elastic force of Vapour ..... inches	0·213	0·195
Mean weight of Vapour in a cub. ft. of air, grains	2·5	2·4
Mean additional weight required for saturation ,,	0·5	0·4
Mean degree of Humidity (saturation 100)	85	86
Mean weight of a cubic foot of air ..... grains	553·2	548·7
Mean amount of Cloud (0—10)	7·1	7·5
Fall of Rain ..... inches	0·627	3·481
Greatest Rainfall in one day (15th) ..... ,,	0·310	0·761
No. of days on which ·005 in. or more Rain fell...	8	16·6

Wind :—Direction.....	N	NE	E	SE	S	SW	W	N W
No. of days.....	2	3	6	1	6	0	8	2
Mean Velocity in miles per hr.	3·8	5·3	7·0	3·5	3·8	0	11·4	7·2
Total No. of miles.....	181	381	1012	83	550	0	2195	344

		Mean*
Total No. of Miles registered	4746	7498·0
Greatest hourly velocity (14th. at 2 a.m., Dir. N.W.)	26	41·1

* *For the last* 54 *years.*

FEBRUARY, 1921.

DIFFERENCES.

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

Mean barometric pressure	+	0·364 in.
Monthly range ,, ...	+	0·094 in.
Mean of highest daily temperatures	+	1·0°
Mean of lowest ,, ,, ...	+	2·7°
Mean daily range	—	1·7°
Adopted mean temperature	+	2·1°
Total rainfall	—	2·854 in.

Ground Frost on 3rd, 4th 8th—12th, 18th, 21st, 22nd and 26th. Hoar Frost on 18th. Lunar Halo on 14th.

EXTREME READINGS FOR FEBRUARY,

During 74 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, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·489	29·446
Highest ,, ,, on the 24th ... ,,	29·880	30·043
Lowest ,, ,, on the 29th ... ,,	28·784	28·643
Range of Barometer Readings ..... ,,	1·096	1·400
Highest Reading of a Max. Therm. on the 24th	56·1	56·8
Lowest Reading of a Min. Therm. on the 7th...	27·1	23·3
Range of Thermometer Readings	29·0	33·5
Mean of Highest Daily Readings	48·8	47·0
Mean of Lowest Daily Readings	38·5	34·3
Mean Daily Range	10·3	12·7
Deduced Mean Temp. (from mean of Max. & Min.)	42·7	39·7
Mean Temperature from Dry Bulb	44·3	40·3
Adopted Mean Temperature	43·5	40·0
Mean Temperature of Evaporation	42·1	38·2
Mean Temperature of Dew Point	40·4	35·8
Mean elastic force of Vapour ..... inches	0·263	0·210
Mean weight of Vapour in a cub. ft. of air, grains	2·9	2·4
Mean additional weight required for saturation ,,	0·4	0·5
Mean degree of Humidity (saturation 100).....	89	85
Mean weight of a cubic foot of air ..... grains	542·7	546·0
Mean amount of Cloud (0—10)	8·1	7·5
Fall of Rain ..... inches	5·001	3.433
Greatest Rainfall in one day (3rd) ..... ,,	0·934	0·779
No. of days on which ·005 or more Rain fell...	25	17·0

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of Days.....	1	0	0	0	6	8	15	1
Mean Velocity in miles per hr.	8·8	0	0	0	17·3	12·9	12·1	19·1
Total No. of miles.....	272	0	0	0	2497	2485	4353	459

		Mean*
Total No. of Miles registered	10066	8510·9
Greatest hourly velocity (16th at 9 a.m., Dir. S. b W.)	37	40·7

* *For the last* 54 *years.*

MARCH, 1921.

DIFFERENCES.

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

Mean barometric pressure	+	0·043 in.
Monthly range ,, ...	—	0·304 in.
Mean of highest daily temperatures	+	1·8°
Mean of lowest , , ...	+	4·2°
Mean daily range	—	2·4°
Adopted mean temperature	+	3·5°
Total rainfall	+	1·568 in.

Ground Frost on 3rd, 7th, 8th, 11th, 12th, 15th and 29th. Heavy Rain on 3rd and 28th. Hail on 2nd, 18th, 26th, 27th and 28th. Snow on 26th, 27th, and 28th. Thunder on 28th. Gale of Wind on 16th. Lunar Halo on 16th.

EXTREME READINGS FOR MARCH, During 74 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 ,, ,, ,, ...	1892	5725

* *Since* 1867 *only*. † *And* 1914.

APRIL, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·714	29·490
Highest ,, ,, on the 7th & 8th... ,,	30·133	29·959
Lowest ,, ,, on the 17th ... ,,	28·885	28·793
Range of Barometer Readings ..... ,,	1·248	1·166
Highest Reading of a Max. Therm. on 30th.	67·0	64·8
Lowest Reading of a Min. Therm. on the 16th...	27·6	28·1
Range of Thermometer Readings	39·4	36·7
Mean of Highest Daily Readings	52·9	54·5
Mean of Lowest Daily Readings	38·4	37·8
Mean Daily Range	14·5	16·7
Deduced Mean Temp. (from mean of Max. & Min.)	44·2	44·0
Mean Temperature from Dry Bulb	45·8	44·7
Adopted Mean Temperature	45·0	44·4
Mean Temperature of Evaporation	42·1	41·7
Mean Temperature of Dew Point	38·7	38·3
Mean elastic force of Vapour ..... inches	0·235	0·235
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).....	79	80
Mean weight of a cubic foot of air ..... grains	545·5	542·2
Mean amount of Cloud (0—10)	5·7	6·7
Fall of Rain ..... inches	2·039	2·576
Greatest Rainfall in one day (13th) ..... ,,	0·930	0·593
No. of days on which ·005 in. or more Rain fell...	13	14·9

Wind :—Direction	N	NE	E	SE	S	SW	W	N W
No. of days.....	5	4	7	0	0	0	12	2
Mean Velocity in miles per hr.	6·1	8·4	9·8	0	0	0	8·6	12·3
Total No. of Miles.....	730	810	1640	0	0	0	2473	592

		Mean*
Total No. of Miles registered	6245	7537·1
Greatest hourly velocity (14th., 9 & 11 a.m., Dir. N.W.)	28	36·2

* *For the last* 53 *years.*

APRIL, 1921.

DIFFERENCES.

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

Mean barometric pressure	+	0·224 in.
Monthly range ,, ...	+	0·082 in.
Mean of highest daily temperatures	—	1·6°
Mean of lowest ,, ,, ...	+	0·6°
Mean daily range	—	2·2°
Adopted mean temperature	+	0·6°
Total rainfall	—	0·537 in.

Ground Frost on 3rd, 8th, 9th, 15th, 16th, 18th—22nd, and 24th. Heavy Rain on 13th. Hail on 8th, 14th, 15th, 16th, 23rd. Snow on 14th, 15th, and 17th. Thunder on 18th. Lunar Halo on 20th. Solar Halo on 22nd.

EXTREME READINGS FOR APRIL,

During 74 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 ...	1913	(26th)	1·180 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, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·502	29·542
Highest ,, ,, on the 23rd ... ,,	29·926	29·992
Lowest ,, ,, on the 30th ... ,,	28·935	28·954
Range of Barometer Readings ..... ,,	0·991	1·038
Highest Reading of a Max. Therm. on the 25th ...	72·0	72·0
Lowest Reading of a Min. Therm. on the 5th	29·6	32·0
Range of Thermometer Readings	42·4	40·0
Mean of Highest Daily Readings	59·2	59·5
Mean of Lowest Daily Readings	43·4	42·5
Mean Daily Range	15·8	17·0
Deduced Mean Temp. (from mean of Max. & Min.)	49·6	49·2
Mean Temperature from Dry Bulb	51·5	50·1
Adopted Mean Temperature	50·6	49·7
Mean Temperature of Evaporation	47·8	46·5
Mean Temperature of Dew Point	44·9	43·0
Mean elastic force of Vapour ..... inches	0·298	0·280
Mean weight of Vapour in a cub. ft. of air, grains	3·4	3·1
Mean additional weight required for saturation ,,	0·8	0·9
Mean degree of Humidity (saturation 100).....	81	77
Mean weight of a cubic foot of air ..... grains	535·2	538·9
Mean amount of Cloud (0—10).....	6·8	7·0
Fall of Rain ..... inches	3·104	2·706
Greatest Rainfall in one day (2nd) ..... ,,	0·440	0·642
No. of days on which ·005 in. or more Rain fell...	15	14·5

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	3	3	0	4	3	17	0
Mean Velocity in miles per hr.	6·3	5·4	6·8	0	8·1	13·5	7·5	0
Total No. of miles.....	150	386	491	0	777	974	3056	0

		Mean*
Total No. of Miles registered	5834	6935·3
Greatest hourly velocity (30th, at 8 p.m., Dir. S. by W.	30	32·7

* *For the last 54 years.*

MAY, 1921.

DIFFERENCES.

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

Mean barometric pressure	—	0·040 in.
Monthly range ,, ...	—	0·047 in.
Mean of highest daily temperatures	—	0·3°
Mean of lowest ,, ,, ...	+	0·9°
Mean daily range	—	1·2°
Adopted mean temperature	+	0·9°
Total rainfall	+	0·398 in.

Ground Frost on 3rd and 5th. Thunderstorm on 2nd and 12th.

EXTREME READINGS FOR MAY,

During 74 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	1920	6·511 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, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·769	29·560
Highest ,, ,, on the 2nd ... ,,	30·031	29·937
Lowest ,, ,, on the 9th ... ,,	29·352	29·044
Range of Barometer Readings ..... ,,	0·679	0·893
Highest Reading of a Max. Therm. on the 25th...	82·7	76·9
Lowest Reading of a Min. Therm. on the 2nd...	40·8	39·1
Range of Thermometer Readings	41·9	37·8
Mean of Highest Daily Readings	64·6	65·3
Mean of Lowest Daily Readings	49·3	48·1
Mean Daily Range	15·3	17·2
Deduced Mean Temp. (from mean of Max. & Min.)	55·2	54·9
Mean Temperature from Dry Bulb	56·6	55·4
Adopted Mean Temperature	55·9	55·1
Mean Temperature of Evaporation	51·8	51·9
Mean Temperature of Dew Point	47·9	48·4
Mean elastic force of Vapour ..... inches	0·338	0·348
Mean weight of Vapour in a cub. ft. of air, grains	3·8	3·9
Mean additional weight required for saturation ,,	1·2	1·0
Mean degree of Humidity (saturation 100)	75	78
Mean weight of a cubic foot of air ..... grains	536·3	531·3
Mean Amount of Cloud (0—10).....	6·4	7·2
Fall of Rain ..... inches	0·660	3·328
Greatest Rainfall in one day (12th) ..... ,,	0·240	0·798
No. of days on which ·005 in. or more Rain fell...	7	15·2

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	6	3	0	1	3	11	4
Mean Velocity in miles per hr.	4·7	6·4	8·5	0	6·5	5·0	10·0	15·4
Total No. of miles.....	226	923	611	0	156	358	2633	1482

		Mean*
Total No. of Miles registered	6389	6173·5
Greatest hourly velocity (20th, Noon, Dir. N.W.)	33	29·4

**For the last 54 years*

JUNE, 1921.

DIFFERENCES.

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

Mean barometric pressure	+	0 209 in.
Monthly range ,, ...	—	0·214 in.
Mean of highest daily temperatures	—	0·7°
Mean of lowest ,, ,, ...	+	1·2°
Mean daily range	—	1·9°
Adopted mean temperature	+	0·8°
Total rainfall	—	2·668 in.

Dense Fog on 16th. Thunderstorm on 26th.

EXTREME READINGS FOR JUNE,

During 74 Years.

Highest reading of the 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 ,, ...	1887	.....	0·525 ,,
Greatest fall of rain in one day ...	1857	(8th)	2·093 ,,
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, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·621	29·527
Highest ,, ,, on the 4th ... ,,	29·896	29·903
Lowest ,, ,, on the 29th ... ,,	28·977	29·019
Range of Barometer Readings ..... ,,	0·919	0·884
Highest Reading of a Max. Therm. on the 18th ...	82·5	78·3
Lowest Reading of a Min. Therm. on the 5th ..	43·6	42·5
Range of Thermometer Readings	38·9	35·8
Mean of Highest Daily Readings	71·4	67·4
Mean of Lowest Daily Readings	54·3	51·1
Mean Daily Range	17·1	16·3
Deduced Mean Temp. (from mean of Max. & Min.)	61·0	57·7
Mean Temperature from Dry Bulb	62·9	58·0
Adopted Mean Temperature	62·0	57·9
Mean Temperature of Evaporation	57·8	54·8
Mean Temperature of Dew Point	54·2	52·0
Mean elastic force of Vapour .....inches	0·421	0·388
Mean weight of Vapour in a cub. ft. of air, grains	4·6	4·4
Mean additional weight required for saturation ,,	1·6	1·1
Mean degree of Humidity (saturation 100)	76	81
Mean weight of a cubic foot of air ..... grains	524·7	527·6
Mean amount of Cloud (0—10)	6·9	7·4
Fall of Rain ..... inches	3·426	3·980
Greatest Rainfall in one day (25th) ..... ,,	1·093	0·868
No. of days on which ·005 in. or more Rain fell...	11	16·5

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	1	6	0	1	2	17	3
Mean Velocity in miles per hr.	8·0	5·2	7·9	0	10·7	12 1	7·4	7·5
Total No. of miles.....	193	124	1139	0	256	579	3032	538

		Mean*
Total No. of Miles registered	5861	6369·9
Greatest hourly velocity (25th, Dir. S.W.)	26	28·2

* *For the last 54 years.*

JULY, 1921.

DIFFERENCES.

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

Mean barometric pressure	+	0·094 in.
Monthly range „	+	0·035 in.
Mean of highest daily temperatures	+	4·0°
Mean of lowest „ „	+	3·2°
Mean daily range	+	0·8°
Adopted Mean temperature	+	4·1°
Total rainfall	—	0·554 in.

Heavy Rain on 22nd, 23rd, and 25th. Thunder on 14th, 15th, 17th and 25th. Lightning on 15th, 17th, and 28th. Solar Halo on 24th and 27th.

EXTREME READINGS FOR JULY,

During 74 Years.

Highest reading of Barometer ...	1911	(10th)	30·203 in.
Lowest „ „ ...	1877	(15th)	28·564 in.
Highest temperature	1901	(20th)	89·0°
Lowest „	1857	(1st)	36·0°
Highest adopted mean temperature	1901	.....	63·2°
Lowest „ „	1862	.....	54·3°
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, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·470	29·494
Highest ,, ,, on the 18th ... ,,	29·788	29·887
Lowest ,, ,, on the 5th ... ,,	29·084	28·946
Range of Barometer Readings ..... ,,	0·704	0·941
Highest Reading of a Max. Therm. on the 18th...	76·0	76·3
Lowest Reading of a Min. Therm. on the 31st...	43·4	41·8
Range of Thermometer Readings	32·6	34·5
Mean of Highest Daily Readings	64·1	66·5
Mean of Lowest Daily Readings	52·8	50·8
Mean Daily Range	11·3	15·7
Deduced Mean. Temp. (from Mean of Max. & Min.)	56·8	56·9
Mean Temperature from Dry Bulb	58·5	57·7
Adopted Mean Temperature	57·7	57·4
Mean Temperature of Evaporation	55·3	54·5
Mean Temperature of Dew Point	53·1	51·8
Mean elastic force of Vapour ..... inches	0·405	0·387
Mean weight of Vapour in a cub. ft. of air, grains	4·5	4·3
Mean additional weight required for saturation ,,	0·8	0·9
Mean degree of Humidity (saturation 100)	84	82
Mean weight of a cubic foot of air ..... grains	526·6	527·5
Mean amount of Cloud (0—10).....	7·4	7·3
Fall of Rain ..... inches	7·126	4·995
Greatest Rainfall in one day (22nd) ..... ,,	1·050	1·052
No. of days on which ·005 in. or more Rain fell...	22	18·3

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	7	0	0	3	3	17	0
Mean Velocity in miles per hr.	4·8	5·1	0	0	6·5	13·0	8·8	0
Total No. of miles.....	114	849	0	0	466	934	3601	0

		Mean*
Total No. of Miles registered	5964	6335·9
Greatest hourly velocity (30th, 3 a.m., Dir. W.S.W.)	30	30·7

* *For the last 54 years.*

AUGUST, 1921.

DIFFERENCES.

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

Mean barometric pressure	—	0·024 in.
Monthly range ,, ...	—	0·237 in.
Mean of highest daily temperatures	—	2·4°
Mean of lowest ,, ,, ...	+	2·0°
Mean daily range	—	4·4°
Adopted mean temperature	+	0·3°
Total rainfall	+	2·131 in.

Heavy Rain on 5th, 22nd, and 28th. Hail on 6th. Thunder on 10th and 21st.

EXTREME READINGS FOR AUGUST,

During 74 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 ...	1857 (7th)	2·333 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, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·679	29·544
Highest ,, ,, on the 27th ... ,,	30·035	30·008
Lowest ,, ,, on the 9th ... ,,	29·248	28·893
Range of Barometer Readings	0·787	1·115
Highest Reading of a Max. Therm. on the 7th..	73·5	72·1
Lowest Reading of a Min. Therm. on the 25th...	40·8	36·6
Range of Thermometer Readings	32·7	35·5
Mean of Highest Daily Readings	62·6	62·0
Mean of Lowest Daily Readings	49·4	47·3
Mean Daily Range	13·2	14·7
Deduced Mean Temp. (from mean of Max. & Min.)	54·7	53·4
Mean Temperature from Dry Bulb	55·8	54·3
Adopted Mean Temperature	55·3	53·8
Mean Temperature of Evaporation	52·5	51·0
Mean Temperature of Dew Point	49·8	48·3
Mean elastic force of Vapour ..... inches	0·359	0·339
Mean weight of Vapour in a cub. ft. of air, grains	4·0	3·9
Mean additional weight required for saturation ,,	1·0	0·9
Mean degree of Humidity (saturation 100).....	83	81
Mean weight of a cubic foot of air.....grains	533·0	532·6
Mean amount of Cloud (0—10)	6·2	6·7
Fall of Rain ..... inches	2·880	4·271
Greatest Rainfall in one day (1st) ..... ,,	0·967	0·957
No. of days on which ·005 in. or more Rain fell...	8	16·2

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	2	5	0	1	5	15	1
Mean Velocity in miles per hr.	4·5	5·1	7·7	0	6·8	5·1	8·5	4·3
Total No. of miles.....	107	246	929	0	162	613	3053	104

		Mean*
Total No. of Miles registered	5214	6056·3
Greatest hourly velocity (11th, Noon., Dir. W.b.S.)	25	31·9

* *For the last* 54 *years.*

SEPTEMBER, 1921.

DIFFERENCES.

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

Mean barometric pressure	+	0·135 in.
Monthly range ,, ...	—	0·328 in.
Mean of highest daily temperatures	+	0·6°
Mean of lowest ,, ,, ...	+	2·1°
Mean daily range	—	1·5°
Adopted mean temperature	+	1·5°
Total rainfall	—	1·391 in.

Heavy Rain on 1st and 13th. Thunder on 1st. Fog on 8th and 23rd.

EXTREME READINGS FOR SEPTEMBER,

During 74 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, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·704	29·447
Highest ,, ,, on the 14th ,,	30·155	30·019
Lowest ,, ,, on the 2nd ,,	29·249	28·688
Range of Barometer Readings..... ,,	0·906	1·331
Highest Reading of a Max. Therm. on the 9th ...	72·0	64·1
Lowest Reading of a Min. Therm. on the 24th ...	32·2	29·8
Range of Thermometer Readings	39·8	34·3
Mean of Highest Daily Readings	60·2	54·5
Mean of Lowest Daily Readings	48·6	42·0
Mean Daily Range	11·6	12·5
Deduced Mean Temp. (from Mean. of Max. and Min.)	53·4	47·3
Mean Temperature from Dry Bulb	54·2	48·0
Adopted Mean Temperature	53·8	47·7
Mean Temperature of Evaporation	51·5	45·5
Mean Temperature of Dew Point	49·3	43·1
Mean elastic force of Vapour.....inches	0·350	0·279
Mean weight of vapour in a cub. ft. of air, grains	4·0	3·2
Mean additional weight required for saturation ,,	0·7	0·6
Mean degree of Humidity (saturation 100).....	85	84
Mean weight of a cubic foot of air .....grains	535·2	537·5
Mean amount of Cloud (0—10)	7·6	7·3
Fall of Rain ..... inches	4·641	4·929
Greatest Rainfall in one day (22nd) ..... ,,	0·765	0·973
No. of days on which ·005 in. or more Rain fell...	18	18·6

Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	4	2	0	1	6	1	15	2
Mean Velocity in miles per hr.	5·9	6·0	0	3·3	5·6	3·5	8·1	13·5
Total No. of miles.....	564	281	0	79	800	84	2901	645

		Mean*
Total No. of miles registered	5354	6857·6
Greatest hourly velocity (29th, and 31st., Dir. N.W. and W.S.W.)	30	37·2

* *For the last* 54 *years.*

OCTOBER, 1921.

DIFFERENCES.

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

Mean barometic pressure	+	0·257 in.
Monthly range ,, ...	—	0·425 in.
Mean of highest daily temperatures	+	5·7°
Mean of lowest ,, ,, ...	+	6·6°
Mean daily range ,, ...	—	0·9°
Adopted Mean temperature	+	6·1°
Total rainfall	—	0·288 in.

Ground Frost on 9th, 21st, 23rd and 24th. Heavy Rain on 19th, 21st, and 22nd. Thunder on 6th, 11th, and 19th. Lightning on 6th, 11th, and 19th. Fog on 26th. Lunar Halo on 12th.

EXTREME READINGS FOR OCTOBER,

During 74 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 ,, ...	1915	1·180 in.
Greatest fall of rain in one day ...	1870 (8th)	2·529 in.
Greatest No. of days on which ·005 in. or more rain fell ...	1903	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, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·625	29·465
Highest „ „ on the 10th ... „	30·093	30·065
Lowest „ „ on the 6th ... „	28·800	28·573
Range of Barometer Readings..... „	1·293	1·492
Highest Reading of a Max. Therm. on the 4th ...	54·7	55·8
Lowest Reading of a Min. Therm. on the 9th ...	24·6	25·4
Range of Thermometer Readings	30·1	30·4
Mean of Highest Daily Readings	44·8	47·2
Mean of Lowest Daily Readings	35·5	36·8
Mean Daily Range	9·3	10·4
Deduced Mean. Temp. (from Mean of Max. and Min.)	39·8	41·6
Mean Temperature from Dry Bulb.....	40·5	42·0
Adopted Mean Temperature	40·2	41·8
Mean Temperature of Evaporation	38·3	39·8
Mean Temperature of Dew Point	35·9	38·2
Mean elastic force of Vapour.....inches	0·211	0·231
Mean weight of Vapour in a cub. ft. of air, grains	2·4	2·7
Mean additional weight required for saturation „	0·5	0·4
Mean degree of Humidity (saturation 100)	85	87
Mean weight of a cubic foot of air ..... grains	548·5	544·6
Mean amount of Cloud (0—10)	7·3	7·4
Fall of Rain ..... inches	2·555	4·374
Greatest Rainfall in one day (5th)..... „	0·965	0·969
No. of days on which ·005 in. or more Rain fell...	16	18·1

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	4	10	6	2	3	0	5	0
Mean Velocity in miles per hr.	6·3	5·1	8·1	6·1	5·6	0	12·8	0
Total No. of miles.....	608	1218	1161	291	402	0	1539	0

		Mean*
Total No. of miles registered	5219	7221·4
Greatest hourly velocity (30th, at midnight Dir. E.)	26	40·9

* *For the last 54 years.* † *And in other years.*

NOVEMBER, 1921.

DIFFERENCES.

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

Mean barometic pressure	+	0·160 in.
Monthly range ,, ...	—	0·209 in.
Mean of highest daily temperatures	—	2·4°
Mean of lowest ,, ,, ...	—	1·3°
Mean daily range ,, ...	—	1·1°
Adopted mean temperature	—	1·6°
Total rainfall	—	1·819 in.

Ground Frost on 7th—15th, and 26th—28th. Heavy Rain on 2nd and 5th. Fog on 3rd and 28th. Snow on 11th. Solar Halo on 1st. Hoar Frost on 9th, 25th—27th, and 29th.

EXTREME READINGS FOR NOVEMBER,

During 74 Years.

Highest reading of Barometer ...	1857	(12th)	30·350 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, 1921.

Results of Observations taken during the Month.		Mean for the last 74 years.
Mean Reading of the Barometer ..... inches	29·539	29·430
Highest ,, ,, on the 13th ,,	29·968	30·057
Lowest ,, ,, on the 28th ,,	28·880	28·539
Range of Barometer Readings..... ,,	1·088	1·518
Highest Reading of a Max. Therm. on 19th	53·2	52·9
Lowest Reading of a Min. Therm. on the 5th ...	28·6	21·3
Range of Thermometer Readings.....	24·6	31·6
Mean of Highest Daily Readings	48·3	43·4
Mean of Lowest Daily Readings	38·5	33·7
Mean Daily Range	9·8	9·7
Deduced Mean Temp. (from Mean. of Max. and Min.)	43·4	38·6
Mean Temperature from Dry Bulb	44·0	39·2
Adopted Mean Temperature	43·7	38·9
Mean Temperature of Evaporation	42·2	37·3
Mean Temperature of Dew Point	40·4	35·3
Mean elastic force of Vapour ..... inches	0·252	0·208
Mean weight of Vapour in a cub. ft. of air, grains	2·9	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	544·2	547·0
Mean amount of Cloud (0—10)	8·3	7·6
Fall of Rain .... inches	7·838	4·733
Greatest Rainfall in one day (27th)..... ,,	1·100	0·855
No. of days on which ·005 in. or more Rain fell...	26	20·1

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	0	4	0	2	8	11	4
Mean Velocity in miles per hr.	9·6	0	11·6	0	8·5	16·4	17·4	6·4
Total No. of miles.....	461	0	1118	0	408	3155	4602	610

		Mean *
Total No. of miles registered	10354	7856·0
Greatest hourly velocity (17th at 2 p.m., Dir. W. by N.)	37	42·2

* *For the last* 54 *years.*

DECEMBER, 1921.

DIFFERENCES.

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

Mean barometric pressure	+	0·109 in.
Monthly range ,, ...	—	0·430 in.
Mean of highest daily temperatures	+	4·9°
Mean of lowest ,, ,, ...	+	4·8°
Mean daily range ,, ...	+	0·1°
Adopted mean temperature	+	4·8°
Total rainfall	+	3·105 in.

Ground Frost on 1st, 4th—6th, 12th, 14th, 16th, 24th—27th. Heavy Rain on 21st, 24th, 26th, and 27th. Fog on 4th, 5th, 16th, and 25th. Hail on 20th, 22nd, 28th, 29th, and 30th. Lunar Halo on 15th.

EXTREME READINGS FOR DECEMBER,

During 74 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 ...	1898	.....	11265
*Least ,, ,, ,, ...	1916	.....	4517

* *Since* 1867 *only.* † *And in other years,*

Summary of Observations, 1921.

Results of Observations taken during the Year.		Mean for the last 74 Years.
Readings of Barometer in inches.		
Mean of the Year	29·615	29·494
Highest Monthly Mean (February)	29·862	29·745
Lowest „ „ (January)	29·416	29·225
Highest Reading (February 26th)	30·420	30·292
Lowest „ (January 12th)	28·655	28·209
Range	1·765	2·083
Thermometer, Fahrenheit.		
Highest Monthly Mean Temperature (July)	62·0	58·6
Lowest „ „ „ (November)	40·2	35·6
Highest Reading of a Max. Therm. (June 25th)	82·7	81·3
Lowest „ Min. „ (November 9th)	24·6	16·1
Range of Thermometer Readings	58·1	65·2
Mean of Highest Daily „	55·8	54·5
Mean of Lowest Daily „	43·8	41·0
Mean Daily Range	12·0	13·5
Deduced Mean Temp. (from mean of Max. and Min.)	48·7	46·8
Mean Temperature from Dry Bulb	49·9	47·1
Adopted Mean Temperature of the Year	49·4	47·0
Mean Temperature of Evaporation	46·9	44·6
Mean Temperature of Dew Point	44·3	42·2
Mean elastic force of Vapour ..... inches	0·300	0·274
Mean weight of Vapour in a cub. ft. of air...grns.	3·4	3·2
Mean additional weight required for saturation „	0·8	0·7
Mean degree of Humidity (saturation 100)	83	83
Mean weight of a cubic foot of air.....grns.	538·8	539·1
Mean amount of Cloud (0—10)	7·2	7·3
Total fall of Rain ..... inches	48·486	47·069
Greatest Monthly Rainfall (January)	8·589	7·604
Least „ „ (February)	0·627	1·245
Greatest Rainfall in one day (December 27th) „	1·100	1·617
No. of days per Month on which ·005 inch or more Rain fell	16·4	17·1

SUMMARY OF WIND, 1921.

Prevailing Direction	N	NE	E	SE	S	SW	W	NW
No. of days for each	27	39	40	4	35	42	159	19
Mean Velocity in miles per hour...	6 1	5 8	8 4	4·7	8·1	11·7	10 6	10·5
Total No. of miles for each Direction	3954	5477	8101	453	6806	11765	40322	4774

		Mean for the last 54 years.
Total No. of miles registered	81652	85592·7
Greatest Monthly Total (January)	10406	9997·8
Least „ „ (February)	4746	4946·3
Greatest hourly velocity (March 16th & Dec. 17th)	37	50·7
Prevailing Direction of Wind	W.	

DIFFERENCES, 1921.

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

Mean barometric pressure...	+	0·121 in.
Yearly range „	—	0·318 in.
Mean of highest daily temperatures	+	1·3°
Mean of lowest „ „	+	2·8°
Mean daily range	—	1·5°
Adopted mean temperature	+	2·4°
Total rainfall	+	1·417 in.

ABSOLUTE EXTREMES

FOR THE LAST 74 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 (July)	5·1
Least „ „	†1855 (Feb.)	1·4

† *And on other dates.*

ABSOLUTE EXTREMES

FOR THE LAST 74 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	1866	62·093
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	8473
Least ,, ,, ,, ...	September ...	6099
Greatest No. ,, ,, year .	1868	102395
Least ,, ,, ,, ,, ...	1915	70623

* *Record dates from* 1867 *only.*

DATES OF OCCASIONAL PHENOMENA.

1921	Frost	Hoar Frost	Snow	Hail	Heavy Rain
January	8, 14, 15, 16		14, 18	11, 18	1, 16, 17, 24, 25
February	3, 4, 8–12, 18, 21, 22, 26	18			
March	3, 7, 8, 11, 12, 15, 29		26, 27, 28	2, 18, 26, 27, 28	3, 28
April	3, 8, 9, 15, 16, 18–22, 24		14, 15, 16, 17	8, 14, 15, 16, 23	13
May	3, 5				
June					
July					22, 23, 25
August				6	5, 22, 28
September					1, 13
October	9, 21, 23, 24				19, 21, 22
November	7–15	9, 13, 25-27, 29	11		2, 5
December	1, 4–6, 12, 14, 16, 24–27			20, 22, 28, 29, 30	21, 24, **26**, 27

1921	Gales of Wind	Fog	Thunder	Lightning	Lunar Halo	Solar Halo	Aurora Borealis
January		25					
February					14		
March	16		28		16		
April			18		20	22	
May			2, 12	2, 12			
June		16	26	26			
July			14, 15, 17, 25	15, 18		24, 27	
August		19	10, 21			18	
September		8, 23	1	1			
October		26	6, 11, 19	6, 11, 19	12		
November		3, 28					
December	17	4, 5, 16, 25			15		

MONTHLY TOTALS FOR EACH HOUR OF RECORDED SUNSHINE.

1921. 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 ...	...	...	...	0·1	0·2	0·5	2·2	4·8	5·0	4·7	4·2	1·0	...	...	...	...	...
February ...	...	...	...	0·3	4·3	8·7	10·4	8·7	10·6	7·7	5·5	3·4	1·6	0·8	...	...	...
March ...	...	...	0·1	3·1	6·8	8·6	9·0	10·1	9·7	10·3	7·9	7·6	4·0	1·4	...	...	...
April ...	...	3·6	12·3	15·8	14·6	17·5	16·6	17·7	15·5	15·5	14·9	15·5	16·1	10·3	3·6	0·3	...
May ...	0·2	5·7	13·8	15·2	15·7	15·1	14·8	16·5	16·6	16·6	14·8	15·9	15·7	16·2	11·8	4·7	...
June ...	3·2	8·6	10·5	14·3	14·7	15·7	17·8	17·0	17·7	18·0	18·9	18·9	17·8	15·2	14·7	10·5	...
July ...	0·8	7·5	13·8	13·8	15·3	13·4	15·1	15·5	14·8	15·8	15·9	14·8	13·8	12·9	12·8	5·8	...
August ...	...	1·4	6·7	11·8	12·4	11·3	11·4	12·0	11·9	11·2	10·3	10·1	9·3	7·7	4·3	...	...
September ..	...	...	2·3	9·5	12·5	15·9	16·7	15·8	18·0	18·1	18·4	17·6	12.2	6·1	0·3	...	...
October ...	...	...	...	1·6	7·4	9·1	11·2	12·6	14·7	15·0	13·6	9·8	2·5	0·2	...	...	...
November...	...	...	...	...	2·7	5·6	8·7	11·4	9·1	10·3	8·2	4·4	0·2	...	...	...	...
December ...	...	...	...	...	...	1·4	4·0	5·9	7·6	7·2	4·2	0·3	...	...	...	...	...
Sums ...	4·2	26·8	59·5	85·5	106·6	122·8	137·9	148·0	151·2	150·4	136·8	119·3	93·2	70·8	47·5	21·3	...

TOTAL AMOUNT OF SUNSHINE RECORDED ON EACH DAY.

1921	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
January ...	0·1	...	...	...	1·6	...	...	...	...	...	1·1	...	...	4.1	...	...	...
February ...	...	2·2	1.1	1·0	...	...	...	...	5·8	3·3	2·3	2·2	0·8	6·5	...	...	3·2
March ...	...	6·3	...	0·1	...	0.2	8·0	2·3	2·3	7·5	1·5	4·3	0·1	0·8	1·1	...	5·3
April ...	8·2	2·2	2·6	3·9	0·6	4·9	11·6	11·6	4·5	0·1	7·4	10·8	2·1	8·2	7·0	11·3	...
May ...	12·8	2·8	8·8	2·2	6·6	...	4·5	4·9	5·1	6·6	1·1	2·5	9·2	0·6	11·3	13·2	12·2
June ...	13·6	14·5	14·7	...	9·6	15·5	15·3	2·0	2·3	11·1	12·6	...	3·5	1·6	11·5	13·8	7·3
July ...	4·7	14·3	5·5	9·6	14·4	0.5	10·5	13·4	13·4	14·3	13·1	14·0	8·2	1·4	2·8	1·7	7·2
August ...	0·7	0·7	5·9	0·3	...	7·3	0·3	4·0	6·0	2·5	...	...	6·6	3·9	12.8	2·2	1·8
September ..	1·4	0·8	...	5·4	9·2	10·4	10·1	10·6	8.9	10·1	6·8	6·8	...	0·9	5·8	8·9	2·8
October ...	9·0	...	...	...	8·0	6·4	...	...	7·8	5·1	1·4	2·9	0·5	7·5	5·0	2·0	3·4
November...	6·2	...	...	...	4·9	7·2	7·5	7·6	...	5·6	5·7	1·6	1·1	...	1·2	0·1	...
December ...	...	...	...	4·3	...	...	...	...	0·1	...	1·9	1·3	5·0	...	...	0·1	3·7

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

1921	18	19	20	21	22	23	24	25	26	27	28	29	30	31	MONTHLY Total	MONTHLY Percen.
January ...	1·8	2·2	...	2·1	4·5	...	...	0·2	0·1	0·1	0·1	1·5	3·2	...	22·7	9·2
February ...	4·7	...	1·0	6·7	5·7	3·3	...	2·0	8·8	1·4	...				62·0	22·8
March ...	3·0	2·0	5·7	0·1	0·2	...	8·3	...	4·3	3·1	...	5·6	6·3	0·2	78·6	21·5
April ...	1·3	11·1	5·6	5·3	10·0	7·5	13·2	...	6·0	0·7	5·4	13·8	12·9		189·8	45·3
May ...	11·6	...	8·6	12·7	7·2	8·0	12·3	14·1	2·8	0·5	8·1	6·2	4·8	8.0	209·3	42·5
June ...	7·8	0·3	2·0	5·1	0·8	0·9	8·4	12·1	1·2	14·4	15·4	14·9	1·3		233·5	46.0
July ...	12·3	1·3	6·0	2·3	0·2	...	7·3	2·9	8·0	4·2	3·5	0·1	4·0	0·7	201·8	39·6
August ...	12·5	10·3	8·3	0·8	0·7	3·3	0·1	5·9	5·8	3·3	5·9	5·4	11·3	3·2	131·8	28·8
September ..	10·5	4·0	4·7	5·6	1·5	5·4	9·8	9·8	3·2	...	4·8	1·9	3·3		163·4	43·1
October ...	8·0	0·9	3·5	0·3	...	2·6	8·9	1·8	0·6	3·1	0·7	2·1	6·2	...	97·7	30·0
November...	...	...	...	...	...	0·2	1·4	2·7	3·5	3·3	...	0·1	0·7		60·6	23·7
December ..	...	0·7	1·8	...	...	1·0	1·1	2·8	...	0·2	1·1	2·3	...	3·2	30·6	13·2

SUMMARY OF SUNSHINE.

	Bright Sunshine Recorded					
	1921			Mean for the last 41 years		
	Number of		Percentage of Possible Sunshine	Number of		Percentage of Possible Sunshine
	Days	Hours		Days	Hours	
January ...	14	22·7	9·2	14·2	32·4	13·1
February ...	18	62·0	22·8	17·7	58·2	21·2
March ...	24	78·6	21·5	24·1	102·3	28·0
April ...	28	189·8	45·3	26·3	148·2	35·4
May ...	29	209·3	42·5	27·6	186·2	37·8
June ...	28	233·5	46·0	28·0	186·2	36·6
July ...	30	201·8	39·6	28·4	173·4	34·1
August ...	28	131·8	28·8	27·6	148·7	32·5
September ..	27	163·4	43·1	25·7	124·9	33·0
October ...	24	97·7	30·0	23·5	85·2	26·1
November ..	18	60·6	23·7	17·5	46·2	18·1
December ...	16	30·6	13·2	13·5	25·9	11·2
Year ...	284	1481·8	33·2	274·0	1317·7	29·5

SUMMARY OF SUNSHINE—*Continued.*

EXTREMES FOR THE LAST 41 YEARS.

Month	Number of Days on which Sunshine was recorded				Number of Hours on which Sunshine was recorded				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.	28	*1894	17	1904	168·6	1907	56·8	1912	46·1	1907	15·5	1912
Aprl.	30	*1909	22	1920	223·7	1893	80·7	1920	53·4	1893	19·3	1920
May	30	*1880	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.	23	*1883	9	1897	86·6	1915	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).

1921	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*					
	15° +						15° +	15° +	
	′	′	′	′	′	′	′	′	′
January ...	44·1	40·1	41·3	41·7	41·8	5·3	47·0	36·0	11·0
February ...	48·5	42·7	42·9	43·9	44·5	7·9	56·0	39·0	17·0
March	51·7	45·5	46·7	48·3	48·1	9·4	57·0	40·0	17·0
April	52·1	46·3	47·6	49·0	48·5	8·8	54·0	26·0	28·0
May	49·1	36·5	39·1	46·1	42·7	22·0	109·0	—20·0	129·0
June	48·0	38·8	41·4	47·4	43·7	11·9	54·0	29·0	25·0
July	47·0	36·8	39·0	44·8	41·9	13·8	53·0	31·0	22·0
August ...	43·2	34·6	37·8	40·0	38·9	13·2	54·0	24·0	30·0
September ...	41·4	34·0	36·0	39·4	37·7	12·8	50·0	13·0	37·0
October ...	40·0	35·4	43·4	40·0	39·0	12·2	49·0	16·0	33·0
November ...	38·2	33·6	36·4	35·8	36·0	8·7	45·0	27·0	18·0
December ...	37·0	33·4	35·2	35·8	35·4	11·3	47·0	14·0	33·0
Means	45·0	38·1	40·5	42·7	41·5	11·4	56·0	23·0	33·0

Mean for the year ... ... 15° 41·5′ 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.

1921	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 +					0 +	17000 +		0 +
January ...	293	279	286	284	286	32	310	230	80
February ...	297	278	291	288	289	29	349	244	105
March ...	290	271	289	283	284	45	352	235	117
April	297	263	279	285	281	56	357	197	160
May	345	300	327	336	327	34	533	—172	705
June	362	322	349	354	346	71	434	293	141
July	356	312	346	348	341	62	396	275	121
August ...	353	315	337	343	337	77	384	258	126
September ...	348	312	338	336	333	50	383	288	95
October ...	364	330	352	353	350	56	387	198	189
November ...	318	299	213	312	311	36	396	241	155
December ...	306	292	299	299	299	44	361	211	150
Means	327	289	317	319	315	54	387	208	179

Mean for the year ... ... ·17315 C. G. S. Units.

* *For the 5 quietest days.*

† *Includes all days.*

ABSOLUTE MEASURES—SUMMARY.

1921	DIRECTION		FORCE.		
	Declination Corrected	Inclination	Horizontal	Vertical	Total
	° ′	° ′	C. G. S. UNITS.		
	15 +	68 +	0·17000+	0·44000+	0·47000+
January ...	46·3	42·1	306	392	646
February ..	46·5	41·1	309	360	618
March ..	46·1	42·9	322	462	718
April	44·9	44·7	318	520	771
May	42·6	45·7	339	613	864
June	43·5	43·2	300	416	667
July	40·4	43·3	322	479	733
August ..	39·9	43·3	324	435	739
September ..	40·0	43·2	317	462	716
October ..	37·0	42·7	322	456	712
November ..	35·2	42·2	302	385	639
December ..	36·5	41·5	299	352	606
Means .	15 41·6	68 43·0	0·17315	0·44449	0·47702

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 vg. The days are civil days.

1921	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1921
D.													D.
1	s	c	m	c	c	s	s	c	c	m	m	c	1
2	c	s	c	s	c	c	s	s	v.g.	s	c	s	2
3	s	c	s	s	s	m	c	g	s	c	c	s	3
4	s	c	c	c	s	m	m	m	m	s	*	c	4
5	s	s	s	s	c	s	c	m	s	g	*	c	5
6	c	s	c	c	c	m	s	s	s	m	m	c	6
7	c	s	s	c	c	m	m	s	s	s	s	c	7
8	c	s	c	c	s	g	m	s	m	v.g.	*	s	8
9	s	s	m	c	s	m	m	s	s	m	*	c	9
10	m	c	s	c	s	m	s	c	s	c	*	s	10
11	c	s	s	c	c	s	s	m	c	g	*	s	11
12	s	c	s	s	g	c	c	s	c	s	*	v.g.	12
13	c	s	s	m	v.g	s	s	c	s	c	s	v.g.	13
14	c	s	s	s	v.g.	s	c	s	c	s	*	s	14
15	s	c	m	c	v.g.	s	m	m	s	s	*	c	15
16	s	c	s	c	v.g.	s	s	m	s	c	m	g	16
17	m	s	s	s	g	c	s	s	c	c	m	m	17
18	c	c	s	m	s	c	s	c	s	c	m	s	18
19	c	m	s	s	v.g.	s	m	s	s	c	s	c	19
20	m	c	s	s	v.g.	s	s	s	s	c	c	c	20
21	s	s	v.g.	v.g.	m	s	s	s	c	m	s	c	21
22	c	c	m	m	s	m	s	c	c	s	c	m	22
23	c	c	c	m	s	m	s	s	m	c	g	g	23
24	s	c	s	s	c	s	c	s	c	s	s	s	24
25	s	s	m	s	c	c	c	c	c	c	s	*	25
26	s	c	m	c	s	m	s	m	c	c	c	m	26
27	c	c	v.g	s	s	s	s	m	s	m	c	s	27
28	c	s	c	s	s	c	s	c	m	m	s	v.g.	28
29	c		m	v.g.	s	s	s	c	v.g.	m	c	g	29
30	c		c	s	c	c	s	m	c	c	c	m	30
31	s		c		c		c	c		m		c	31
TOTAL c	15	14	8	11	10	7	7	9	11	12	8	11	
TOTAL s	13	13	14	13	12	13	18	13	13	8	7	9	
TOTAL m	3	1	7	4	1	9	6	8	4	8	5	4	
TOTAL g	...	...	...	...	2	1	...	1	...	2	1	3	
TOTAL vg	...	...	2	2	6	...	...	...	2	1	...	3	

* *No record.*

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.

1921	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1921
D.													D.
1	1·9			4·2	0·0	0·4	13·3			0·0	1·2		1
2		3·0	0·3	2.1	0·6	0·6	12·3						2
3					0·9	0·8	11·2	1·3					3
4		3·2		1·2	0·0		11·2		0·0			0·0	4
5	2.4				0·0	0·9	10·3		0·0	0·0	0·0		5
6				2·0		1·4		0·0	0·0	0·0	0·0		6
7			0·1	2·1	0·0	2·2	9·1		0·0		0·0		7
8			0·3	1·7	0.2	3·2	8·1		0·0		0·0		8
9		2·5	0·5		7·9	2·4	6·5	0·1	0·0	0·0	0·0		9
10		2·8	1·5		12·4	4·0	5· 6	0·0	0·0	0·1	0·0		10
11	6·9	2·0	2·0	3·0		3·7	4·8		0·8	0.3	0·0	2·0	11
12		1·4	3·1	3·0	14·9		4·7		1·8	0·6	1·7	3·0	12
13				2·6	15·6	1·7	2·7	0·9		0·3		4·6	13
14	9.3	0·8		3·2	16·5		1·6	0·7		0·3			14
15				3·3	14·3	0·9	1·7	0·5	4·4	0·9	3·5		15
16	3·1			4·4	13·0	0 0	0·7	0·8	5·7	1·0			16
17			1·6		11·3	0·4	0·7	1·2	5·8	1·3		7·2	17
18	5·7	2·7			7·4	0·8	0·5	1·7	6·4	1·4			18
19	3·8		1·6	5·8				3·1	5·8	1·4		6·6	19
20		7·2	0·6	4·5	2·1		0·3	2·9	4·9	1·4		5·4	20
21	2·3	6·1		3·9	1·0	1·7	0·1		4·8				21
22	1·9	4·5		4·1	0·8								22
23		2·7		3·9	0·6	2·2		1·2	3·0		7·3	3·2	23
24			4·9	3·4	0·5	2·0	0·2		2·1	8·6	6·8	2·5	24
25		0·3		2·4	0·4	2·2	0·5	4·7	1·5		6·2	1·6	25
26		0·2	6·9	2·2	0·2		1·8	6·9	1·3	11·5	4·8		26
27	0·6	0·4	7·9			6·8	3·2	9·9		10·2	4·7		27
28				0·9	0·3	10·4	4·6	7·0	2·6				28
29	0·1		7·9	0·4	0·6	12·5		4·2	1·5	2·9	2·4	0·1	29
30	0·3		6·2	0·0	0.4	12·9	4·8	2·4	0·0	2·8	1·2		30
31					0·2			1·6				0·0	31
Daily Means	3·2	2·7	3·0	2·8	4·5	3·2	4·8	2·6	2·3	2·3	2·3	3·0	

1921.

Date	No. of Group.	Mean Lat.	Mean Long.	Max. Area.	Where Measured
Jan. 1	1	+ 8°·9	37°·8	0·3	
Jan. 1-5	2	—12°·5	349°·0	0·8	Chief spot.
Jan. 1	3	+19°·1	330°·4	0·1	
Jan. 1-5	4	— 6°·1	262°·8	2·3	Cen. of two chief spots.
Jan. 11-14 ...	5	—13°·4	206°·5	3·9	Centre of Group.
Jan. 11-14 ...	5	—14°·2	210°·6	3·9	Chief spot.
Jan. 11-14 ...	6	+ 8°·5	156°·3	0·2	Centre of group.
Jan. 11-19 ...	7	— 9°·8	144°·1	4·6	Cpief spot.
Jan. 11-19 ...	7	— 8°·8	140°·4	4·6	Centre of group.
Jan. 14-22 ...	8	+ 3°·2	101°·2	3·7	Chief spot.
Jan. 21-22 ...	8	— 3°·0	99°·4	3·7	Cen. of Sec. group
Jan. 21-30 ...	9	—12°·0	356°·0	0·7	Centre of group.
Jan. 21-22 ...	9	—10°·2	2°·3	0·7	Chief spot.
Jan. 27	10	+12°·0	308°·3	0·3	
Jan. 30-Feb. 11	11	—14°·8	213°·2	3·1	Chief spot.
Feb. 2-4 ...	11	—16°·0	217°·8	3·1	Centre of group.
Feb. 2-4 ...	12	+ 7°·3	206°·7	0·1	Chief spot.
Feb. 9-14 ...	13	— 8°·9	146°·1	1·8	Chief spot.
Feb. 11-12 ...	14	+12°·2	212°·8	0·1	
Feb. 12	15	—11°·2	61°·2	0·1	
Feb. 14	15	—10°·4	64°·0	0·6	Centre of group.
Feb. 18-23 ...	16	— 6°·6	46°·1	7·2	Centre of group.
Feb. 18-23 ...	16	— 6°·5	52°·2	7·2	Chief spot.
Feb. 22-26 ...	17	— 9°·3	13°·6	0·6	Chief spot.
Feb. 27-Mar. 2	18	+11°·8	216°·6	0·3	Chief spot.
Feb. 27	19	—14°·9	214°·2	0·1	
Mar. 7	20	—17°·2	138°·3	0·1	
Mar. 8	21	+ 9°·5	223°·6	0·1	Chief spot.
Mar. 8-17 ...	22	+ 4°·2	103°·3	2·3	Chief spot.
Mar. 11-12 ...	23	— 4°·7	112°·9	0·4	Centre of group.
Mar. 11-17 ...	24	— 7°·5	60°·4	0·3	Chief spot.
Mar. 12-20 ...	25	—11°·2	37°·3	1·3	Chief spot.
Mar. 19	26	+18°·3	89°·4	0·5	Chief spot.
Mar. 24-Apl. 1 ...	27	+ 9°·4	282°·1	5·4	Chief spot.
Mar. 26-Apl. 4 ...	28	— 8°·0	243°·8	2·5	Chief spot.
Mar. 27-29 ...	29	+ 6°·6	218°·2	0·3	Centre of group.

1921.—*Cont.*

Date	No. of Group.	Mean Lat.	Mean Long.	Max. Area.	Where Measured
Mar. 29	30	+13°·9	186°·2	0·2	Centre of group.
Apl. 1-2	31	—14°·9	160°·5	0·1	
Apl. 4-8	32	—10°·4	193°·4	0·8	Chief spot.
Apl. 6-15 ...	33	+17°·4	88°·2	1·9	Centre of group.
Apl. 11-22 ...	34	+ 9°·6	17°·0	3·0	
Apl. 16-19 ...	35	+ 9°·9	38°·9	1·3	Centre of group.
Apl. 16-28 ...	36	—15°·5	302°·2	2·0	Chief spot.
Apl. 19-29 ...	37	+ 9°·4	285°·1	2·3	Chief spot.
Apl. 20-26 ...	38	— 6°·4	263°·9	0·5	Centre of group.
May 2-3 ...	39	+11°·4	224°·3	0·9	Chief spot.
May 8-21 ...	40	+ 1°·2	2°·8	16·5	Mean cen. of grp.
May 8-21 ...	40	+ 1°·8	6°·9	16·5	Chief spot (1).
May 8-21 ...	40	+ 0°·6	358°·8	16·5	Chief spot (2).
May 20-26 ...	41	+11°·9	232°·8	0·8	Chief spot.
May 28-30 ...	42	— 6°·6	111°·2	0·5	
June 1-3 ...	42	— 5°·2	112°·3	0·1	Cen. of Sec. group
May 28-30 ...	43	—15°·2	125°·7	0·1	
June 1	44	+12°·7	196°·8	0·1	
June 1-10 ...	45	+14°·3	89°·9	1·0	Centre of group.
June 5-15 ...	46	+ 1°·7	15°·5	1·4	Chief spot.
June 8-15 ...	47	+ 8°·4	13°·7	2·7	Centre of group.
June 8-9 ...	48	— 4°·7	97°·0	0·2	Centre of group.
June 8, 9, 16 ...	49	+13°·7	353°·2	0·3	Centre of group.
June 11	50	— 8°·0	46°·8	0·1	
June 13	51	— 7°·9	325°·0	0·1	Centre of group.
June 17-28 ...	52	+11°·3	205°·4	2·1	
June 23-27 ...	53	+12°·3	129°·8	0·1	
June 24-25 ...	54	+13°·4	101°·8	0·2	
June 25-July 5...	55	— 6°·9	111°·8	9·6	Chief spot.
June 27-July 1...	56	+13°·4	94°·7	3·5	Centre of group.
July 1-5 ...	56	+13°·7	90°·3		Centre of main gp.
June 30-July 2...	57	— 9°·9	49°·0	0·2	Centre of group.
June 30-July 12	58	+ 4°·0	21°·5	4·2	Centre of group.
July 1-13 ...	59	+12°·6	7°·4	5·5	Cen. of 2 chief spts
July 8-13 ...	60	+ 3°·2	310°·0	1·1	Centre of group.
July 9-14 ...	61	—12°·8	355°·0	1·7	Centre of group.
July 12-20 ...	62	— 3°·9	239°·0	1·7	Centre of group.

1921.—*Cont.*

Date	No. of Group.	Mean Lat.	Mean Long.	Max. Area.	Where Measured
July 20	63	— 9°·6	177°·7	0·2	Centre of group.
July 21-24 ...	64	— 5°·1	120°·3	0·1	Centre of group.
July 24-26 ...	65	—16°·0	175°·6	0·2	Centre of group.
July 25-28 ...	66	+14°·1	84°·9	0·3	Centre of group.
July 25-Aug. 3 ..	67	— 8°·5	62°·5	4·8	Chief spot.
Aug. 9	68	+11°·2	316°·6	0·1	Centre of group.
Aug. 13-17 ...	69	+ 0°·7	254°·8	0·8	Chief spot.
Aug. 13	70	+ 4°·9	166°·0	0·1	Centre of group.
Aug. 14	70	+ 4°·6	168°·9	0·1	Remaining spot.
Aug. 16-25 ...	71	— 4°·1	129°·7	1·7	Chief spot.
Aug. 18-20 ...	72	—14°·9	197°·4	1·5	Chief spot.
Aug. 23-31 ...	73	+11°·2	56°·7	8·4	First main spot.
Aug. 23-31 ...	73	+12°·0	50°·5	8·4	Sec'd main spot.
Aug. 26-29 ...	74	+11°·9	109°·5	1·5	Centre of group.
Aug. 31	75	— 8°·9	39°·7	0·2	Centre of group.
Sep. 11-15 ...	76	— 9°·8	244°·4	1·8	Chief spot.
Sep. 15-25 ...	77	+10°·6	117°·5	5·4	Chief spot.
Sep. 16-20 ...	78	— 4°·5	109°·7	0·8	Centre of group.
Sep. 20-24 ...	78	— 4°·2	118°·6	0·8	Chief spot.
Sep. 18-19 ...	79	—12°·0	136°·3	0·5	Centre of group.
Sep. 24-29 ...	80	+ 9°·2	54°·7	2·6	Centre of group.
Oct. 10-15 ...	81	+12°·3	117°·7	0·2	Chief spot.
Oct. 11-14 ...	82	+ 1°·2	174°·6	0·5	Centre of group.
Oct. 15-24 ...	83	+ 7°·9	61°·3	1·4	
Oct. 20-27 ...	84	+ 7°·5	37°·3	4·4	Centre of group.
Oct. 24-Nov. 1 .	85	+ 3°·9	330°·5	7·1	First main spot.
Oct. 24-Nov. 1 .	85	+ 2°·9	322°·0	7·1	Sec'd. main spot.
Oct. 27	86	+10°·8	286°·5	0·1	
Oct. 29	87	+25°·4	17°·7	0·1	Chief spot.
Nov. 12-24 ...	88	+ 6°·8	44°·0	3·5	Chief spot.
Nov. 23-27 ...	89	+ 2°·9	332°·3	0·8	Chief spot.
Nov. 23-30 ...	90	— 5°·9	319°·3	5·7	Chief spot.
Dec. 11-13 ...	91	+ 8°·4	105°·9	0·5	Centre of group.
Dec. 11-20 ...	92	+ 7°·6	46°·6	4·8	Centre of group.
Dec. 17-25 ...	93	— 5°·4	325°·2	3·9	Chief spot.
Dec. 19-23 ...	94	+12°·1	5°·1	0·8	Centre of group.
Dec. 29	95	+11°·5	224°·3	0·1	Centre of group.

DISTURBED SUN-SPOT AREAS, 1921.

No. of Area.	Date.	No. of Group.	Mean Latitude.	Mean Longitude.	Max. Area.
1	July 1—13 ...	59	+12°·6	7°·4	5·5
	Dec. 19—23 ...	94	+12°·1	5°·1	0·8
2	April 11—22 ...	34	+ 9°·6	17°·0	3·0
	June 8—15 ...	47	+ 8°·4	13°·7	2·7
3	May 8—21 ...	40 (1)	+ 1°·8	6°·9	16·5
	June 5—15 ...	46	+ 1°·7	15°·5	1·4
	June 30-July 12	58	+ 4°·0	21°·5	4·2
4	Feb. 12—14 ...	15	—10°·4	64°·0	0·6
	Mar. 11—17 ...	24	— 7°·5	60°·4	0·3
	July 25-Aug. 3	67	— 8°·5	62°·5	4·8
5	Feb. 18—23 ...	16	— 6°·6	46°·1	7·2
	June 11 ...	50	— 8°·0	46°·8	0·1
	June 30-July 2	57	— 9°·9	49°·0	0·2
	Aug. 31 ...	75	— 8°·9	39°·7	0·2
6	Jan. 1 ...	1	+ 8°·9	37°·8	0·3
	April 16—19 ...	35	+ 9°·9	38°·9	1·3
	Oct. 20—27 ...	84	+ 7°·5	37°·3	4·4
	Nov. 12—24 ...	88	+ 6°·8	44°·0	3·5
	Dec. 11—20 ...	92	+ 7°·6	46°·6	4·8
7	Aug. 23—31 ...	73	+11°·6	53°·6	8·4
	Sept. 24—29 ...	80	+ 9°·2	54°·7	2·6
	Oct. 15—24 ...	83	+ 7°·9	61°·3	1·4
8	June 1—10 ...	45	+14°·3	89°·9	1·0
	June 27--July 5	56	+13°·7	90°·3	3·5
	July 25—28 ...	66	+14°·1	84°·9	0·3
9	Mar. 19 ...	26	+18°·3	89°·4	0·5
	April 6—15 ...	33	+17°·4	88°·2	1·9

DISTURBED SUN-SPOT AREAS, 1921.—*Cont.*

No. of Area.	Date.	No. of Group.	Mean Latitude.	Mean Longitude.	Max. Area.
10	Mar. 11—12 ...	23	— 4°·7	112°·9	0·4
	May 28—30 ...	42	— 6°·6	111°·2	0·5
	June 25--July 5	55	— 6°·9	111°·8	9·6
	July 21—24 ...	64	— 5°·1	120°·3	0·1
	Aug. 16—25 ...	71	— 4°·1	129°·7	1·7
	Sept. 16—24 ...	78	— 4″·2	118°·6	0·8
11	Aug. 26—29 ...	74	+11°·9	109°·5	1·5
	Sept. 15—25 ...	77	+10°·6	117°·5	5·4
	Oct. 10—15 ...	81	+12°·3	117°·7	0·2
12	Jan. 11—19 ...	7	— 8°·8	140°·4	4·6
	Feb. 9—14 ...	13	— 8°·9	146°·1	1·8
13	Mar. 29 ...	30	+13°·9	186°·2	0·2
	June 1 ...	44	+12°·7	196°·8	0·1
	June 17—28 ...	52	+11°·3	205°·4	2·1
14	Jan. 11—14 ...	5	—14°·2	210°·6	3·9
	Jan. 30--Feb. 11	11	—14°·8	213°·2	3·1
	Feb. 27 ...	19	—14°·9	214°·2	0·1
	Aug. 18—20 ...	72	—14°·9	197°·4	1·5
15	Feb. 2—4 ...	12	+ 7°·3	206°·7	0·1
	May 27—29 ...	29	+ 6°·6	218°·2	0·3
16	Feb. 11—12 ...	14	+12 2	212°·8	0·1
	Feb. 27--Mar. 2	18	+11°·8	216°·6	0·3
	May 2—3 ...	39	+11°·4	224°·3	0·9
	May 20—26 ...	41	+11°·9	232°·8	0·8
	Dec. 29 ...	95	+11°·5	224°·3	0·1
17	Mar. 26--April 4	28	— 8°·0	243°·8	2·5
	Sept. 11—15 ...	76	— 9°·8	244°·4	1·8

DISTURBED SUN-SPOT AREAS, 1921.—*Cont.*

No. of Area.	Date.	No. of Group.	Mean Latitude.	Mean Longitude.	Max. Area.
18	Jan. 1—5 ...	4	— 6°·1	262°·8	2·3
	April 20—26 ...	38	— 6°·4	263°·9	0·5
19	Mar. 24--April 1	27	+ 9°·4	282°·1	5·4
	April 19—29 ...	37	+ 9°·4	285°·1	2·3
	Oct. 27 ...	86	+10°·8	286°·5	0·1
20	Jan. 27 ...	10	+12°·0	308°·3	0·3
	Aug. 9 ...	68	+11°·2	316°·6	0·1
21	July 8—13 ...	60	+ 3°·2	310°·1	1·1
	Oct. 24--Nov. 1	85	+ 3°·4	326°·3	7·1
	Nov. 23—27 ...	89	+ 2°·9	332°·3	0·8
22	June 13 ...	51	— 7°·9	325°·0	0·1
	Nov. 23—30 ...	90	— 5°·9	319°·3	5·7
	Dec. 17—25 ...	93	— 5°·4	325°·2	3·9
23	Jan. 1—5 ...	2	—12°·5	349°·0	0·8
	Jan. 21—30 ...	9	—12°·0	356°·0	0·7
	July 9—14 .	61	—12°·8	355°·0	1·7