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, 1916.

With Report and Notes of the Director,

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

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REPORT AND NOTES.

Meteorological.—The meteorological continuous records have been uninterrupted during the year.

The wind is recorded by a Robinson's Anemograph at about 45 feet above the ground. A velocity of 37 miles per hour and over is called a gale.

Bright sunshine is recorded by a Campbell-Stokes Recorder.

The Rain Gauge is a Beckley Self Recorder. 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 $\frac{1}{5}$ inch or more during the day.

The Barometer is a standard barometer of the pattern approved by the Meteorological Office. It is now mounted, with a photo-barograph, 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 year, on the whole, may be described as mild, cloudy, and wet. Barometric pressure, temperature, and wind-force were all very moderate and uniform throughout the year. There have been no extremes of heat or cold. The highest temperature in the shade was only 77°, on July 22nd, and the lowest 23°·2, on December 6th. The yearly range of temperature is thus 12° below the average. Shade temperatures of 70° and over occurred on 23 days, viz.: 4 in May, 7 in July, 11 in August, and 1 in September.

August was the warmest month of the year at mean temperature 59·6. But January was *relatively* much the warmest month at mean temperature 44°·7, which is not only 7°·2 above its average and the highest yet recorded for January, but exceeds, slightly, the average temperature of the month of April. December at mean temperature 36°·1 was the coldest month,

but March was *relatively* colder at mean temperature 37·0, which is 3° below its average.

The duration of bright sunshine was 205 hours short of the yearly average. The months of June, March and July show the chief deficiencies, while August and December were the only months favoured with more than their average amount.

The yearly rainfall, notwithstanding a fall of over 10 inches in October, was only 2·325 inches above the average. The number of rainy days was 223, against an average of 205. The distribution of rainfall throughout the year shows an excess of 9·416 inches for the 5 months January, February, April, May, and October, and a deficit of 7·091 inches for the remaining 7 months. With reference to the great fall in October, it may be noted that on our Register a month's rain-fall of 10 inches, or more, has been recorded only in the month of October; and this three times in the past 69 years, viz.:—

October,	1870	13·437 ins.
„	1903	10·830 ins.
„	1916	10·305 ins.

The prevailing wind for the year has been, as usual, from the West, but during the very dry month of March N.E. winds prevailed in the proportion of 3 N.E. to 1 W.; and during the very wet month of October S.W. winds prevailed in the same proportion. Both the mean velocity of the wind and the total run for the year were well below the average, and gale-force (37 miles per hour, or over), was reached on only 3 days,

viz.: January 1st, February 3rd, and 16th, at 41, 44, and 43 miles per hour respectively.

Fine dry periods of the year, not excluding occasional interruptions by slight rains of short duration, may be noted as follows:—February 19th—24th; March 3rd—6th, 17th—24th, 28th—April 9th; April 22nd—May 3rd; May 15th—30th; June 11th—28th; July 16th—August 12th; August 26th—30th; September 4th—10th, 19th—October 1st; November 11th —17th; December 10th—17th. Total, 13 periods, average duration 11 days.

Heavy rains of 1 inch, or more, fell on 11 days, viz.: 1 in January, 2 in April, 1 in August, 1 in September, 5 in October, and 1 in December.

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 all the even numbered hours by automatic interruptions of the pencils of light. The interruptions are worked by a relay, which is controlled by a separate clock. This arrangement has the advantage of freeing the time-indications from the errors of any irregular running of the motor-clock.

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 regu-

larly; 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 ten 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.

On the table of magnetic disturbances (page 38) the following remarks may be of service. There is often some embarrassment in assigning the proper note of magnetic condition to the date. Overlapping of indications cannot be wholly avoided; and some allowance must be made for the subjective impressions of the Recorder. But the general intention of the table 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, and may therefore be found occasionally at variance with our own quotations, which are given for the Astronomical day (from noon to noon). It has not been thought well to make any change here; because the convenience for tabulation is very great, when the curve, started at noon, stands for one day; and the risk of clerical errors is notably less.

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

The Solar Surface has been observed on 215 days, and 211 drawings have been added to our collection. Of these, 183 are complete, as showing both spots and faculæ, and 25 are complete for all spots, but wanting the faculæ. On four days notes with rough sketches of the spots were made. On two days only the surface was found free from spots.

The mean disc area of the spots (in units of $\frac{1}{1000}$th of the visible surface) appears at 4.52, closely the same

as last year; and the mean daily range of magnetic Declination (in minutes of arc) at 12·1. These are included in the following table for comparison with the corresponding *means* of the past five years:—

Year.....	1911	1912	1913	1914	1915	1916
Spot Area	0·33	0·22	0·04	0·82	4·51	4·52
Declination range	12·6	8·1	9·7	10·2	11·7	12·1

A new projection apparatus, designed and made by Mr. G. J. Gibbs, F.R.A.S., consisting of an aluminium collar and bicycle rods, was fitted to the equatorial during the year. It is found to be very light and rigid.

During the year, in the summer months, some very good and detailed drawings of the faculæ were made by Mr. W. McKeon, a list of which follows. It would be an interesting study to compare them with spectroheliograms in hydrogen and calcium light obtained on the same dates. Applications for such records have quite recently been made.

Dates on which good drawings of Faculæ were secured for comparison with spectroheliograms:—

1916.		*G.M.T.*	
May	28	9-30—10-15	a.m.
„	29	8-35—10- 0	„
„	30	8- 2— 8-50	„
June	2	7-33— 8-55	„
June	3	7- 8— 8-40	„
„	6	7- 6— 8- 5	„
„	10	8-15— 9-35	„
„	11	7-10— 8- 5	„
„	14	9-50—10-15	„

1916.			G.M.T.	
„	15	... ...	7-20— 8-55	a.m.
„	16	... ...	7- 8— 7-50	„
„	17	... ...	7-12— 8-15	„
„	28	... ...	7-20— 8-20	„
July	4	... ...	9- 8—10- 0	„
„	20	... ...	7-13— 8- 5	„
„	22	... ...	8-50—10- 0	„
„	23	... ...	7-30— 9- 0	„
„	23	... ...	9-20—10-30	„
„	24	... ...	7-23— 9- 5	„
„	25	... ...	7-23—10- 0	„
„	27	... ...	9-45—11-20	„
„	29	... ...	7-30—10-20	„
Aug.	1	... ...	8-34— 9-45	„
„	6	... ...	7-13— 7-40	„
„	7	... ...	7-25— 8-15	„
„	8	... ...	7-14— 8-40	„
„	10	... ...	7-34— 9- 0	„
„	11	... ...	8-40—10-10	„
Sept.	24	... ...	7-37— 8-20	„

The spectra of a few spots were photographed in the red region of the spectrum, with the large grating spectrograph, and a few visual observations were also made. These observations confirm the essential permanence of the spot-spectrum since the year 1882.

Owing to the want of assistance, due to the war, work with the Whitelow camera has been in abeyance. With the Thorp prismatic equatorial spectra have been secured of the following stars: *o* Ceti at two maxima, *α* Orionis, *α* Canis Minoris, *α* Leonis, the Nebula of Orion, and the planets Mars and Saturn.

Astronomical.—In our last Report we had the satisfaction of acknowledging the kind permission of the late Postmaster-General to re-erect our Radiotelegraphic apparatus. Now we have to express our regret that the Military Authorities have requested the suppression of the installation. We have pressed our claim to an exception, in our favour, from the general policy against private wireless installations, but without avail. We have, therefore, to rely upon fine evenings for our time service by the transit instrument. Happily the chronometer has shown a very constant rate during long intervals of cloudy skies, and the rectification of our longitude by the Paris Wireless time signals has been deferred to better days, when the serious defects of the transit instrument can be remedied.

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.—Some remarks on the formation of Sun-Spots Monthly Notices R.A.S. 76, pp. 404—407. Plate 6.

2.—The Efficiency of Sun-Spots in relation to the Mean Daily Range of Terrestrial Magnetic Declination. Ibid. pp. 631—634.

3.—The Colours and Spectra of the Stars. Journal Manchester Astronomical Society. No. 3, pp. 1—16. Plates I.—III.

METEOROLOGICAL REPORT.

JANUARY, 1916.

Results of Observations taken during the Month.		Mean for the last 69 years.
Mean Reading of the Barometer ..... inches	29·613	29·488
Highest ,, ,, on the 31st ... ,,	30·095	30·128
Lowest ,, ,, on the 1st ... ,,	28·582	28·584
Range of Barometer Readings..... ,,	1·513	1·544
Highest Reading of a Max. Therm. on the 6th ...	54·0	51·3
Lowest Reading of a Min. Therm. on the 14th	29·4	21·3
Range of Thermometer Readings	24·6	30·0
Mean of Highest Daily Readings	48·8	42·4
Mean of Lowest Daily Readings	40·0	33·0
Mean Daily Range	8·8	9·4
Deduced Mean Temp. (from mean of Max. and Min.)	44·2	37·4
Mean Temperature from Dry Bulb	45·2	37·6
Adopted Mean Temperature	44·7	37·5
Mean Temperature of Evaporation	43·3	36·3
Mean Temperature of Dew Point	41·7	34·2
Mean elastic force of Vapour.....inches	0·264	0·199
Mean weight of Vapour in a cub. ft. of air, grains	3·0	2·4
Mean additional weight required for saturation ,,	0·4	0·4
Mean degree of Humidity (saturation 100)	90	87
Mean weight of a cubic foot of air ..... grains	543·6	549·6
Mean amount of Cloud (0—10)	8·4	7·8
Fall of Rain ..... inches	4·670	4·230
Greatest Rainfall in one day (6th) ..... ,,	1·000	0·818
No. of days on which ·005 in. or more Rain fell...	26	19·2

Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	1	0	0	7	9	14	0
Mean Velocity in miles per hr.	0	2·8	0	0	12·7	15·3	16·6	0
Total No. of miles	0	67	0	0	2132	3296	5594	0

		Mean*
Total No. of miles registered	11089	8211·0
Greatest hourly velocity (1st. 4 p.m. Dir. S.W.)...	41	41·4

* *For the last 49 years.*

JANUARY, 1916.

DIFFERENCES.

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

Mean barometric pressure	+	0·125 in.
Monthly range ,, ...	—	0·031 in.
Mean of highest daily temperatures	+	6·4°
Mean of lowest ,, ,, ...	+	7·0°
Mean daily range	—	0·6°
Adopted mean temperature	+	7·2°
Total rainfall	+	0.440 in.

Ground Frost on 12th, 14th, 23rd, and 27th. Hail on 7th. Heavy rain on 6th and 20th. Gales of wind on 1st and 13th.

The mean temperature is the highest on record for January. The figure, 44°·7, just exceeds the average for the month of April.

EXTREME READINGS FOR JANUARY, During 69 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, 1916.

Results of Observations taken during the Month.			Mean for the last 69 years.
Mean Reading of the Barometer	inches	29·286	29·487
Highest ,, ,, on the 1st ...	,,	29·995	30·093
Lowest ,, ,, on the 4th ...	,,	28·440	28·638
Range of Barometer Readings.....	,,	1·555	1·455
Highest Reading of a Max. Therm. on the 16th ..		50·4	52·0
Lowest Reading of a Min. Therm. on the 21st...		27·8	22·4
Range of Thermometer Readings		22·6	29·6
Mean of Highest Daily Readings		42·4	44·0
Mean of Lowest Daily Readings		33·7	33·5
Mean Daily Range		8·7	10·5
Deduced Mean Temp. (from mean of Max. & Min.)		37·7	38·2
Mean Temperature from Dry Bulb		38·1	38·4
Adopted Mean Temperature		37·9	38·3
Mean Temperature of Evaporation		35·6	36·8
Mean Temperature of Dew Point		32·5	34·5
Mean elastic force of Vapour	inches	0·185	0·195
Mean weight of Vapour in a cub. ft. of air, grains		2·1	2·4
Mean additional weight required for saturation ,,		0·6	0·4
Mean degree of Humidity (saturation 100).....		82	86
Mean weight of a cubic foot of air	grains	545·4	548·5
Mean amount of Cloud (0—10)		7·2	7·5
Fall of Rain	inches	4·730	3·535
Greatest Rainfall in one day (5th)	,,	0·730	0·759
No. of days on which ·005 in. or more Rain fell...		22	16·9

Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	8	0	0	3	4	9	2
Mean Velocity in miles per hr.	7·7	10·9	0	0	15·0	10·9	16·5	4·9
Total No. of miles.....	553	2102	0	0	1082	1043	3571	235

		Mean*
Total No. of Miles registered	8586	7698·9
Greatest hourly velocity (3rd, 9 a.m., S. by E.) ...	44	42·5

* *For the last 69 years.*

FEBRUARY, 1916.

DIFFERENCES.

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

Mean barometric pressure	—	0·201 in.
Monthly range ,, ...	+	0·100 in.
Mean of highest daily temperatures	—	1·6°
Mean of lowest ,, ,, ...	+	0·2°
Mean daily range	—	1·8°
Adopted mean temperature	—	0·4°
Total rainfall	+	1·195 in.

Ground frost on 1st, 5th, 9th, 10th, 12th, 15th, 17th, 20th—29th. Snow on 9th, 11th, 14th—17th, 22nd—29th. Hail on 7th, 8th, 9th, 14th—17th. Heavy rain on 6th and 18th. Gales of wind on 3rd and 16th. Thunder on the 9th. Solar halo on 10th, 13th, and 20th.

EXTREME READINGS FOR FEBRUARY, During 69 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 ,, ,, ,, ...	1886	.....	4251

* *Since 1887 only.*

MARCH, 1916.

Results of Observations taken during the Month.		Mean for the last 69 years.
Mean Reading of the Barometer ..... inches	29·280	29·445
Highest „ „ on the 31st ... „	29·941	30·040
Lowest „ „ on the 26th ... „	28·600	28·639
Range of Barometer Readings ..... „	1·341	1·401
Highest Reading of a Max. Therm. on the 31st ...	53·0	56·9
Lowest Reading of a Min. Therm. on the 23rd...	23·8	23·2
Range of Thermometer Readings	29·2	33·7
Mean of Highest Daily Readings	41·4	47·0
Mean of Lowest Daily Readings	32·9	34·3
Mean Daily Range	8·5	12·7
Deduced Mean Temp. (from mean of Max. & Min.)	36·2	39·7
Mean Temperature from Dry Bulb	37·8	40·2
Adopted Mean Temperature	37·0	40·0
Mean Temperature of Evaporation	35·1	38·1
Mean Temperature of Dew Point	32·4	35·7
Mean elastic force of Vapour ..... inches	0·184	0·209
Mean weight of Vapour in a cub. ft. of air, grains	2·1	2·4
Mean additional weight required for saturation „	0·5	0·5
Mean degree of Humidity (saturation 100).....	84	85
Mean weight of a cubic foot of air ..... grains	546·5	546·1
Mean amount of Cloud (0—10)	7·9	7·5
Fall of Rain ..... inches	1·925	3·398
Greatest Rainfall in one day (16 h) ..... „	0·330	0·773
No. of days on which ·005 or more Rain fell...	20	16·8

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of Days.....	10	12	1	0	0	3	4	1
Mean Velocity in miles per hr.	8·8	10·9	14·1	0	0	12.4	15·0	5·0
Total No. of miles.....	2116	3130	339	0	0	894	1443	119

		Mean*
Total No. of Miles registered	8041	8553·0
Greatest hourly velocity (28th. 5 a m. Dir. S.W.)...	30	41·2

*. For the last 49 years.

MARCH, 1915.

DIFFERENCES.

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

Mean barometric pressure	—	0·165 in.
Monthly range ,, ...	—	0·060 in.
Mean of highest daily temperatures	—	5·6°
Mean of lowest ,, ,, ...	—	1·4°
Mean daily range	—	4·2°
Adopted mean temperature	—	3·0°
Total rainfall	—	1·473 in.

Ground frost on 1st—15th, 17th, 22nd—30th. Snow on 2nd, 3rd, 6th—8th, 9th—13th, 23rd—28th. Hail on 6th, 12th, 22nd, 24th—27th. Lunar halo on 17th. Solar halo on 3rd, 17th, 18th, 27th, 28th, and 29th.

EXTREME READINGS FOR MARCH, During 69 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	.....	12779
*Least ,, ,, ,, ...	1892	.....	5725

* *Since 1867 only.* † *Also 1882.*

APRIL, 1916.

Results of Observations taken during the Month.		Mean for the last 69 years.
Mean Reading of the Barometer ..... inches	29·435	29·489
Highest ,, ,, on the 1st ... ,,	29·951	29·952
Lowest ,, ,, on the 18th ... ,,	28·606	28·803
Range of Barometer Readings ..... ,,	1·345	1·149
Highest Reading of a Max. Therm. on the 26th...	67·6	65·1
Lowest Reading of a Min. Therm. on the 2nd ...	30·8	28·2
Range of Thermometer Readings	36·8	36·9
Mean of Highest Daily Readings	52·0	54·8
Mean of Lowest Daily Readings	38·5	37·8
Mean Daily Range	13·5	17·0
Deduced Mean Temp. (from mean of Max. & Min.)	43·8	44·1
Mean Temperature from Dry Bulb	45·5	44·8
Adopted Mean Temperature	44·7	44·5
Mean Temperature of Evaporation	42·2	41·7
Mean Temperature of Dew Point	39·3	38·3
Mean elastic force of Vapour ..... inches	0·241	0·235
Mean weight of Vapour in a cub. ft. of air, grains	2·8	2·7
Mean additional weight required for saturation ,,	0·6	0·7
Mean degree of Humidity (saturation 100).....	81	80
Mean weight of a cubic foot of air ..... grains	540·7	542·1
Mean amount of Cloud (0—10)	5·7	6·7
Fall of Rain ..... inches	4·570	2·568
Greatest Rainfall in one day (17th) ..... ,,	1·010	0·595
No. of days on which ·005 in. or more Rain fell...	14	14·8

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	3	1	1	3	1	17	2
Mean Velocity in miles per hr.	4·3	5·3	8·3	8·3	15·3	2·9	13·8	4·8
Total No. of Miles.....	206	378	200	198	1104	70	5637	230

		Mean*
Total No. of Miles registered	8023	7597·7
Greatest hourly velocity (18th. 3 a.m. Dir. W.) ...	30	37·0

* *For the last* 49 *years.*

APRIL, 1916.

DIFFERENCES.

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

Mean barometric pressure	—	0·054 in.
Monthly range ,, ...	+	0·196 in.
Mean of highest daily temperatures	—	2·8°
Mean of lowest ,, ,, ...	+	0·7°
Mean daily range	—	3·5°
Adopted mean temperature	+	0·2°
Total rainfall	+	2·002 in.

Ground frost on 2nd, 3rd, 5th—8th, 10th, 14th—16th, 22nd, 23rd. Hoar frost on 2nd. Snow on 14th. Hail on 11th, 12th, 14th and 21st. Heavy rain on 11th and 17th. Gale of wind on the 14th. Thunder and lightning on 14th. Lunar halo on 9th. Solar halo on 9th and 28th.

EXTREME READINGS FOR APRIL, During 69 Years.

Highest reading of Barometer ...	1906	(8th)	30·317 in.
Lowest ,, ,, ...	1868	(20th)	28·358 in.
Highest temperature	1852	(14th)	74·1°
Lowest ,, ...	1892	(13th)	20·8°
Highest adopted mean temperature	1865	.....	48·5°
Lowest ,, ,, ...	1879	.....	40·7°
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, 1916.

Results of Observations taken during the Month.		Mean for the last 69 years.
Mean Reading of the Barometer ..... inches	29·482	29·539
Highest ,, ,, on the 18th ... ,,	29·998	29·992
Lowest ,, ,, on the 6th ... ,,	28·864	28·950
Range of Barometer Readings ..... ,,	1·134	1·042
Highest Reading of a Max. Therm. on the 19th...	75·2	71·7
Lowest Reading of a Min. Therm. on the 4th ...	32·2	31·8
Range of Thermometer Readings	43·0	39·9
Mean of Highest Daily Readings	58·7	59·4
Mean of Lowest Daily Readings	43·2	42·3
Mean Daily Range	15·5	17·1
Deduced Mean Temp. (from mean of Max. & Min.)	49·3	49·1
Mean Temperature from Dry Bulb	51·7	49·9
Adopted Mean Temperature	50·5	49·5
Mean Temperature of Evaporation	47·7	46·3
Mean Temperature of Dew Point	44·8	42·8
Mean elastic force of Vapour ..... inches	0·297	0·278
Mean weight of Vapour in a cub. ft. of air, grains	3·4	3·1
Mean additional weigh required for saturation ,,	0·8	0·9
Mean degree of Humidity (saturation 100).....	81	77
Mean weight of a cubic foot of air ..... grains	534·8	537·1
Mean amount of Cloud (0—10).....	6·7	7·0
Fall of Rain ..... inches	3·120	2·684
Greatest Rainfall in one day (14th) ..... ,,	0·670	0·636
No. of days on which ·005 in. or more Rain fell...	12	14·6

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	6	1	0	4	5	15	0
Mean Velocity in miles per hr.	0	8·8	10·5	0	5·3	5·2	7·5	0
Total No. of miles.....	0	1265	253	0	505	620	2710	0

		Mean*
Total No. of Miles registered	5353	7022·4
Greatest hourly velocity (15th, 8 a.m. Dir. W.N.W.)	30	33·2

* *For the last 40 years.*

MAY, 1916.

DIFFERENCES.

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

Mean barometric pressure	—	0·057 in.
Monthly range ,, ...	+	0·092 in.
Mean of highest daily temperatures	—	0·7°
Mean of lowest ,, ,, ...	+	0·9°
Mean daily range	—	1·6°
Adopted mean temperature	+	1·0°
Total rainfall	+	0·436 in.

Ground frost on 3rd, 4th, 9th, 10th and 14th. Heavy rain on 14th. Solar halo on 2nd, 4th, 13th and 17th.

The total wind mileage, 5,353, is the lowest on record for May.

EXTREME READINGS FOR MAY,

During 69 Years.

Highest reading of Barometer ...	1881	(10th)	30·332 in.
Lowest ,, ,, ...	1877	(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 ,, ,, ,, ...	1916	.....	5353

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

JUNE, 1916.

Results of Observations taken during the Month.		Mean for the last 69 years.
Mean Reading of the Barometer ..... inches	29·472	29·553
Highest ,, ,, on the 16th ... ,,	29·923	29·931
Lowest ,, ,, on the 5th ... ,,	28·699	29·030
Range of Barometer Readings ..... ,,	1·224	0·901
Highest Reading of a Max. Therm. on the 23rd...	68·6	76·9
Lowest Reading of a Min. Therm. on the 17th...	37·6	39·0
Range of Thermometer Readings	31·0	37·9
Mean of Highest Daily Readings	58·8	65·4
Mean of Lowest Daily Readings	49·7	48·1
Mean Daily Range	9·1	17·3
Deduced Mean Temp. (from mean of Max. & Min.)	52·5	54·9
Mean Temperature from Dry Bulb	51·9	55·3
Adopted Mean Temperature	52·2	55·1
Mean Temperature of Evaporation	48·3	51·9
Mean Temperature of Dew Point	44·3	48·4
Mean elastic force of Vapour ..... inches	0·292	0·349
Mean weight of Vapour in a cub. ft. of air, grains	3·3	3·9
Mean additional weight required for saturation ,,	1·1	1·0
Mean degree of Humidity (saturation 100)	75	78
Mean weight of a cubic foot of air ..... grains	533·0	531·2
Mean Amount of Cloud (0—10).....	7·5	7·2
Fall of Rain ..... inches	2·500	3·409
Greatest Rainfall in one day (4th) ..... ,,	0·650	0·818
No. of days on which ·005 in. or more Rain fell...	15	15·3

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	5	2	0	2	3	2	15	1
Mean Velocity in miles per hr.	8·0	6·6	0	3·3	7·8	11·9	9·1	6·3
Total No. of miles.....	956	319	0	158	563	573	3258	152

		Mean*
Total No. of Miles registered	5979	6168·0
Greatest hourly velocity (1st, 3 p.m.. Dir. S.S.W.)	25	29·5

* *For the last 49 years.*

JUNE, 1916.

DIFFERENCES.

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

Mean barometric pressure	—	0·081 in.
Monthly range ,, ...	+	0·323 in.
Mean of highest daily temperatures	—	6.6°
Mean of lowest ,, ,, ...	+	1·6°
Mean daily range	—	8·2°
Adopted mean temperature	—	2·9°
Total rainfall	—	0·909 in.

Hail on 2nd, 6th, and 9th. Heavy rain on 4th. Thunder on 9th, 10th, 24th, and 26th. Lightning on 9th Solar halo on 14th, 24th, and 29th.

A dry, but cold and sunless month.

EXTREME READINGS FOR JUNE,

During 69 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, 1916.

Results of Observations taken during the Month.		Mean for the last 69 years.
Mean Reading of the Barometer ..... inches	29·600	29·525
Highest ,, ,, on the 29th ... ,,	29·974	29·903
Lowest ,, ,, on the 7th ... ,,	29·006	29·018
Range of Barometer Readings ..... ,,	0·968	0·885
Highest Reading of a Max. Therm. on the 22nd..	77·0	78·6
Lowest Reading of a Min. Therm. on the 6th ..	44·6	42·5
Range of Thermometer Readings	32·4	36·1
Mean of Highest Daily Readings	64·8	67·5
Mean of Lowest Daily Readings	58·6	51·1
Mean Daily Range	6·2	16·4
Deduced Mean Temp. (from mean of Max. & Min.)	59·8	57·7
Mean Temperature from Dry Bulb	58·2	57·9
Adopted Mean Temperature	59·0	57·8
Mean Temperature of Evaporation	55·1	54·8
Mean Temperature of Dew Point	51·6	52·0
Mean elastic force of Vapour ..... inches	0·383	0·389
Mean weight of Vapour in a cub. ft. of air, grains	4·3	4·4
Mean additional weight required for saturation ,,	1·3	1·1
Mean degree of Humidity (saturation 100)	77	81
Mean weight of a cubic foot of air ..... grains	527·7	527·5
Mean amount of Cloud (0—10)	7·0	7·4
Fall of Rain ..... inches	2·880	3·998
Greatest Rainfall in one day (12th)..... ,,	0·650	0·865
No. of days on which ·005 in. or more Rain fell...	18	16·6

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	3	0	1	2	5	18	0
Mean Velocity in miles per hr.	3·1	4·1	0	3·9	3·8	8·8	6·8	0
Total No. of miles.....	147	296	0	93	182	1058	2939	0

		Mean*
Total No. of Miles registered	4715	6430·7
Greatest hourly velocity (1st, Noon, Dir. S.E.)...	22	28·7

* *For the last 69 years.*

JULY, 1916.

DIFFERENCES.

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

Mean barometric pressure	+	0·075 in.
Monthly range „	+	0·083 in.
Mean of highest daily temperatures	—	2 7°
Mean of lowest „ „	+	7 5°
Mean daily range	—	10 2°
Adopted Mean temperature	+	1 2°
Total rainfall	—	1 118 in.

Heavy rain on 12th. Thunder on 3rd, 7th, 16th, 20th, 21st, 25th, and 26th. Lightning on 7th, and 26th.

EXTREME READINGS FOR JULY,

During 69 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, 1916.

Results of Observations taken during the Month.		Mean for the last 69 years.
Mean Reading of the Barometer ..... inches	29·488	29·495
Highest ,, ,, on the 5th ... ,,	29·984	29·890
Lowest ,, ,, on the 25th ... ,,	28·947	28·956
Range of Barometer Readings ..... ,,	1·037	0·934
Highest Reading of a Max. Therm. on the 11th...	75·0	76·5
Lowest Reading of a Min. Therm. on the 31st ...	46·0	41·8
Range of Thermometer Readings	29·0	34·7
Mean of Highest Daily Readings	67·1	66·7
Mean of Lowest Daily Readings	53·6	50·7
Mean Daily Range	13·5	16·0
Deduced Mean. Temp. (from Mean of Max. & Min.)	58·7	57·0
Mean Temperature from Dry Bulb	60·4	57·7
Adopted Mean Temperature	59·6	57·4
Mean Temperature of Evaporation	56·8	54·5
Mean Temperature of Dew Point	54·3	51·8
Mean elastic force of Vapour ..... inches	0·423	0·387
Mean weight of Vapour in a cub. ft. of air, grains	4·7	4·3
Mean additional weight required for saturation ,,	1·0	0·9
Mean degree of Humidity (saturation 100)	84	82
Mean weight of a cubic foot of air ..... grains	524·6	527·5
Mean amount of Cloud (0—10).....	6·6	7·3
Fall of Rain ..... inches	4·130	4·998
Greatest Rainfall in one day (14th) ..... ,,	1·240	1·063
No. of days on which ·005 in. or more Rain fell...	14	18·3

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	4	1	1	1	4	6	14	0
Mean Velocity in miles per hr.	4·1	6·0	5·8	3·5	4·5	6·4	6·8	0
Total No. of miles.....	396	143	140	84	435	920	2291	0

		Mean*
Total No. of Miles registered	4409	6358·8
Greatest hourly velocity (20th, 3 p.m. Dir. W. b S.)	20	31·2

* *For the last 49 years.*

AUGUST, 1916.

DIFFERENCES.

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

Mean barometric pressure	—	0·007 in.
Monthly range ,, ...	+	0·103 in.
Mean of highest daily temperatures	+	0·4°
Mean of lowest ,, ,, ...	+	2·9°
Mean daily range	—	2·5°
Adopted mean temperature	+	2·2°
Total rainfall	—	0·868 in.

Heavy rain on 13th, 14th, and 15th. Fog on 10th and 11th. Thunder on 14th, 15th, and 17th. Lightning on 14th and 17th.

EXTREME READINGS FOR AUGUST,
During 69 Years.

Highest reading of Barometer ...	1874	(21st)	30·114 in.
Lowest ,, ,, ...	1903	(15th)	28·492 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, 1916.

Results of Observations taken during the Month.		Mean for the last 69 years.
Mean Reading of the Barometer ..... inches	29·610	29·547
Highest „ „ on the 7th ... „	29·998	30·014
Lowest „ „ on the 3rd ... „	29·170	28·895
Range of Barometer Readings	0·828	1·119
Highest Reading of a Max. Therm. on the 7th...	71·1	72·1
Lowest Reading of a Min. Therm. on the 24th...	39·4	36·4
Range of Thermometer Readings	31·7	35·7
Mean of Highest Daily Readings	60·4	62·1
Mean of Lowest Daily Readings	49·0	47·2
Mean Daily Range	11·4	14·9
Deduced Mean Temp. (from mean of Max. & Min.)	53·4	53·4
Mean Temperature from Dry Bulb	55·0	54·3
Adopted Mean Temperature	54·2	53·8
Mean Temperature of Evaporation	51·7	51·0
Mean Temperature of Dew Point	49·3	48·3
Mean elastic force of Vapour ..... inches	0·350	0·339
Mean weight of Vapour in a cub. ft. of air, grains	4·0	3·9
Mean additional weight required for saturation „	0·8	0·9
Mean degree of Humidity (saturation 100).....	83	81
Mean weight of a cubic foot of air.....grains	532·9	532·6
Mean amount of Cloud (0—10)	6·4	6·7
Fall of Rain ..... inches	3·090	4·217
Greatest Rainfall in one day (17th)..... „	1·150	0·954
No. of days on which ·005 in. or more Rain fell...	11	16·2

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	9	3	1	0	2	4	10	1
Mean Velocity in miles per hr.	6·1	7·0	8·0	0	4·7	6·3	10·1	9·9
Total No. of miles.....	1314	503	191	0	225	608	2429	238

		Mean*
Total No. of Miles registered	5508	6051·1
Greatest hourly velocity (13th and 15th, 2 and 4 p.m., Dir. W.)	22	32·4

* *For the last 49 years.*

SEPTEMBER, 1916.

DIFFERENCES.

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

Mean barometric pressure	+	0·063 in.
Monthly range ,, ...	—	0·291 in.
Mean of highest daily temperatures	—	1·7°
Mean of lowest ,, ,, ...	+	1·8°
Mean daily range	—	3·5°
Adopted mean temperature	+	0·4°
Total rainfall	—	1·127 in.

Heavy rain on 3rd and 17th. Thunder on 2nd and 3rd. Lightning on 3rd. Solar halo on 14th, 16th, 22nd, and 23rd. Aurora Borealis on 23rd.

EXTREME READINGS FOR SEPTEMBER,

During 69 Years.

Highest reading of Barometer ...	1851	(15th)	30·247 in.
Lowest ,, ,, ...	1896	(25th)	28·314 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	1869	.....	9·539 in.
Least ,, ...	1910	.....	0·652 in.
Greatest fall of rain in one day ...	1869	(26th)	2·060 in.
Greatest No. of days on which ·005 in. or more rain fell ...	1866	.....	27
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, 1916.

Results of Observations taken during the Month.		Mean for the last 69 years.
Mean Reading of the Barometer ..... inches	29·334	29·440
Highest ,, ,, on the 20th ,,	29·892	30·020
Lowest ,, ,, on the 27th ,,	28·312	28·672
Range of Barometer Readings..... ,,	1·580	1·348
Highest Reading of a Max. Therm. on the 6th ...	64·8	64·0
Lowest Reading of a Min. Therm. on the 22nd ...	34·2	29·6
Range of Thermometer Readings	30·6	34·4
Mean of Highest Daily Readings	54·2	54·6
Mean of Lowest Daily Readings	44·6	42·0
Mean Daily Range	9·6	12·6
Deduced Mean Temp. (from Mean. of Max. and Min.)	48·4	47·3
Mean Temperature from Dry Bulb	50·3	48·0
Adopted Mean Temperature	49·4	47·6
Mean Temperature of Evaporation	47·4	45·5
Mean Temperature of Dew Point	45·2	43·0
Mean elastic force of Vapour.....inches	0·303	0·279
Mean weight of vapour in a cub. ft. of air, grains	3·5	3·2
Mean additional weight required for saturation ,,	0·6	0·6
Mean degree of Humidity (saturation 100).....	86	84
Mean weight of a cubic foot of air .....grains	533·5	537·4
Mean amount of Cloud (0—10)	7·4	7·3
Fall of Rain ..... inches	10·305	4·962
Greatest Rainfall in one day (13th) ..... ,,	1·680	0·988
No. of days on which ·005 in. or more Rain fell...	27	18·8

Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	0	4	3	7	11	4	0
Mean Velocity in miles per hr.	6·1	0	10·3	5·9	14·8	14·4	11·9	0
Total No. of miles.....	294	0	985	422	2481	3810	1139	0

		Mean*
Total No. of miles registered	9131	6945·6
Greatest hourly velocity (30th, 2 p.m., Dir. S.) ...	36	37·6

* *For the last 49 years.*

OCTOBER, 1916.

DIFFERENCES.

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

Mean barometic pressure	—	0·106 in.
Monthly range ,, ...	+	0·232 in.
Mean of highest daily temperatures	—	0·4°
Mean of lowest ,, ,, ...	+	2·6°
Mean daily range ,, ...	—	3·0°
Adopted Mean temperature	+	1·8°
Total rainfall	+	5·343 in.

Ground frost on 16th, 17th, 20th—22nd, 26th and 27th. Hoar frost on 21st, 22nd, and 26th. Hail on 15th and 31st. Heavy rain on 4th, 5th, 10th 13th, 28th, and 30th. Gale of wind on 30th. Thunder on 25th and 27th. Lightning on 27th. Solar halo on 22nd.

EXTREME READINGS FOR OCTOBER,

During 69 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, 1916.

Results of Observations taken during the Month.		Mean for the last 69 years.
Mean Reading of the Barometer ..... inches	29·250	29·459
Highest ,, ,, on the 14th ... ,,	30·005	30·063
Lowest ,, ,, on the 5th ... ,,	28·057	28·560
Range of Barometer Readings..... ,,	1·948	1·503
Highest Reading of a Max. Therm. on the 24th...	55·6	55·8
Lowest Reading of a Min. Therm. on the 28th ...	29·0	25·4
Range of Thermometer Readings	26·6	30·4
Mean of Highest Daily Readings	47·9	47·2
Mean of Lowest Daily Readings	40·3	36·7
Mean Daily Range	7·6	10·5
Deduced Mean. Temp. (from Mean of Max. and Min.)	43·7	41·6
Mean Temperature from Dry Bulb.....	43·2	42·0
Adopted Mean Temperature	43·5	41·8
Mean Temperature of Evaporation	41·0	39·7
Mean Temperature of Dew Point	38·1	38·2
Mean elastic force of Vapour.....inches	0·229	0·231
Mean weight of Vapour in a cub. ft. of air, grains	2·7	2·7
Mean additional weight required for saturation ,,	0·6	0·4
Mean degree of Humidity (saturation 100)	81	87
Mean weight of a cubic foot of air ..... grains	538·5	544·5
Mean amount of Cloud (0—10)	8·4	7·4
Fall of Rain ..... inches	3·605	4·424
Greatest Rainfall in one day (25th)..... ,,	0·500	0·965
No. of days on which ·005 in. or more Rain fell...	25	18·0

Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	3	6	0	8	7	6	0
Mean Velocity in miles per hr.	0	8·0	15·2	0	13·0	10·9	9·1	0
Total No. of miles.....	0	579	2188	0	2490	1823	1311	0

		Mean*
Total No. of miles registered	8391	7296·8
Greatest hourly velocity (23rd, 10 p.m., Dir. S. by W.	34	41·3

* *For the last 49 years.*

NOVEMBER, 1916.

DIFFERENCES.

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

Mean barometic pressure	—	0·209 in.
Monthly range „	+	0·445 in.
Mean of highest daily temperatures	+	0·7°
Mean of lowest „ „	+	3·6°
Mean daily range „	—	2·9°
Adopted mean temperature	+	1·7°
Total rainfall	—	0·819 in.

Ground frost on 3rd, 16th—18th, 22nd, and 26th—28th. Hoar frost on 21st and 22nd. Snow on 18th, 19th and 20th. Hail on 1st, 18th, 19th, 20th, 25th, and 26th. Heavy rain on 25th. Lightning on 1st, 25th and 26th.

EXTREME READINGS FOR NOVEMBER,
During 69 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, 1916.

Results of Observations taken during the Month.		Mean for the last 69 years.
Mean Reading of the Barometer ..... inches	29·175	29·427
Highest ,, ,, on the 6th ,,	29·780	30·064
Lowest ,, ,, on the 12th ,,	28·568	28·518
Range of Barometer Readings..... ,,	1·212	1·546
Highest Reading of a Max. Therm. on the 31st...	50·2	52·9
Lowest Reading of a Min. Therm. on the 6th ...	23·2	21·0
Range of Thermometer Readings.....	27·0	31·9
Mean of Highest Daily Readings	40·0	43·3
Mean of Lowest Daily Readings	31·4	33·5
Mean Daily Range	8·6	9·8
Deduced Mean Temp. (from Mean. of Max. and Min.)	35·7	38·4
Mean Temperature from Dry Bulb	36·4	39·1
Adopted Mean Temperature	36·1	38·8
Mean Temperature of Evaporation	34·7	37·2
Mean Temperature of Dew Point	32·6	35·2
Mean elastic force of Vapour ..... inches	0·187	0·207
Mean weight of Vapour in a cub. ft. of air, grains	2·1	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	545·4	547·1
Mean amount of Cloud (0—10)	5·8	7·6
Fall of Rain ..... inches	3·850	4·627
Greatest Rainfall in one day (28th)..... ,,	1·030	0·852
No. of days on which ·005 in. or more Rain fell...	19	19·8

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	6	2	1	0	6	4	7	5
Mean Velocity in miles per hr.	3·8	2·6	10·1	0	7·0	8·6	7·3	4·5
Total No. of miles.....	541	123	243	0	1008	829	1232	541

		*Mean
Total No. of miles registered	4517	7817·6
Greatest hourly velocity (20th, 8 and 9 a.m. Dir. S.S.E.	32	42·6

* *For the last 49 years.*

DECEMBER, 1916.

DIFFERENCES.

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

Mean barometric pressure	—	0·252 in.
Monthly range „	—	0·334 in.
Mean of highest daily temperatures	—	3·3°
Mean of lowest „ „	—	2·1°
Mean daily range „	—	1·2°
Adopted mean temperature	—	2·7°
Total rainfall	—	0·777 in.

Ground frost on 1st—23rd, 27th and 28th Hoar frost on 1st, 2nd, 16th, 17th, and 27th Snow on 11th, 13th, 18th, 19th and 23rd Hail on 9th and 19th Heavy rain on 28th, 29th and 31st. Fog on 1st, 2nd, 6th, 7th, 8th and 13th.

A remarkably calm month, with no gales and the least total mileage on record for December.

EXTREME READINGS FOR DECEMBER, During 69 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	1880	9·211 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 ...	1868	28
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, 1916.

Results of Observations taken during the Year.		Mean for the last 69 Years.
Readings of Barometer in inches.		
Mean of the Year	29·419	29·492
Highest Monthly Mean (January)	29·613	29·745
Lowest „ „ (December)	29·175	29·220
Highest Reading (January)	30·095	30·292
Lowest „ (November)	28·057	28·202
Range	2·038	2·090
Thermometer, Fahrenheit.		
Highest Monthly Mean Temperature (August)	59·6	58·6
Lowest „ „ „ (December)	36·1	35·5
Highest Reading of a Max. Therm. (July 22nd)	77·0	81·5
Lowest „ Min. „ (Dec. 6th)	23·2	16·0
Range of Thermometer Readings	53·8	65·5
Mean of Highest Daily „	53·0	54·6
Mean of Lowest Daily „	43·0	40·9
Mean Daily Range	10·0	13·7
Deduced Mean Temp. (from mean of Max. and Min.)	47·0	46·8
Mean Temperature from Dry Bulb	47·8	47·1
Adopted Mean Temperature of the Year	47·4	47·0
Mean Temperature of Evaporation	44·9	44·6
Mean Temperature of Dew Point	42·2	42·1
Mean elastic force of Vapour ..... inches	0·278	0·274
Mean weight of Vapour in a cub. ft. of air...grns.	3·2	3·2
Mean additional weight required for saturation „	0·7	0·7
Mean degree of Humidity (saturation 100)	83	83
Mean weight of a cubic foot of air.....grns.	537·2	539·1
Mean amount of Cloud (0—10)	7·1	7·3
Total fall of Rain ..... inches	49·375	47·051
Greatest Monthly Rainfall (October)	10·305	7·529
Least „ „ (March)	1·925	1·228
Greatest Rainfall in one day (October 13th) „	1·680	1·625
No. of days per Month on which ·005 inch or more Rain fell	18·6	17·1

SUMMARY OF WIND, 1916.

Prevailing Direction	N	NE	E	SE	S	SW	W	NW
No. of days for each	43	44	16	8	49	61	133	12
Mean Velocity in miles per hour...	6·3	8·4	11·8	5·0	10·4	10·6	10·5	5·3
Total No. of miles for each Direction	6523	8905	4539	955	12207	15544	33554	1515

		Mean for the last 49 years.
Total No. of miles registered	83742	86151·5
Greatest Monthly Total (January)	11089	10038·7
Least „ „ (August)	4409	5028·3
Greatest hourly velocity (February 3rd) ...	44	51·5
Prevailing Direction of Wind	W	W

DIFFERENCES, 1916.

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

Mean barometric pressure...	—	0·073 in.
Yearly range „	—	0·052 in.
Mean of highest daily temperatures	—	1·6°
Mean of lowest „ „	+	2·1°
Mean daily range	—	3·7°
Adopted mean temperature	+	0·4°
Total rainfall	+	2·324 in.

ABSOLUTE EXTREMES

FOR THE LAST 69 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 69 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.)	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 ,, ,, ...	1888 (Sep.) ...	3261
Greatest Mean No. ,, ,, ...	March	8553
Least ,, ,, ,, ...	September	6051
Greatest No. ,, ,, year .	1888	102395
Least ,, ,, ,, ,, ...	1915	70623

* *Record dates from 1887 only.*

DATES OF OCCASIONAL PHENOMENA.

1916	Frost	Hoar Frost	Snow	Hail	Heavy Rain
January	12, 14, 23, 27			7	6, 20
February	1, 5, 9, 10, 12, 15, 17, 20-29		9, 11, 14-17, 22-29	7, 8, 9, 14-17	6, 18
March	1-13, 17, 22-30		2,3,6-8,9-13,23-28	6, 12, 22, 24-27	
April	2, 3, 5-8, 10, 14-16, 22, 23	2	14	11, 12, 14, 21	11, 17
May	3, 4, 9, 10, 14				14
June				2, 6, 9	4
July					12
August					13, 14, 15
September					3, 17
October	16, 17, 20-22, 26, 27	21, 22, 26		15, 31	4, 5, 10, 13, 28, 30
November	3, 16-18, 22, 26-28	21, 22	18, 19, 20	1, 18, 19, 20, 25, 26	25
December	1-23, 27, 28	1-2,16,17,27	11, 13, 18, 19, 23	9, 19	28, 29, 31

1916	Gales of Wind	Fog	Thunder	Lightning	*Lunar Halo	*Solar Halo	Aurora Borealis
January	1, 13						
February	3, 16		9			10, 13, 20	
March					17	3,17,18,27,28,29	
April			14	14	9	9, 28	
May						2, 4, 13, 17	
June			9, 10, 24, 26	9		14, 24, 29	
July			3, 7, 16, 20, 21, 25, 26	7, 26			
August		10, 11	14, 15, 17	14, 17			
September			2, 3	3		14, 16, 22, 23	23
October	30		25, 27	27		22	
November				1, 25, 26			
December		1,2,6,7,8,13					

*22° *Radius.*

MONTHLY TOTALS FOR EACH HOUR OF RECORDED SUNSHINE.

1916. 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 ...	...	...	...	...	0·2	3·1	4·9	8·6	7·1	4·4	3·4	0·1	...	...	...	...	...
February ...	...	...	...	0.3	4·5	7·8	9·2	10·6	7·6	5·7	6·1	2·9	1·1	...	...	...	...
March ...	...	...	0.6	2·4	6·7	9·6	10·4	9·0	6·4	5·9	4·1	2·7	1·1	0·5	...	...	...
April ...	...	0·5	3·7	7·8	11·3	12·3	13·2	15·4	15·2	16·0	14·9	12·6	11·4	9·6	2·5	0.2	...
May ...	0·1	4·3	9·4	9·9	12·9	12·3	11·6	12·1	12·2	13·4	11·5	12·3	13·6	12·7	9·3	1·9	...
June ...	1·2	3·5	7·1	9·7	10·6	10·0	8·8	8·2	10·5	9·4	10·2	9·9	11·1	11·1	8·6	2·9	...
July ...	0.3	2·1	5·2	7·0	8·8	11·6	11·5	11·5	12·7	11·4	13·2	13·0	11·0	9·2	8·0	1·3	...
August ...	...	0·6	5·2	7·2	9·1	11·4	13·8	15·9	15·7	13·6	14·8	16·1	17·4	12·7	6·8	...	...
September ...	...	...	1·3	5·9	9·8	8·7	10·9	11·5	11·0	11·6	12·4	10·2	6·8	3·3	0·5	0·1	...
October ...	...	...	...	1·0	3·4	6·8	6·6	8·1	9·4	7·5	7·0	5·5	2·3	0·4	...	...	...
November ...	...	...	...	...	0·4	3·0	6·4	6·1	7·9	6·0	5·6	0·9	...	...	...	...	...
December ...	...	...	...	...	0.2	2·1	4·9	8·7	9·2	6·0	3·1	...	...	...	...	...	...
Sums ...	1·6	11·0	32·5	51·2	77·9	98·7	112·2	125·7	124·9	110·9	106·3	86·2	75·8	59·5	35·7	6·4	...

TOTAL AMOUNT OF SUNSHINE RECORDED ON EACH DAY.

1916	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
January ...	0·1	...	3.1	...	1·9	...	1·2	3·2	...	0·1	...	...	5.5	0·1	...	0·1	...
February ...	0·1	...	0·1	...	3·9	...	2·8	1·2	4·5	3·2	...	3·4	3·1	1·2	1·5	0·2	2·6
March ...	...	...	6·0	7·5	3·0	7·7	3·0	0·2	1·2	1·8	0·2	...	1·6	...	...	...	4·1
April ...	9·0	9·1	10·2	5·5	4·0	0·1	6·3	5·5	4·0	5·0	7·7	1·6	0·5	7·6	9·9	...	...
May ...	12·1	10·5	2·7	0·9	...	0·1	0·3	1·0	1·5	12·1	0·1	...	2·1	...	8·1	3·7	6·3
June ...	0·2	9·3	7·9	...	4·4	7·6	...	1·1	0·6	3·0	2·0	2·9	2·8	6·3	15·1	13·3	13·5
July ...	...	3·5	0·1	3·6	3·7	...	...	3·7	3·5	1·0	1·4	...	6·3	1·4	5·7	...	...
August ...	9·1	8·9	3·8	7·2	12·8	4·5	13·1	10·5	8·1	10·9	4·4	0·7	4·3	6·2	0·6	1·0	4·0
September ..	8·8	3·5	0.1	4·7	5·8	9·9	6·0	1·3	0·1	0·8	1·0	0·5	...	9·5	0·2	8·4	...
October ...	1·0	...	...	...	...	0·1	0·3	2·0	8·5	...	...	0·6	0·1	0·1	5·0	3·0	...
November...	1·0	1·4	...	2·1	...	2·7	0·8	2·0	...	...	1·7	...	...	...	1·1	...	5·6
December ...	0·1	...	1·4	5.6	5·5	...	...	0·8	...	3·5	...	...	1·6	1·0	4·3	4·1	1·5

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

1916	18	19	20	21	22	23	24	25	26	27	28	29	30	31	MONTHLY Total	MONTHLY Percen.
January ...	2·5	...	1·3	...	3·6	0·7	5·0	...	...	1·1	...	0·7	...	1·6	31·8	12·8
February ...	...	0·4	...	5·3	6·0	5·0	8·1	...	...	1·6	1·6	...			55·8	19·8
March ...	0·5	...	...	...	0·1	...	5·4	1·3	1·0	4·6	0·1	8·0	0·2	1·9	59·4	16·2
April ...	1·6	1·5	...	1·7	5·8	3·5	...	0·6	4·2	8·7	8·1	12·9	12·0		146·6	35·0
May ...	9·8	11·5	10·1	2·7	7·7	9·6	1·5	0·2	9·7	...	10·6	14·4	9·6	0.6	159·5	32·4
June ...	2·6	5·9	3·1	1·5	0·1	5·0	1·5	1·7	...	1·2	6·7	6·1	7·4		132·8	26·1
July ...	2·6	10·1	5·4	0·9	8·4	11·0	12·5	7·5	3·2	9·7	12·9	11·4	0.7	7·6	137·8	27·1
August ...	1·9	1·5	9·5	6·2	8·5	0·4	2·7	...	4·0	4·8	3·4	3·7	0·1	1.5	160·3	35·1
September ..	2·5	7·0	7·5	...	...	1·5	6·1	5·8	0·4	0·1	7·3	5·0	0·2		104·0	27·4
October ...	2·7	7·6	4·1	4·9	0·7	0·8	5·8	1·5	7·0	...	0·1	....	0·7	1·4	58·0	17·8
November...	1·8	...	...	2·2	3·9	...	1·3	...	2·8	5·9	...	...	...	...	36·3	14·2
December ..	1·7	0·4	...	...	...	...	...	...	1·0	1·6	...	...	0·1	...	34·2	14·8

SUMMARY OF SUNSHINE.

	Bright Sunshine Recorded					
	1916			Mean for the last 36 years		
	Number of		Percentage of Possible Sunshine	Number of		Percentage of Possible Sunshine
	Days	Hours		Days	Hours	
January ...	17	31·8	12·8	14·0	32·8	13·2
February ...	20	55·8	19·8	17·9	59·0	21·5
March ...	21	59·4	16·2	24·1	103·4	28·3
April ...	26	146·6	35·0	26·3	150·0	35·8
May ...	27	159·5	32·4	27·5	186·0	37·7
June ...	27	132·8	26·1	27·9	184·0	36·2
July ...	25	137·8	27·1	28·3	174·2	34·2
August ...	30	160·3	35·1	27·6	151·2	33·1
September ..	26	104·0	27·4	25·8	125·7	33·2
October ...	22	58·0	17·8	23·3	83·4	25·6
November ..	15	36·3	14·2	17·5	46·7	18·3
December ...	16	34·2	14·8	13·2	25·2	10·9
Year ...	272	1116·5	25·0	273·3	1321·6	29·6

SUMMARY OF SUNSHINE—*Continued.*

EXTREMES FOR THE LAST 36 YEARS

MONTH	Number of Days on which Sunshine was recorded				Number of Hours				Percentage of Possible Sunshine			
	Greatest		Least		Greatest		Least		Greatest		Least	
Jan.	21	1881	8	1898	64·2	1881	12·3	1913	25·9	1881	5·0	1913
Feb.	24	1895	11	1882	89·3	1887	29·6	1882	32·8	1887	10·9	1882
Mar.	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.	18	*1886	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).

1916	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° +	16° +	
	′	′	′	′	′	′	′	′	′
January ...	31·6	27·5	29·4	28·6	29·3	9·0	38·7	0·0	38·7
February ...	32·1	26·7	30·2	28·6	29·4	8·1	37·2	9·0	28·2
March	32·3	24·8	29·5	27·1	28·4	15·1	40·0	— 8·8	48·8
April	31·5	22·1	28·3	25·4	26·8	12·5	36·2	6·2	30·0
May	29·3	19·5	26·1	22·7	24·4	12·0	35·2	1·2	34·0
June	32·6	22·6	30·5	25·0	27·6	12·2	37·0	7·0	30·0
July	28·8	18·5	25·9	22·2	23·8	11·7	32·0	11·0	21·0
August ...	28·0	17·1	22·5	20·3	22·0	14·0	39·0	— 8·0	47·0
September ...	32·1	21·9	27·7	24·2	26·5	14·0	38·0	7·0	31·0
October ...	29·2	21·3	25·3	24·5	25·1	14·1	43·0	— 2·0	45·0
November ...	25·5	18·7	23·0	21·8	22·2	13·6	36·0	0·0	36·0
December ...	24·4	19·9	22·4	22·0	22·2	8·8	37·0	14·0	23·0
Means	29·8	21·7	26·7	24·4	25·6	12·1	37·4	3·1	34·4

Mean for the year ... ... 16° 25·6 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.

1916	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*					
	1700 +				0 +		17000 +		0 +
January ...	391	369	380	383	381	38	436	256	180
February ...	389	366	379	382	379	36	422	335	87
March ...	388	346	374	376	371	71	459	284	175
April	386	334	372	373	366	73	464	238	226
May	383	330	365	355	358	81	468	284	184
June	378	322	365	358	356	80	436	238	198
July	365	309	347	338	340	73	441	272	169
August ...	346	295	336	322	325	83	464	96	368
September ...	333	290	317	317	314	66	395	243	152
October ...	329	287	310	316	311	62	372	202	170
November ...	333	296	318	318	317	53	413	358	55
December ...	332	309	321	323	321	42	376	243	133
Means	363	321	349	347	345	63	429	254	175

Mean for the year ... ... 0·17345 C. G. S. Units.

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

ABSOLUTE MEASURES—SUMMARY.

	DIRECTION				FORCE.		
1916	Declination Corrected		Inclination		Horizontal	Vertical	Total
	°	′	°	′	C. G. S. UNITS.		
January ...	16	29·0	68	41·2	0·17369	0·44518	0·47787
February ...	16	29·9	68	40·6	0·17364	0·44483	0·47752
March ...	16	27·7	68	45·2	0·17353	0·44630	0·47884
April	16	26·6	68	43·0	0·17349	0·44536	0·47796
May	16	25·3	68	38·6	0·17342	0·44351	0·47622
June	16	26·4	68	41·8	0·17329	0·44439	0·47698
July	16	24·3	68	42·7	0·17348	0·44522	0·47783
August ...	16	24·2	68	41·8	0·17341	0·44470	0·47731
September ...	16	24·8	68	42·1	0·17326	0·44443	0·47701
October ...	16	23·9	68	42·7	0·17327	0·44468	0·47725
November ...	16	22·2	68	41·4	0·17327	0·44419	0·47679
December ...	16	22·2	68	41·7	0·17334	0·44448	0·47708
Means ...	16	25·6	68	41·9	0·17342	0·44477	0·47739

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.

1916	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1916
D.													D.
1	c	c	c	s	s	s	m	m	s	m	s	m	1
2	c	c	m	s	m	s	s	s	s	s	s	m	2
3	s	c	m	s	s	s	s	s	m	s	s	s	3
4	s	s	c	c	s	s	m	s	g	s	m	s	4
5	s	s	s	s	s	s	m	m	s	m	m	s	5
6	s	s	s	s	s	s	s	m	s	g	m	c	6
7	c	s	s	s	s	m	s	m	s	m	s	s	7
8	c	s	g	s	s	m	m	s	c	s	s	s	8
9	c	s	g	s	s	s	m	s	s	s	s	s	9
10	m	c	m	c	m	s	s	s	s	s	s	c	10
11	g	c	s	s	m	s	s	s	m	s	s	s	11
12	m	s	c	s	s	m	s	s	m	s	m	s	12
13	s	s	s	s	s	s	s	s	s	m	s	s	13
14	c	s	s	m	s	s	s	s	s	c	s	s	14
15	c	c	c	m	s	s	c	c	s	c	s	m	15
16	s	c	m	s	s	s	s	c	s	c	s	s	16
17	c	m	s	s	s	s	m	s	s	c	s	s	17
18	c	m	s	s	s	m	m	c	s	c	s	c	18
19	s	s	s	s	s	s	s	m	c	c	s	s	19
20	s	s	s	s	s	s	s	m	c	s	s	s	20
21	c	s	s	s	g	s	c	m	c	s	s	c	21
22	m	c	c	s	g	m	s	g	s	s	s	c	22
23	m	s	c	s	m	s	m	g	s	s	s	c	23
24	s	c	m	s	s	s	s	s	s	s	c	c	24
25	m	c	m	g	s	s	s	c	s	s	s	s	25
26	s	s	c	m	s	s	s	v.g.	m	c	s	s	26
27	c	s	c	g	s	s	c	s	m	c	s	s	27
28	s	c	s	g	s	s	c	s	c	c	s	s	28
29	c	c	g	m	s	*	s	s	c	s	s	s	29
30	s		g	s	m	m	s	s	m	s	s	s	30
31	s		m		m		c	s		s		s	31
TOTAL c	12	12	8	2	...	...	5	4	6	9	1	7	
TOTAL s	13	15	12	21	23	23	18	17	17	17	25	21	
TOTAL m	5	2	7	4	6	6	8	7	6	4	4	3	
TOTAL g	1	...	4	3	2	...	...	2	1	1	...	...	
TOTAL vg	...	...	...	...	...	...	...	1	...	...	...	...	

* *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.
The letter "f" to a date means a record of faculæ but no spot.
n=note without a complete drawing.

1916	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1916
D.													D.
1		5·3		9·2	6·0			0·9	0·1	0·2		4·4	1
2				12·6	6·4	2·6		0·4	0·3		3·8	5·0	2
3	7·0		5·1	11·0	6·1	2·2				0·5		5·2	3
4			7·8	11·2			1·2	0·4	1·1		7·7	6·7	4
5	9·5	6·0	10·0	8·2		8·4	0·8	0·8	1·0			6·3	5
6			10·5			5·2		1·4	1·0		12·3	6·8	6
7	7·5		12·4	3·5				1·3	1·2		9·3		7
8	6·0			2·8			2·3	1·8	2·0	5·7	11·0		8
9				2·4				1·6		10·5			9
10		6·8		2·2	3·3	2·4	2·1	1·3				3·4	10
11				3·1		2·5		1·7	1·5		5·0		11
12	3·3	2·0								13·3			12
13	3·0	3·5	3·1			4·7	2·0	2·1	4·8	13·0		2·3	13
14	2·3	4·1				5·5	2·1		4·8				14
15				3·4	1·2	6·2				10·6	2·2	0·5	15
16					0·7	6·3		1 6	6·6	5·8		1·2	16
17		1·3	0·7		0·7	6·1		1·7			3·3	2·0	17
18	0·6			1·4	0·8		2·1			4·2		1·8	18
19					2·0	6·7	1·4	9·8	4·3	3·0		1·7	19
20	0·3				0·7		2·8	13·5	4·0	2·5		1·5	20
21		1·8		1·2	2·0	6·1	7·5	7·5		1·2	0·4		21
22	1·6	2 8	n	2·1	3·6	8·1	10·4	6·4		0 2	2·3	1·1	22
23	1·5	2·0		4·2	7·0	16·2	12·0		1·1	0·3			23
24	1·8	1·0	8·8		8·3	17·2	12·7	1·0	0·7	0 6	5·1		24
25				5·1			12·0		0 3	0·8			25
26	n			4·5	13·0		8·3	f		1·7	5·1	3·1	26
27	3·8	1·5	5·4	3·7	19·0		7·5	f		3·6	4·4	3·5	27
28		1·8	n	3·8	19·6	10·7	4·9	0·1	1·0				28
29	4·0		6·0	5·4	17·3	6.0	4·0		0·8				29
30				4·3	11·0			0·1		3·5		n	30
31	2·4		7·4		7· 4		1·2	0·2		5·2			31
Daily Means	3·6	3·1	7·0	5·0	6·8	6·8	5·1	2·4	2·0	4·3	5·5	3 3	

PRESENTATIONS TO THE LIBRARY, 1916.

An asterisk (*) indicates that the work is an excerpt.

Algiers, Observatoire :

Carte photographique du Ciel. 14 Charts.
Zone—1°, + 1°, + 3°. (*N.A. Office, Dr. Cowell*).

Allegheny Observatory of the University of Pittsburg :

Publications. Vol. 3. No. 22—23. (*Observatory.*)

Arctowski (Henryk) :

—: *Notice sur Quelques Relations Numériques entre Facules et Taches Solaires.
—: *Recherches sur les Variations du Rapport entre Facules et Taches Solaires. (*Author*).

Barcelona, Estación Sismica del Observatorio Fabra :

Current Seismic Registers. (*Observatory.*)

Barcelona, Sociedad Astronómica :

Boletin Mensual, 1916. (*Society.*)

Batavia, Royal Magnetical and Meteorological Observatory :

—: Meteorological and Magnetical Observations, 1912.
—: Observations made at Secondary Stations in Netherlands. East India. Vol. 2 (1912); Vol. 3 (1913).
—: Regenwaarnemingen in Nederlandsch-Indië, 1913, 1914.
—: Verhandelingen, No. 3, 4.
Current Seismological Bulletins. (*Observatory.*)

Bauer (L. A.) :

—: *Our Earth a Great Magnet.
—: Report on Results of Comparisons of the Stonyhurst College Observatory Magnetic Instruments with Standards, September, 1915. (*Author.*)

Bauer (L. A.), and Fisk (H. W.) :

*On the Results of some Magnetic Observations during the Solar Eclipse of August 21st, 1914. (*Authors.*)

Bilt (J. v. d.) :

The Variable Stars R. Sagittæ, V. Vulpeculæ, R. V. Tauri. (*Author*).

Birmingham and Midland Institute, Edgbaston Observatory :
Records of Meteorological Observations, 1915. (*Observatory.*)

Blackburn Free Library, Museum, &c. :
Report of the Committee, 1915—1916. (*Librarian.*)

Bolivia, Observatorio del Colegio San Calixto :
—: Boletin Mensual del Observatorio Meteorológico, December, 1915.
—: Boletin Sismico, 1915, 1916. (*Observatory.*)

Bolton Corporation Observatory :
Monthly Meteorological Summaries, 1916. (*Observatory.*)

Bordeaux, Observatoire :
—: Catalogue photographique du Ciel: Coordonnées rectilignes. Tome 4, zone + 13° à + 15°.
—: Carte Photographique du Ciel. 51 Charts. Zone + 12°, + 14°, + 16°. (*N.A. Office, Dr. Cowell.*)

British Association for the Advancement of Science :
—: Twentieth Report on Seismological Investigations, 1915.
—: Bulletin (of the Seismological Committee) for February and March, 1915.
—: Report for the Year 1915. (*Association.*)

Buenos Aires, Argentine Meteorological Office :
—: Argentine Meteorological Service: History and Organization.
—: Anales. Tomo 15, 1, 2; 17, 1, 2.
—: Boletin, No. 4, 5.
—: Boletin Mensual, Año 1, Núm. 1, 2. (*Office.*)

Burgos, Observatorio Colegio Maximo :
Observaciones Meteorológicas, 1915. (*Observatory.*)

Burns (Kevin) Meggers (W. F.) and Mervill (Paul W.) :
*Interference Measurements of Wave-Lengths in the Iron Spectrum. (*Authors.*)

California, Observatory of Santa Clara University :
—: "The Sunspot." Vol. 1, No. 11, 12; Vol. 2, No. 1—6.
—: Current Seismological Bulletins. (*Observatory.*)

Cambridge University, Solar Physics Observatory :
Third Annual Report of the Director, 1915—16. (*Observatory.*)

Canada, Department of Marine [etc.] :

—: Results of Meteorological, Magnetical, and Seismological Observations, 1914, and 1915.
—: Monthly Record of Meteorological Observations in the Dominion of Canada, and the Colonies of Bermuda and Newfoundland, 1916, January—July.
—: Upper Air Investigation in Canada, Part 1.
—: Report of the Meteorological Service of Canada, 1913.
—: Toronto Magnetical Observations, 1914. (*Department.*)

Cape of Good Hope, Royal Observatory :

—: Independent Day-Numbers for 1916.
—: Report of His Majesty's Astronomer, 1914, 1915. (*Observatory.*)

Catania, R. Osservatorio Geodinamico :

Bollettino Sismico, 1915 [April—December]. (*Observatory.*)

Catania, Osservatorio Collegio Pennisi :

Bolletino Meteorico Mensile, 1915. (*Observatory.*)

Chree (C.) :

—:*Discussion of Kew Magnetic Data, especially the Diurnal Inequalities of Horizontal Force and Vertical Force, from Ordinary Days of the eleven years, 1890 to 1900.
—:*The Seventh Kelvin Lecture. Lord Kelvin and Terrestrial Magnetism. (*Author.*)

Cincinnati University Observatory :

Catalogue of Proper Motion Stars. Part 2. (*Observatory.*)

Cleveland, Ohio, St. Ignatius College Observatory :

Seismological Bulletins, 1914, 1915, 1916. (*Observatory.*)

Clitheroe, Urban, and Rural, District Council :

Annual Reports of the Medical Officer, 1915. (*Medical Officer.*)

Colne Corporation :

Rainfall Summary, 1916, and 1901—1916. (*Corporation.*)

Commission Internationale de Magnétisme Terrestre :

—: Caractère Magnétique de chaque jour des mois, 1915—16.
—: Caractère Magnétique des années, 1914, '15, et '16. (*Commission.*)

Copenhagen, Institut Météorologique de Danemark :

Annuaire Magnétique, 1914. (*Institute.*)

Copenhagen University Observatory :
Publications. No. 23—25. (*Observatory.*)

Córdoba, Observatorio Nacional Argentino :
Catálogo de las Zonas de Exploración, Entrega 4, – 52° á – 62°. (*Observatory.*)

Dearborn Observatory of Northwestern University :
Annals. Vol. 1. (*Observatory.*)

De Bilt, Koninklijk Nederlandsch Meteorologisch Instituut :
— : Annuaire, A. Météorologie, B. Magnétisme Terrestre, 1913, 1914.
— : Ergebnisse Aerologischer Beobachtungen, 1913.
— : Mededeelingen en Verhandelingen : 18, 19, 20.
— : Perturbations Magnétiques, 1914, 1915. (*Institute.*)

Duffield (W. G.), and Waller (Mary D.) :
*The Consumption of Carbon in the Electric Arc. No. 3, The Anode Loss. (*Authors.*)

Edinburgh, Royal Observatory :
Twenty-sixth Annual Report of the Astronomer Royal for Scotland, 1915—16. (*Observatory.*)

Egypt, Survey Department :
The Magnetic Survey of Egypt and the Sudan. (*Department.*)

Falmouth Observatory :
Report, etc., for the year 1915. (*Observatory*).

France, Observatoire de Bourges :
— : " La Revue Verte," No. 1, 1916, Oct.
— : " La Revue du Ciel," No. 2, 3, 1916, Nov. Dec. (*Observatory.*)

Granada, Observatorio de Cartuja :
— : Bulletins, Meteorological and Seismological, 1916.
— :*Essai de quelques formules aux tremblements de terre de Messina et Avezzano. (*Observatory.*)

Greenwich, Royal Observatory :
— :*Mean Areas and Heliographic Latitudes of Sun-Spots, 1914.
— : Astronomer Royal's Report.....1916.
— : Clock Star List, 1917. (*Observatory.*)

Guildford, Surrey, Seismograph Station :
Annual Report, 1915. (*Observatory.*)

Habana, Observatorio de Montserrat :

Observaciones Meteorológicas de 1915. (*Observatory.*)

Harvard College Astronomical Observatory :

—: Annals. Vol. 73, pt. 2, 3; 76, No. 10, 11, 12; 80, No. 2, 3; 84, No. 1.
Vol. 73, pt. 2, 3. Blue Hill Meteorological Observations.
,, 76, No. 10. Photographic magnitudes of polar stars.
,, 11. The light curve of Nova Geminorum.
,, 12. Magnitudes of the Cape photographic Durchmusterung.
,, 80. 2. Photographic plates showing faint stars.
,, 3. Illustrations in Harvard Annals.
,, 84. 1. Photographic observations of seven circumpolar variables.
—: Seventieth Annual Report of the Director, 1915.
—: Circular, No. 189—198.
—: Bulletin, No. 585—613. (*Observatory.*)

Hongkong Royal Observatory :

—: Monthly Meteorological Bulletins for 1916.
—: Director's Report for the year 1915.
—: Further Experiments with the Electric Sidereal Clock.
—: The Climate of Hongkong. (*Observatory.*)

Hyderabad, Nizamiah Observatory :

—:*Comparison of the Bordeaux, Washington, and Algiers Catalogues.
—:*The Distribution in Space of the Stars in Zone + 25° of the Oxford Astrographic Catalogue.
—: Director's Report, 1915—1916. (*Observatory.*)

India, Meteorological Department of the Government :

—: Director's Report, Bombay and Alibag Observatories, 1915.
—: Memoirs, Vol. 21, pt. 13, 14. (*Department.*)

Johannesburg, Union Observatory :

Circular, No. 33, 34, 35. (*Observatory.*)

Kasan, Kaiserl. Universitäts-Sternwarte :

—: Bulletin, de l'observatoire Météorologique, 1915. (*Observatory.*)

Kodaikanal and Madras Observatories :

—: Annual Report of the Director for 1915.
—: Bulletin, No. 49—52. (*Observatory.*)

Lancaster Astronomical and Scientific Association :

Annual Report, Session 1915—16. (*Neville Holden.*)

Lancaster County :
Monthly Rainfall at Huntroyde. 1916. (*E. G. Howsin.*)

Lancaster, County Palatine of :
Report of the Medical Officer, 1915. (*Medical Officer.*)

La Plata, Observatorio Astronómico Universidad Nacional :
Resultado de las Observaciones en la Zona – 57° a – 61°. Tomo 2. (*Observatory.*)

Lick Observatory, University of California :
— : Bulletin, No. 276—287.
— : Registration of Earthquakes at the Berkeley and Lick Observatory Stations, 1915—1916. (*Observatory.*)

Lisbon, Observatório "Infante D. Luís" :
Resumo das observações meteorológicas feitas nas estações do continente e dos arquipélagos da Madeira e Cabo Verde, 1915—16. (*Observatory.*)

Liverpool Observatory, Bidston :
Director's Report, 1915. (*Observatory.*)

Lockyer (Sir Norman), and Goodson (H. E.) :
*On the Oxy-hydrogen Flame Spectrum of Iron. (*Authors.*)

London, Meteorological Office :
— : Daily Readings, 1915, at Meteorological Stations of the 1st and 2nd orders.
— : Eleventh Annual Report of the Meteorological Committee, 1916.
— : Earthquake Bulletins, 1916, Eskdalemuir, Scotland.
— : The Weather Map. (*Office.*)

London, Royal Botanic Society :
The Botanical Journal, Vol. 4, No. 4 ; Vol. 5, No. 1, 2. (*Society.*)

London, Royal Meteorological Society :
Quarterly Journal of. Vol. 42. No. 177—180. (*Society.*)

Manchester, Municipal School of Technology :
Report of the Godlee Observatory for 1913, 1914, 1915. (*Principal.*)

Manila, Philippine Central Weather Bureau :
— : Monthly Bulletins, Meteorological and Seismological, 1915—16.
— : Annual Report, 1913, pt. 3 ; 1914, pt. 3 ; 1915, pt. 1, 2.
— :*Earthquakes in the Batan Islands, May and July, 1915.
— :*Catalogue of Philippine Earthquakes, 1915. (*Observatory.*)

Marseilles Observatory :

Journal des Observateurs, Vol. 1, Numéro 1—13. (*Observatory.*)

Mascart (M. Jean) :

—: Exposition Internationale de Lyon, 1914.—La Science à l'Exposition. (*Author.*)

Mauritius, Royal Alfred Observatory :

Results of Magnetical, Meteorological and Seismological Observations, 1915—1916. (*Observatory.*)

Melbourne Commonwealth Bureau of Meteorology :

—: Australian Monthly Weather Report, Vol. 3, No. 12, 13 ; Vol. 4, 1, 2.
—: Results of Rainfall Observations made in N.S. Wales, 1909—1914.
—: Rain Map of Australia for 1915.
—: Bulletin No. 11—13. (*Bureau.*)

Melbourne Observatory :

—: Reports of the Board of Visitors and of the Government Astronomer for the Years 1906 to 1915.
—: Results of Observations in Meteorology and Terrestrial Magnetism made at Melbourne and other Stations in Victoria, 1902—1907. (*Observatory.*)

Mexico, Observatorio Meteorológico Merida :

Boletín Mensual, 1914—1915. (*Observatory.*)

Mexico, Observatorio Meteorológico Magnético Central :

Boletín Mensual, 1914, [May—December.] (*Observatory.*)

Mexico, Sociedad Cientifica " Antonio Alzate " :

Memorias y Revista, Vo. 33, 11—12 ; 34, 1—10. (*Society.*)

Milan, Reale Osservatorio di Brera :

—: Oscillazioni Periodiche e Previsione della Pressione Atmosferica.
—: Osservazioni Meteorologiche e Geofisiche, 1915. (*Observatory.*)

Missouri University, Laws Observatory :

Bulletin, No. 22—25. (*Observatory.*)

Moncalieri, Osservatorio del R. Collegio Carlo Alberto :

Current Bulletins, Meteorological and Seismological. (*Observatory.*)

Montecassino, Meteorico-Aerologico-Geodinamico :

Bollettino Mensile, 1915—1916. (*Observatory.*)

Mount Wilson Solar Observatory, California :

— :*Communications to the National Academy of Sciences, No. 18—36.
— :*Contributions, No. 108—123.
— :*Annual Report of the Director, 1915. (*Carnegie Institution.*)

Naples, Osservatorio Pio X. in Valle di Pompei :

— : Sezione Meteorica.—Riassunto dell'Anno 1914.
— : Bollettino Meteorico-Geodinamico, 1915—16. (*Observatory.*)

National Physical Laboratory :

Report for the year 1915—16. (*The Director.*)

New York, Meteorological Observatory :

— : Hourly Readings, 1916, Draper Self-Recording Instruments.
— : Report for the Year 1916. (*Observatory.*)

Osaka Meteorological and Seismological Observatory :

Annual Report, 1915, Part 1, 2. (*Observatory.*)

Ottawa, Dominion Observatory :

— : Publications, Vol. 2, No. 10—15 ; Vol. 3, No. 1—7.
— :*The Scientific Work of the Government, by Otto Klotz.
— :*Prince Boris Galitzin, by Otto Klotz. (*Observatory.*)

Oxford, Radcliffe Observatory :

Results of Meteorological Observations, 1911—15 ; and of Underground Temperatures, 1898—1910. (*Observatory.*)

Paris, Bureau Central Météorologique de France :

Bulletin Mensuel, 1915. (*Bureau.*)

Paris, Observatoire :

— : Carte photographique du Ciel. 23 Charts. Zone + 18°, + 20°.
— : Catalogue Photographique du Ciel. Coordonnées rectilignes. Tome 4. Zone + 20° à + 22°.
— : Rapport Annuel.....1914, 1915. (*Observatory.*)

Paris, Société Météorologique de France :

Bulletin des Publications Nouvelles de la Librairie Gauthier-Villars et Cie., 1916. (*Society.*)

Patagonia, Punta Arenas, Observatorio del Colegio San José :

Monthly Meteorological Bulletins, 1915—16. (*Observatory.*)

Registrar-General :

Quarterly Returns of Marriages, etc., 268—271. (*Reg. General.*)

Riccò (Annibale) :

*" Astronomia " (*Author.*)

Rigge (W. F.) :

*The California Meeting of the American Astronomical Society. (*Author.*)

Rome, Specola Astronomica Vaticana :

Catalogo Astrografico, 1900.0 Vol. 2. + 63°. (*Observatory.*)

San Fernando, Observatorio de Marina :

Current Seismic Registers. (*Observatory.*)

Scottish Meteorological Society :

Journal of, Vol. 17, 1915. (*Society.*)

Scottish Provident Institution :

Star Maps, 1917. (*Institution.*)

Sidmouth, S. Devon, The Hill Observatory :

Bulletin No. 5. Catalogue of 287 of the fainter Stars, Classified according to their Chemistry and Temperature. (*Observatory.*)

Southport, Fernley Meteorological Observatory :

Report and Results of Observations, 1915. (*Observatory.*

Stockholm, K. Svenska Vetenskaps Akademie :

— : Tables for the Computation of the Jupiter-Perturbations of Asteroids with a mean daily Motion in the Vicinity of 1050".
— : Über die Beziehungen zwischen Luftdrucksgradient, Wind und Reibung bei stationärer, geradliniger Bewegung.
— : Arkiv för matematik, astronomi och fysik. Bd. 10 : 4 ; 11 : 1—3.
— : Die totale Sonnenfinsternis am 21 Aug., 1914, von K. Bohlin.
— : Quelques Recherches sur les Centres D'Action de L'Atmosphère.
— : Appendice aux Observations Météorologiques Suédoises, 1914.
— : Observations Météorologiques Suédoises, 1914. (*Academy.*)

Sydney, Riverview College Observatory :

— : Seismological Bulletins, 1915, December ; 1916, January.
— : Special Bulletin (Constants of 1915, Dec., 16). (*Observatory.*)

Tacubaya, Observatorio Astronómico Nacional :

Anuario.....para el año de 1916.
— : Boletin, Numero 5. (*Observatory.*)

Texas, U.S.A., Carothers Observatory :

—: Auxiliary Bulletin, Solar, No. 1.
—: Ditto, Weather, No. 1. (*Observatory.*)

Tortosa, Observatorio de Física Cósmica del Ebro :

Boletín Mensual, 1915. (*Observatory.*)

Toulouse, Observatoire :

Carte photographique du Ciel. 17 Charts. Zone + 5°, + 7°, + 9°. (*N. A. Office, Dr. Cowell.*)

Turin, Società Meteorol, Italiana :

Bolletino Bimensuale, Vol. 34, 5—12 ; 35, 1—2. (*Society.*)

Upsala, Observatoire Météorologique de l'Université :

Bulletin Mensuel. Vol. 47, 1915. (*Observatory.*)

Utrecht, Observatoire Astronomique :

Recherches Astronomiques, VI. (*Observatory.*)

Washington, Carnegie Institution :

List of Publications of the Department of Terrestrial Magnetism. (*Institution.*)

Washington, Department of Commerce :

*The Damping of Waves and other Disturbances in Mercury. (*Department.*)

Washington, Hydrographic Office :

—: Monthly Pilot Charts, N. Atlantic Ocean, 1916.
—: Monthly Pilot Charts, N. Pacific Ocean, 1916.
—: Monthly Pilot Charts, Central American Waters, 1915, 1916.
—: Monthly Pilot Chart of the Indian Ocean for July, 1916.
—: The Circulation in the N. and S. Atlantic Oceans. (Supplement to the Pilot Chart of the N. Atlantic Ocean.) (*Office.*)

Washington, Library of Congress :

—: Guide to the Law of Spain.
—: Classification : Class A, General Works, Polygraphy ; "G.R." and "G.T.," completion of Class G. ; "H.T.," completion of Class H.
—: A List of American Doctoral Dissertations, printed in 1913.
—: A List of American Doctoral Dissertations, printed in 1914.
—: Classification : Class C. (*Library.*)

Washington, National Academy of Sciences :

Memoirs, Vol. 12, pt. 2 ; 13 ; 14 "first memoir." (*Academy.*)

Washington, Smithsonian Institution :
— : Arequipa Pyrheliometry, by C. G. Abbot.
— : The Pyranometer—An Instrument for Measuring Sky Radiation.
— :*On the Distribution of Radiation over the Sun's Disk, and New Evidences of Solar Variability.
— : Annual Report, 1914. (*Institution.*)

Washington, U.S. Department of Agriculture :
— : Monthly Weather Review, 1916, January—July.
— : Weather Forecasting in the United States. (*Department.*)

Washington, U.S. Coast and Geodetic Survey :
— : Application of the Theory of Least Squares to the Adjustment of Triangulation.
— : Distribution of the Magnetic Declination in the United States for January 1, 1915.
— : Latitude Observations with Photographic Zenith Tube at Gaithersburg, M.D.
— : Determination of the Difference in Longitude between each two of the Stations Washington, Cambridge, and Far Rockaway.
— : Triangulation along the Columbia River and the Coasts of Oregon and Northern California.
— : Triangulation in West Virginia, Ohio, Kentucky, Indiana, Illinois, and Missouri.
— : Results of Magnetic Observations, ...1914, 1915.
— : ,, ,, ,, near Honolulu, Hawaii, 1913—14.
— : ,, ,, ,, at Sitka, Alaska, 1913, 1914.
— : ,, ,, ,, at Vieques, Porto Rico, 1913, 1914.
— : ,, ,, ,, at Cheltenham, 1913, 1914.
— : ,, ,, ,, near Tucson, Arizona, 1913, 1914.
— : Annual Report of the Superintendent, 1915. (*Superintendent.*)

Washington, U.S. Naval Observatory
— : Nine-Inch Transit Circle Observations, 1903—1908.
— : Annual Report for the fiscal year 1916. (*Observatory.*)

Zi-Ka-Wei Observatory, Shanghai :
— : The Typhoon of July, 28th, 1915, and its Effects at Shanghai.
— : Bulletin des Observations, 1911.....Météorologie.
— : ,, ,, ...Sismologie.
— : Observations Magnétiques faites à l'Observatoire de Lu-Kia-Pang, 1911.
— : Etude Photographique des Taches Solaires, par le R. P. S. Chevalier, S.J. (Extrait des Annales de l'Observatoire de Zô-Sè, Tome 9, 1913).
— : Revue Mensuelle, 1915—16.
— : Bulletin Sismique, 1915—16. (*Observatory.*)