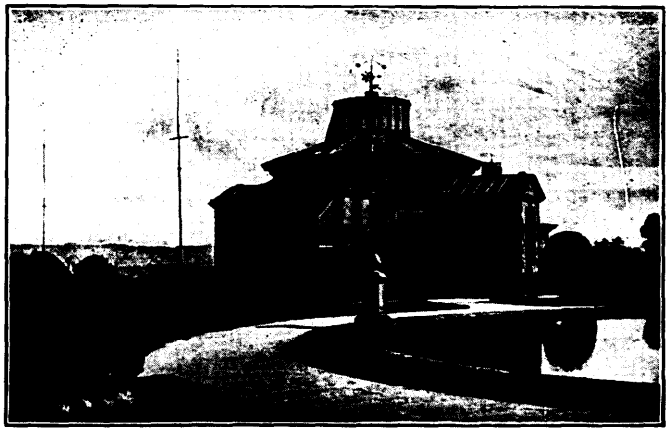
STONYHURST COLLEGE OBSERVATORY.

Lat. 53° 50′ 40·7″ N. Long. 9m. 52s. 70 W.
Height of the Barometer above the Sea, 381 feet.



(ESTABLISHED 1838.)

Results of Geophysical and Solar Observations,

1938.

With Report and Notes of the Director,

Rev. J. P. ROWLAND, S.J., B.Sc, F.R.A.S., F.R.Met.Soc.

BLACKBURN:
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CONTENTS.

REPORT AND NOTES.

GENERAL.—The Staff of the Observatory remains as last year. Father H. Macklin, S.J., B.Sc. (Oxon)., and Father J. Lawrence, S.J., B.Sc., M.A. (Oxon.), who are on the teaching staff of the College, continue to give part time service, and Mr. W. Brown, the only full-time assistant, is responsible for the routine meteorological work, the changing of charts on the recording instruments and development of photographic records. The current year marks the Centenary of the establishment of the Observatory.

The Director attended the meeting of the British Association at Cambridge in August.

METEOROLOGICAL.—The Meteorological records have been continued without interruption throughout the year, and Weekly and Monthly Reports have been supplied as heretofore to the Meteorological Office, London.

A daily forecast of local weather has been supplied to the *Lancashire Daily Post*, for which purpose a synoptic chart has been prepared each morning from data received by wireless telegraphy, giving the conditions at 0700 G.M.T. at a large number of reporting stations in Western Europe, Iceland and the Azores, and as reported by ships on the North Atlantic. Occasional forecasts have also been supplied to other newspapers, on request.

The year's weather was characterised by the dry and relatively sunny months of February, March, and April, the severe drought during April and May, the deficiency of sunshine during the summer, the heavy rainfall of October, and the general mildness and storminess of the winter months, both at the beginning and end of the year.

The total fall of rain during the year, 52·156 inches, was only slightly above the normal, but nearly 80% of it was registered during the winter and early summer. The rainfall for January, 6·245 inches, was 40% in excess of the average, and was evenly distributed on 25 days, the heaviest fall, 0·86 of an inch, occurring on the 27th. February, March, and April were all very dry. The amount for the whole period, 5·133 inches, was only 59% of the normal. A remarkable feature during this period was the severe drought which began on April 6th, from which date no measurable rain occurred until the 23rd, when a very slight fall of 0·02 of an inch was recorded. A further slight fall of 0·01 of an inch followed on the 27th, but after this the dry spell continued unbroken till the 11th of May. Of the 1·25 inches recorded during April, almost all fell during the first four days, and 0·794 of an inch, 63% of the total, fell on the 2nd alone. During the 35 days from the 6th of April to the 10th of May only 0·03 of an inch of rain was measured. In spite of the dryness of the first ten days of May the total for this month was above the average. The wet weather then continued until the end of July, precipitation for the period being 25% above the mean. August and September were both fairly dry, September having slightly less than half of the normal rainfall. The

amounts for the remaining months were all above average, that for October, 10·677 inches, being 109% in excess of the mean. On four days during the month the rainfall exceeded one inch, and only five days were dry. Snow, which fell in small amounts during January and February was most frequent in December and was noted on nine days, the heaviest fall, three-quarters of an inch deep, occurring on the 21st.

The total amount of bright sunshine, 1287·4 hours, was only 25 hours below the average. April and December were relatively the sunniest months. having an excess of 28% and 47% respectively, During April 59% of the total amount was registered during the 12 days from the 6th to the 17th. All the summer months had totals in defect of the mean, with the exception of August, which had ten hours above the average. The amount recorded during June, July and August, 565·4 hours, was less than the average by 64 hours. July was the dullest month with a total of 124·4 hours, against an average of 167·4, a deficit of 26%. During the 14 days from the 7th to the 20th only 24·5 hours of sunshine were recorded, an average of only $1\frac{3}{4}$ hours per day. September was the next dullest month, and its total was less than the normal by 20%. Throughout the summer no really notable sunny periods occurred, the greatest number of consecutive days with ten hours of bright sunshine or more was four, April 10th to the 13th inclusive.

The year was notable for the mild conditions existing during the winter, early spring, and autumn. March and November were relatively the warmest months. The Adopted Mean Temperature for March, 46°·4, was 6°·2 above the average, whilst that for

November, 47°·3, was 5°·4 above. Both these temperatures constitute records for the last 91 years, the previous highest for March being 42°·2 in 1920, and for November 47°·0, in 1899, and also in 1881. No frost occurred in the air during March, whilst ground frost was recorded on only seven nights, three of which had less than one degree each, and five less than three. During November, only three nights with ground frost, each with less than three degrees, were registered, whilst the minimum temperature in the air was 32°. May, June and July were relatively the coldest months, the adopted mean temperatures being 0°·3, 0°·8, and 2°·0 respectively below the normal. With the single exception of December, which had a mean temperature only 0°·1 less than the mean, the remaining months were all above average. The most severe period of frost occurred from December 18th to the 25th, when a minimum air temperature of 21°·3 was registered twice, and a minimum ground temperature of 10°·4 was recorded on the 21st, the lowest ground temperature of the year. The highest shade temperatures occurred in August, the thermometer reaching 70° or more on every day from the 3rd to the 11th, but the maximum shade temperature for the year, 75°·8, on the 10th, was 0°·2 below the average.

The total wind mileage for the year, 92,100, was slightly over 7,500 miles in excess of the average. With the exception of April, August and September, every month of the year had an excess of wind. The total for June, 8,422 miles, was 36% above the mean and 38 miles more than the previous 71 years' record of 1877, although the greatest hourly velocity for the month was considerably below gale force. The months

of January, February, October and November were all more stormy than usual, the totals being respectively 19%, 20%, 29%, and 27% above normal. April was the quietest month, with a total of 5563 miles, against the average of 7408. Gales of mean hourly velocity 39 m.p.h. or more occurred, two in January, one in February, two in October, and four in November. The greatest mean hourly velocity recorded was 47 m.p.h., on the 15th of January, with a maximum gust velocity of 66 m.p.h. A greater gust, however, accompanied the gale of 44 m.p.h., on October 3rd, when the velocity was 73 m.p.h.

Thunderstorms were noted on 14 occasions during the year, but the only storm of any severity occurred on August 12th, when the centre was estimated to be not more than half-a-mile distant, and local electric light supplies failed for a short period. Lightning without thunder was observed twice, and thunder alone was noted on four occasions.

Heavy falls of rain of one inch or more occurred as follows :—October 2nd, 3rd, 8th and 12th, and December 31st. The greatest was 1·440 inches, on October 2nd. Rainless periods of five days or more occurred as follows :—February 14th—23rd, March 4th—8th, April 6th—22nd, April 28th—May 10th, June 12th—17th, July 18th—24th A total of six periods with an average of 9·3 days each. An absolute drought was constituted by the dry period April 6th—22nd.

Bright sunshine for ten hours or more was recorded on :—April 10th, 11th, 12th, 13th, 17th, 30th ; May 1st, 4th, 5th, 6th, 8th 10th, 21st ; June 5th, 7th,

8th, 9th, 13th, 15th, 16th, 17th, 19th, 30th ; July 2nd, 26th ; August 4th, 14th, 20th, 21st, 31st ; September 2nd, 8th, 9th, 10th, 15th. A total of 35 days with an average of 11·8 hours each.

Days on which notably continuous sunshine occurred were :—February 11th, 12th ; March 1st, 14th ; April 10th, 11th, 12th, 13th ; May 4th, 5th, 6th, 21st ; June 17th ; August 4th, 31st ; September 2nd, 9th, 10th, 26th ; November 29th.

MAGNETICAL.—Absolute measures of Horizontal Magnetic Force have been made once each month, by the method of Vibration and Deflection. The constants of the magnetometer magnets were described in our 1921 Annual Report (*p.* vii). The Inclination is also measured, once each month, by two needles, with Dover's Circle, No. 159. The Declination is observed each week. The Differential Instruments, or Photo-Magnetographs, which have been in practically continuous action since the year 1866, are of the Kew Observatory pattern, except that the radial distances between the centres of the magnets and the surfaces of the respective cylinders are somewhat shorter, being 152·4 Cms. The time-scale is provided by cutting off the light every two hours, by means of a relay operated by the Synchronome Clock. The scale values of the instruments are as follows :—

For the Unifilar ..	11·28′	per Cm. of Ordinate
„ Bifilar	·000518 C.G.S.	„

The Vertical Force Balance has been maintained in service throughout the year, but its performance is

not sufficiently reliable for its record to be used for measurement, and it only serves to indicate increase or decrease in this element.

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

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

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

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

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

In 1928, in consideration of the low values of the ranges assigned to the higher character letters, the scale was revised and is as follows :—(c) 0–2, (s) 3–7, (m) 8–20, (g) 21–60, (v.g.) over 60.

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

Corresponding tabulations are sent quarterly to the Meteorological Institute at De Bilt (Holland), for the International Committee on Terrestrial Magnetism. In these the significant notes are restricted to three— 0 (quiet), 1 (moderately disturbed), and 2 highly disturbed). The character figures are assigned according to the scheme detailed in the Annuaire for 1918 of the Royal Dutch Meteorological Institute. The mean excess ranges according to which these character figures have been assigned are as follows :—0, 0—4 ; 1, 5—10 ; 2, over 10. The civil day is used for both the international figures and for our own characteristic letters.

Magnetic activity as indicated by the mean daily ranges again shows an increase on last year, though the Relative Sunspot Numbers issued by the Observatory of Zurich show a slight fall from 114·4 in 1937 to 109·6 in 1938, from which it appears that the maximum of the sunspot cycle was attained in 1937.

This fall in solar activity is also shown in the decreased area of spots in the Stonyhurst drawings in the following table, in which are exhibited the variations in solar and magnetic activity since 1930.

	Solar		Magnetic Mean Daily Range	
	Spotless Days	Mean Area (1/5000 of Disc)	Decln. ′	H.F. γ
1930 ...	4	2·44	16·9	88·7
1931 ...	46	1·26	13·8	59·5
1932 ...	118	0·81	14·4	62·8
1933 ...	249	0·41	13·4	58·1
1934 ...	175	0·58	12·4	53·1
1935 ...	24	3·12	14·2	59·3
1936 ...	0	5·40	16·3	69·0
1937 ...	0	10·27	17·4	84·6
1938 ...	0	8·31	>20·3	>94·6

The increased magnetic activity shown by the mean daily ranges in the above table is also conspicuous in the monthly ranges given on pp. 35—36, the mean monthly range in Declination having increased from 44′·4 to 77′·8, and in Horizontal Force from 285γ to 368γ. In the table showing the days of different magnetic character given on p. 38, whilst the numbers of days of " calm " and of " moderate " disturbance differ little from those in 1937, the number of days of " small " disturbance falls from 151 to 134,

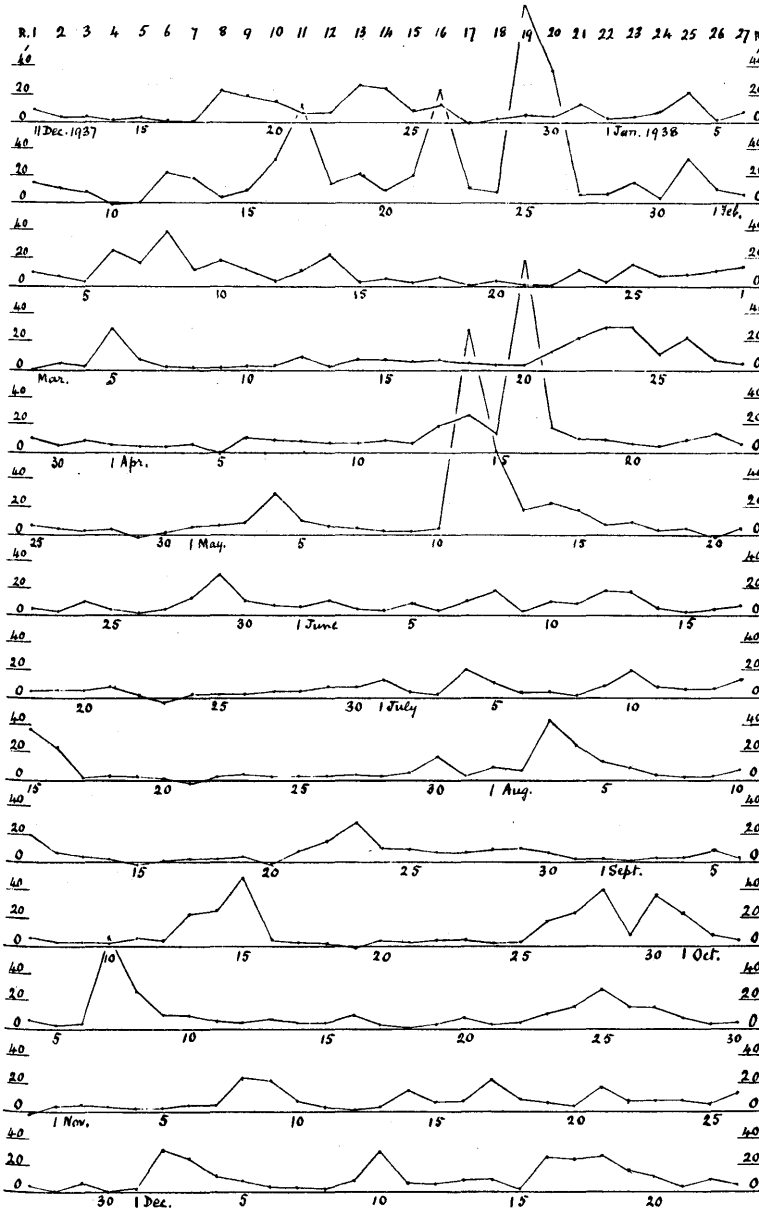
and that of " greater " disturbance rises from 28 to 40, and that of " very great " disturbance, or true magnetic storms, is doubled from 4 to 8. The Aurora Borealis was observed on four nights, that of January 25th being of exceptional brilliance.

The chart on p. xv shows the magnetic character of each day of the year, divided into 27-day periods, the ordinates representing the values of diurnal range from which our character letters are determined, as explained on p. xii.

As in recent years, there is again a lack of sequences of disturbances at approximately 27 days interval. The occurrence of the two very great disturbances on January 25th and April 16th, with an interval of three rotations, and a third on May 11th, after 25 days, appears to be fortuitous, as these disturbances do not correspond with any recurrence of sun-spot activity in the same area on the sun.

" Sudden Commencements " were noted on the dates and at the times indicated in the following table :

DATE	TIME H. M.	DATE	TIME H. M.	DATE	TIME H. M.
Jan. 16	22 36	May 11	15 55	Aug. 10	3 22
,, 19	22 36	June 7	22 2	,, 22	13 54
,, 25	11 54	,, 12	17 55	,, 24	19 15
,, 31	19 24	,, 12	23 2	,, 28	15 16
,, 31	22 33	July 4	12 3	Sept. 13	18 39
Feb. 6	3 10	,, 9	19 53	,, 23	4 36
,, 6	15 57	,, 13	20 4	,, 26	7 22
Mar. 12	20 28	,, 15	3 16	Oct. 7	6 14
Apr. 12	19 58	,, 30	4 36	Nov. 14	13 54
,, 22	12 0			,, 17	5 40



1938. DAILY MAGNETIC CHARACTER IN 27-DAY PERIODS.

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

SOLAR OBSERVATIONS.—The routine work of solar drawing was normally carried out by the Director, and in his absence by Mr. Brown or Father Lawrence.

Drawings of the sun, showing all spots, were obtained on 227 days, and these were supplemented by 118 drawings kindly supplied by Professor Brunner, of Zurich, to whom copies of the Stonyhurst drawings were supplied for a number of dates when no observation was obtained at Zurich. There remain 20 days on which no observation was possible at either observatory.

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

The observation days and daily projected areas in units 1/5000 of the disc for the Stonyhurst drawings are recorded on pages 39 and 40. The horizontal lines on these pages indicate the commencement of a new solar rotation in accordance with the Greenwich Convention. For these measurements we are indebted to the Rev. K. O'Callaghan, S.J.

There were again, as last year, no spotless days, and the number of new groups which appeared during

the year in the Stonyhurst observations was 362, as against 422 in 1937, and 354 in 1936. The largest group of the year crossed the central meridian in Lat. 15° N. on January 18th, and was just disappearing at the West limb at the time of the great magnetic storm and brilliant Aurora of January 25th—26th. Other large groups crossed the Central Meridian on the following dates :—Feb. 10th, April 13th, May 10th, July 14th, Sept. 5th, Sept. 27th, Oct. 12th, Nov. 10th, and Nov. 28th.

Reference to the chart on page xv. shows that several of these groups when near the Central Meridian were accompanied or followed at varying intervals by notable magnetic disturbances.

SEISMOLOGICAL.—The Milne-Shaw seismograph has been in continuous service throughout the year, the total number of earthquakes recorded being 130, as against 95 last year. They were distributed as follows :

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
6	7	7	8	16	8	7	10	11	11	27	12	130

Among the more notable were the following :—

Feb.	1—Nr. New Guinea	Sept.	7—Formosa
May	12— ,,	Oct.	10—Celebes Island
,,	19—Celebes Island	,,	19—N.W. Mongolia
,,	23—Japan	,,	20—Timor Sea
June	10—N.E. of Formosa	Nov.	5—Japan
,,	11—Belgium	,,	5— ,,
,,	16—China Sea	,,	6—E. of Japan
,,	20—21—Turkestan	,,	10—S. of Alaska
Aug.	16—Burma	,,	17— ,,

Of these, the Belgian earthquake of June 11th, though not severe by comparison with the others, was notable for this part of the world, and was comparable with that in the North Sea on June 7th, 1931, which was felt over a large area in England. The earthquake of November 10th, near the Alaskan peninsula, was one of the greatest recorded since the installation of the Milne-Shaw seismograph in 1923. The trace went beyond the limits of registration in both directions, but an estimate of its probable range indicates a range of actual ground oscillation at Stonyhurst of about three-quarters of an inch, though the origin was at a distance of nearly five thousand miles.

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

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

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

J. P. Rowland, s.j.,

Director.

Maximum Gusts for each Day of the Year, 1938.

Recorded by the Dines Tube Anemograph.

1938	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1938
DAY													DAY
1	24	**62**	45	27	41	38	26	24	19	19	52	47	1
2	17	58	**50**	**56**	48	46	25	25	27	62	42	41	2
3	23	44	40	42	**54**	37	31	26	30	**73**	28	36	3
4	29	40	32	37	48	34	27	29	18	71	46	39	4
5	23	35	37	39	32	30	29	27	21	39	36	30	5
6	32	22	21	50	29	41	23	16	22	37	25	30	6
7	40	18	10	40	26	38	37	14	38	54	35	35	7
8	23	20	39	22	28	32	30	18	38	45	30	28	8
9	45	34	42	24	33	31	**49**	22	22	44	24	49	9
10	11	57	37	14	24	33	30	22	18	46	23	28	10
11	33	37	15	21	30	29	36	24	31	38	32	36	11
12	37	48	12	21	32	9	27	26	37	38	46	41	12
13	53	40	18	21	34	29	29	22	**40**	45	52	35	13
14	49	31	35	18	30	38	25	18	34	50	36	32	14
15	**66**	30	44	16	34	33	14	26	18	24	18	39	15
16	51	37	45	28	15	25	26	43	22	34	24	32	16
17	33	54	28	31	18	18	26	45	37	35	23	38	17
18	34	51	41	23	30	25	24	44	19	34	55	**50**	18
19	46	45	45	24	27	42	21	37	23	44	37	46	19
20	32	31	40	22	23	33	24	**46**	18	19	19	25	20
21	43	14	36	23	15	38	13	25	25	24	22	43	21
22	32	22	16	25	29	16	14	19	32	23	30	36	22
23	40	24	28	20	41	24	17	26	36	10	**61**	28	23
24	50	22	36	27	40	34	21	23	14	17	36	22	24
25	55	38	39	26	22	54	21	5	14	22	46	21	25
26	45	40	39	21	32	30	29	18	14	30	46	41	26
27	36	53	46	18	21	**59**	41	27	23	27	45	34	27
28	56	49	35	28	22	49	40	20	17	16	24	24	28
29	64		32	37	36	48	34	24	26	20	27	37	29
30	44		45	40	37	37	44	23	17	28	54	35	30
31	56		40		52		31	20		38		29	31

METEOROLOGICAL REPORT.

JANUARY, 1938.

Results of Observations taken during the Month.		Mean for the last 81 years.
Mean Reading of the Barometer ..... inches	29·330	29·479
Highest ,, on the 1st ..... ,,	30·057	30·129
Lowest ,, on the 15th ..... ,,	28·227	28·588
Range of Barometer Readings ..... ,,	1·830	1·541
Highest Reading of a Max. Therm. on the 22nd ..	51·9	51·5
Lowest Reading of a Min. Therm. on the 11th...	28·0	22·1
Range of Thermometer Readings.....	23·9	29·4
Mean of Highest Daily Readings	45·5	42·6
Mean of Lowest Daily Readings	36·9	33·4
Mean Daily Range	8·6	9·2
Deduced Mean Temp. (from mean of Max. and Min.)	41·0	37·8
Mean Temperature from Dry Bulb	41·9	38·2
Adopted Mean Temperature	41·5	38·0
Mean Temperature of Evaporation	40·0	36·8
Mean Temperature of Dew Point	37·6	34·7
Mean elastic force of Vapour ..... inches	0·226	0·203
Mean weight of Vapour in a cub. ft. of air, grains	2·6	2·4
Mean additional weight required for saturation ,,	0·5	0·4
Mean degree of Humidity (saturation 100)	84	87
Mean weight of a cubic foot of air ..... grains	541·7	548·9
Mean amount of Cloud (0—10)	8·1	7·8
Fall of Rain ..... inches	6·245	4·446
Greatest Rainfall in one day (27th)..... ,,	0·860	0·828
No. of days on which ·005 in. or more Rain fell...	25	19·9

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	3	0	0	2	7	15	2
Mean Velocity in miles per hr.	7·1	4·3	0	0	16·1	15·5	14·3	11·0
Total No. of miles.....	339	310	0	0	771	2601	5160	528

		Mean*
Total No. of miles registered	9709	8329
Greatest hourly velocity (15th, at 0600 G.M.T., Dir. S.)	47	42

* *For the last* 71 *years.*

JANUARY, 1938.

DIFFERENCES.

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

Mean barometric pressure	—	0·149 in.
Monthly range „	+	0·289 in.
Mean of highest daily temperatures	+	2·9°
Mean of lowest „ „	+	3·5°
Mean daily Range	—	0·6°
Adopted mean temperature	+	3·5°
Total rainfall	+	1·799 in.

Ground Frost on the 1st—3rd, 5th, 9th—11th, 18th, 22nd, 27th, 30th and 31st. Hoar Frost on the 11th. Snow on the 9th and 30th. Hail on the 6th and 7th, 29th, 30th and 31st. Heavy Rain on the 20th and 27th. Gales of Wind on the 15th and 29th. Fog on the 8th. Thunder on the 26th. Lightning on the 26th and 28th. Lunar Halo on the 11th. Solar Halo on the 13th, 26th and 27th. Aurora Borealis on the 25th.

EXTREME READINGS FOR JANUARY.

During 91 Years.

Highest reading of Barometer ...	1896 (9th) ...	...30·597 in.
Lowest „ „	1884 (26th) ...	...27·803 in.
Highest temperature	1877 (7th) ...	... 59·9°
Lowest „	1881 (15th) ...	... 4·6°
Highest adopted mean temperature	1916	... 44·7°
Lowest „ „	1881	... 29·2°
Greatest fall of rain	1928	...12·267 in.
Least „	1881	... 0·472 in.
Greatest fall of rain in one day ...	1914 (8th) ...	... 2·074 in.
Greatest No. of days on which ·005 in. or more rain fell ...	1890	... 30
Least „ „ „ ...	†1879	... 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* 1850.

FEBRUARY, 1938.

Results of Observations taken during the Month.		Mean for the last 91 years.
Mean Reading of the Barometer ..... inches	29·818	29·496
Highest ,, on the 20th ..... ,,	30·226	30·107
Lowest ,, on the 1st ..... ,,	28·731	28·661
Range of Barometer Readings ..... ,,	1·495	1·446
Highest Reading of a Max. Therm. on the 26th ..	53·3	52·1
Lowest Reading of a Min. Therm. on the 24th...	29·0	22·9
Range of Thermometer Readings.....	24·3	29·2
Mean of Highest Daily Readings	44·8	43·8
Mean of Lowest Daily Readings	36·2	33·7
Mean Daily Range	8·6	10·1
Deduced Mean Temp. (from mean of Max. and Min.)	40·1	38·2
Mean Temperature from Dry Bulb	41·5	38·6
Adopted Mean Temperature	40·8	38·4
Mean Temperature of Evaporation	38·9	36·9
Mean Temperature of Dew Point	35·7	34·6
Mean elastic force of Vapour ..... inches	0·210	0·197
Mean weight of Vapour in a cub. ft. of air, grains	2·4	2·4
Mean additional weight required for saturation ,,	0·6	0·4
Mean degree of Humidity (saturation 100)	78	86
Mean weight of a cubic foot of air ..... grains	551·4	548·6
Mean amount of Cloud (0—10)	7·9	7·5
Fall of Rain ..... inches	2·109	3·529
Greatest Rainfall in one day (9th) ..... ,,	0·557	0·754
No. of days on which ·005 in. or more Rain fell...	14	16·6

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	9	3	2	2	3	5	3
Mean Velocity in miles per hr.	15·9	9·6	6·4	4·9	16·3	17·8	18·5	21·1
Total No. of miles.....	381	2077	464	234	782	1278	2220	1521

		Mean*
Total No. of miles registered	8957	7387
Greatest hourly velocity (2nd, at 0100 G.M.T., Dir. W. by S.).....	40	39

* *For the last* 71 *years.*

FEBRUARY, 1938.

DIFFERENCES.

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

Mean barometric pressure	+	0·322 in.
Monthly range ,, ...	+	0·049 in.
Mean of highest daily temperatures	+	1·0°
Mean of lowest ,, ,, ...	+	2·5°
Mean daily range	—	1·5°
Adopted mean temperature	+	2·4°
Total rainfall	—	1·420 in.

Ground Frost on the 7th, 9th, 11th, 13th—18th, 21st, 22nd, 24th and 25th. Hoar Frost on the 24th. Snow on the 13th and 14th. Hail on the 1st, 10th, and 18th. Heavy Rain on the 9th and 27th. Gales of Wind on the 2nd. Fog on the 9th. Solar Halo on the 24th.

EXTREME READINGS FOR FEBRUARY,

During 91 Years.

Highest reading of Barometer ...	1934 (15th) ...	...30·515 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 ,, ...	1932	... 0·123 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, 1938.

Results of Observations taken during the Month.		Mean for the last 91 years.
Mean Reading of the Barometer ..... inches	29·742	29·456
Highest „ on the 4th ..... „	30·262	30·046
Lowest „ on the 21st ..... „	29·205	28·671
Range of Barometer Readings ..... „	1·057	1·375
Highest Reading of a Max. Therm. on the 12th...	58·5	56·8
Lowest Reading of a Min. Therm. on the 23rd...	33·4	23·8
Range of Thermometer Readings.....	25·1	33·0
Mean of Highest Daily Readings	51·9	47·0
Mean of Lowest Daily Readings	41·0	34·6
Mean Daily Range	10·9	12·4
Deduced Mean Temp. (from mean of Max. and Min.)	45·5	39·8
Mean Temperature from Dry Bulb	47·3	40·5
Adopted Mean Temperature	46·4	40·2
Mean Temperature of Evaporation	44·8	38·4
Mean Temperature of Dew Point	42·1	35·9
Mean elastic force of Vapour ..... inches	0·268	0·211
Mean weight of Vapour in a cub. ft. of air, grains	3·1	2·4
Mean additional weight required for saturation „	0·6	0·5
Mean degree of Humidity (saturation 100)	81	85
Mean weight of a cubic foot of air ..... grains	543·1	545·9
Mean amount of Cloud (0—10)	7·8	7·5
Fall of Rain ..... inches	1·774	3·206
Greatest Rainfall in one day (24th)..... „	0·340	0·733
No. of days on which ·005 in. or more Rain fell...	13	16·6

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	0	0	0	4	5	19	2
Mean Velocity in miles per hr.	2·0	0	0	0	12·2	16·5	12·0	7·3
Total No. of miles.....	48	0	0	0	1170	1977	5489	350

		Mean*
Total No. of miles registered	9034	8191
Greatest hourly velocity (2nd, at 1130 G.M.T., Dir. W.)	32	39

* *For the last* 71 *years.*

MARCH, 1938.

DIFFERENCES.

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

Mean barometric pressure	+	0·286 in.
Monthly range „	—	0·318 in.
Mean of highest daily temperatures	+	4·9°
Mean of lowest „ „	+	6·4°
Mean daily range	—	1·5°
Adopted mean temperature	+	6·2°
Total rainfall	—	1·432 in.

Ground Frost on the 2nd, 7th, 14th, 22nd, 23rd and 24th. Hoar Frost on the 23rd. Fog on the 5th—8th, 10th, 11th, 13th, 16th, 17th, 20th, 22nd and 23rd. Solar Halo on the 28th.

EXTREME READINGS FOR MARCH,

During 91 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	1938	... 46·4°
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 ...	†1914	... 28
Least „ „ „ ...	1852	... 3
*Greatest hourly velocity of wind...	1905 (15th) ...	... 57 mls.
*Greatest No. of miles registered ...	1903	... 12773
*Least „ „ „ ...	1929	... 4437

* *Since* 1867 *only.* † *And in* 1861.

APRIL, 1938.

Results of Observations taken during the Month.			Mean for the last 91 years.
Mean Reading of the Barometer	inches	29·891	29·483
Highest „ on the 11th	„	30·351	29·958
Lowest „ on the 2nd	„	29·365	28·812
Range of Barometer Readings	„	0·986	1·146
Highest Reading of a Max. Therm. on 12th		60·8	64·0
Lowest Reading of a Min. Therm. on the 18th...		26·0	28·3
Range of Thermometer Readings.....		34·8	35·7
Mean of Highest Daily Readings		52·6	53·9
Mean of Lowest Daily Readings		38·2	38·0
Mean Daily Range		14·4	15·9
Deduced Mean Temp. (from mean of Max. and Min.)		43·9	43·8
Mean Temperature from Dry Bulb		45·8	44·7
Adopted Mean Temperature		44·9	44·4
Mean Temperature of Evaporation		41·8	41·6
Mean Temperature of Dew Point		37·2	38·2
Mean elastic force of Vapour	inches	0·224	0·234
Mean weight of Vapour in a cub. ft. of air, grains		2·6	2·7
Mean additional weight required for saturation „		1·0	0·7
Mean degree of Humidity (saturation 100)		69	79
Mean weight of a cubic foot of air	grains	547·8	541·9
Mean amount of Cloud (0—10)		5·1	6·8
Fall of Rain	inches	1·250	2·550
Greatest Rainfall in one day (2nd)	„	0·794	0·591
No. of days on which ·005 in. or more Rain fell...		6	14·9

Wind:—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	11	1	0	0	3	6	6
Mean Velocity in miles per hr.	6·8	5·4	4·4	0	0	4·7	11·0	11·3
Total No. of miles.....	492	1428	105	0	0	339	1578	1621

		Mean*
Total No. of miles registered	5563	7408
Greatest hourly velocity (2nd, at 1100 G.M.T., Dir. W.S.W.)	33	35

* *For the last* 71 *years.*

APRIL, 1938.

DIFFERENCES.

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

Mean barometric pressure	+	0·408 in.
Monthly range „	—	0·160 in.
Mean of highest daily temperatures	—	1·3°
Mean of lowest „ „	+	0·2°
Mean daily range	—	1·5°
Adopted mean temperature	+	0·5°
Total rainfall	—	1·300 in.

Ground Frost on the 4th, 8th—12th, 16th—18th, 20th and 29th. Hoar Frost on the 10th, 11th, 12th and 18th. Hail on the 3rd. Heavy Rain on the 2nd. Fog on the 20th. Lunar Halo on the 7th. Solar Halo on the 18th and 23rd. Aurora Borealis on the 16th.

EXTREME READINGS FOR APRIL,

During 91 Years.

Highest reading of Barometer ...	1906 (8th) ...	...30·317 in.
Lowest „ „ ...	1919 (14th) ...	...28·250 in.
Highest temperature	1852 (14th) ...	... 74·1°
Lowest „	1917 (2nd) ...	... 13·6°
Highest adopted mean temperature	1865	... 48·5°
Lowest „ „ ...	1917	... 39·8°
Greatest fall of rain	1867	... 5·672 in.
Least „	1852	... 0·478 in.
Greatest fall of rain in one day ...	1923 (12th) ...	... 1·260 in.
Greatest No. of days on which ·005 in. or more rain fell ...	1920	... 27
Least „ „ „ ...	1852	... 4
*Greatest hourly velocity of wind...	1911 (19th) ...	... 53 mls.
*Greatest No. of miles registered ...	1904	... 11016
*Least „ „ „ ...	1884	... 5047

* *Since* 1867 *only.*

MAY, 1938.

Results of Observations taken during the Month.		Mean for the last 91 years.
Mean Reading of the Barometer ..... inches	29·516	29·540
Highest ,, on the 22nd ..... ,,	29·907	29·977
Lowest ,, on the 29th ..... ,,	28·953	28·958
Range of Barometer Readings ..... ,,	0·954	1·019
Highest Reading of a Max. Therm. on the 2nd ...	65·0	71·8
Lowest Reading of a Min. Therm. on the 8th ...	29·2	32·3
Range of Thermometer Readings.....	35·8	39·5
Mean of Highest Daily Readings	57·5	59·2
Mean of Lowest Daily Readings	43·1	42·7
Mean Daily Range	14·4	16·5
Deduced Mean Temp. (from mean of Max. and Min.)	48·6	49·2
Mean Temperature from Dry Bulb	50·2	50·2
Adopted Mean Temperature	49·4	49·7
Mean Temperature of Evaporation	46·2	46·5
Mean Temperature of Dew Point	42·0	43·0
Mean elastic force of Vapour ..... inches	0·267	0·280
Mean weight of Vapour in a cub. ft. of air, grains	3·0	3·2
Mean additional weight required for saturation ,,	1·1	0·8
Mean degree of Humidity (saturation 100)	72	77
Mean weight of a cubic foot of air ..... grains	536·1	536·8
Mean amount of Cloud (0—10)	7·5	7·0
Fall of Rain ..... inches	3·631	2·766
Greatest Rainfall in one day (29th)..... ,,	0·712	0·653
No. of days on which ·005 in. or more Rain fell...	17	14·7

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	8	1	0	6	2	11	0
Mean Velocity in miles per hr.	6·0	10·0	15·9	0	10.2	13·5	9·1	0
Total No. of miles.....	434	1911	382	0	1467	646	2397	0

		Mean*
Total No. of miles registered	7237	6820
Greatest hourly velocity (31st, at 1830 G.M.T., Dir. S.W.)	29	32

* *For the last* 71 *years.*

MAY, 1938.

DIFFERENCES.

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

Mean barometric pressure	—	0·024 in.
Monthly range ,, ...	—	0·065 in.
Mean of highest daily temperatures	—	1·7°
Mean of lowest ,, ,, ...	+	0·4°
Mean daily range	—	2·1°
Adopted mean temperature	—	0·3°
Total rainfall	+	0·865 in.

Ground Frost on the 5th, 6th, 8th, 9th, 19th and 20th. Hoar Frost on the 8th. Heavy Rain on the 17th and 29th. Thunder on the 16th. Solar Halo on the 11th, 15th, 22nd, 25th and 30th. Aurora Borealis on the 24th.

EXTREME READINGS FOR MAY,

During 91 Years.

Highest reading of Barometer ...	1881 (10th) ...	...30·332 in.
Lowest ,, ,, ...	1887 (28th) ...	...28·559 in.
Highest temperature	1864 (19th)	82·5°
Lowest ,, ...	1855 (4th)	23·5°
Highest adopted mean temperature	1848	55·1°
Lowest ,, ,, ,, ...	1855	45·0°
Greatest fall of rain	1924	6·765 in.
Least ,, ...	1859	0·249 in.
Greatest fall of rain in one day ...	1881 (5th)	1·647 in.
Greatest No. of days on which ·005 in. or more rain fell ...	1924	26
Least ,, ,, ,,	†1859	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* 1848.

JUNE, 1938.

Results of Observations taken during the Month.		Mean for the last 91 years.
Mean Reading of the Barometer ..... inches	29·530	29·559
Highest „ on the 13th ..... „	29·937	29·937
Lowest „ on the 28th ..... „	28·673	29·043
Range of Barometer Readings ..... „	1·264	0·894
Highest Reading of a Max. Therm. on the 17th...	70·7	76·4
Lowest Reading of a Min. Therm. on the 2nd ...	42·2	39·3
Range of Thermometer Readings.....	28·5	37·1
Mean of Highest Daily Readings	61·3	64·8
Mean of Lowest Daily Readings	49·4	48·3
Mean Daily Range	11·9	16·5
Deduced Mean Temp. (from mean of Max. and Min.)	53·6	54·7
Mean Temperature from Dry Bulb	55·0	55·4
Adopted Mean Temperature	54·3	55·1
Mean Temperature of Evaporation	51·5	51·8
Mean Temperature of Dew Point	48·2	48·3
Mean elastic force of Vapour ..... inches	0·337	0·345
Mean weight of Vapour in a cub. ft. of air, grains	3·8	3·8
Mean additional weight required for saturation „	1·1	1·0
Mean degree of Humidity (saturation 100)	77	78
Mean weight of a cubic foot of air ..... grains	530·8	531·2
Mean amount of Cloud (0—10)	7·6	7·2
Fall of Rain ..... inches	4·291	3·311
Greatest Rainfall in one day (28th)..... „	0·820	0·804
No. of days on which ·005 in. or more Rain fell...	18	15·1

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	0	0	0	2	7	20	1
Mean Velocity in miles per hr.	0	0	0	0	17·7	10·1	11·3	19·3
Total No. of miles.....	0	0	0	0	848	1691	5420	463

		Mean*
Total No. of miles registered	8422	6181
Greatest hourly velocity (28th, at 1800 G.M.T., Dir. S. by W.)	30	29

* *For the last* 71 *years.*

JUNE, 1938.

DIFFERENCES.

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

Mean barometric pressure	—	0·029 in.
Monthly range „	+	0·370 in.
Mean of highest daily temperatures	—	3·5°
Mean of lowest „ „	+	1·1°
Mean daily range	—	4·6°
Adopted mean temperature	—	0·8°
Total rainfall	+	0·980 in.

Heavy Rain on the 1st, 23rd and 28th. Fog on the 23rd. Thunder on the 1st and 5th. Lightning on the 1st.

EXTREME READINGS FOR JUNE,

During 91 Years.

Highest reading of Barometer ...	1874 (15th) ...	...30·219 in.
Lowest „ „ ...	1862 (12th) ...	...28·632 in.
Highest temperature	1893 (18th)	88·7°
Lowest „	1902 (9th)	32·0°
Highest adopted mean temperature	1896	59·3°
Lowest „ „ „	1907	51·5°
Greatest fall of rain	1907	8·705 in.
Least „	1925	0·282 in.
Greatest fall of rain in one day ...	1857 (8th)	2·093 in.
Greatest No. of days on which ·005 in. or more rain fell ...	†1912	27
Least „ „ „	1887	4
*Greatest hourly velocity of wind...	1897 (16th)	45 mls.
*Greatest No. of miles registered ...	1938	8422
*Least „ „ „ ...	1915	3967

* *Since* 1867 *only.* † *And in* 1907.

JULY, 1938.

Results of Observations taken during the Month.		Mean for the last 91 years.
Mean Reading of the Barometer ..... inches	29·472	29·522
Highest ,, on the 31st ..... ,,	29·796	29·900
Lowest ,, on the 8th ..... ,,	29·086	29·007
Range of Barometer Readings ..... ,,	0·710	0·893
Highest Reading of a Max. Therm. on 22nd	70·0	78·0
Lowest Reading of a Min. Therm. on the 2nd ...	43·8	43·1
Range of Thermometer Readings.....	26·2	34·9
Mean of Highest Daily Readings	63·0	67·1
Mean of Lowest Daily Readings	51·0	51·5
Mean Daily Range	12·0	15·6
Deduced Mean Temp. (from mean of Max. and Min.)	55·1	57·6
Mean Temperature from Dry Bulb	56·8	58·2
Adopted Mean Temperature	56·0	58·0
Mean Temperature of Evaporation	54·0	54·9
Mean Temperature of Dew Point	51·4	52·1
Mean elastic force of Vapour ..... inches	0·380	0·390
Mean weight of Vapour in a cub. ft. of air, grains	4·2	4·4
Mean additional weight required for saturation ,,	0·9	1·1
Mean degree of Humidity (saturation 100)	82	81
Mean weight of a cubic foot of air ..... grains	527·6	527·3
Mean amount of Cloud (0—10)	8·1	7·4
Fall of Rain ..... inches	4·672	4·023
Greatest Rainfall in one day (10th)..... ,,	·0·940	0·871
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.....	0	0	1	1	2	3	19	5
Mean Velocity in miles per hr.	0	0	8·6	14·8	18·3	6·8	8·4	5·5
Total No. of miles.....	0	0	207	356	878	487	3841	656

		Mean*
Total No. of miles registered	6425	6312
Greatest hourly velocity (28th, at 0200 G.M.T., Dir. S.)	29	28

* *For the last* 71 *years.*

JULY, 1938.

DIFFERENCES.

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

Mean barometric pressure	—	0·050 in.
Monthly range „	—	0·183 in.
Mean of highest daily temperatures	—	4·1°
Mean of lowest „ „	—	0·5°
Mean daily range	—	3·6°
Adopted mean temperature	—	2·0°
Total rainfall	+	0·649 in.

Hail on the 5th. Heavy Rain on the 7th and 10th. Fog on the 2nd and 24th. Thunder on the 7th, 24th and 25th. Lightning on the 7th and 25th.

EXTREME READINGS FOR JULY,

During 91 Years.

Highest reading of Barometer ...	1911 (10th) ...	...30·203 in.
Lowest „ „ ...	1922 (6th) ...	...28·493 in.
Highest temperature	1901 (20th) ...	... 89·0°
Lowest „	1857 (1st) ...	... 36·0°
Highest adopted mean temperature	1901	... 63·2°
Lowest „ „	1922	... 54·0°
Greatest fall of rain	1888	... 8·475 in.
Least „	1868	... 0·669 in.
Greatest fall of rain in one day ...	1888 (2nd) ...	... 2·482 in.
Greatest No. of days on which ·005 in. or more rain fell ...	1920	... 28
Least „ „ „ ...	†1917	... 8
*Greatest hourly velocity of wind...	1892 (8th) ...	... 44 mls.
*Greatest No. of miles registered ...	1879	... 8288
*Least „ „ „ ...	1913	... 4577

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

AUGUST, 1938.

Results of Observations taken during the Month.		Mean for the last 91 years
Mean Reading of the Barometer ..... inches	29·544	29·498
Highest ,, on the 1st ..... ,,	29·929	29·900
Lowest ,, on the 19th ..... ,,	28·944	28·952
Range of Barometer Readings ..... ,,	0·985	0·948
Highest Reading of a Max. Therm. on the 10th...	75·8	76·0
Lowest Reading of a Min. Therm. on the 31st ...	39·7	42·1
Range of Thermometer Readings.....	36·1	33·9
Mean of Highest Daily Readings	65·9	66·2
Mean of Lowest Daily Readings	52·7	51·1
Mean Daily Range	13·2	15·1
Deduced Mean Temp. (from mean of Max. and Min.)	57·6	56·9
Mean Temperature from Dry Bulb	59·2	57·9
Adopted Mean Temperature	58·4	57·4
Mean Temperature of Evaporation	55·7	54·6
Mean Temperature of Dew Point	52·6	51·9
Mean elastic force of Vapour ..... inches	0·397	0·388
Mean weight of Vapour in a cub. ft. of air, grains	4·5	4·3
Mean additional weight required for saturation ,,	1·2	1·0
Mean degree of Humidity (saturation 100)	79	81
Mean weight of a cubic foot of air ..... grains	526·3	527·2
Mean amount of Cloud (0—10)	6·8	7·3
Fall of Rain ..... inches	3·959	5·031
Greatest Rainfall in one day (15th)..... ,,	0·670	1·057
No. of days on which ·005 in. or more Rain fell...	17	18·5

Wind:—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	7	3	0	2	4	12	3
Mean Velocity in miles per hr.	0	5·7	7·1	0	8·3	7·0	8·6	5·0
Total No. of miles.....	0	961	509	0	396	671	2480	357

		Mean*
Total No. of miles registered	5374	6199
Greatest hourly velocity (17th, at 0300 G.M.T., Dir. W.)	24	30

* *For the last 71 years.*

AUGUST, 1938.

DIFFERENCES.

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

Mean barometric pressure	+	0·046 in.
Monthly range „	+	0·037 in.
Mean of highest daily temperatures	—	0·3°
Mean of lowest „ „	+	1·6°
Mean daily range	—	1·9°
Adopted mean temperature	+	1·0°
Total rainfall	—	1·072 in.

Heavy Rain on the 15th, 17th and 18th. Fog on the 1st, 7th, 25th—27th, and 30th. Thunder on the 5th, 8th, 9th, 11th and 12th. Lightning on the 5th, 8th, 11th and 12th. Solar Halo on the 3rd and 14th.

EXTREME READINGS FOR AUGUST,

During 91 Years.

Highest reading of Barometer ...	1932 (22nd) ...	...30·208 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 „	1935	1·637 in.
Greatest fall of rain in one day ...	1929 (23rd)	2·350 in.
Greatest No. of days on which ·005 in. or more rain fell ...	1891	27
Least „ „ „ ...	1880	6
*Greatest hourly velocity of wind...	1903 (31st)	45 mls.
*Greatest No. of miles registered ...	1903	8486
*Least „ „ „ ...	1915	3918

* *Since* 1867 *only.*

SEPTEMBER, 1938.

Results of Observations taken during the Month.		Mean for the last 91 years.
Mean Reading of the Barometer ..... inches	29·553	29·542
Highest „ on the 9th ..... „	29·921	30·002
Lowest „ on the 20th ..... „	29·139	28·891
Range of Barometer Readings ..... „	0·782	1·111
Highest Reading of a Max. Therm. on the 8th ...	66·4	71·6
Lowest Reading of a Min. Therm. on the 15th...	32·5	36·8
Range of Thermometer Readings.....	33·9	34·8
Mean of Highest Daily Readings	61·0	61·7
Mean of Lowest Daily Readings	49·7	47·5
Mean Daily Range	11·3	14·2
Deduced Mean Temp. (from mean of Max. and Min.)	54·1	53·4
Mean Temperature from Dry Bulb	55·8	54·4
Adopted Mean Temperature	55·0	53·9
Mean Temperature of Evaporation	52·9	51·1
Mean Temperature of Dew Point	50·2	48·4
Mean elastic force of Vapour ..... inches	0·365	0·340
Mean weight of Vapour in a cub. ft. of air, grains	4·1	3·9
Mean additional weight required for saturation „	0·9	0·9
Mean degree of Humidity (saturation 100)	82	82
Mean weight of a cubic foot of air ..... grains	530·1	532·3
Mean amount of Cloud (0—10)	7·4	6·7
Fall of Rain ..... inches	2·027	4·333
Greatest Rainfall in one day (30th)..... „	0·420	0·980
No. of days on which ·005 in. or more Rain fell...	19	16·6

Wind:—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	4	1	0	8	3	12	2
Mean Velocity in miles per hr.	0	6·3	5·5	0	8·5	8·3	6·4	6·1
Total No. of miles.....	0	600	131	0	1629	597	1848	293

		Mean*
Total No. of miles registered	5098	5988
Greatest hourly velocity (23rd, at 0330 G.M.T., Dir. S.S.E.)	26	31

* *For the last* 71 *years.*

SEPTEMBER, 1938.

DIFFERENCES.

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

Mean barometric pressure	+	0·011 in.
Monthly range „	—	0·329 in.
Mean of highest daily temperatures	—	0·7°
Mean of lowest „ „	+	2·2°
Mean daily range	—	2·9°
Adopted mean temperature	+	1·1°
Total rainfall	—	2·306 in.

Ground Frost on the 15th. Hoar Frost on the 15th. Fog on the 2nd and 5th. Solar Halo on the 1st.

EXTREME READINGS FOR SEPTEMBER,

During 91 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 ...	1932 (2nd) ...	... 2·800 in.
Greatest No. of days on which ·005 in. or more rain fell ...	1918	... 29
Least „ „ „	†1915	... 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, 1938.

Results of Observations taken during the Month.			Mean for the last 91 years.
Mean Reading of the Barometer	inches	29·337	29·445
Highest „ on the 20th	„	29·854	30·017
Lowest „ on the 3rd	„	28·367	28·677
Range of Barometer Readings	„	1·487	1·340
Highest Reading of a Max. Therm. on the 13th...		61·2	63·8
Lowest Reading of a Min. Therm. on the 26th...		33·5	30·0
Range of Thermometer Readings.....		27·7	33·8
Mean of Highest Daily Readings		54·1	54·3
Mean of Lowest Daily Readings		44·7	42·2
Mean Daily Range		9·4	12·1
Deduced Mean Temp. (from mean of Max. and Min.)		48·4	47·3
Mean Temperature from Dry Bulb		49·8	48·1
Adopted Mean Temperature		49·1	47·8
Mean Temperature of Evaporation		47·2	45·6
Mean Temperature of Dew Point		44·4	43·1
Mean elastic force of Vapour	inches	0·293	0·279
Mean weight of Vapour in a cub. ft. of air, grains		3·4	3·2
Mean additional weight required for saturation „		0·7	0·6
Mean degree of Humidity (saturation 100)		81	84
Mean weight of a cubic foot of air	grains	533·1	537·3
Mean amount of Cloud (0—10)		7·7	7·3
Fall of Rain	inches	10·677	5·112
Greatest Rainfall in one day (2nd)	„	1·440	0·993
No. of days on which ·005 in. or more Rain fell...		26	19·0

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	1	1	0	1	7	18	1
Mean Velocity in miles per hr.	6·4	3·0	5·9	0	10·:	12·0	13·7	7·2
Total No. of miles.....	308	71	142	0	248	2008	5919	173

		Mean*
Total No. of miles registered	8869	6880
Greatest hourly velocity (3rd, at 1900 G.M.T., Dir. S.)	44	37

* *For the last* 71 *years.*

OCTOBER, 1938.

DIFFERENCES.

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

Mean barometric pressure	—	0·108 in.
Monthly range „	+	0·147 in.
Mean of highest daily temperatures	—	0·2°
Mean of lowest „ „	+	2·5°
Mean daily range	—	2·7°
Adopted mean temperature	+	1·3°
Total rainfall	+	5·565 in.

Ground Frost on the 26th—28th. Hoar Frost on the 26th. Hail on the 5th, 6th, 7th and 10th. Heavy Rain on the 2nd, 3rd, 4th, 8th, 12th, 17th and 31st. Gales of Wind on the 3rd and 4th. Fog on the 23rd—25th, 28th and 29th. Thunder on the 4th, 5th and 6th. Lightning on the 4th, 5th and 6th. Solar Halo on the 22nd. Aurora Borealis on the 26th.

EXTREME READINGS FOR OCTOBER,
During 91 Years.

Highest reading of Barometer ...	1884 (5th) ...	...30·306 in.
Lowest „ „ ...	1862 (19th) ...	...28·139 in.
Highest temperature	1890 (12th) ...	... 74·0°
Lowest „	1895 (28th) ...	... 17·8°
Highest adopted mean temperature	1921	... 53·8°
Lowest „ „	1895	... 42·8°
Greatest fall of rain	1870	...13·437 in.
Least „	1922	... 0·918 in.
Greatest fall of rain in one day ...	1870 (8th) ...	... 2·529 in.
Greatest No. of days on which ·005 ins. or more rain fell ...	†1934	29
Least „ „ „ ...	1920	8
*Greatest hourly velocity of wind...	1877 (15th)	52 mls.
*Greatest No. of miles registered ...	1934	9925
*Least „ „ „ ...	1915	3965

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

NOVEMBER, 1938.

Results of Observations taken during the Month.		Mean for the last 91 years.
Mean Reading of the Barometer ..... inches	29·274	29·456
Highest ,, on the 15th ..... ,,	29·985	30·063
Lowest ,, on the 23rd ..... ,,	28·076	28·566
Range of Barometer Readings ..... ,,	1·909	1·497
Highest Reading of a Max. Therm. on the 12th...	60·0	55·7
Lowest Reading of a Min. Therm. on the 22nd...	32·0	25·7
Range of Thermometer Readings.....	28·0	30·0
Mean of Highest Daily Readings	51·4	47·1
Mean of Lowest Daily Readings	43·3	36·9
Mean Daily Range	8·1	10·2
Deduced Mean Temp. (from mean of Max. and Min.)	47·0	41·7
Mean Temperature from Dry Bulb	47·5	42·2
Adopted Mean Temperature	47·3	41·9
Mean Temperature of Evaporation	45·7	40·0
Mean Temperature of Dew Point	43·7	38·3
Mean elastic force of Vapour ..... inches	0·285	0·232
Mean weight of Vapour in a cub. ft. of air, grains	3·2	2·8
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	534·3	544·2
Mean amount of Cloud (0—10)	8·1	7·4
Fall of Rain ..... inches	5·967	4·455
Greatest Rainfall in one day (25th)..... ,,	0·739	0·984
No. of days on which ·005 in. or more Rain fell...	24	18·2

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	1	1	1	5	10	12	0
Mean Velocity in miles per hr.	0	5·3	8·5	7·0	19·3	9·3	13·5	0
Total No. of miles.....	0	127	204	168	2312	2220	3884	0

		Mean*
Total No. of miles registered	8915	7038
Greatest hourly velocity (13th and 30th, at 0500 and 0530 G.M.T., Dir. S.)	40	40

* *For the last* 71 *years.*

NOVEMBER, 1938.

DIFFERENCES.

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

Mean barometric pressure	—	0·182 in.
Monthly range „	+	0·412 in.
Mean of highest daily temperatures	+	4·3°
Mean of lowest „ „	+	6·4°
Mean daily range	—	2·1°
Adopted mean temperature	+	5·4°
Total rainfall	+	1·512 in.

Ground Frost on the 21st, 22nd, 25th and 27th. Snow on the 19th, 26th and 27th. Hail on the 1st, 2nd, 19th, 23rd—26th, 28th and 30th. Heavy Rain on the 13th and 25th. Gales of Wind on the 13th, 18th, 23rd and 30th. Fog on the 15th, 18th, 21st and 22nd. Thunder on the 23rd and 26th. Lightning on the 23rd, 24th and 26th. Solar Halo on the 18th.

EXTREME READINGS FOR NOVEMBER,

During 91 Years.

Highest reading of Barometer ...	1922 (15th) ...	...30·375 in.
Lowest „ „ ...	1891 (11th) ...	...27·938 in.
Highest temperature	1900 (1st) ...	... 62·4°
Lowest „ „ ...	1901 (15th) ...	... 17·5°
Highest adopted mean temperature	1938	... 47·3°
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 „ „ „ ...	1934	... 4419

* *Since* 1867 *only.*

DECEMBER, 1938.

Results of Observations taken during the Month		Mean for the last 91 years.
Mean Reading of the Barometer ..... inches	29·379	29·434
Highest ,, on the 25th ..... ,,	30·051	30·078
Lowest ,, on the 1st ..... ,,	28·626	28·537
Range of Barometer Readings ..... ,,	1·425	1·541
Highest Reading of a Max. Therm. on the 11th...	52·2	52·6
Lowest Reading of a Min. Therm. on the 20th & 21st	21·3	22·0
Range of Thermometer Readings.....	30·9	30·6
Mean of Highest Daily Readings	43·2	43·4
Mean of Lowest Daily Readings	35·1	34·0
Mean Daily Range	8·1	9·4
Deduced Mean Temp. (from mean of Max. and Min.)	39·2	38·7
Mean Temperature from Dry Bulb	38·7	39·3
Adopted Mean Temperature	39·0	39·1
Mean Temperature of Evaporation	37·7	37·5
Mean Temperature of Dew Point	36·4	35·5
Mean elastic force of Vapour ..... inches	0·216	0·209
Mean weight of Vapour in a cub. ft. of air, grains	2·5	2·4
Mean additional weight required for saturation ,,	0·2	0·4
Mean degree of Humidity (saturation 100)	91	87
Mean weight of a cubic foot of air ..... grains	546·2	546·9
Mean amount of Cloud (0—10)	8·6	7·7
Fall of Rain ..... inches	5·554	4·606
Greatest Rainfall in one day (31st) ..... ,,	1·002	0·824
No. of days on which ·005 in. or more Rain fell...	20	20·1

Wind :—Direction	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	2	6	3	6	2	7	2
Mean Velocity in miles per hr.	11·1	6·2	11·8	13·2	11·6	15·4	11·7	7·6
Total No. of miles.....	801	298	1702	952	1676	737	1967	364

		Mean*
Total No. of miles registered	8497	7752
Greatest hourly velocity (18th, at 1230 G.M.T., Dir. E. by S.)	37	42

* *For the last 71 years.*

DECEMBER, 1938.

DIFFERENCES.

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

Mean barometric pressure	—	0·055 in.
Monthly range „	—	0·116 in.
Mean of highest daily temperatures	—	0·2°
Mean of lowest „ „	+	1·1°
Mean daily range	—	1·3°
Adopted mean temperature	—	0·1°
Total rainfall	+	0·948 in.

Ground Frost on the 4th, 9th, 15th, 18th—26th, 28th and 31st. Hoar Frost on the 4th and 15th. Snow on the 3rd, 17th—22nd, 25th and 31st. Hail on the 1st, 3rd and 9th. Heavy Rain on the 1st, 4th, 29th and 31st. Fog on the 10th, 26th, 28th and 29th. Thunder on the 1st. Lightning on the 1st. Lunar Halo on the 3rd.

EXTREME READINGS FOR DECEMBER,

During 91 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	1934	... 45·8°
Lowest „ „ ...	1878	... 30·3°
Greatest fall of rain	1918	...10·597 in.
Least „	1890	... 0·550 in.
Greatest fall of rain in one day ...	1870 (19th) ...	... 1·962 in.
Greatest No. of days on which ·005 in. or more rain fell ...	1918	30
Least „ „ „ ...	†1890	8
*Greatest hourly velocity of wind...	1894 (22nd) ...	... 65 mls.
*Greatest No. of miles registered ...	1929	... 11493
*Least „ „ „ ...	1933	... 4477

* *Since* 1867 *only.* † *And in* 1853.

Summary of Observations, 1938.

Results of Observations taken during the Year.		Mean for the last 91 Years
Readings of Barometer in inches.		
Mean of the Year	29·532	29·493
Highest Monthly Mean (April)	29·891	29·752
Lowest „ „ (November)	29·274	29·222
Highest Reading (April 11th)	30·351	30·300
Lowest „ (November 23rd)	28·076	28·218
Range	2·275	2·082
Thermometer, Fahrenheit.		
Highest Monthly Mean Temperature (August)	58·4	58·7
Lowest „ „ „ (December)	39·0	35·9
Highest Reading of a Max. Therm. (August 10th)	75·8	81·0
Lowest „ Min. „ (Dec. 20th & 21st)	21·3	17·0
Range of Thermometer Readings	54·5	64·0
Mean of Highest Daily „	54·4	54·3
Mean of Lowest Daily „	43·4	41·2
Mean Daily Range	11·0	13·1
Deduced Mean Temp. (from Mean of Max. and Min.)	47·8	46·8
Mean Temperature from Dry Bulb	49·1	47·3
Adopted Mean Temperature of the Year	48·5	47·1
Mean Temperature of Evaporation	46·4	44·7
Mean Temperature of Dew Point	43·5	42·2
Mean elastic force of Vapour ... inches	0·284	0·275
Mean weight of Vapour in a cub. ft. of air...grns.	3·2	3·2
Mean additional weight required for saturation „	0·8	0·7
Mean degree of Humidity (saturation 100)	80	84
Mean weight of a cubic foot of air ... grns.	537·4	538·9
Mean amount of Cloud (0—10)	7·6	7·3
Total fall of Rain ... inches	52·156	47·364
Greatest Monthly Rainfall (October)	10·677	7·653
Least „ „ (April)	1·250	1·215
Greatest Rainfall in one day (October 2nd)	1·440	1·662
No. of days on which ·005 inch or more Rain fell	219	207·1

SUMMARY OF WIND, 1938.

Prevailing Direction	N	NE	E	SE	S	SW	W	NW
No. of days for each	15	46	18	7	40	56	156	27
Mean Velocity in miles per hour ...	7·8	7·0	8·9	10·2	12·7	11·3	11·3	9·8
Total No. of miles for each Direction	2803	7783	3846	1710	12177	15252	42203	6326

		Mean for the last 71 years.
Total No. of miles registered	92100	84576
Greatest Monthly Total (January)	9709	9889
Least „ „ (September)	5098	4858
Greatest recorded hourly velocity (January 15th)...	47	50
Prevailing Direction of Wind	W.	W.

DIFFERENCES, 1938.

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

Mean barometric pressure	+	0·039 in.
Yearly range	+	0·193 in.
Mean of highest daily temperatures	+	0·1°
Mean of lowest „ „	+	2·2°
Mean daily range	—	2·1°
Adopted mean temperature	+	1·4°
Total rainfall	+	4·792 in.

ABSOLUTE EXTREMES

FOR THE LAST 91 YEARS.

Readings of Barometer, in inches.

Highest monthly mean	1932 (Feb.)	30·082
Lowest „ „	1868 (Dec.)	28·984
Highest yearly „	1921	29·615
Lowest „ „	1872	29·319
Greatest monthly range	1886 (Dec.)	2·795
Least „ „	1852 (July)	0·505
Highest reading	1896 (Jan. 9th) ...	30·597
Lowest „	1886 (Dec. 8th) ...	27·350
Extreme range	... ...	3·247

Thermometer, Fahrenheit.

Highest monthly mean temperature ...	1901 (July) ...	63·2
Lowest „ „ ...	1855 (Feb.) ...	28·6
Highest yearly „ „ ...	1921	49·4
Lowest „ „ „ ...	1879	44·1
Highest reading „ ...	1901 (July 20th)	89·0
Lowest „ „ ...	1881 (Jan 15th)	4·6

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

Greatest monthly mean	1852 and 1927 (July)	5·1
Least „ „	†1895 (Feb.)	1·4

† *And in* 1855 (*Feb.*).

ABSOLUTE EXTREMES

FOR THE LAST 91 YEARS—*Continued.*

Rainfall, in inches.

Greatest Rainfall in one day	...	1866 (Nov. 16th)	... 3·700
Greatest ,, ,, month	...	1870 (Oct.)	... 13·437
Least ,, ,, ,,	...	1932 (Feb.)	... 0·123
Greatest ,, ,, year	...	1923	... 63·558
Least ,, ,, ,,	...	1887	... 31·250
Days on which ·005 in. or more Rain fell :			
Greatest No. in one month	...	1890 (Jan.)	... } 30
	and	1918 (Dec.)	... }
Least ,, ,,	...	1852 (Mar.)	... 3
Greatest ,, year	...	1872	... 281
Least ,, ,,	...	1855	... 135

* *Wind.*

Greatest hourly velocity, in miles		1894 (Dec. 22)	... 65
Greatest No. of miles registered in a month	...	1888 (Nov.)	... 12813
Least ,,	...	1917 (Feb.)	... 3160
Greatest Mean No. ,, ,,	...	January	... 8310
Least ,, ,, ,,	...	September	... 6001
Greatest No. ,, ,, year		1868	... 102395
Least ,, ,, ,, ,,		1915	... 70623

* *Record dates from* 1867 *only.*

DATES OF OCCASIONAL PHENOMENA.

1938	Frost	Hoar Frost	Snow	Hail	Heavy Rain
January	1-3, 5, 9-11, 18, 22, 27, 30, 31	11	9, 30	6, 7, 29, 30, 31	20, 27
February	7, 9, 11, 13-18, 21, 22, 24, 25	24	13, 14	1, 10, 18	9, 27
March	2, 7, 14, 22, 23, 24	23			
April	4, 8-12, 16, 17, 18, 20, 29	10, 11, 12, 18		3	2
May	5, 6, 8, 9, 19-20	8			17, 29
June					1, 23, 28
July				5	7, 10
August					15, 17, 18
September	15	15			
October	26, 27, 28	26		5, 6, 7, 10	2, 3, 4, 8, 12, 17, 31
November	21, 22, 25, 27		19, 26, 27	1, 2, 19, 23-26, 28, 30	13, 25
December	4, 9, 15, 18-26, 28, 31	4, 15	3, 17-22, 25, 31	1, 3, 9	1, 4, 29, 31

1938	Gales of Wind	Fog	Thunder	Lightning	Lunar Halo	Solar Halo	Aurora Borealis
January	15, 29	8	26	26, 28	11	13, 26, 27	25
February	2	9				24	
March		5-8,10,11,13,16,17,20,22,23				28	
April		20			7	18, 23	16
May			16			11, 15, 22, 25, 30	24
June		23	1, 5	1			
July		2, 24	7, 24 25	7, 25			
August		1, 7, 25, 26, 27, 30	5, 8-9, 11-12	5, 8, 11, 12		3, 14	
September		2, 5				1	
October	3, 4	23, 24, 25, 28, 29	4, 5, 6	4, 5, 6		22	26
November	13, 18, 23, 30	15, 18, 21, 22	23, 26	23, 24, 26		18	
December		10, 26, 28, 29	1	1	3		

MONTHLY TOTALS FOR EACH HOUR OF RECORDED SUNSHINE.

1938. Local apparent time	4–5	5–6	6–7	7–8	8–9	9–10	10–11	11–12	12–1	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9
January ...	...	...	...	...	1·8	3·7	5·6	5·4	6·4	5·2	3·8	0·2	...	...	...	...	...
February ...	...	...	...	1·1	3·8	8·9	10·5	9·5	10·3	10·6	8·5	4·7	0·9	...	...	...	...
March ...	...	...	0·8	3·8	5·4	7·8	12·2	11·6	11·7	11·5	11·5	12·0	7·1	1·6	...	...	...
April ...	...	2·5	11·5	15·3	16·0	18·0	17·1	15·9	15·1	15·3	15·9	15·0	14·2	11·2	2·2	...	...
May ...	0·8	6·7	9·8	10·5	10·5	9·6	12·5	14·0	15·9	16·2	17·3	16·6	14·9	13·5	7·6	1·6	...
June ...	2·4	3·8	7·9	12·3	12·9	11·7	13·9	14·6	14·1	14·5	15·3	15·0	13·0	13·4	10·7	4·2	...
July ...	1·5	3·4	2·6	6·2	6·6	6·2	5·0	9·7	12·3	10·6	13·0	13·3	12·3	9·9	7·8	4·0	...
August ...	0·1	3·9	10·6	11·0	11·9	10·6	11·5	15·7	15·0	17·0	14·6	14·2	12·1	8·6	3·9	...	...
September ..	...	0·4	4·1	7·3	9·3	9·2	9·7	9·7	8·5	9·3	9·8	11·4	7·2	3·5	0·3	...	...
October ...	...	...	...	0·7	4·6	8·0	10·0	10·9	11·7	8·9	9·5	5·7	2·0	...	...	...	...
November...	...	...	...	0·1	1·7	4·6	9·2	10·2	9·0	6·0	4·8	1·1	0·2	...	...	...	...
December ...	...	...	...	...	0·2	4·7	8·0	8·6	10·7	6·7	3·1	...	...	...	...	...	...
Sums...	4·8	20·7	47·3	68·3	84·7	103·0	125·2	135·8	140·7	131·8	127·1	109·2	83·9	61·7	32·5	9·8	...

TOTAL AMOUNT OF SUNSHINE RECORDED ON EACH DAY.

1938	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
January ...	...	3·0	0·1	...	0·1	...	0·1	0·1	0·7	0·6	...	...	...	0·6	...	...	1·8
February ...	...	2·8	2·9	1·0	...	...	...	...	...	3·3	6·7	8·0	5·4	3·2	0·6	5·1	6·6
March ...	8·6	1·4	8·1	5·0	7·2	...	2·5	3·3	...	...	...	0·3	8·2	9·9	0·2	2·0	6·4
April ...	0·6	0·2	9·5	2·4	4·9	7·4	6·7	9·9	7·6	10·7	11·0	11·0	10·1	8·3	6·9	9·7	10·3
May ...	12·0	9·4	7·7	14·1	14·2	13·9	6·6	11·7	3·7	10·4	8·8	...	3·1	...	1·6	0·2	...
June ...	2·6	3·6	8·4	6·7	10·1	...	11·0	12·8	10·1	9·6	3·2	1·1	13·1	4·3	11·0	10·5	13·0
July ...	9·2	11·6	2·3	7·5	8·0	9·6	...	2·7	3·4	...	0·2	0·1	1·0	0·1	0·8	...	2·1
August ...	9·8	7·2	3·6	12·2	2·6	2·3	1·8	1·1	3·9	8·4	6·2	0·6	1·2	10·3	3·1	2·9	6·1
September ..	4·5	12·4	0·3	4·7	0·3	1·6	2·4	11·1	11·8	10·2	0·1	0·9	0·4	...	10·3	...	...
October ...	4·5	...	3·3	1·9	3·0	5·2	4·1	0·8	0·9	5·1	1·7	...	...	7·0	2·6	2·4	0·7
November...	5·6	2·4	0·1	...	...	1·0	0·3	0·1	4·6	...	1·8	0·2	0·4	3·0	3·1	...	0·2
December ...	0·4	2·1	3·6	...	2·0	0·5	...	...	...	4·0	...	...	...	2·2	0·4	1·1	...

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

1938	18	19	20	21	22	23	24	25	26	27	28	29	30	31	MONTHLY Total	MONTHLY Percen.
January ...	0·1	3·8	0·1	5·4	...	...	3·3	2·4	0·7	4·9	...	2·5	1·3	0·5	32·1	12·9
February ...	6·6	4·8	0·1	1·2	1·7	0·1	4·3	...	0·1	4·3	...	...	...	...	68·8	25·3
March ...	0·3	...	...	0·7	7·8	5·3	0·1	3·6	7·7	2·1	1·9	...	3·2	1·2	97·0	26·5
April ...	3·7	5·4	5·4	1·1	0·5	0·1	1·7	3·4	1·6	8·6	6·3	7·5	12·7	...	185·2	44·2
May ...	...	6·4	7·7	12·9	4·7	2·8	8·0	6·2	0·8	0·2	...	7·0	5·4	...	178·0	36·1
June ...	2·9	10·7	5·9	3·0	1·1	0·3	...	4·3	0·6	2·0	1·7	5·3	10·8	...	179·7	35·4
July ...	6·7	6·6	0·8	6·2	8·1	6·8	1·0	0·4	11·5	4·4	8·3	...	...	5·0	124·4	24·4
August ...	2·0	3·6	10·6	10·6	9·5	8·7	...	...	2·3	3·4	...	9·5	5·7	12·4	161·6	35·4
September ..	...	0·1	...	3·6	5·1	0·1	1·1	3·8	8·3	0·7	0·1	4·8	1 0	...	99·7	26·3
October ...	0·1	3·3	4·2	3·4	0·2	0·6	2·1	...	0·4	3·2	2·5	3·0	5·8	...	72 0	22 1
November...	1·2	4·0	...	1·5	3·7	0·1	2·1	2·1	1·9	...	0·1	5·2	2·2	...	46·9	18·3
December ..	2·6	1·6	3·6	5.0	...	0·7	0·2	...	...	5·0	0·1	...	2·3	4·6	42·0	18·2

SUMMARY OF SUNSHINE.

	Bright Sunshine Recorded					
	1938			Mean for the last 58 years		
	Number of		Percentage of Possible Sunshine	Number of		Percentage of Possible Sunshine
	Days	Hours		Days	Hours	
January ...	20	32·1	12·9	15·1	34·1	13·8
February ...	20	68·8	25·3	17·7	56·5	20·6
March ...	24	97·0	26·5	24·4	102·6	28·0
April ...	30	185·2	44·2	26·6	144·7	34·5
May ...	25	178·0	36·1	27·8	183·4	37·2
June ...	28	179·7	35·4	28·0	185·2	36·5
July ...	26	124·4	24·4	28·5	167·4	33·0
August ...	28	161·6	35·4	27·8	152·0	32·9
September ..	25	99·7	26·3	25·6	124·3	32·7
October ...	26	72·0	22·1	23·8	86·5	26·5
November ..	24	46·9	18·3	18·2	47·5	18·6
December ...	19	42·0	18·2	14·3	28·5	12·3
Year ...	295	1287·4	28·8	278·0	1312·6	29·4

SUMMARY OF SUNSHINE—*Continued.*

EXTREMES FOR THE LAST 58 YEARS.

Month	Number of Days on which Sunshine was recorded				Number of Hours				Percentage of Possible Sunshine			
	Greatest		Least		Greatest		Least		Greatest		Least	
Jan.	23	*1933	8	1898	64·2	1881	12·3	1913	25·9	1881	5·0	1913
Feb.	24	1895	11	1882	89·3	1887	29·6	1882	32·8	1887	10·9	1882
Mar.	30	1929	17	1904	178·9	1929	51·3	1936	48·9	1929	14·0	1936
April	30	*1938	22	1920	223·7	1893	80·7	1920	53·4	1893	19·3	1920
May	31	*1937	22	1886	280·7	1935	79·7	1906	56·9	1935	16·2	1906
June	30	*1896	24	*1888	272·5	1887	85·2	1912	53·6	1887	16·8	1912
July	31	*1882	24	1920	263·4	1911	98·0	1888	51·7	1911	19·3	1888
Aug.	31	*1937	23	1894	235·2	1899	74·1	1912	51·5	1899	16·2	1912
Sept.	30	1914	21	1897	204·1	1933	62·9	1896	53·9	1933	16·6	1896
Oct.	29	*1933	17	1889	134·9	1899	50·0	1889	41·4	1899	15·3	1889
Nov.	24	*1938	9	1897	89·9	1925	18·5	1891	35·1	1925	7·2	1891
Dec	20	*1935	6	1882	60·1	1886	7·4	1912	26·0	1886	3·2	1912
Year	307	1933	251	1903	1613·7	1887	927·6	1912	36·1	1887	20·7	1912

* *And in other years.*

HORIZONTAL MAGNETIC DIRECTION.

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

1938.	MEANS OF *				Mean for the month *	Mean daily range †	Highest reading of the month	Lowest reading of the month	Monthly range
	Highest readings	Lowest readings	4 a.m. readings	4 p.m. readings					
	12° +						12° +	11° +	
	′	′	′	′	′	′	′	′	′
January ...	25·8	16·6	20·6	22·8	21·5	31·6	93·4	− 1·6	155·0
February ...	24·8	16·2	19·2	22·0	20·6	19·6	42·4	48·4	54·0
March	26·2	14·8	17·6	23·8	20·6	19·9	46·4	45·4	61·0
April	28·2	12·8	18·2	24·0	20·8	>24·7	>111·2	21·2	>150·0
May	23·6	12·4	17·4	20·8	18·6	>22·3	> 91·2	1·2	>150·0
June	21·8	10·0	15·0	20·0	16·7	16·2	29·2	60·2	29·0
July	23·4	9·4	15·2	22·2	17·5	19·2	38·2	56·2	42·0
August ...	24·1	10·7	13·9	18·7	16·9	19·6	36·7	51·7	45·0
September ...	22·9	10·1	13·8	20·1	16·7	21·4	42·7	26·7	76.0
October ...	21·1	10·5	13·3	17·9	15·8	20·1	68·7	45·7	83·0
November ...	17·9	11·1	13·7	16·1	14·7	14·7	33·7	52·7	41·0
December ...	14·5	10·1	11·5	13·7	12·5	14·6	34·7	46·7	48·0
Means	22·9	12·1	15·8	20·2	17·7	>20·3	> 55·7	37·9	> 77·8

Mean for the year ... ... 12° 17′·7 W.

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

HORIZONTAL MAGNETIC FORCE.

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

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

1938	MEANS OF * Highest readings	Lowest readings	4 a.m. readings	4 p m. readings	Mean for the month *	Mean daily range †	Highest reading of the month	Lowest reading of the month	Monthly range
	17000 +						17000 +		
January ...	190	151	165	171	168	>138·0	422	–254	676
February ...	183	148	174	168	169	67·6	243	059	184
March ...	180	140	159	164	161	78·2	247	008	239
April	175	114	156	165	153	>119·6	532	<–176	>708
May	178	125	152	160	154	>130·6	>506	<–254	>760
June	174	118	149	154	149	91·1	247	054	193
July	171	106	143	151	143	104·9	311	017	294
August ...	151	96	133	136	129	104·9	302	–029	331
September ...	157	96	137	135	132	102·1	252	–139	391
October ...	160	115	141	140	140	87·4	302	–015	317
November ...	157	122	148	143	143	56·6	192	049	143
December ...	167	147	155	160	158	54·3	202	022	180
Means... ...	170	123	151	154	150	> 94·6	>313	<–055	>368

Mean for the year ... ... ·17150 C. G. S. Units.

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

ABSOLUTE MEASURES—SUMMARY.

1938	DIRECTION		FORCE.		
	Declination Corrected	Inclination	Horizontal	Vertical	Total
			C. G. S. UNITS.		
	° ′ 12 +	° ′ 68 +	0·17000+	0·44000+	0·47000+
January ...	20·7	56·1	148	522	710
February ...	20·8	53·8	143	274	457
March ...	21·1	53·4	146	412	606
April	20·8	52·8	138	369	564
May	18·1	53·4	162	454	651
June	17·0	52·5	179	463	666
July	17·6	52·6	158	412	611
August ...	17·4	56·3	148	491	676
September ...	16·4	56·8	146	544	730
October ...	14·1	55·8	140	490	677
November ...	14·3	54·8	147	469	661
December ...	14·2	52·9	153	411	608
	° ′	° ′			
Means ...	12 17·7	68 54·3	0·17150	0·44443	0·47635

DATES OF MAGNETIC DISTURBANCES.

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

1938	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1938
D.													D.
1	c	m	m	s	s	s	m	m	c	g	s	c	1
2	s	s	c	s	s	m	s	m	c	s	s	g	2
3	s	m	s	s	m	s	c	g	c	s	c	g	3
4	g	s	c	s	g	s	m	g	c	s	c	m	4
5	c	s	g	c	m	m	m	m	s	c	c	m	5
6	s	g	s	m	s	s	s	m	c	s	s	s	6
7	m	m	c	s	s	m	s	s	s	vg	s	c	7
8	m	g	c	s	c	m	c	c	c	g	g	c	8
9	m	m	c	s	c	s	m	c	c	m	g	m	9
10	c	m	c	s	s	m	m	s	c	m	s	g	10
11	c	m	c	m	vg	m	s	m	s	s	c	s	11
12	g	s	m	s	vg	m	s	s	s	s	c	s	12
13	m	m	c	m	m	m	s	s	g	s	c	m	13
14	s	g	s	g	g	s	s	c	g	s	m	m	14
15	s	c	s	m	m	c	g	c	g	s	s	c	15
16	g	s	s	vg	s	s	g	c	s	m	s	g	16
17	vg	c	s	m	m	s	c	c	c	s	g	g	17
18	m	s	(s)	m	s	s	s	c	c	c	m	g	18
19	g	c	(c)	m	s	s	c	c	c	c	s	m	19
20	m	c	s	s	c	s	c	c	s	s	s	m	20
21	m	c	m	s	s	s	c	s	c	c	m	s	21
22	vg	c	g	m	s	c	c	m	s	s	s	m	22
23	m	m	g	m	c	c	s	g	s	m	s	s	23
24	m	c	g	s	m	c	c	m	c	m	s	c	24
25	vg	m	m	s	s	c	c	m	c	g	s	c	25
26	vg	s	g	s	c	c	c	s	m	m	m	c	26
27	s	m	s	c	s	s	s	s	g	m	s	c	27
28	s	m	s	s	m	s	c	m	g	m	c	s	28
29	m		m	c	g	m	s	m	s	s	s	s	29
30	s		s	c	m	m	m	s	g	s	c	s	30
31	g		m		s		s	c		c		c	31
TOTAL c	4	7	9	4	5	6	11	10	14	5	8	9	92
TOTAL s	8	7	11	15	13	14	12	8	9	14	15	8	134
TOTAL m	10	11	6	9	8	10	6	10	1	8	4	8	91
TOTAL g	5	3	5	1	3	—	2	3	6	3	3	6	40
TOTAL vg	4	—	—	1	2	—	—	—	—	1	—	—	8

TOTALS

Note :—Character letters in brackets indicate incomplete records.

DATES OF SOLAR OBSERVATIONS

The Unit is $\frac{1}{5000}$th of the Disc.
NS—No Spots.

1938	Jan.	Feb.	Mar.	April	May	June
DAY						
1			4·17		11·04	3·83
2	6·91	6·81	2·58		8·91	3·73
3		7·51	1·94	4·35	9·98	4·97
4		6·65	2·47	3·32	7·76	4·72
5			3·13	3·81	9·74	4·77
6				4·97	7·73	
7			4·92	3·62	8·10	6·27
8			5·69	5·25	11·50	6·41
9				8·50	11·65	5·75
10	5·38	11·13		10·79	11·08	5·36
11		11·76		13·71	15·27	5·37
12		8·32		15·09		
13		9·26	7·52	16·19	10·79	4·82
14	20·17	13·54	6·11	12·27		4·05
15				13·38		4·46
16		9·81	4·20	15·12		3·84
17	29·78	8·48	4·53	13·76		4·16
18		8·62		13·32		5·35
19	28·02	6·96		13·78	9·68	6·64
20	20·27			13·70	11·27	7·92
21		3·54	5·04		8·18	9·71
22			7·08		9·46	
23		3·39	9·25		10·71	
24	4·98	2·53		12·40	14·26	
25	1·86		10·44	5·94	15·92	4·28
26	2·15		9·73	6·22	11·35	
27	1·71	2·17		7·62		4·47
28			10·10	8·69		
29				8·41	5·58	3·29
30	3·01		8·31	8·35	3·31	6·99
31						
Mean	11·29	7·53	5·96	9·70	10·14	5·27

AND DISC AREAS OF SPOTS.

n—Incomplete observation at Stonyhurst.

July	Aug.	Sept.	Oct.	Nov.	Dec.	1938
						DAY
5·45	7·36	5·04	4·99	4·72	13·93	1
7·31	5·43	8·67		4·04	11·52	2
	4·19		0·81		9·37	3
14·59	4·95	9·34				4
9·60	10·62		6·74		6·11	5
13·91	10·89	14·21	12·28			6
	11·49	9·44	18·65			7
21·74	10·87	8·53				8
	16·43	6·13		20·75		9
	15·19	4·44	24·93		7·77	10
	15·91		24·12	18·68		11
						12
18·95		0·76			5·47	13
	8·70	1·70	15·66	13·38	6·77	14
		2·77	13·14	12·17	4·12	15
	6·17		8·73		4·65	16
n			1·84			17
10·88	3·46			7·09		18
12·97	3·20		0·76	10·16	3·85	19
	2·42		1·36		6·77	20
5·82	2·09	5·35	2·72	3·37	7·25	21
3·28	1·47	6·67	2·61	2·87		22
6·03	2·10		3·96		10·84	23
			3·30	1·55		24
9·02		13·59		7·39		25
10·07	1·74	14·28		13·93		26
11·07	1·35	11·52	7·62		7·41	27
6·17			6·04	15·84	n	28
	1·99	6·92	6·40	16·40		29
	4·10	5·50	5·47	14·51	4·22	30
4·69	3·28				4·47	31
10·09	6·60	6·93	8·61	10·43	7·18	Mean