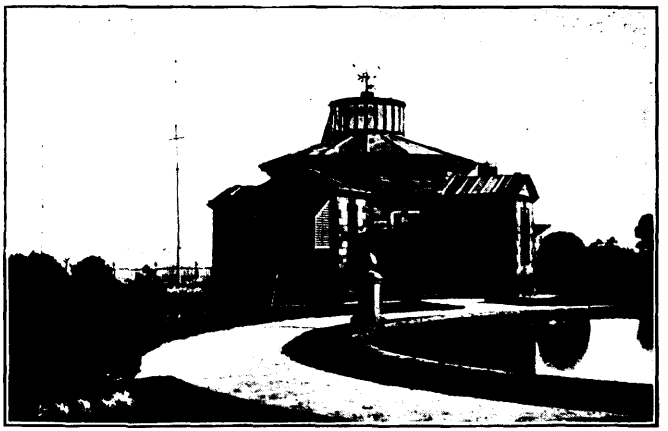
STONYHURST COLLEGE OBSERVATORY.

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 Meteorological, Magnetical, AND Seismological Observations, 1918.

With Report and Notes of the Director,

REV. W. SIDGREAVES, S.J., F.R.A.S.

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1919.

CONTENTS.

FATHER WALTER SIDGREAVES, S.J., F.R.A.S.,

Director of the Stonyhurst College Observatory, 1863-1868, and 1890-1919.

Died June 12th, 1919. Aged 82.

REPORT AND NOTES.

Meteorological.—The Meteorological continuous records have been uninterrupted during the year, except that the Robinson's Anemograph was out of action for repairs on eleven days in June and on one day in November.

The Anemograph stands about 45 feet above the ground. A velocity of the wind of 37 miles per hour and over is called a gale.

Bright sunshine is recorded by a Campbell-Stokes Recorder.

The self-recording Rain Guage is of the Beckley pattern. Its receiving surface is 22 inches above the ground, and 377 feet above sea-level. The daily measures are taken at 10 a.m. for the preceding 24 hours. Heavy rain noted in the monthly tabulations, signifies a fall of ½ inch or over during the day. The rainfall values as printed in the monthly tables were registered not by the Beckley Self-Recorder but by the M.O. 8-inch gauge.

The Barometer is a standard barometer of the pattern approved by the Meteorological Office. It is mounted in the underground Magnetic Chamber. Its cup is 363 feet above sea-level. Its readings in the monthly tables are quoted for the density of mercury at 32° Fahr., and for the original position of the barometer at 381 feet above sea-level; and the mean pressures are corrected for diurnal range.

The Thermometers are the property of the Meteorological Office. They are mounted at 7 feet above the ground on the north side of the Observatory, enclosed in a Stevenson Screen. All the readings are corrected for index errors, as determined by the Office-standards.

The *monthly mean temperature* is derived in two ways: 1st, from the mean of the highest and lowest daily readings corrected by the average difference between this mean and the true mean of the hourly tabulations; and 2nd, from the mean of the readings at 9 a.m. and 9 p.m. corrected in the same manner. Both corrections have been furnished by the Greenwich records, and are taken from the well-known Glaisher's tables. The *Adopted mean temperature* is the mean of these two results.

The weather of the year as a whole, rainfall excepted, was remarkably close to the normal (*see Summary p.* 25). The Summer months in general, however, were colder, and the winter months warmer than usual; the former being 0·3° below, and the latter 1·5° above their respective averages. The only summer-like weather of the year occurred in May and August. The latter month at mean temperature 58·3° was the warmest month of the year, and January, with mean temperature 38·5° and 1° *above* normal was yet the coldest month of the twelve. The three *relatively* warmest months were February, December and May, their mean temperatures being 4·6°, 3·9°, and 3·7° above their respective averages; and the excessively wet month of September was, relatively, the coldest month of the twelve at 2.8° below its average temperature.

Temperatures in the shade reached 70° and over on 22 days, viz., 5 days in May, 3 in June, 4 in July, and 10 in August, the highest reading being 79·8° in May, and the lowest 13·1° in January.

Heavy rains of 1 inch or over in 24 hours occurred on 8 days of the year, viz., February 6th and 10th, July 23rd (on which day 1 inch was registered in half-an-hour), September 8th and 15th, December 1st, 22nd, and 28th.

The most striking feature of the year's weather was the extraordinary heavy rainfall recorded in the months of September and December. In the Report for 1916 it was stated that a month's rainfall of 10 inches or over had not been registered during 69 years, except in the month of October. But now, in 1918 (71 years) two other months have exceeded this amount, viz., September, with a total of 12·620 inches on 29 days, and December, with 10·595 inches on 30 days.

The excess over their combined average of these two months alone, 14·207 inches, not only covers the total excess of the whole year, but leaves 2¼ inches to spare.

Fine day periods are recorded as follows:—Jan. 1—6, 24—31; Feb. 13—18; March 1—8, 11—17, 19—26; April 1—5, April 12—May 3, 5—11, 13—22, 25—June 6, 27—July 8, 25—Aug. 5, 8—16, 19—24, Oct. 15—26; Nov. 11—24. Total, 17 periods, average duration, 8 days.

The prevailing direction of the wind has been in

all months, except April, from the west side of the meridian. In April the easterly direction was much more pronounced than the westerly.

Magnetical.—The Differential Photo-Magnetographs 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. Time marks on the curves are now made at set hours by hand.

The scale values of the instruments are as follows:

For the Unifilar ... 11·28′ per Cm. of Ordinate.
„ Bifilar ... ·00050 C.G.S. „ „

In connection with these, absolute measures of Horizontal Direction and Force have been made regularly; of the former four times, and of the latter once in each month. These have been 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 inclination, or Dip, has been observed once each month by two needles with Dover's circle No. 159.

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, and worth a reference to the original curve; *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 general returns from the Bureau show considerable discordance between the interpretations of different authorities; and it may be well to state the rule followed at this Observatory. The two important notes are held to be 0 and 2: the former meaning a true calm, and the latter a disturbance not less than our note (m); and the intervening note comprises all the rest.

On this list the notes are quoted for the civil day. We cannot undertake hourly readings, but it is necessary to divide the civil day into its two halves a.m. and p.m. for the tabulations of maximum and minimum ranges, since these readings occur as often as not on different sheets. The astronomical day is now suppressed, and the civil day is used for both the international figures, 0, 1, 2, and our own characteristic letters.

Judging by the ranges of the Declination and Horizontal Force Magnets (D and H), the year has been

more disturbed than the previous year 1917. This is out of accord with the mean daily spot area, as may be seen in the comparisons shown in the next section (*page* XI). Both D and H have increased in spite of the marked decline in spot area. But at the actual maximum of sun spot area in August, 1917, that month's mean range of H was greater than that of any other month since and including the last maximum in 1905. Also the mean range of D for the same month was greater than the greatest of any other month for the seven years 1911—17, but less than those of the earlier years of the sun spot cycle, including 1905.

Solar and Astro-Physical.—The Perry Memorial 15 inch O.G. equatorial, with the Whitelow 6 inch O.G. camera attached, the Thorp prism equatorial, and the large grating spectrometer, remain under the direction of Father Cortie

Observations of the solar surface were made on 200 days, and include 199 drawings on as many days, and notes without a drawing on 1 day. Of the drawings 169 are complete, showing all spots and faculæ, and the remaining 30 are complete, so far as the spots are concerned, but are wanting in a full record of the faculæ.

The mean daily disc-area of the spots (in units of $\frac{1}{5000}$th of the visible surface), stands at 7·9, a decrease of nearly 35 per cent. on last year's figure. Taking the spot area as index, solar activity has greatly and steadily declined since the great maximum of August, 1917.

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.....	1913	1914	1915	1916	1917	1918
Spot Area	0·04	0·82	4·51	4·52	12·1	7·9
Declination range	9·7	10·2	11·7	12·1	11·8	12·4
Horizontal Force Range	39	47	58	63	59	69

In our last report we noted that a preliminary comparison of the drawings of the faculæ and the photographs of flocculi, showed an almost perfect agreement between the faculæ and the calcium flocculi, but no similarity with the hydrogen flocculi. We find, in addition, in numerous cases, that streams of faculæ connect sun-spot disturbances, although the sun-spots may be widely separated in latitude, though situated on the same limb of the sun.

A good series of spectrograms of Nova Aquilæ (1918), covering the period June 10th to October 23rd, was obtained with the Thorp and the Whitelow prismatic cameras. Three spectra, typical of characteristic phases in the life history of a Nova, taken on June 10th, June 15th, and July 29th, have been measured, and the results have been presented to the R.A.S.

The spectroscopic results for the total solar eclipses of 1911, and 1914, were finally reduced, and the results were presented to the R.A.S. The photograph of the spectrum of the chromosphere, and of the corona, which was obtained in 1911, extends far into the red, and 25 previously unrecorded lines are assigned to the chromosphere in the region 6600 to 7640 A. There are also

probable indications of a new coronal radiation about 7150 A. From the photograph of the spectrum of the corona taken in 1914, the wave-lengths of 36 faint lines between 4780 and 6616 A were obtained, and of these 24 do not appear in any previous records.

Several popular lectures on astronomical subjects have been given to the troops in home camps and in hospitals in connection with the Army education scheme.

Seismological.—A short account of the Seismograph is given on page xiii. of our Annual, 1909. It is of the Milne photographic pattern, and is mounted with horizontal pendulum, or boom, 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. This contains many small disturbances of uncertain origin, which do not appear in our occasional bulletins distributed amongst the Seismic stations at home and abroad; they have to await confirmation by other Observatories. The instrument has been in constant service throughout the year. But it is now considered out of date and to be only of second rate value. The natural period of the boom in oscillation is too closely the same as that of the earth transmitting a shock; and the result is a series of interferences, which throws doubt upon the true time of the greatest displacement. We hope to find a remedy with a mechanical device for damping the oscillations of the boom. But for this we have to await the return of better times, when the Observatory staff may have recovered its normal efficiency.

The following papers have been published during the year :—

1. " The Chromospheric and Coronal Spectrum in the Total Solar Eclipse, 1911, April 28th." Monthly Notices R.A.S. 78, 441.

2. " The Spectrum of the Corona, 1914, August 21st."—Ibid. 78, 665.

3. " The earlier Spectrum of Nova Aquilæ, 1918." Ibid. 79, 121.

Owing to the greatly increased cost of paper and printing we cease, for the present, to publish our appendix " Presentations to the Library."

FATHER WALTER SIDGREAVES, S.J.

It is with very great and sincere regret that we have to record the death of Father Walter Sidgreaves, S.J., the Director of the Stonyhurst College Observatory, who died at Stonyhurst on June 12th, 1919, in his 82nd year, after a lingering last illness, borne with exemplary patience. His loss to the Observatory, the staff of which is greatly depleted owing to the exigencies of the war, is a severe one.

He was born on October 4th, 1837, the second son of Edward Sidgreaves, Esq., of Grimsargh, near Preston, and was educated at Stonyhurst College. He entered the Society of Jesus in 1855, and was ordained priest in 1871. He had a long and distinguished scientific career. His first directorship of the Observatory was during the years 1863—68, while the late Father Perry was engaged in his theological studies. In 1863 he commenced the regular series of magnetic observations, which have been continued uninterruptedly since that time. In 1866 he installed all the self-recording meterological instruments in the Observatory, the Observatory having been chosen by the Board of Trade as one of the seven principal stations for meterology in the British Isles. The following year an eight-inch equatorial was purchased, which permitted of great development

in the astronomical work of the Observatory. He accompanied Father Perry on a magnetic survey of the west and east of France in the years 1868—69. He also served as companion to Father Perry in the two Government expeditions to observe the transit of Venus across the Sun's disc in Kerguelen Island in 1874, and in Madagascar in 1882.

On the death of Father Perry on the total solar eclipse expedition of 1889, at Salut Isles, French Guiana, Father Sidgreaves succeeded him in the direction of the Observatory. While maintaining the solar work inaugurated by Father Perry, he devoted himself more particularly to stellar spectroscopy. He devised some very efficient instruments with which he took remarkable photographs of the spectra of the new stars of 1892 and 1901, as also of many other stars. The results of his astrophysical work have appeared in several papers communicated to the Royal Astronomical Society, as detailed below. His photographic work in stellar spectroscopy was awarded a gold medal in the St. Louis Exposition of 1904, and a *grand prix* by the Franco-British Exhibition of 1908.

He was of a retiring disposition, but all who came in contact with him were attracted by his kindly and sympathetic manner. Although he has been ailing in health during the past six months, with indomitable courage he observed the magnetic elements until a month before his death.

During his second directorship of the Observatory he installed a 15-inch equatorial telescope, the memorial

subscribed for by the friends of the late Father Perry, he acquired a seismograph, and erected a powerful wireless telegraphic plant.

He was elected a fellow of the Royal Astronomical Society in 1891, and served for many years on the Council of the Society. He also taught as a young man, chemistry and mathematics, and as a priest, physics, for 25 years, at St. Mary's Hall, Stonyhurst. His lectures were marked by much originality in exposition, and remarkable skill in experimental demonstration. His original researches on the spectrum of the star β Lyræ formed the subject of a lecture he delivered before the Royal Institution in 1904.

He contributed two memoirs to the Royal Astronomical Society. The first on the "Spectrum of Nova Aurigæ" (li. 29), contains a long list of bright and dark lines measured in the spectrum of the star, and is a very valuable contribution to our knowledge of the constitution of new stars. Nova Aurigæ was the first new star the spectrum of which was photographed, and Father Sidgreaves was one of the first observers to obtain such photographs. He recognised the similarity between the spectrum of the star and that of the solar chromosphere.

The second Memoir, "On the connection between sun-spots and earth-magnetic storms" (liv. 85), contains a discussion, founded on a very great number of measures of the areas of sun-spots from the Stonyhurst drawings, and the ranges in the magnetic elements derived from our photographic records. The conclusion he arrived

at was that the connection was not one of direct cause and effect, but that both the spots on the sun, and the magnetic storms on earth were due to clouds of electrified particles which existed between the sun and the earth.

The following is a list of the papers he contributed to the Monthly Notices R.A.S. :—

1. Note on the Stonyhurst drawings of Solar Spots and Faculæ, lii. 104.

2. The variable spectrum of β Lyræ in the region F—h, liv. 94.

3. Notes on Solar Observations at Stonyhurst College Observatory, lv. 6.

4. The Wilsonian theory and the Stonyhurst drawings of sun-spots, lv. 282.

5. The spectrum of β Lyræ as observed at Stonyhurst College Observatory, lvii. 515.

6. The spectrum of o Ceti as photographed at Stonyhurst College Observatory, lviii. 34.

7. Eclipse of the Moon, 1898, December 27th, lix. 162.

8. Notes on the spectrum of γ Cassiopeiæ and o Ceti. lix. 505.

9. The partial eclipse of the Sun, 1900, May 28th, observed at Stonyhurst College Observatory, lx. 592.

10. Notes on the spectrum of Nova Persei, observed at the Stonyhurst College Observatory, lxi. 335.

11. Note 2. lxi. 388.

12. Note 3. lxi. 389.

13. Note 4. lxi. 462.

14. The spectrum of Nova Persei, 1901, February 28th to April 26th; with appendix on the spectrum in September, lxii. 521.

15. A spectrographic study of β Lyræ, lxiv. 168.

16. The spectrum of *Mira Ceti* in December, 1906, as photographed at Stonyhurst College Observatory, lxvii. 534.

And conjointly with Father Cortie:—

17. Note on Comet 1908 *c* (Morehouse), 1908, September 29th to October 2nd, lxix 54.

18. Notes on Comet 1910 *a*. lxx. 464.

The papers on the spectra of the stars are illustrated by some beautiful reproductions from his original photographs, and are most valuable detailed descriptions, accompanied by tables of wave-lengths of the particular stars studied. He has left hundreds of plates of the spectra of the brighter stars, which await measurement.

In solar physics, one of the chief studies he made, was of a long series of photographs of the H and K calcium lines of the sun's spectrum, in the general light of the sun. The result was to prove that the sun is akin to that class of stars which show both bright and dark lines in their spectra.

Contrary to the usually accepted theory he held, from a study of a long series of the Stonyhurst drawings, that the umbræ of sun-spots were elevations above, and not depressions below, the sun's surface.

He also contributed several papers to the Journal of the British Astronomical Association, the Astrophysical Journal, and other scientific periodicals. He acted for a term as President of the North-Western Branch of the British Astronomical Association.

He was a most painstaking, methodical, and accurate observer. He had a large share of the dogged determination of the typical Lancashire man's character. For the last nine years, however, except for observations with the transit instrument for time, he had practically given up astronomical work, and devoted himself almost entirely to the magnetic observations and reductions, which he had himself inaugurated 56 years ago.

He was buried at Stonyhurst, with which College by far the great part of his long life had been identified, and which he had so faithfully served, on June 14th, 1919.—R.I.P.

The present Report of the Observatory was practically finished at the time of Father Sidgreaves' death. My share in the work has been the arrangement of the Notes left by Father Sidgreaves, and the writing of the Solar and Astrophysical portions of the Report.

A. L. C.

METEOROLOGICAL REPORT.

JANUARY, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·476	29·489
Highest ,, ,, on the 3rd ... ,,	30·100	30·127
Lowest ,, ,, on the 20th... ,,	28·740	28·583
Range of Barometer Readings..... ,,	1·360	1·544
Highest Reading of a Max. Therm. on the 24th...	52·6	51·3
Lowest Reading of a Min. Therm. on the 13th	13·1	21·4
Range of Thermometer Readings	39·5	29·9
Mean of Highest Daily Readings	43·4	42·4
Mean of Lowest Daily Readings	32·9	33·0
Mean Daily Range	10·5	9·4
Deduced Mean Temp. (from mean of Max. and Min.)	38·0	37·4
Mean Temperature from Dry Bulb	39·0	37·7
Adopted Mean Temperature	38·5	37·6
Mean Temperature of Evaporation	37·2	36·3
Mean Temperature of Dew Point	35·4	34·2
Mean elastic force of Vapour.....inches	0·208	0·199
Mean weight of Vapour in a cub. ft. of air, grains	2·4	2·4
Mean additional weight required for saturation ,,	0·3	0·4
Mean degree of Humidity (saturation 100)	89	87
Mean weight of a cubic foot of air ..... grains	548·3	549·6
Mean amount of Cloud (0—10)	7·4	7·8
Fall of Rain ..... inches	3·710	4·206
Greatest Rainfall in one day (18th) ..... ,,	0·655	0·826
No. of days on which ·005 in. or more Rain fell...	19	19·1

Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	1	0	1	12	5	7	2
Mean Velocity in miles per hr.	5·2	9·6	0	5·3	12·6	6·9	14·0	13·7
Total No. of miles	375	230	0	127	3619	828	2351	659

		Mean*
Total No. of miles registered	8189	8211·6
Greatest hourly velocity (20th, 10 & 11 p.m., Dir. S.)	40	41·2

* *For the last* 51 *years.*

JANUARY, 1918.

DIFFERENCES.

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

Mean barometric pressure	—	0·013 in.
Monthly range ,, ...	—	0·184 in.
Mean of highest daily temperatures	+	1·0°
Mean of lowest ,, ,, ...	—	0·1°
Mean daily range	+	1·1°
Adopted mean temperature	+	0·9°
Total rainfall	—	0·496 in.

Ground Frost on 1st—3rd, 6th—17th, 29th—31st. Snow on 4th, 7th, 11th—14th, 16th, 18th. Hail on 7th, 9th, 12th, 13th, 14th and 17th. Heavy Rain on 18th. Gale of Wind on 20th.

A fairly normal January.

EXTREME READINGS FOR JANUARY,
During 71 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	1910	.....	8·403 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, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·627	29·492
Highest ,, ,, on the 25th... ,,	30·290	30·096
Lowest ,, ,, on the 28th... ,,	29·038	28·651
Range of Barometer Readings..... ,,	1·252	1·445
Highest Reading of a Max. Therm. on the 4th ...	52·0	51·9
Lowest Reading of a Min. Therm. on the 18th ..	29·8	22·4
Range of Thermometer Readings	22·2	29·5
Mean of Highest Daily Readings	46·7	44·0
Mean of Lowest Daily Readings	39·0	33·5
Mean Daily Range	7·7	10·5
Deduced Mean Temp. (from mean of Max. & Min.)	42·5	38·2
Mean Temperature from Dry Bulb	43·3	38·4
Adopted Mean Temperature	42·9	38·3
Mean Temperature of Evaporation	41·3	36·8
Mean Temperature of Dew Point	39·4	34·5
Mean elastic force of Vapour ..... inches	0·242	0·195
Mean weight of Vapour in a cub. ft. of air, grains	2·8	2·4
Mean additional weight required for saturation ,,	0·4	0·4
Mean degree of Humidity (saturation 100).....	87	86
Mean weight of a cubic foot of air ..... grains	545·9	548·6
Mean amount of Cloud (0—10)	8·1	7·5
Fall of Rain ..... inches	6·015	3·546
Greatest Rainfall in one day (6th) ..... ,,	1·170	0·760
No. of days on which ·005 in. or more Rain fell...	20	16·9

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	0	4	1	6	11	2	1
Mean Velocity in miles per hr.	11·8	0	6·7	5·7	11·7	17·1	15·3	9·7
Total No. of miles.....	850	0	647	136	1684	4519	735	234

		Mean*
Total No. of Miles registered	8805	7611·9
Greatest hourly velocity (21st, 11 p.m., Dir.W.S.W.)	38	41·9

* *For the last* **51** *years.*

FEBRUARY, 1918.

DIFFERENCES.

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

Mean barometric pressure	+	0·135 in.
Monthly range ,, ...	—	0·193 in.
Mean of highest daily temperatures	+	2·7°
Mean of lowest ,, ,, ...	+	5·5°
Mean daily range	—	2·8°
Adopted mean temperature	+	4·6°
Total rainfall	+	2·469 in.

Ground Frost on 16th—18th, 24th, 27th, 28th. Snow and hail on 28th. Heavy Rain on 6th, 9th, 10th and 20th. Gale of Wind on 21st. Lightning on 9th. Solar Halo on 5th.

An unusually warm, wet, and cloudy February.

EXTREME READINGS FOR FEBRUARY,

During 71 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, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·612	29·447
Highest ,, ,, on the 21st ... ,,	30·055	30·042
Lowest ,, ,, on the 31st ... ,,	28·634	28·642
Range of Barometer Readings ..... ,,	1·421	1·400
Highest Reading of a Max. Therm. on the 23rd...	58·0	56·8
Lowest Reading of a Min. Therm. on the 9th...	29·6	23·2
Range of Thermometer Readings	28·4	33·6
Mean of Highest Daily Readings	46·8	47·0
Mean of Lowest Daily Readings	35·6	34·3
Mean Daily Range	11·2	12·7
Deduced Mean Temp. (from mean of Max. & Min.)	40·2	39·7
Mean Temperature from Dry Bulb	41·9	40·2
Adopted Mean Temperature	41·1	40·0
Mean Temperature of Evaporation	39·6	38·1
Mean Temperature of Dew Point	37·7	35·7
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 ,,	0·4	0·5
Mean degree of Humidity (saturation 100).....	89	85
Mean weight of a cubic foot of air ..... grains	547·7	546·1
Mean amount of Cloud (0—10)	6·9	7·5
Fall of Rain ..... inches	1·690	3·370
Greatest Rainfall in one day (27th) ..... ,,	0·650	0·768
No. of days on which ·005 or more Rain fell...	12	16·7

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of Days.....	2	7	4	2	7	2	5	2
Mean Velocity in miles per hr.	3·8	7·2	12·5	6·3	7·8	5·7	6·3	11·3
Total No. of miles.....	180	1215	1196	302	1305	273	758	541

		Mean*
Total No. of Miles registered	5770	8496·5
Greatest hourly velocity (28th & 31st, at 4 a.m. and 2 p.m., Dir. S. and S.S.E.	26	40·8

* *For the last 51 years.*

MARCH, 1918.

DIFFERENCES.

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

Mean barometric pressure	+	0·165 in.
Monthly range „	+	0·021 in.
Mean of highest daily temperatures	—	0·2°
Mean of lowest „ „ ...	+	1·3°
Mean daily range	—	1·5°
Adopted mean temperature	+	1·1°
Total rainfall	—	1·680 in.

Ground Frost on 1st—3rd, 9th, 13th, 14th, 17th, 21st—26th, and 30th. Snow on 1st—3rd, and 8th. Hail on 1st. Heavy Rain on 27th.

The weather in general was exceptionally dry and calm.

EXTREME READINGS FOR MARCH, During 71 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	1871	..... 44·0°
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, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·562	29·490
Highest ,, ,, on the 28th ... ,,	29·891	29·954
Lowest ,, ,, on the 1st ... ,,	28·817	28·803
Range of Barometer Readings ..... ,,	1·074	1·151
Highest Reading of a Max. Therm. on the 25th...	64·6	65·0
Lowest Reading of a Min. Therm. on the 20th...	29·7	28·1
Range of Thermometer Readings	34·9	36·9
Mean of Highest Daily Readings	50·6	54·7
Mean of Lowest Daily Readings	37·9	37·8
Mean Daily Range	12·7	16·9
Deduced Mean Temp. (from mean of Max. & Min.)	42·8	44·0
Mean Temperature from Dry Bulb	44·3	44·7
Adopted Mean Temperature	43·6	44·4
Mean Temperature of Evaporation	40·7	41·6
Mean Temperature of Dew Point	37·3	38·2
Mean elastic force of Vapour ..... inches	0·222	0·235
Mean weight of Vapour in a cub. ft. of air, grains	2·6	2·7
Mean additional weight required for Saturation ,,	0·7	0·7
Mean degree of Humidity (saturation 100).....	78	80
Mean weight of a cubic foot of air ..... grains	544·1	542·2
Mean amount of Cloud (0—10)	6·1	6·7
Fall of Rain ..... inches	1·410	2·538
Greatest Rainfall in one day (6th) ..... ,,	0·500	0·589
No. of days on which ·005 in. or more Rain fell...	10	14·7

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	7	8	6	0	0	1	7	1
Mean Velocity in miles per hr.	10·7	7·5	10·1	0	0	5·8	8·6	13·8
Total No. of Miles.....	1803	1434	1454	0	0	140	1450	330

		Mean*
Total No. of Miles registered	6611	7562·4
Greatest hourly velocity (7th & 10th. Dir. W.N.W. and N.E).	21	36·6

* *For the last* **51** *years.*

APRIL, 1918.

DIFFERENCES.

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

Mean barometric pressure	+	0·072 in.
Monthly range ,, ...	—	0·077 in.
Mean of highest daily temperatures	—	4·1°
Mean of lowest ,, ,, ...	+	0·1°
Mean daily range	—	4·2°
Adopted mean temperature	—	0 8°
Total rainfall	—	1·128 in.

Ground Frost on 3rd, 13th, 14th, 17th—22nd, 26th, 28th—30th. Snow on 18th, 19th, and 20th. Hail on 19th Heavy Rain on 6th Thunder and Lightning on 12th. Solar Halo on 18th.

Weather unusually dry, but otherwise normal.

EXTREME READINGS FOR APRIL, During 71 Years.

Highest reading of Barometer ...	1906 (8th)	30·317 in.
Lowest ,, ,, ...	1868 (20th)	28·358 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	1867	24
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, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·621	29·541
Highest ,, ,, on the 31st ... ,,	30·051	29·992
Lowest ,, ,, on the 13th ... ,,	29·049	28·956
Range of Barometer Readings ..... ,,	1·002	1·036
Highest Reading of a Max. Therm. on the 22nd...	79·8	71·9
Lowest Reading of a Min. Therm. on the 1st ...	34·6	31·9
Range of Thermometer Readings	45·2	40·0
Mean of Highest Daily Readings	62·7	59·5
Mean of Lowest Daily Readings	45.5	42·4
Mean Daily Range	17.2	17·1
Deduced Mean Temp. (from mean of Max. & Min.)	52.4	49·2
Mean Temperature from Dry Bulb	54·2	50·0
Adopted Mean Temperature	53·3	49·6
Mean Temperature of Evaporation	50·1	46·4
Mean Temperature of Dew Point	46·9	42·9
Mean elastic force of Vapour ..... inches	0·321	0·279
Mean weight of Vapour in a cub. ft. of air, grains	3·6	3·1
Mean additional weigh required for saturation ,,	1·0	0·9
Mean degree of Humidity (saturation 100).....	79	75
Mean weight of a cubic foot of air ..... grains	534·3	537·0
Mean amount of Cloud (0—10).....	5·3	7·0
Fall of Rain ..... inches	1·805	2·655
Greatest Rainfall in one day (3rd) ..... ,,	0·540	0·633
No. of days on which ·005 in. or more Rain fell...	9	14·4

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	6	2	0	6	7	8	0
Mean Velocity in miles per hr.	5·2	6·8	10·1	0	7·8	6·2	6·5	0
Total No. of miles.....	251	974	485	0	1123	1040	1240	0

		Mean*
Total No. of Miles registered	5113	6961·0
Greatest hourly velocity (22nd, 1 p.m. Dir. S.S.E.)	18	32·6

* *For the last 51 years.*

MAY, 1918.

DIFFERENCES.

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

Mean brometric pressure	+	0·080 in.
Monthly range ,, ...	—	0·034 in.
Mean of highest daily temperatures	+	3·2°
Mean of lowest ,, ,, ...	+	3·1°
Mean daily range	+	0·1°
Adopted mean temperature	+	3·7°
Total rainfall	—	0·850 in.

Ground Frost on 1st, 5th, 9th—11th. Heavy Rain on 3rd. Thunder on 17th, 21st, 22nd, and 23rd. Lightning on 17th, 22nd, and 23rd. Solar Halo on 5th and 25th.

The general weather during this month was the finest of the year.

EXTREME READINGS FOR MAY,

During 71 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	1886	6·178 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, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·630	29·555
Highest ,, ,, on the 1st ... ,,	30·079	29·933
Lowest ,, ,, on the 18th ... ,,	29·188	29·035
Range of Barometer Readings ..... ,,	0·891	0·898
Highest Reading of a Max. Therm. on the 1st ...	74·9	76·9
Lowest Reading of a Min. Therm. on the 16th...	39·4	39·1
Range of Thermometer Readings	35·5	37·8
Mean of Highest Daily Readings	61·4	65·3
Mean of Lowest Daily Readings	46·7	48·1
Mean Daily Range	14·7	17·2
Deduced Mean Temp. (from mean of Max. & Min.)	52·3	54·9
Mean Temperature from Dry Bulb	54·4	55·3
Adopted Mean Temperature	53·4	55·1
Mean Temperature of Evaporation	50·7	51·9
Mean Temperature of Dew Point	48·0	48·4
Mean elastic force of Vapour ..... inches	0·335	0·349
Mean weight of Vapour in a cub. ft. of air, grains	3·8	3·9
Mean additional weight required for saturation ,,	0·8	1·0
Mean degree of Humidity (saturation 100)	82	78
Mean weight of a cubic foot of air ..... grains	534·2	531·2
Mean Amount of Cloud (0—10).....	6·2	7·2
Fall of Rain ..... inches	2·365	3·398
Greatest Rainfall in one day (25th) ..... ,,	0·660	0·815
No. of days on which ·005 in. or more Rain fell...	16	15·3

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	2	0	0	1	2	13	0
Mean Velocity in miles per hr.	4·8	4·4	0	0	10·3	6·6	10·8	0
Total No. of miles.....	114	212	0	0	248	319	3368	0

		Mean*
Total No. of Miles registered .....†	4261	6146·2
Greatest hourly velocity (22nd, 11 a.m. Dir. W.).	31	29·4

* *For the last 51 years.* † 11 *days' record lost.* *Instrument under repair.*

JUNE, 1918.

DIFFERENCES.

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

Mean barometric pressure	+	0·075 in.
Monthly range ,, ...	—	0·007 in.
Mean of highest daily temperatures	—	3.9°
Mean of lowest ,, ,, ...	—	1·4°
Mean daily range	—	2·5°
Adopted mean temperature	—	1·7°
Total rainfall	—	1·033 in.

Hail on 22nd. Heavy Rain on 25th. Thunder on 5th, 14th, and 25th. Lightning on 14th and 25th. Solar Halo on 11th.

A dry, but rather cold, June.

EXTREME READINGS FOR JUNE,

During 71 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, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·464	29·526
Highest ,, ,, on the 3rd ... ,,	30·030	29·905
Lowest ,, ,, on the 23rd ... ,,	29·035	29·019
Range of Barometer Readings ..... ,,	0·995	0·886
Highest Reading of a Max. Therm. on the 31st..	71·5	78·5
Lowest Reading of a Min. Therm. on the 9th...	42·6	42·4
Range of Thermometer Readings	28·9	36·1
Mean of Highest Daily Readings	65·1	67·5
Mean of Lowest Daily Readings	50·7	51·1
Mean Daily Range	14·4	16·4
Deduced Mean Temp. (from mean of Max. & Min.)	56·0	57·7
Mean Temperature from Dry Bulb	58·1	58·0
Adopted Mean Temperature	57·1	57·9
Mean Temperature of Evaporation	54·7	54·8
Mean Temperature of Dew Point	52·5	52·0
Mean elastic force of Vapour ..... inches	0·396	0·388
Mean weight of Vapour in a cub. ft. of air, grains	4·4	4·4
Mean additional weight required for saturation ,,	0·8	1·1
Mean degree of Humidity (saturation 100)	85	89
Mean weight of a cubic foot of air ..... grains	527·1	527·5
Mean amount of Cloud (0—10)	7·0	7·4
Fall of Rain ..... inches	4·835	3·983
Greatest Rainfall in one day (23rd)..... ,,	1·280	0·871
No. of days on which ·005 in. or more Rain fell...	18	16·5

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	4	1	1	1	3	10	11	0
Mean Velocity in miles per hr.	5·7	5·0	7·8	5·1	7·4	7·2	8·9	0
Total No. of miles.....	551	120	186	122	534	1716	2355	0

		Mean*
Total No. of Miles registered	5584	6389·8
Greatest hourly velocity (21st, Noon, Dir. W.S.W.)	23	28·4

* *For the last* 51 *years.*

JULY, 1918.

DIFFERENCES.

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

Mean barometric pressure	—	0·062 in.
Monthly range ,, ...	+	0·109 in.
Mean of highest daily temperatures	—	2·4°
Mean of lowest ,, ,, ...	—	0·4°
Mean daily range	—	2·0°
Adopted Mean temperature	—	0·8°
Total rainfall	+	0·852 in.

Heavy Rain on 23rd. Thunder on 8th—12th, 16th—18th, 20th, 23rd, and 26th. Lightning on 9th—11th, 17th, 18th, 20th and 23rd. Solar Halo on 7th, 21st and 28th.

This, though the warmest month of the year, was nevertheless, a relatively wet and cold July.

EXTREME READINGS FOR JULY,

During 71 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	†1861	.....	27
Least ,, ,, ,,	†1863	.....	8
*Greatest hourly velocity of wind	1892	(8th)	44 mls.
*Greatest No. of miles registered ...	1877	.....	8288
*Least ,, ,, ,,	1913	.....	4577

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

AUGUST, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·534	29·492
Highest ,, ,, on the 10th ... ,,	29·887	29·886
Lowest ,, ,, on the 5th ... ,,	29·101	28·947
Range of Barometer Readings ..... ,,	0·786	0·939
Highest Reading of a Max. Therm. on the 21st...	77·0	76·5
Lowest Reading of a Min. Therm. on the 24th...	43·8	41·8
Range of Thermometer Readings	33·2	34·7
Mean of Highest Daily Readings	66·5	66·6
Mean of Lowest Daily Readings	52·8	50·7
Mean Daily Range	13·7	15·9
Deduced Mean. Temp. (from Mean of Max. & Min.)	58·0	57·0
Mean Temperature from Dry Bulb	58·6	57·8
Adopted Mean Temperature	58·3	57·4
Mean Temperature of Evaporation	55·4	54·5
Mean Temperature of Dew Point	52·8	51·8
Mean elastic force of Vapour ..... inches	0·400	0·387
Mean weight of Vapour in a cub. ft. of air, grains	4·5	4·3
Mean additional weight required for saturation ,,	1·0	0·9
Mean degree of Humidity (saturation 100)	82	82
Mean weight of a cubic foot of air ..... grains	527·2	527·4
Mean amount of Cloud (0—10).....	7·4	7·3
Fall of Rain ..... inches	5·195	5·018
Greatest Rainfall in one day (5th) ..... ,,	0·860	1·058
No. of days on which ·005 in. or more Rain fell...	18	18·4

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	1	0	1	3	13	9	1
Mean Velocity in miles per hr.	7·0	9·3	0	6·1	5·2	9·5	9·6	8·8
Total No. of miles.....	502	223	0	146	371	2950	2076	212

		Mean*
Total No. of Miles registered	6480	6366·7
Greatest hourly velocity (14th, 2 p.m. Dir. S.W. by S.)	22	31·0

* *For the last* **51** *years.*

AUGUST, 1918.

DIFFERENCES.

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

Mean barometric pressure	+	0·042 in.
Monthly range ,, ...	—	0·153 in.
Mean of highest daily temperatures	—	0·1°
Mean of lowest ,, ,, ...	+	2·1°
Mean daily range	—	2·2°
Adopted mean temperature	+	0·9°
Total rainfall	+	0·177 in.

Heavy Rain on 5th, 19th, 25th, 27th, and 31st. Lightning on 5th.

After May, this was the most summer-like month of the year.

EXTREME READINGS FOR AUGUST,

During 71 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, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·209	29·542
Highest ,, ,, on the 7th ... ,,	29·755	30·009
Lowest ,, ,, on the 23rd ... ,,	28·210	28·888
Range of Barometer Readings	1·545	1·121
Highest Reading of a Max. Therm. on the 7th ..	69·0	72·0
Lowest Reading of a Min. Therm. on the 29th...	38·6	36·6
Range of Thermometer Readings	30·4	35·4
Mean of Highest Daily Readings	56·6	62·0
Mean of Lowest Daily Readings	46·6	47·2
Mean Daily Range	10·0	14·8
Deduced Mean Temp. (from mean of Max. & Min.)	50·3	53·4
Mean Temperature from Dry Bulb	51·6	54·2
Adopted Mean Temperature	51·0	53·8
Mean Temperature of Evaporation	48·5	51·0
Mean Temperature of Dew Point	45·9	48·3
Mean elastic force of Vapour ..... inches	0·311	0·339
Mean weight of Vapour in a cub. ft. of air, grains	3·5	3·9
Mean additional weight required for saturation ,,	0·7	0·9
Mean degree of Humidity (saturation 100).....	83	81
Mean weight of a cubic foot of air.....grains	529·3	532·6
Mean amount of Cloud (0—10)	8·2	6·7
Fall of Rain ..... inches	12·620	4·322
Greatest Rainfall in one day (15th)..... ,,	1·690	0·966
No. of days on which ·005 in. or more Rain fell...	29	16·4

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	4	1	0	0	6	7	11	1
Mean Velocity in miles per hr.	5·6	9·0	0	0	10·9	11·3	13·1	9·2
Total No. of miles.....	539	217	0	0	1576	1904	3453	220

		Mean*
Total No. of Miles registered	7909	6091·2
Greatest hourly velocity (20th & 25th, Dir. S. by E. and W.S.W.	30	32·3

* *For the last* 51 *years.*

SEPTEMBER, 1918.

DIFFERENCES.

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

Mean barometric pressure	—	0·333 in.
Monthly range ,, ...	+	0·424 in.
Mean of highest daily temperatures	—	5·4°
Mean of lowest ,, ,, ...	—	0·6°
Mean daily range	—	4·8°
Adopted mean temperature	—	2·8°
Total rainfall	+	8·298 in.

Hail on 8th, 9th, 11th, 27th, and 28th. Heavy Rain on 1st, 4th, 8th, 9th, 13th, 14th, 15th, 21st, 22nd, 25th, and 27th. Thunder on 8th—11th, 17th, and 27th. Lightning on 10th and 27th. Lunar Halo on 18th. Solar Halo on 29th.

The total rainfall and number of rainy days were both the greatest on record for this month, and in addition the weather was unusually cold and stormy.

EXTREME READINGS FOR SEPTEMBER,

During 71 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, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·497	29·438
Highest ,, ,, on the 20th ,,	29·879	30·015
Lowest ,, ,, on the 7th ,,	29·058	28·674
Range of Barometer Readings..... ,,	0·821	1·341
Highest Reading of a Max. Therm. on the 10th...	62·2	64·0
Lowest Reading of a Min. Therm. on the 26th ...	33·4	29·6
Range of Thermometer Readings	28·8	34·4
Mean of Highest Daily Readings	53·1	54·5
Mean of Lowest Daily Readings	42·7	41·9
Mean Daily Range	10·4	12·6
Deduced Mean Temp. (from Mean. of Max. and Min.)	46·9	47·2
Mean Temperature from Dry Bulb	47·3	47·9
Adopted Mean Temperature	47·1	47·6
Mean Temperature of Evaporation	45·3	45·4
Mean Temperature of Dew Point	43·3	43·0
Mean elastic force of Vapour.....inches	0·281	0·278
Mean weight of vapour in a cub. ft. of air, grains	3·2	3·2
Mean additional weight required for saturation ,,	0·5	0·6
Mean degree of Humidity (saturation 100).....	88	84
Mean weight of a cubic foot of air .....grains	538·9	537·5
Mean amount of Cloud (0—10)	7·9	7·3
Fall of Rain ..... inches	5·215	5·019
Greatest Rainfall in one day (5th) ..... ,,	0·705	0·985
No. of days on which ·005 in. or more Rain fell...	20	18·9

Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	4	3	0	1	6	8	6	3
Mean Velocity in miles per hr.	3·4	3·9	0	17·8	10·2	14·9	5·2	4·7
Total No. of miles.....	323	283	0	428	1470	2869	748	340

		Mean*
Total No. of miles registered	6461	6953·5
Greatest hourly velocity (7th, 6 a.m., Dir. S.S.E.)..	38	37·7

* *For the last* 51 *years.*

OCTOBER, 1918.

DIFFERENCES.

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

Mean barometic pressure	+	0·059 in.
Monthly range ,, ...	—	0·520 in.
Mean of highest daily temperatures	—	1·4°
Mean of lowest ,, ,, ...	+	0·8°
Mean daily range ,, ...	—	2·2°
Adopted Mean temperature	—	0·5°
Total rainfall	+	0·196 in.

Ground Frost on 1st, 13th, 24th, and 26th. Hoar Frost on 13th. Hail on 1st, 3rd—5th, 6th, and 8th. Heavy Rain on 3rd, 5th, and 9th. Gale of Wind on 7th. Fog on 26th and 27th. Thunder on 7th. Lightning on 6th and 7th.

EXTREME READINGS FOR OCTOBER,

During 71 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	1908	52·5°
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 ,, ,, ,,	1864	10
*Greatest hourly velocity of wind	1877 (15th)	52 mls.
*Greatest No. of miles registered...	1874	9818
*Least ,, ,, ,, ...	1915	3965

* *Since* 1867 *only.*

NOVEMBER, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·563	29·462
Highest ,, ,, on the 12th ... ,,	30·105	30·065
Lowest ,, ,, on the 4th ... ,,	28·666	28·562
Range of Barometer Readings..... ,,	1·439	1·503
Highest Reading of a Max. Therm. on the 2nd & 5th	56·0	55·8
Lowest Reading of a Min. Therm. on the 19th ...	23·6	25·4
Range of Thermometer Readings	32·4	30·4
Mean of Highest Daily Readings	46·0	47·2
Mean of Lowest Daily Readings	36·7	36·8
Mean Daily Range	9·3	10·4
Deduced Mean. Temp. (from Mean of Max. and Min.)	41·0	41·7
Mean Temperature from Dry Bulb.....	41·1	42·0
Adopted Mean Temperature	41·1	41·9
Mean Temperature of Evaporation	39·3	39·8
Mean Temperature of Dew Point	37·0	38·2
Mean elastic force of Vapour.....inches	0·220	0·231
Mean weight of Vapour in a cub. ft. of air, grains	2·6	2·7
Mean additional weight required for saturation ,,	0·5	0·4
Mean degree of Humidity (saturation 100)	86	87
Mean weight of a cubic foot of air ..... grains	547·1	544·5
Mean amount of Cloud (0—10)	7·0	7·4
Fall of Rain ..... inches	3·537	4·434
Greatest Rainfall in one day (10th)..... ,,	0·715	0·974
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.....	7	0	3	0	8	5	6	0
Mean Velocity in miles per hr.	3·1	0	7·8	0	12·0	9·0	4·5	0
Total No. of miles.....	516	0	564	0	2299	1078	642	0

		Mean*
Total No. of miles registered .....†	5099	7288·2
Greatest hourly velocity (2nd, 8 a.m. Dir. S.E. by S.)	45	41·4

* *For the last* 51 *years.* † 1 *day's record lost. Instrument under repairs.*

NOVEMBER, 1918.

DIFFERENCES.

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

Mean barometic pressure	+	0·101 in.
Monthly range ,, ...	—	0·064 in.
Mean of highest daily temperatures	—	1·2°
Mean of lowest ,, ,, ...	—	0·1°
Mean daily range ,, ...	—	1·1°
Adopted mean temperature	—	0·8°
Total rainfall	—	0·897 in.

Ground Frost on 3rd, 4th, 6th—9th, 12th—23rd, 26th, and 30th. Hoar Frost on 7th, 8th, 13th—15th, 18th—23rd. Hail on 8th. Heavy Rain on 10th and 26th. Gales of Wind on 2nd, 4th, and 8th. Fog on 25th—29th. Solar Halo on 7th and 12th. Aurora Borealis on 29th.

There was absolutely no rain for 12 consecutive days, 11th—22nd inclusive.

EXTREME READINGS FOR NOVEMBER, During 71 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, 1918.

Results of Observations taken during the Month.		Mean for the last 71 years.
Mean Reading of the Barometer ..... inches	29·289	29·430
Highest ,, ,, on the 14th ,,	29·790	30·060
Lowest ,, ,, on the 18th ,,	28·720	28·529
Range of Barometer Readings..... ,,	1·070	1·531
Highest Reading of a Max. Therm. on the 4th...	55·0	52·9
Lowest Reading of a Min. Therm. on the 26th ...	27·6	21·1
Range of Thermometer Readings.....	27·4	31·8
Mean of Highest Daily Readings	47·3	43·3
Mean of Lowest Daily Readings	39·2	33·6
Mean Daily Range	8·1	9·7
Deduced Mean Temp. (from Mean. of Max. and Min.)	43·3	38·5
Mean Temperature from Dry Bulb	42·1	39·1
Adopted Mean Temperature	42·7	38·8
Mean Temperature of Evaporation	40·6	37·2
Mean Temperature of Dew Point	38·1	35·2
Mean elastic force of Vapour ..... inches	0·230	0·207
Mean weight of Vapour in a cub. ft. of air, grains	2·7	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	539·9	547·1
Mean amount of Cloud (0—10)	8·1	7·6
Fall of Rain ..... inches	10·595	4·686
Greatest Rainfall in one day (28th)..... ,,	1·400	0·855
No. of days on which ·005 in. or more Rain fell...	30	19·9

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	4	1	0	0	10	9	7	0
Mean Velocity in miles per hr.	5·9	4·1	0	0	9·4	12·7	12·0	0
Total No. of miles.....	571	99	0	0	2244	2738	2018	0

		*Mean
Total No. of miles registered	7670	7802·6
Greatest hourly velocity (12th and 23rd Dir. W.S.W. and W.N.W.)	30	42·2

* *For the last* 51 *years.*

DECEMBER, 1918.

DIFFERENCES.

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

Mean barometric pressure	—	0·141 in.
Monthly range ,, ...	—	0·461 in.
Mean of highest daily temperatures	+	4·0°
Mean of lowest ,, ,, ...	+	5·6°
Mean daily range ,, ...	—	1·6°
Adopted mean temperature	+	3·9°
Total rainfall	+	5·909 in.

Ground Frost on 9th—11th, 15th, 17th—22nd, 24th—26th, and 31st. Snow on 17th, 18th, 19th, 24th, and 26th. Hail on 16th, 18th, 19th, 23rd, and 26th. Heavy Rain on 1st, 2nd, 14th, 15th, 18th, 19th, 22nd, 27th, and 28th. Thunder and Lightning on 18th. Solar Halo on 7th.

The total rainfall and the number of rainy days were both the greatest on record for December. Aurora Borealis on 25th.

EXTREME READINGS FOR DECEMBER, During 71 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, 1918.

Results of Observations taken during the Year.		Mean for the last 71 Years.
Readings of Barometer in inches.		
Mean of the Year	29·507	29·492
Highest Monthly Mean (June)	29·630	29·744
Lowest ,, ,, (September)	29·209	29·220
Highest Reading (February)	30·290	30·291
Lowest ,, (September)	28·210	28·201
Range	2·080	2·090
Thermometer, Fahrenheit.		
Highest Monthly Mean Temperature (August)	58·3	58·6
Lowest ,, ,, ,, (January)	38·5	35·5
Highest Reading of a Max. Therm. (May 22nd)	79·8	81·4
Lowest ,, Min. ,, (January 13th)	13·1	15·9
Range of Thermometer Readings	66·7	65·5
Mean of Highest Daily ,,	53·9	54·5
Mean of Lowest Daily ,,	42·2	40·9
Mean Daily Range	11·7	13·6
Deduced Mean Temp. (from mean of Max. and Min.)	47·0	46·8
Mean Temperature from Dry Bulb	48·0	47·1
Adopted Mean Temperature of the Year	47·5	47·0
Mean Temperature of Evaporation	45·3	44·6
Mean Temperature of Dew Point	42·9	42·1
Mean elastic force of Vapour ..... inches	0·283	0·274
Mean weight of Vapour in a cub. ft. of air...grns.	3·2	3·2
Mean additional weight required for saturation ,,	0·6	0·7
Mean degree of Humidity (saturation 100)	84	83
Mean weight of a cubic foot of air.....grns.	538·7	539·1
Mean amount of Cloud (0—10)	7·1	7·3
Total fall of Rain ..... inches	58·992	47·179
Greatest Monthly Rainfall (September)	12·620	7·619
Least ,, ,, (April)	1·410	1·235
Greatest Rainfall in one day (September 15th) ,,	1·690	1·629
No. of days per Month on which ·005 inch or more Rain fell	18·1	17·1

SUMMARY OF WIND, 1918.

Prevailing Direction	N	NE	E	SE	S	SW	W	NW
No. of days for each	44	31	20	7	68	80	92	11
Mean Velocity in miles per hour...	6·2	6·7	9·4	7·5	10·1	10·6	9·6	9·6
Total No. of miles for each Direction	6575	5007	4532	1261	16473	20374	21194	2536

		Mean for the last 51 years.
Total No. of miles registered	77952	85861·0
Greatest Monthly Total (February)	8805	9991·9
Least ,, ,, (June)	4261	4976·7
Greatest hourly velocity (November 2nd) ...	45	51·2
Prevailing Direction of Wind	W.	W

DIFFERENCES, 1918.

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

Mean barometric pressure...	+	0·015 in.
Yearly range ,, ...	—	0·010 in.
Mean of highest daily temperatures	—	0·6°
Mean of lowest ,, ,, ...	+	1·3°
Mean daily range	—	1·9°
Adopted mean temperature	+	0·5°
Total rainfall	+	11·813 in.

ABSOLUTE EXTREMES

FOR THE LAST 71 YEARS.

Readings of Barometer, in inches.

Highest monthly mean	1891 (Feb.)	29·997
Lowest „ „	1868 (Dec.)	28·984
Highest yearly „	1896	29·584
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 „ „	1868	49·1
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 71 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	8497
Least ,, ,, ,, ...	September	6091
Greatest No. ,, ,, year .	1868	102395
Least ,, ,, ,, ,, ...	1915	70623

* *Record dates from 1867 only.*

DATES OF OCCASIONAL PHENOMENA.

1918	Frost	Hoar Frost	Snow	Hail	Heavy Rain
January	1–3, 6–17, 29–31		4, 7, 11-14, 16-18,	7, 9, 12-13, 14, 17	18
February	16-18, 24, 27, 28		28	28	6, 9, 10, 20
March	1-3, 9, 13-14, 17, 21-26, 30,		1-3, 8	1	27
April	3, 13, 14, 17-22, 26, 28-30		18, 19, 20	19	6
May	1, 5, 9–11				3
June				22	25
July					23
August					5, 19, 25, 27, 31
September				8, 9, 11, 27, 28	1, 4, 8, 9, 13-15, 21
October	1, 13, 24, 26,	13		1, 3-5, 6, 8	3, 5, 9, [22, 25, 27
November	3, 4, 6-9, 12-23, 26, 30	7, 8, 13-15		8	10, 26
December	9-11, 15, 17-22, 24-26, 31	[18-23	17, 18, 19, 24, 26	16, 18, 19, 23, 26	1, 2, 14, 15, 18, 19 [22, 27, 28

1918	Gales of Wind	Fog	Thunder	Lightning	*Lunar Halo	*Solar Halo	Aurora Borealis
January	20						
February	21			9		5	
March							
April			12	12		18	
May			17, 21, 22, 23	17, 22, 23		5, 25	
June			5, 14, 25,	14, 25		11	
July			8-12, 16-18, 20, 23, 26	9-11, 17, 18, 20, 23		7, 21, 28	
August				5			
September			8-11, 17, 27	10, 27	18	29	
October	7	26, 27	7	6, 7,			
November	2, 4, 8	25-29				7, 12	29
December			18	18		7	25

*22° *Radius.*

MONTHLY TOTALS FOR EACH HOUR OF RECORDED SUNSHINE.

1918. 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 ...	...	...	...	...	0·7	4·9	9·2	9·0	9·5	6·8	3·6	0·2	...	...	...	...	...
February ...	...	...	...	0·7	2·1	4·0	5·5	5·2	3·8	3·5	3·2	2·1	1·4	...	...	...	...
March ...	...	...	0·5	5·0	10·2	10·1	12·0	12·2	12·1	11·9	12·4	10·2	6·8	1·3	...	...	...
April ...	...	4·2	9·3	10·6	12·9	12·9	14·6	16·0	15·7	15·2	15·4	16·1	14·0	10·2	5·6	...	...
May ...	...	5·4	11·0	13·5	17·7	19·0	18·3	15·7	15·6	14·9	11·7	12·0	12·2	13·4	10·5	2·1	...
June ...	0·8	7·6	10·2	14·3	14·5	13·3	13·9	13·5	14·3	13·7	15·8	15·9	17·0	15·0	12·2	7·2	...
July ...	...	3·4	7·8	9·3	11·7	12·9	12·2	14·8	12·1	13·2	15·3	15·8	12·8	11·8	9·9	2·5	...
August ...	...	1·2	6·0	8·5	8·6	10·9	12·8	14·2	13·3	15·0	13·5	13·7	14·7	12·5	5·2	...	...
September ..	...	...	0·2	4·4	7·8	10·9	11·1	12·1	12·7	12·4	11·0	9·1	8·1	3·1	0·1	...	...
October ...	...	...	...	1·4	5·4	6·4	10·3	10·3	11·3	10·3	9·8	5·6	1·1	0·2	...	...	...
November...	...	...	...	...	0·5	4·9	5·2	5·9	7·0	6·0	4·9	0·9	...	...	...	...	...
December ...	...	...	...	...	...	0·7	3·4	5·8	7·6	3·9	1·1	0·2	...	...	...	...	...
Sums ...	0·8	21·8	45·0	67·7	92·1	110·9	128·5	134·7	135·0	126·8	117·7	101·8	88·1	67·5	43·5	11·8	...

TOTAL AMOUNT OF SUNSHINE RECORDED ON EACH DAY.

1918	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
January ...	0·3	1·8	4·8	...	...	...	2·5	6·1	...	...	0·1	0·3	0.2	...	...	4·5	...
February ...	3·3	...	...	3·1	1·4	...	...	2·1	...	...	...	...	...	...	...	0·2	3·8
March ...	7·0	7·7	5·5	...	...	2·0	...	...	6·3	1·1	0·5	0·1	8·5	3·3	0·6	...	5·8
April ...	0·5	2·1	6·8	8·5	4.8	1·3	2·8	3·8	0·1	...	5·5	...	...	2·6	2·4	4·1	9·9
May ...	5·7	...	1·5	0·3	7·5	6·5	0·3	7·0	8·3	14·0	3·7	7.8	...	1·5	0·9	4·7	7·3
June ...	14·2	13·7	13·4	13·5	7·8	12·1	9·5	6·6	0·2	2·5	10·7	1·2	5·0	4·0	5·5	2·9	1·5
July ...	9·3	4·2	12·1	6·0	4·8	3·2	4·4	4·3	9·6	2·4	3·3	4·3	11·7	3·0	3·7	3·4	1·6
August ...	3·9	4·6	1·0	5·5	2·8	2·0	6·8	3·3	8·4	5·2	0·5	9·2	9·7	6·3	2·7	10·0	0·4
September ..	...	2·3	9·0	...	...	2·2	6·0	0·6	5·0	6·5	3·5	4·6	5·5	...	...	0·5	5·3
October ...	3·3	0·5	...	5·5	...	5·5	5·8	4·5	...	1.7	3·3	3·5	6·5	...	4·0	2·5	0·9
November...	...	0·7	...	0·1	3·0	4·2	3·8	2·3	0·2	...	0·6	3·5	0·4	4·3	0·3	4·2	0·1
December ...	...	0·1	...	0·1	...	...	0·6	...	...	...	...	1·0	...	2·9	...	1·3	3·9

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

1918	18	19	20	21	22	23	24	25	26	27	28	29	30	31	MONTHLY Total	MONTHLY Percen.
January ...	...	...	...	2·7	0·5	...	...	2·3	2·3	...	2·5	4·4	3·6	5·0	43·9	17·7
February ...	0·8	0·1	...	2·9	...	0·1	0·1	9·3	1·1	0·2	3·0				31·5	11·6
March ...	1·0	...	0·2	7·1	9·5	10·6	10·6	7·5	7·8	...	0·3	0·9	...	0·8	104·7	28·6
April ...	3·0	6·4	...	5·7	0·6	12·6	11·7	12·9	12·4	13·7	12·9	13·6	12·0		172·7	41·2
May ...	10·8	14·0	9·0	6·6	10·8	...	0·1	5·7	2·6	9·2	11·6	11·9	11·2	12.5	193·0	39·1
June ...	...	1·6	1·1	1·5	9·0	14·6	10·7	2·5	9·6	0·4	0·5	11·8	11·6		199·2	39·2
July ...	...	6·5	0·3	9·6	...	0·5	6·7	4·5	1·7	6·4	8·8	8·7	12·0	8·5	165·5	32·5
August ...	2·3	2·4	2·6	8·7	6·4	11·7	11·7	...	2·2	...	3·5	7·8	0·5	8.0	150·1	32·8
September ..	8·3	4·0	4·1	0·4	6·8	5·5	...	7·9	0·7	3·6	6·9	...	3·8		103·0	27·2
October ...	0·5	2·1	1·9	1·0	...	6·2	...	5·3	1·7	...	...	...	1·2	4·7	72·1	22·1
November...	0·4	0·5	...	3·4	0·8	...	...	1·2	...	1·2	...	0·1	...		35·3	13·8
December ..	1·0	...	1·1	...	...	3·9	0·6	1·5	0·4	...	0·6	...	0·7	3·0	22·7	9·8

SUMMARY OF SUNSHINE.

	Bright Sunshine Recorded					
	1918			Mean for the last 38 years		
	Number of		Percentage of Possible Sunshine	Number of		Percentage of Possible Sunshine
	Days	Hours		Days	Hours	
January ...	17	43·9	17·7	14·2	32·7	13·2
February ...	15	31·5	11·6	17·7	58·2	21·2
March ...	23	104·7	28·6	24·1	103·5	28·3
April ...	26	172·7	41·2	26·4	149·6	35·7
May ...	28	193·0	39·1	27·6	186·2	37·8
June ...	29	199·2	39·2	27·9	185·1	36·4
July ...	29	165·5	32·5	28·4	175·2	34·4
August ...	29	150·1	32·8	27·6	150·2	32·9
September ..	23	103·0	27·2	25·7	124·4	32·8
October ...	22	72·1	22·1	23·4	83·2	25·5
November ..	21	35·3	13·8	17·4	45·9	17·9
December ...	16	22·7	9·8	13·4	25·6	11·1
Year ...	278	1293·7	29·0	273·7	1319·9	29·6

SUMMARY OF SUNSHINE—*Continued.*

EXTREMES FOR THE LAST 38 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	1905	223·7	1893	94·0	1913	53·4	1893	22·3	1913
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	25	*1888	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).

1918	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 p.m. readings	4 a.m. readings*					
	16° +						16° +	15° +	
	′	′	′	′	′	′	′	′	′
January ...	13·7	8·9	11·1	12·3	11·5	9·3	16·7	43·7	33·0
February ...	13·1	9·1	10·1	11·3	10·9	10·4	23·7	49·7	34·0
March	13·7	6·1	8·7	11·5	10·0	11·3	19·7	47·7	32·0
April	13·3	4·7	7·9	11·1	9·3	14·9	22·7	45·7	37·0
May	13·1	3·7	6·1	10·1	8·3	13·0	18·7	39·7	39·0
June	11·7	2·9	4·7	9·1	7·1	11·4	15·7	54·7	21·0
July	10·3	0·9	3·3	7·9	5·6	12·4	15·7	47·7	28·0
August ...	10·5	0·0	2·3	6·3	4·7	12·3	13·7	49·7	24·0
September ...	12·1	12·1	0·9	2·7	6·6	18·4	22·7	33·7	49·0
October ...	9·9	9·9	0·9	4·1	7·1	14·1	11·7	36·7	35·0
November ...	12·1	7·9	9·5	11·1	10·2	9·6	39·7	72·7	27·0
December ...	9·7	6·5	7·1	8·3	7·9	11·1	43·7	43·7	60·0
Means	11·9	6·1	6·1	8·8	8·3	12·4	22·0	47·1	34·9

Mean for the year ... ... · 16° 8·3 W.

† *For the 10 quietest days.* * *Of the following day.* ‡ *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.

1918	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 p.m. readings	4 a m. readings*					
	17000 +				0 +		17000 +		0 +
January ...	372	340	356	353	355	41	397	259	138
February ...	362	336	356	349	351	52	400	257	143
March ...	362	324	346	350	346	61	438	81	357
April	362	312	339	341	338	86	414	123	291
May	357	306	337	345	336	79	372	240	132
June	316	271	299	306	298	70	405	217	188
July	348	301	329	338	329	76	400	240	160
August ...	334	285	319	322	315	77	405	222	183
September ...	347	295	328	326	324	78	403	181	222
October ...	339	301	328	330	325	77	402	181	221
November ...	336	312	325	332	326	62	411	232	179
December ...	332	311	323	322	322	65	411	218	193
Means	347	308	332	335	330	69	405	204	201

Mean for the year ... ... 0·17330 C. G. S. Units.

† *For the* 10 *quietest days.* **Of the following days.* ‡ *Includes all days.*

ABSOLUTE MEASURES—SUMMARY.

1918	DIRECTION				FORCE.		
	Declination Corrected		Inclination		Horizontal	Vertical	Total
	°	′	°	′	C. G. S. UNITS.		
January ...	16	11·2	68	44·6	0·17362	0·44632	0·47890
February ...	16	12·7	68	43·6	0·17323	0·44492	0·47746
March ...	16	11·8	68	44·3	0·17349	0·44586	0·47842
April	16	7·9	68	41·6	0·17369	0·44534	0·47802
May	16	7·5	68	43·2	0·17338	0·44516	0·47773
June	16	5·8	68	43·8	0·17342	0·44550	0·47806
July	16	6·9	68	42·2	0·17346	0·44498	0·47760
August ...	16	5·7	68	42·8	0·17307	0·44421	0·47673
September ...	16	9·2	68	43·8	0·17313	0·44475	0·47726
October ...	16	10·7	68	44·3	0·17350	0·44588	0·47845
November ...	16	7·9	68	43·5	0·17296	0·44421	0·47669
December ...	16	5·6	68	42·0	0·17270	0·44295	0·47543
Means ...	16	8·6	68	43·3	0·17330	0·44501	0·47756

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 reckoned astronomically from noon to noon.

1918	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1918
D.													D.
1	*	s	c	s	s	c	m	c	m	m	s	v.g.	1
2	*	s	s	c	c	c	c	s	s	m	s	m	2
3	*	c	s	s	c	s	m	s	s	m	c	m	3
4	*	c	c	s	s	c	*	s	m	m	c	s	4
5	*	s	c	m	m	s	c	s	*	m	c	c	5
6	s	m	c	g	c	s	c	s	*	m	c	c	6
7	c	c	s	s	c	s	s	c	c	s	c	m	7
8	c	c	g	s	s	s	s	s	m	g	c	v.g.	8
9	c	s	c	s	c	m	s	s	s	s	c	m	9
10	c	m	s	s	c	g	s	c	s	c	s	m	10
11	c	m	m	v.g.	s	m	m	s	c	c	m	m	11
12	s	g	s	m	s	m	m	s	c	c	g	m	12
13	s	m	c	c	c	s	m	c	c	c	m	m	13
14	c	m	c	c	s	s	s	c	s	c	m	s	14
15	s	m	m	c	m	m	s	*	s	s	g	c	15
16	c	m	m	c	v.g.	m	s	c	m	g	s	c	16
17	c	s	c	c	g	s	c	c	s	g	s	c	17
18	c	c	c	m	s	s	s	c	m	s	c	s	18
19	c	c	c	m	s	c	c	c	m	m	m	m	19
20	c	s	c	c	s	c	c	c	s	s	s	s	20
21	c	s	s	c	c	m	s	c	v.g.	s	s	s	21
22	c	c	s	c	c	c	c	c	m	m	s	s	22
23	c	m	m	s	c	c	c	c	c	s	m	s	23
24	c	s	c	c	c	c	*	m	s	s	m	s	24
25	c	c	c	g	c	c	m	m	c	s	c	v.g.	25
26	c	c	s	m	c	s	s	s	m	c	c	g	26
27	s	s	s	c	c	s	s	m	c	c	c	c	27
28	c	m	c	c	c	c	g	s	s	m	s	c	28
29	m		c	c	s	c	s	c	s	c	v.g.	c	29
30	v.g.		c	m	s	c	s	c	m	s	m	c	30
31	m		c		c		s	m		s		c	31
TOTAL c	18	9	17	13	16	12	8	15	7	8	11	10	
TOTAL s	5	9	9	8	11	11	14	11	11	11	9	8	
TOTAL m	2	9	4	6	2	6	6	4	9	9	7	9	
TOTAL g	...	1	1	2	1	1	1	...	...	3	2	1	
TOTAL vg	1	...	...	1	1	...	...	...	1	...	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.

1918	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1918
D.													D.
1		5·0	3·6		7·7	13·3	5·3	10·4		13·0			1
2	11·0		2·4			13·6		12·0					2
3	11·0		2·7	8·4	8·2	15·5	11·6		1·8				3
4		2·7		10·2		16·0	12·2	15·5		7.2		1·5	4
5		3·6		12.0	10·6	13·3		15.3					5
6			1·3	13·0	10·8	14·0	12·7		1·8	2·8	2·0		6
7	8·4			12·2		9·4	12·5	11·0	3·0	3·5	2·2	5·1	7
8	10 6			8·6	9·0	4·3		5·7		6·0	1·8		8
9			2·7		11·0		10·0	5·3	3·1				9
10					10·7		7·3	4·4	3·6				10
11					8·0	3·0	6·7			7·1			11
12					7·5		6·0	7·4	4·4	6·2	2·7	7·4	12
13			11·6				4·1	9·0	9·3	7·0	5·6		13
14				3·0	5·4	0·6	3·0	8·0			9·0	7·0	14
15					5·4	0·4	8·0	9·8		7·8			15
16	4·5	7·7		3·3	3·0		8·0	n		10·0	13·6	3 6	16
17		10·4	12·1	2·8	3·3	0·4	10·0		12·3	12·8		5·4	17
18		12·0			2·8				10·0			7·0	18
19				4·0	2·1	1·1	9·5	12·1	9·0	13·4	21·0		19
20					2 0	2·0			8·8	18·0		14·3	20
21	14·7	6·2	1·6	3·0	2·0	2·6	11.0	18·0		17.0	14.0		21
22			2·7	3·0	2·6			15·0			10·0		22
23			3·0			2·0		15·5		15·0		20·2	23
24			4·0	4·0		2·5	15·6	15·0					24
25	14.6	5·5	8·2	3·6	2·5	1·6	15·4		9·6	13.0	9·6		25
26	11·7		8·4	5·2	4·0	1·2	12·0			11·5		8·0	26
27				7·0	5·6		10·0		8·2		12·0		27
28	7·4	4·2		7·0	9·2		8·5	12·0	13·0			6·5	28
29	7.4			9·5	9·4	3·7	7·4	8·4					29
30	7·8			8·0	10·3		6·6	.	13·0				30
31	5·7				12·3		6·7	6·0		7·8		1·8	31
Daily Means	10·4	6·4	4·9	6·7	6·6	6·0	9·2	10·8	7·4	10·0	8·6	7·3	