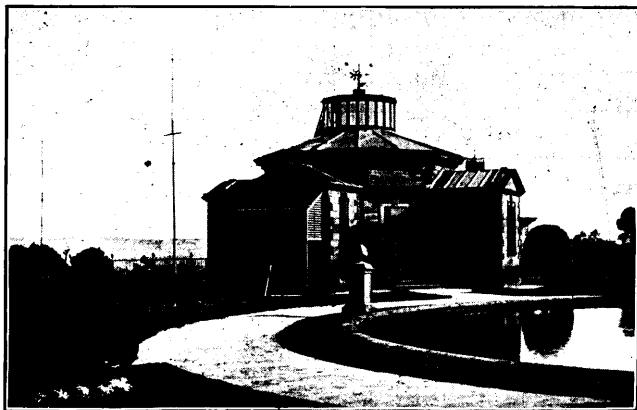


# STONYHURST COLLEGE OBSERVATORY.

Lat.  $53^{\circ} 50' 40''$  N. Long.  $9^{\text{m}} 52^{\text{s}}.68$  W.  
Height of the Barometer above the Sea, 381 feet.



(FOUNDED 1838.)

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## Results of Geophysical and Solar Observations, 1922.

With Report and Notes of the Director,  
Rev. A. L. CORTIE, S.J., D.Sc., F.R.A.S., F. Inst P.

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REPORT AND NOTES.

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GENERAL.—The Staff consists, in addition to the Director, of Father J. Rowland, S.J., B.Sc. (Lond.), F.R.A.S., and of the Rev. H. Macklin, S.J., B.Sc. (Oxon.). Mr. Joseph Burns performs the duties of Meteorological Clerk. During the months of August and September Father B. G. Swindells, S.J., B.Sc., A.R.C.Sc., assisted in the routine work of the Observatory, and was engaged on a research concerning the relations between terrestrial magnetic and sun-spot phenomena. The Director attended the meetings of the International Astronomical and Geophysical Unions, held in Rome, May 2nd to May 10th. He was appointed a Member of the Commission on the Solar Atmosphere, and the Stonyhurst College Observatory was made the international centre for visual observations of the solar surface. He also represented the College and the Observatory at the celebrations held at Padua, May 14th to May 17th, to commemorate the seventh centenary of the foundation of the University. In his capacity of delegate he received the degree of Doctor of the University, *honoris causa*.

All the instruments, which are under the care of Father Rowland, continue to be in good working order. From an old friend of the Observatory, Mr. E. T. Whitelow, F.R.A.S., we have to acknowledge a further

gift of a Ross-Goertz double anastigmatic lens, 12 inch focal length, working at F 7.7. Dr. G. A. Hemsalech has also kindly made and presented to us excellent replica copies of an occulting wedge.

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

The dominating character of the weather during the greater portion of the year was its very changeable and unseasonable condition. (*See Summary, p. 25*). June, July, and August were the warmest months absolutely, although in each case the adopted mean temperature was below the normal, and in the case of July as much as  $3.8^{\circ}$ . January, February, and March were the coldest months, the mean temperature in each case being near the normal. The percentage of possible sunshine 28.0, was slightly below the normal, but its distribution was very abnormal, for July, August, and September had amounts of sunshine considerably below the average, and in the case of July, with the lowest mean temperature recorded during our 75 years of observation, and a rainfall of 161 per cent. of the average, the climatic conditions were most unseasonable. But in October the conditions were reversed, with a percentage of possible sunshine, nearly 11 above the average, and a record low rainfall of 0.92 inches, which is only 19 per cent. of the average. The distribution of rainfall which was in the total very near the average, namely 46.99 inches, as compared with 47.07, was such that February, July and August had much greater amounts

of precipitation than the average, while March, May, and November had amounts below the average, and October was an extraordinarily dry month.

Heavy falls of rain, of one inch or more in 24 hours, occurred on five days of the year: February 2nd, July 5th, August 8th, November 6th, and December 20th.

The adopted mean temperature for the year was  $46.2^{\circ}$ , which is only  $0.8^{\circ}$  below the average. Shade temperature reached  $70^{\circ}$  or over on 9 days only, five in May, and four in June. Fine dry periods of five days or more were recorded as follows: February 5th—12th, March 12th—18th, April 17th—21st, May 5th—9th, 23rd—31st, June 1st—8th, September 7th—11th, November 15th—24th. The total was 8 periods with an average duration of 7 days.

Bright sunshine for 10 hours or more was registered on three days in April, nine in May, two in June, three in July, and one in September, which gives a total of 26 days.

The days of the year which had the greatest duration of sunshine were June 4th, 6th, 7th, 11th, 12th, each with  $14.8$  hours of bright sunshine.

Gales of wind occurred on January 1st, 18th, April 5th, November 1st, December 21st, 22nd, the velocity averaging 39 miles per hour. The prevailing direction of the wind for the year was from the W.

**MAGNETICAL.**—Absolute measures of Horizontal Magnetic Force have been made once each month, by



## VIII.

the method of Vibration and Deflection. The constants of the magnetometer needles were described in our last 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 four times each month, at nearly equal intervals, and usually at 16 hours. The Differential Instruments, or Photo-Magnetographs, which have been in practically continuous action since the year 1866, are of the Kew Observatory pattern, except that the radial distances between the centres of the magnets and the surfaces of the respective cylinders are somewhat shorter, being 152·4 Cms. The time-scale is provided by hand screens, cutting off the light at noted times, usually at 10 hours and 16 hours. The times are controlled by the wireless signals from Paris. The scale values of the instruments are as follows :—

For the Unifilar	...	11·28'		per Cm. of Ordinate.
,, Bifilar	...	·000499	C.G.S.	,, ,,
,, Balance	...	·000683		,, ,,

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

The absolute measures of Horizontal Direction and Force are corrected by the difference between the curve ordinate at the time of observation and the monthly mean of the four daily readings, according to the rule stated on page xii of our Report, 1908 ; and the month means are taken from the readings on the five quietest days of the month.

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

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

Corresponding tabulations are sent quarterly to the Meteorological Institute at De Bilt (Holland), for the International Committee on Terrestrial Magnetism. In these the significant notes are restricted to three—0 (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. In general the figure 0 corresponds to the letter c, and the figure 2 to the letters g, and v.g. The figure 1 corresponds to s generally, and to m sometimes, which same letter also does not unfrequently correspond to the figure 2. The civil day is used for both the international figures, and for our own characteristic letters. The rule followed in assigning these letters to denote the magnetic character of a day is as follows :—

From the measured ranges of D and H in minutes of arc on the five quietest days of a month a mean value is obtained of D and H combined. Similarly for each day of the month a mean value in minutes of arc of the range of D and H combined is set down. The excess of this mean daily range over the mean for the five quietest days gives the magnetic character of the day. The following values of the excess are adopted for the table of magnetic disturbances :—0 to 2 calm, 2 to 7 small,

7 to 15 moderate, 15 to 20 great, above 20 very great. Further, an inspection of the curves helps to settle the magnetic character of the day in doubtful cases.

The mean daily range of the Declination magnet for the quiet days,  $6\cdot9'$ , was identical with the value for 1921, but that for all days was greater,  $13\cdot5'$ , compared with  $11\cdot4'$  for 1921. With regard to Horizontal Force, for the quiet days the range was less than in the preceding year, 28 as compared with 38 units, but greater for all days, 60 compared with 54 units.

The mean magnetic characters for the various months, whether derived from the International numbers, or from numerical values corresponding to the Stonyhurst letters, agree in pointing to March as the most magnetically active month, with February, April, October as also months of disturbance, while June, November, and December showed least disturbance. Sudden commencements of disturbance were noted on March 10th, 8 h. 0 m. ; April 7th, 15 h. 28 m. ; May 16th, 12 h. 18 m. ; June 28th, 10 h. 24 m. ; November 13th, 15 h. 30 m. ; December 9th, 21 h. 50 m. ; and December 24th, 21 h. 48 m. Repetitions of movements at approximately the same hour were noted on the Declination Magnets, on April 9th, 10th, 11th, 12th, 13th, and 15th ; April 18th and 20th ; April 23rd to 29th ; August 12th and 13th ; and October 8th and 9th. In June the ranges in Horizontal Force were notably greater than those in Declination. On December 11th a sudden bay in H and D commenced to form at 21 h. 36 m., followed by corresponding movements of the needles, December 13th, 20 h. 36 m. ; December 14th, 19 h. 12 m. ; and December 15th, 18 h. 38 m.

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

The measurement of the areas and positions of the spots on the drawings was made by the Rev. H. Macklin, and the results are exhibited in the Tables on pp. 39, et seq. He reports as follows :—

“ Observations of the solar surface were made on 256 days, and include 248 drawings. Of these drawings 220 are complete, and show all spots and faculæ ; the remaining 28 are complete for the spots, but not for the faculæ.

The mean daily disc-area of the spots (in units 1/5000th of the visible surface), stands at 1.73. A comparison of the mean disc-area of the spots, with the mean daily range of magnetic Declination in minutes of arc, and of Horizontal Force in units  $10^{-5}$  C.G.S., is set forth as follows :—

Year ... ..	1917	1918	1919	1920	1921	1922
Spot-Area ... ..	12.1	7.9	8.4	4.05	3.14	1.73
Declination Range	11.8	12.4	12.7	11.2	11.4	13.5
Horizontal Force						
Range ... ..	59	69	66	57	54	60

The sun-spot activity showed a notable decline. There were two large spot-groups ; No. 106, which had a maximum area of 21.5 units, crossing the sun's disc between February 27th and March 8th, the centres

of the chief spots forming the group lying between  $+6^{\circ}\cdot8$  and  $+11^{\circ}\cdot1$  in latitude, and  $105^{\circ}\cdot5$  and  $136^{\circ}\cdot5$  in longitude; and a second large spot group which was first observed on December 22nd, and which attained a maximum area of 13·0 units, the centres of the two chief spots being  $+6^{\circ}\cdot1$ ,  $93^{\circ}\cdot5$ , and  $+6^{\circ}\cdot3$ ,  $85^{\circ}\cdot6$  in latitude and longitude. Other moderately large spots were No. 103, February 8th—17th, with an area of 9·2 units, and No. 108, March 1st—12th, with an area of 9·6 units.

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

#### JANUARY—MARCH.

In positive latitude 11 groups with an area of 46·7 units  
 In negative latitude 10 groups with an area of 20·6 units

#### APRIL—JUNE.

In positive latitude 11 groups with an area of 12·2 units  
 In negative latitude 2 groups with an area of 0·5 units

#### JULY—SEPTEMBER.

In positive latitude 7 groups with an area of 2·8 units  
 In negative latitude 6 groups with an area of 9·2 units

#### OCTOBER—DECEMBER.

In positive latitude 6 groups with an area of 14·9 units  
 In negative latitude 8 groups with an area of 8·3 units

This shows that on the whole the greater activity remains in the Sun's N. hemisphere, but is tending to pass back to the S. hemisphere.

In the whole year there were in N. latitude 33 spot-groups with an area of 72·6 units, and in S. latitude

26 groups with an area of 38·6 units. There were 93 spotless days in 1922, mainly in the months April to October, as against 29 spotless days in 1921, the relative and respective percentages of all days of observation being 36·3 and 12·5."

The spectra of the March and December sun-spots were examined, and the observations confirm the permanent nature of the sun-spot spectrum.

The large grating spectrograph has been employed mainly in experimental work. With the stellar spectrograph a fair number of photographs of the brighter stars has been secured, especially of  $\gamma$  Cassiopeiae. It is intended, if possible, to use our accumulated store of stellar spectrograms for the determination of stellar parallaxes by the spectroscopic method. Other researches in hand deal with the relations between solar and terrestrial magnetic phenomena.

SEISMOLOGICAL.—The following is Father Rowland's Report :—" A short account of the Seismograph is given on p. xiii of our Annual Report for 1909. It is of the Milne type, with horizontal pendulum, mounted in the astronomical meridian, recording photographically. A copy of its register is sent monthly to the Secretary of the Seismological Committee of the British Association for the Advancement of Science, and quarterly bulletins are despatched to some seventy Seismological Stations throughout the world. The instrument has been in satisfactory operation throughout the year, but the record was lost from accidental causes on three days—two in May and one in June—and the latter portion of the record of the Chilian Earthquake

on November 11th, was lost owing to the amplitude of oscillation at the maximum phase, causing the boom to adhere to the stop at the limit of its traverse.

The time of operation of the automatic cut-off which gives marks on the record is checked daily from the Paris time signals to within one second, but owing to the character of the record given by this type of instrument it is not possible to measure the times of phases to a greater degree of accuracy than 0·1 minute. Even this degree of precision is rarely justified, as owing to the very gradual emergence of most disturbances, the assignment of the point of commencement is a matter of considerable uncertainty. The oscillation period of the pendulum has been maintained at 18·0 sec. throughout the year.

The most notable earthquakes recorded during the year, having a double amplitude of 5 m.m. or more, were on Jan. 17th (8·5 mm.), 31st (7·0 mm.); June 12th (5·0 mm.); Aug. 13th (11·8 mm.); Sept. 1st (15·0 mm., origin S.E. China); Nov. 11th (over 25 mm., Chile); 7th (5·0 mm.).

The total number of shocks recorded was 131, distributed as follows :—

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Tl.
15	16	11	14	9	5	7	15	10	4	11	13	131

The following papers have been published during the year :—

1. Sun-Spot Areas and Terrestrial Magnetic Hori-

zontal Ranges and Disturbances. *The Observatory*, 45, No. 574.

2. Terrestrial Magnetic Disturbances and Sun-Spots. *Monthly Notices, R.A.S.*, 82, 170.

3. Note on the Proper Motions of Stars of the Clusters  $\beta$  and  $\chi$  Persei. *Ibid*, 83, 79.

4. Measuring the Stars. *Journal Manchester Astronomical Society*, No. 6, 25.

5. The Work of a Magnetic Observatory. *Ibid*, No. 6, 23.

6. Solar Prominences. *Ibid*, No. 6, 41.

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





# METEOROLOGICAL REPORT.

## JANUARY, 1922.

Results of Observations taken during the Month.								Mean for the last 75 years.
Mean Reading of the Barometer .....	inches	29·333						29·481
Highest „ „ on the 12th .....	„	29·987						30·125
Lowest „ „ on the 15th .....	„	28·586						28·578
Range of Barometer Readings.....	„	1·401						1·547
Highest Reading of a Max. Therm. on the 9th ...		54·0						51·4
Lowest Reading of a Min. Therm. on the 18th .....		19·6						21·5
Range of Thermometer Readings .....		34·4						29·9
Mean of Highest Daily Readings .....		41·6						42·4
Mean of Lowest Daily Readings .....		33·1						33·1
Mean Daily Range .....		8·5						9·3
Deduced Mean Temp. (from mean of Max. and Min.)		37·2						37·5
Mean Temperature from Dry Bulb .....		37·8						37·8
Adopted Mean Temperature .....		37·5						37·7
Mean Temperature of Evaporation .....		36·2						36·4
Mean Temperature of Dew Point .....		34·4						34·3
Mean elastic force of Vapour.....inches		0·199						0·200
Mean weight of Vapour in a cub. ft. of air, grains		2·3						2·4
Mean additional weight required for saturation „		0·3						0·4
Mean degree of Humidity (saturation 100) .....		89						87
Mean weight of a cubic foot of air .....	grains	547·1						549·4
Mean amount of Cloud (0—10) .....		8·0						7·8
Fall of Rain .....	inches	3·990						4·285
Greatest Rainfall in one day (15th) .....	„	0·590						0·825
No. of days on which ·005 in. or more Rain fell...		23						19·4
Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	0	9	3	4	0	9	3
Mean Velocity in miles per hr.	6·4	0	11·2	7·8	7·3	0	14·9	14·4
Total No. of miles .....	462	0	2410	565	700	0	3216	1038
								Mean*
Total No. of miles registered .....								8391
Greatest hourly velocity (1st, at 2 & 3 p.m., Dir.W.)								40
								41·2

\* For the last 55 years.

## JANUARY, 1922.

### DIFFERENCES.

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

Mean barometric pressure	...	...	...	—	0·148 in.
Monthly range	„	...	...	—	0·146 in.
Mean of highest daily temperatures	...	...	...	—	0·8°
Mean of lowest	„	„	...	—	0·0°
Mean daily range	...	...	...	—	0·8°
Adopted mean temperature	...	...	...	—	0·2°
Total rainfall	...	...	...	—	0·295 in.

Ground Frost on 4th, 5th, 12th, 22nd, 24th—27th. Heavy Rain on 15th. Snow on 13th, 16th, 18th, 24th—26th. Hail on 11th, 27th. Fog on 6th, 7th, 19th. Lunar Halo on 8th. Gales of Wind on 1st and 18th.

### EXTREME READINGS FOR JANUARY,

During 75 Years.

Highest reading of Barometer	...	1896 (9th)	.....	30·597 in.
Lowest	„	„	...	1884 (26th) ..... 27·803 in.
Highest temperature	...	...	1877 (7th)	..... 59·9°
Lowest	„	„	...	1881 (15th) ..... 4·6°
Highest adopted mean temperature	...	...	1916	..... 44·7°
Lowest	„	„	...	1881 ..... 29·2°
Greatest fall of rain	...	...	1921	..... 8·589 in.
Least	„	„	...	1881 ..... 0·472 in.
Greatest fall of rain in one day	...	...	1914 (8th)	..... 2·074 in.
Greatest No. of days on which				
·005 in. or more rain fell	...	1890	.....	30
Least	„	„	...	†1850 ..... 8
*Greatest hourly velocity of wind	...	1899 (12th)	.....	63 mls.
*Greatest No. of miles registered	...	1890	.....	11661
*Least	„	„	...	1881 ..... 4352

\* Since 1867 only.

† And in other years.

## FEBRUARY, 1922.

Results of Observations taken during the Month.	Mean for the last 75 years.							
Mean Reading of the Barometer ..... inches	29·346	29·496						
Highest     "     "     on the 10th...     "	29·999	30·104						
Lowest     "     "     on the 3rd ...     "	28·622	28·658						
Range of Barometer Readings.....     "	1·337	1·446						
Highest Reading of a Max. Therm. on the 25th..	56·0	52·0						
Lowest Reading of a Min. Therm. on the 6th ..	20·6	22·5						
Range of Thermometer Readings .....	35·4	29·5						
Mean of Highest Daily Readings .....	43·5	44·0						
Mean of Lowest Daily Readings .....	34·1	33·6						
Mean Daily Range .....	9·4	10·4						
Deduced Mean Temp. (from mean of Max. & Min.)	38·4	38·2						
Mean Temperature from Dry Bulb .....	38·7	38·5						
Adopted Mean Temperature .....	38·6	38·4						
Mean Temperature of Evaporation .....	36·7	36·8						
Mean Temperature of Dew Point .....	34·1	34·5						
Mean elastic force of Vapour ..... inches	0·197	0·195						
Mean weight of Vapour in a cub. ft. of air, grains	2·3	2·4						
Mean additional weight required for saturation ..	0·5	0·4						
Mean degree of Humidity (saturation 100) . ....	85	86						
Mean weight of a cubic foot of air .....	545·8	548·7						
Mean amount of Cloud (0—10) .....	7·8	7·5						
Fall of Rain .....	5·907	3·513						
Greatest Rainfall in one day (2nd) .....	1·230	0·767						
No. of days on which ·005 in. or more Rain fell...	19	16·7						
Wind :—Direction .....	N	NE	E	SE	S	SW	W	N W
No. of days.....	0	3	3	0	6	4	12	0
Mean Velocity in miles per hr.	0	6·0	6·4	0	10·5	13·0	12·2	0
Total No. of miles.....	0	430	463	0	1511	1252	3515	0
								Mean *
Total No. of Miles registered .....	7171							7492·0
Greatest hourly velocity (26th. at 9 a.m., Dir. S.) ...	33							41·0

\* For the last 55 years.

## FEBRUARY, 1922.

### DIFFERENCES.

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

Mean barometric pressure	...	...	...	—	0·150 in.
Monthly range	"	"	"	—	0·069 in.
Mean of highest daily temperatures	"	"	"	—	0·5°
Mean of lowest	"	"	"	+	0·5°
Mean daily range	"	"	"	—	1·0°
Adopted mean temperature	"	"	"	+	0·2°
Total rainfall	"	"	"	+	2·394 in.

Ground Frost on 2nd, 4th—14th, 19th, 22nd. Heavy Rain on 2nd, 3rd, and 22nd. Snow on 4th, 13th, 18th, 20th—22nd. Hail on 13th, 18th, 20th—22nd. Fog on 15th and 16th. Lunar Halo on 7th and 9th. Solar Halo on 14th.

### EXTREME READINGS FOR FEBRUARY,

During 75 Years.

Highest reading of Barometer	...	1902 (1st)	.....	30·476 in.
Lowest	"	"	"	27·870 in.
Highest temperature	.....	1877 (8th)	.....	58·3°
Lowest	"	1902 (11th)	.....	5·0°
Highest adopted mean temperature	.....	1869	.....	44·0°
Lowest	"	1855	.....	28·6°
Greatest fall of rain	.....	1848	.....	8·882 in.
Least	"	1858	.....	0·306 in.
Greatest fall of rain in one day	...	1909 (3rd)	.....	2·000 in.
Greatest No. of days on which				
·005 or more rain fell	.....	1910	.....	27
Least	"	1855	.....	4
*Greatest hourly velocity of wind	...	1903 (27th)	.....	60 mls.
*Greatest No. of miles registered	...	1868	.....	12577
*Least	"	1917	.....	3160

\* Since 1867 only.

## MARCH, 1922.

Results of Observations taken during the Month,	Mean for the last 75 years.							
Mean Reading of the Barometer ..... inches	29·448	29·446						
Highest     "     "     on the 13th ...     "	30·075	30·044						
Lowest     "     "     on the 8th ...     "	28·484	28·641						
Range of Barometer Readings .....	1·591	1·403						
Highest Reading of a Max. Therm. on the 12th...	52·8	56·7						
Lowest Reading of a Min. Therm. on the 22nd...	25·6	23·3						
Range of Thermometer Readings .....	27·2	33·4						
Mean of Highest Daily Readings .....	44·6	46·9						
Mean of Lowest Daily Readings .....	35·1	34·4						
Mean Daily Range .....	9·5	12·5						
Deduced Mean Temp. (from mean of Max. & Min.)	38·9	39·7						
Mean Temperature from Dry Bulb .....	39·5	40·3						
Adopted Mean Temperature .....	39·2	40·0						
Mean Temperature of Evaporation .....	37·2	38·2						
Mean Temperature of Dew Point .....	34·6	35·8						
Mean elastic force of Vapour ..... inches	0·201	0·210						
Mean weight of Vapour in a cub. ft. of air, grains	2·3	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	546·9	546·1						
Mean amount of Cloud (0—10) .....	7·7	7·5						
Fall of Rain .....	2·395	3·420						
Greatest Rainfall in one day (5th) ..... "	0·740	0·778						
No. of days on which ·005 or more Rain fell...	15	16·9						
Wind :—Direction .....	N	NE	E	SE	S	SW	W	NW
No. of Days.....	6	3	10	0	2	2	8	0
Mean Velocity in miles per hr.	7·5	7·6	7·2	0	14·7	13·4	10·2	0
Total No. of miles.....	1081	550	1720	0	704	643	1950	0
								<b>Mean*</b>
Total No. of Miles registered .....	6648							8477·0
Greatest hourly velocity (5th at 11 a.m., Dir.S.S.W.)	33							40·6

\* For the last 55 years.

## MARCH, 1922.

### DIFFERENCES.

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

Mean barometric pressure	...	...	...	...	+	0·002 in.
Monthly range	"	"	...	...	+	0·188 in.
Mean of highest daily temperatures	...	...	...	...	—	2·3°
Mean of lowest	"	"	...	...	+	0·7°
Mean daily range	...	...	...	...	—	3·0°
Adopted mean temperature	...	...	...	...	—	0·8°
Total rainfall	...	...	...	...	—	1·025 in.

Ground Frost on 10th, 11th, 14th, 19th—24th, 26th—31st.  
Heavy Rain on 5th. Hail on 4th, 8th, 9th, 27th. Snow on 10th,  
20th, 21st, 23rd, 24th, 27th, and 31st. Fog on 12th. Zodiacal  
Light 14th, 17th, 20th, and 22nd. Solar Halo on 29th.

### EXTREME READINGS FOR MARCH, During 75 Years.

Highest reading of Barometer	...	1854 (4th)	.....	30·452 in.
Lowest	"	"	...	1876 (10th) .....28·100 in.
Highest temperature	.....	1871 (25th)	.....	68·0°
Lowest	"	.....	1874 (10th)	..... 11·1°
Highest adopted mean temperature	.....	1920	.....	44·2°
Lowest	"	"	.....	1883 ..... 34·4°
Greatest fall of rain	.....	1912	.....	7·205 in.
Least	"	.....	1852	..... 0·352 in.
Greatest fall of rain in one day	...	1898 (17th)	.....	1·540 in.
Greatest No. of days on which ·005 in. or more rain fell	...	†1861	.....	28
Least	"	"	.....	1852 ..... 3
*Greatest hourly velocity of wind	..	1905 (15th)	.....	57 mls.
*Greatest No. of miles registered	...	1903	.....	12773
*Least	"	"	.....	1892 ..... 5725

\* Since 1867 only. † And 1914.

## APRIL, 1922.

Results of Observations taken during the Month.							Mean for the last 75 years.	
Mean Reading of the Barometer .....	inches	29·336					29·487	
Highest " " on the 18th ... "		30·144					29·962	
Lowest " " on the 12th ... "		28·563					28·790	
Range of Barometer Readings .....		1·581					1·172	
Highest Reading of a Max. Therm. on 15th. ....		55·4					64·7	
Lowest Reading of a Min. Therm. on the 1st ...		26·4					28·1	
Range of Thermometer Readings .....		29·0					36·6	
Mean of Highest Daily Readings .....		48·1					54·5	
Mean of Lowest Daily Readings .....		34·4					37·8	
Mean Daily Range .....		13·7					16·7	
Deduced Mean Temp. (from mean of Max. & Min.)		39·8					43·9	
Mean Temperature from Dry Bulb .....		41·3					44·7	
Adopted Mean Temperature .....		40·6					44·4	
Mean Temperature of Evaporation .....		38·1					41·6	
Mean Temperature of Dew Point .....		34·9					38·2	
Mean elastic force of Vapour .....	inches	0·203					0·234	
Mean weight of Vapour in a cub. ft. of air, grains		2·4					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	544·0					542·2	
Mean amount of Cloud (0—10) .....		7·4					6·7	
Fall of Rain .....	inches	2·798					2·579	
Greatest Rainfall in one day (23rd) .....	"	0·640					0·594	
No. of days on which ·005 in. or more Rain fell...		18					14·9	
Wind :—Direction .....	N	NE	E	SE	S	SW	W	NW
No. of days.....	6	6	1	1	2	1	12	1
Mean Velocity in miles per hr.	8·0	6·4	7·4	5·3	17·1	3·0	8·6	8·3
Total No. of Miles.....	1153	918	177	128	822	72	2491	198
Total No. of Miles registered .....					5959		Mean*	
Greatest hourly velocity (15th, 11 a.m., Dir. S.S.W.)					41		7508·4	36·2

\* For the last 55 years.

## APRIL, 1922.

### DIFFERENCES.

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

Mean barometric pressure	...	...	...	—	0·151 in.
Monthly range	„	...	...	+	0·409 in.
Mean of highest daily temperatures	...	...	...	—	6·4°
Mean of lowest	„	„	...	—	3·4°
Mean daily range	...	...	...	—	3·0°
Adopted mean temperature	...	...	...	—	3·8°
Total rainfall	...	...	...	+	0·219 in.

Ground Frost on 1st—9th, 11th, 12th, 17th—21st, 23rd, 29th, and 30th. Heavy Rain on 23rd. Snow on 1st, 7th, and 8th. Hail on 3rd, 24th, and 27th. Hoar Frost on 5th, 6th and 7th. Fog on 30th. Lunar Halo on 3rd. Solar Halo on 13th. Gale of Wind on 15th.

### EXTREME READINGS FOR APRIL,

During 75 Years.

Highest reading of Barometer	...	1906 (8th)	.....	30·317 in.
Lowest	„	1919 (14th)	.....	28·250 in.
Highest temperature	.....	1852 (14th)	.....	74·1°
Lowest	„	1917 (2nd)	.....	13·6°
Highest adopted mean temperature	.....	1865	.....	48·5°
Lowest	„	1917	.....	39·8°
Greatest fall of rain	.....	1867	.....	5·672 in.
Least	„	1852	.....	0·478 in.
Greatest fall of rain in one day	...	1913 (26th)	.....	1·180 in.
Greatest No. of days on which				
·005 in. or more rain fell	.....	1920	.....	27
Least	„	1852	.....	4
*Greatest hourly velocity of wind	...	1911 (19th)	.....	53 mls.
*Greatest No. of miles registered	.....	1904	.....	11016
*Least	„	1884	.....	5047

\* Since 1867 only.



## MAY, 1922.

Results of Observations taken during the Month.		Mean for the last 75 years.						
Mean Reading of the Barometer .....	inches 29·645	29·543						
Highest " " on the 27th ...	" " 30·028	29·992						
Lowest " " on the 17th ...	" " 29·179	28·957						
Range of Barometer Readings .....	" " 0·849	1·035						
Highest Reading of a Max. Therm. on the 31st ...	74·7	72·0						
Lowest Reading of a Min. Therm. on the 2nd .....	32·5	32·0						
Range of Thermometer Readings .....	42·2	40·0						
Mean of Highest Daily Readings .....	60·8	59·5						
Mean of Lowest Daily Readings .....	45·1	42·6						
Mean Daily Range .....	15·7	16·9						
Deduced Mean Temp. (from mean of Max. & Min.)	51·3	49·3						
Mean Temperature from Dry Bulb .....	52·8	50·1						
Adopted Mean Temperature .....	52·1	49·7						
Mean Temperature of Evaporation .....	48·8	46·5						
Mean Temperature of Dew Point .....	45·4	43·0						
Mean elastic force of Vapour .....	inches 0·304	0·281						
Mean weight of Vapour in a cub. ft. of air, grains	3·5	3·2						
Mean additional weight required for saturation "	1·0	0·9						
Mean degree of Humidity (saturation 100).....	78	77						
Mean weight of a cubic foot of air .....	536·3	536·9						
Mean amount of Cloud (0—10).....	7·8	7·0						
Fall of Rain .....	inches 2·045	2·697						
Greatest Rainfall in one day (19th) .....	" " 0·445	0·640						
No. of days on which ·005 in. or more Rain fell...	13	14·4						
Wind :—Direction .....	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	1	1	0	3	3	21	0
Mean Velocity in miles per hr.	3·5	5·4	7·4	0	7·0	8·9	8·8	0
Total No. of miles.....	168	130	177	0	506	639	4425	0
Total No. of Miles registered .....	5975	Mean*						
Greatest hourly velocity (4th, at 4 & 5 p.m., Dir. W.S.W.) .....	28	6917·9						
		32·6						

\* For the last 55 years.

## MAY, 1922.

## DIFFERENCES.

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

Mean barometric pressure	...	...	...	+	0·102 in.
Monthly range	"	...	...	—	0·186 in.
Mean of highest daily temperatures	...	...	...	+	1·3°
Mean of lowest	"	"	...	+	2·5°
Mean daily range	...	...	...	—	1·2°
Adopted mean temperature	...	...	...	+	2·4°
Total rainfall	...	...	...	—	0·652 in.

Ground Frost on 2nd, 12th and 13th. Hail on 4th and 12th. Snow on 12th. Thunder on 17th, 21st, and 23rd. Lightning on 21st and 23rd. Lunar Halo on 5th, 7th and 8th. Solar Halo on 9th and 17th.

## EXTREME READINGS FOR MAY,

During 75 Years.

Highest reading of Barometer	...	1881 (10th)	.....	30·332 in.
Lowest	"	"	.....	1887 (28th) .....28·559 in.
Highest temperature	.....	1864 (19th)	.....	82·5°
Lowest	"	.....	1855 (4th)	..... 23·5°
Highest adopted mean temperature	.....	1848	.....	55·1°
Lowest	"	"	.....	1855 ..... 45·0°
Greatest fall of rain	.....	1920	.....	6·511 in.
Least	"	"	.....	1859 ..... 0·249 in.
Greatest fall of rain in one day	...	1881 (5th)	.....	1·647 in.
Greatest No. of days on which				
.005 in. or more rain fell	...†	1860	.....	22
Least	"	"	...†	1848 ..... 4
*Greatest hourly velocity of wind	...	1888 (2nd)	.....	49 mls
*Greatest No. of miles registered...	...	1888	.....	9648
*Least	"	"	... ..	1918 ..... 5113

\* Since 1867 only.

† And in other years.

## JUNE, 1922.

Results of Observations taken during the Month.		Mean for the last 75 years.						
Mean Reading of the Barometer .....	inches 29·587	29·560						
Highest " " on the 14th ... "	29·890	29·936						
Lowest " " on the 25th ... "	29·090	29·044						
Range of Barometer Readings .....	" 0·800	0·891						
Highest Reading of a Max. Therm. on the 1st ...	78·8	76·9						
Lowest Reading of a Min. Therm. on the 6th ...	40·0	39·2						
Range of Thermometer Readings .....	38·8	37·7						
Mean of Highest Daily Readings .....	62·2	65·2						
Mean of Lowest Daily Readings .....	47·8	48·1						
Mean Daily Range .....	14·4	17·1						
Deduced Mean Temp. (from mean of Max. & Min.)	53·2	54·9						
Mean Temperature from Dry Bulb .....	55·1	55·3						
Adopted Mean Temperature .....	54·2	55·1						
Mean Temperature of Evaporation .....	50·5	51·8						
Mean Temperature of Dew Point .....	46·9	48·4						
Mean elastic force of Vapour .....	inches 0·320	0·348						
Mean weight of Vapour in a cub. ft. of air, grains	3·6	3·9						
Mean additional weight required for saturation "	1·1	1·0						
Mean degree of Humidity (saturation 100) .....	76	78						
Mean weight of a cubic foot of air .....	grains 532·4	531·3						
Mean Amount of Cloud (0—10).....	7·3	7·2						
Fall of Rain .....	inches 3·287	3·328						
Greatest Rainfall in one day (27th) .....	" 0·780	0·797						
No. of days on which ·005 in. or more Rain fell...	15	15·2						
Wind :—Direction .....	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	1	2	0	1	1	21	1
Mean Velocity in miles per hr.	6·1	6·5	5·1	0	6·5	10·3	9·3	16·2
Total No. of miles.....	442	155	244	0	157	248	4691	389
Total No. of Miles registered .....	6326						Mean*	
Greatest hourly velocity (17th & 25th, Dir. N.W. and W.) .....	24						29·3	

\*For the last 55 years

## JUNE, 1922.

### DIFFERENCES.

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

Mean barometric pressure	...	...	...	+	0·027 in.
Monthly range	..	..	..	—	0·091 in.
Mean of highest daily temperatures	...	...	...	—	3·0°
Mean of lowest	..	..	..	—	0·3°
Mean daily range	...	...	...	—	2·7°
Adopted mean temperature	...	...	...	—	0·9°
Total rainfall	...	...	...	—	0·041 in.

Heavy Rain on 24th and 27th. Thunder on 24th. Solar  
Halo on 21st.

### EXTREME READINGS FOR JUNE,

During 75 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, 1922.

Results of Observations taken during the Month.		Mean for the last 75 years.						
Mean Reading of the Barometer .....	inches 29·440	29·526						
Highest " " on the 11th ...	" 29·876	29·903						
Lowest " " on the 6th ...	" 28·493	29·012						
Range of Barometer Readings .....	" 1·383	0·891						
Highest Reading of a Max. Therm. on the 20th ...	67·3	78·1						
Lowest Reading of a Min. Therm. on the 15th..	42·6	42·5						
Range of Thermometer Readings .....	24·7	35·6						
Mean of Highest Daily Readings .....	60·9	67·3						
Mean of Lowest Daily Readings .....	49·4	51·1						
Mean Daily Range .....	11·5	16·2						
Deduced Mean Temp. (from mean of Max. & Min.)	53·3	57·6						
Mean Temperature from Dry Bulb .....	54·6	57·9						
Adopted Mean Temperature .....	54·0	57·8						
Mean Temperature of Evaporation .....	51·4	54·7						
Mean Temperature of Dew Point .....	48·9	51·9						
Mean elastic force of Vapour .....	inches 0·344	0·387						
Mean weight of Vapour in a cub. ft. of air, grains	3·9	4·4						
Mean additional weight required for saturation ..	0·8	1·1						
Mean degree of Humidity (saturation 100) .....	82	81						
Mean weight of a cubic foot of air .....	grains 529·8	527·6						
Mean amount of Cloud (0—10) .....	8·4	7·4						
Fall of Rain .....	inches 6·458	4·013						
Greatest Rainfall in one day (5th) .....	" 1·800	0·881						
No. of days on which ·005 in. or more Rain fell...	23	16·6						
Wind :—Direction .....	N	NE	E	SE	S	SW	W	NW
No. of days.....	1	1	1	0	2	4	21	1
Mean Velocity in miles per hr.	7·8	6·9	7·5	0	12·3	11·0	8·1	13·4
Total No. of miles.....	188	165	179	0	592	1052	4060	322
Total No. of Miles registered .....	6558						Mean* 6373·3	
Greatest hourly velocity (1st & 6th, Dir. W. and W.N.W.) .....	30						28·3	

\* For the last 55 years.

## JULY, 1922.

### DIFFERENCES.

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

Mean barometric pressure	...	...	...	—	0·086 in.
Monthly range	"	"	"	+	0·492 in.
Mean of highest daily temperatures	...	...	...	—	6·4°
Mean of lowest	"	"	"	—	1·7°
Mean daily range	...	...	...	—	4·7°
Adopted Mean temperature	...	...	...	—	3·8°
Total rainfall	...	...	...	+	2·445 in.

Heavy Rain on 5th and 29th. Thunder and Lightning on  
29th and 31st. Solar Halo on 7th and 14th. Hail on 31st.

### EXTREME READINGS FOR JULY,

During 75 Years.

Highest reading of Barometer	...	1911 (10th)	.....	30·203 in.		
Lowest	"	"	...	1922 (6th)	.....	28·493 in.
Highest temperature	.....	1901 (20th)	.....	89·0°		
Lowest	"	.....	1857 (1st)	.....	36·0°	
Highest adopted mean temperature	1901	.....	.....	63·2°		
Lowest	"	"	1922	.....	54·0°	
Greatest fall of rain	.....	1888	.....	8·475 in.		
Least	"	.....	1868	.....	0·669 in.	
Greatest fall of rain in one day	...	1888 (2nd)	.....	2·482 in.		
Greatest No. of days on which						
·005 in. or more rain fell	.....	† 1920	.....	28		
Least	"	"	.....	† 1863	.....	8
*Greatest hourly velocity of wind	1892 (8th)	.....	.....	44 mls.		
*Greatest No. of miles registered	....	1879	.....	8288		
*Least	"	"	.....	1913	.....	4577

\* Since 1867 only.

† And in other years.

## AUGUST, 1922.

Results of Observations taken during the Month.		Mean for the last 75 years.						
Mean Reading of the Barometer .....	inches 29·484	29·494						
Highest " " on the 19th ... "	29·818	29·886						
Lowest " " on the 30th ... "	29·014	28·947						
Range of Barometer Readings .....	" 0·804	0·939						
Highest Reading of a Max. Therm. on the 21st...	68·4	76·2						
Lowest Reading of a Min. Therm. on the 10th...	41·6	41·8						
Range of Thermometer Readings .....	26·8	34·4						
Mean of Highest Daily Readings .....	60·9	66·4						
Mean of Lowest Daily Readings .....	51·8	50·8						
Mean Daily Range .....	9·1	15·6						
Deduced Mean. Temp. (from Mean of Max. & Min.)	54·7	56·9						
Mean Temperature from Dry Bulb .....	55·5	57·7						
Adopted Mean Temperature .....	55·1	57·3						
Mean Temperature of Evaporation .....	52·3	54·5						
Mean Temperature of Dew Point .....	49·6	51·8						
Mean elastic force of Vapour .....	inches 0·356	0·386						
Mean weight of Vapour in a cub. ft. of air, grains	4·0	4·3						
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 529·9	527·5						
Mean amount of Cloud (0—10).....	8·8	7·3						
Fall of Rain .....	inches 5·990	5·008						
Greatest Rainfall in one day (8th) .....	" 1·600	1·059						
No. of days on which ·005 in. or more Rain fell...	21	18·4						
Wind :—Direction .....	N	NE	E	SE	S	SW	W	NW
No. of days.....	2	6	1	0	4	4	12	2
Mean Velocity in miles per hr.	4·5	5·5	2·4	0	8·4	7·7	9·7	7·0
Total No. of miles.....	216	787	58	0	809	736	2780	338
Total No. of Miles registered .....	5724	Mean*						
Greatest hourly velocity (17th, 3 p.m., Dir. W.S.W.)	30	6324·8	30·7					

\* For the last 55 years.

## AUGUST 1922.

## DIFFERENCES.

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

Mean barometric pressure	...	...	...	—	0·010 in.
Monthly range	..	..	..	—	0·135 in.
Mean of highest daily temperatures	...	...	...	—	5·5°
Mean of lowest	..	..	..	+	1·0°
Mean daily range	...	...	...	—	6·5°
Adopted mean temperature	...	...	...	—	2·2°
Total rainfall	...	...	...	+	0·982 in.

Heavy Rain on 6th, 7th, 8th, 16th and 28th. Hail on 1st. Thunder and Lightning on 28th. Fog on 21st. Solar Halo on 30th.

## EXTREME READINGS FOR AUGUST,

During 75 Years.

Highest reading of Barometer	...	1874 (21st)	.....	30·114 in.
Lowest	..	1917 (28th)	.....	28·156 in.
Highest temperature	.....	1868 (2nd)	.....	88·0°
Lowest	..	1887 (13th)	.....	33·4°
Highest adopted mean temperature	.....	1911	.....	62·1°
Lowest	..	1848	.....	52·5°
Greatest fall of rain	.....	1891	.....	9·869 in.
Least	..	1871	.....	2·085 in.
Greatest fall of rain in one day	...	1857 (7th)	.....	2·333 in.
Greatest No. of days on which				
·005 in. or more rain fell	...	1891	.....	27
Least	..	1880	.....	6
*Greatest hourly velocity of wind	.....	1903 (31st)	.....	45 mls.
*Greatest No. of miles registered...	.....	1903	.....	8486
*Least	..	1915	.....	3918

\* Since 1867 only.



## SEPTEMBER, 1922.

Results of Observations taken during the Month.		Mean for the last 75 years.						
Mean Reading of the Barometer .....	inches 29·539	29·544						
Highest " " on the 8th ... "	30·039	30·009						
Lowest " " on the 13th ... "	28·584	28·889						
Range of Barometer Readings .....	1·455	1·120						
Highest Reading of a Max. Therm. on the 16th..	66·0	72·0						
Lowest Reading of a Min. Therm. on the 10th...	38·1	36·6						
Range of Thermometer Readings .....	27·9	35·4						
Mean of Highest Daily Readings .....	58·8	61·9						
Mean of Lowest Daily Readings .....	47·7	47·3						
Mean Daily Range .....	11·1	14·6						
Deduced Mean Temp. (from mean of Max. & Min.)	52·0	53·4						
Mean Temperature from Dry Bulb .....	53·4	54·2						
Adopted Mean Temperature .....	52·7	53·8						
Mean Temperature of Evaporation .....	50·3	51·0						
Mean Temperature of Dew Point .....	47·9	48·3						
Mean elastic force of Vapour .....	inches 0·334	0·339						
Mean weight of Vapour in a cub. ft. of air, grains	3·8	3·9						
Mean additional weight required for saturation ,,	0·8	0·9						
Mean degree of Humidity (saturation 100).....	84	82						
Mean weight of a cubic foot of air.....	grains 533·4	532·6						
Mean amount of Cloud (0—10) .....	7·5	6·7						
Fall of Rain .....	inches 4·601	4·275						
Greatest Rainfall in one day (18th).....	" 0·920	0·957						
No. of days on which ·005 in. or more Rain fell...	18	16·3						
Wind :—Direction .....	N	NE	E	SE	S	SW	W	NW
No. of days.....	8	3	6	1	2	1	8	1
Mean Velocity in miles per hr.	4·5	4·7	5·0	12·2	8·4	11·9	11·0	10·8
Total No. of miles.....	870	340	721	293	401	285	2113	260
Total No. of Miles registered .....	5283	Mean*						
Greatest hourly velocity (19th, Mid.) .....	32	6042·2						
		31·9						

\* For the last 55 years.

## SEPTEMBER, 1922.

### DIFFERENCES.

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

Mean barometric pressure	...	...	...	—	0·005 in.
Monthly range	..	..	..	+	0·335 in.
Mean of highest daily temperatures	...	...	...	—	3·1°
Mean of lowest	..	..	..	+	0·4°
Mean daily range	...	...	...	—	3·5°
Adopted mean temperature	...	...	...	—	1·1°
Total rainfall	...	...	...	+	0·326 in.

Ground Frost on 10th. Heavy Rain on 13th, 18th, 19th and 30th. Fog on 4th and 5th. Lightning on 1st. Thunder on 1st. Solar Halo on 23rd and 26th.

### EXTREME READINGS FOR SEPTEMBER,

During 75 Years.

Highest reading of Barometer	...	1851 (15th)	.....	30·247 in.		
Lowest	..	..	...	1918 (23rd)	.....	28·210 in.
Highest temperature	.....	1868 (6th)	.....	85·0°		
Lowest	..	.....	†1885 (25th)	.....	29·8°	
Highest adopted mean temperature	.....	1865	.....	59·1°		
Lowest	..	..	.....	1863	.....	50·9°
Greatest fall of rain	.....	1918	.....	12·620 in.		
Least	..	.....	.....	1910	.....	0·652 in.
Greatest fall of rain in one day	...	1889 (26th)	.....	2·060 in.		
Greatest No. of days on which						
·005 in. or more rain fell	...	1918	.....	29		
Least	..	..	.....	†1851	.....	6
*Greatest hourly velocity of wind	...	1875 (26th)	.....	53 mls.		
*Greatest No. of miles registered	...	1869	.....	9053		
*Least	..	..	...	1888	.....	3261

\* Since 1867 only.

† And in other years.

## OCTOBER, 1922.

Results of Observations taken during the Month.		Mean for the last 75 years.						
Mean Reading of the Barometer .....	inches 29·691	29·450						
Highest " " on the 7th ..	30·020	30·019						
Lowest " " on the 30th ..	29·292	28·696						
Range of Barometer Readings.....	" 0·728	1·323						
Highest Reading of a Max. Therm. on the 14th...	62·0	64·1						
Lowest Reading of a Min. Therm. on the 29th ...	29·3	29·8						
Range of Thermometer Readings .....	32·7	34·3						
Mean of Highest Daily Readings .....	52·4	54·5						
Mean of Lowest Daily Readings .....	41·4	42·0						
Mean Daily Range .....	11·0	12·5						
Deduced Mean Temp. (from Mean. of Max. and Min.)	45·9	47·3						
Mean Temperature from Dry Bulb .....	46·3	48·0						
Adopted Mean Temperature .....	46·1	47·7						
Mean Temperature of Evaporation .....	43·4	45·4						
Mean Temperature of Dew Point .....	40·3	43·0						
Mean elastic force of Vapour.....inches	0·251	0·279						
Mean weight of vapour in a cub. ft. of air, grains	2·9	3·2						
Mean additional weight required for saturation ..	0·8	0·6						
Mean degree of Humidity (saturation 100).....	82	84						
Mean weight of a cubic foot of air .....	543·8	537·6						
Mean amount of Cloud (0—10) .....	6·4	7·3						
Fall of Rain .....	inches 0·918	4·875						
Greatest Rainfall in one day (31st) .....	" 0·280	0·964						
No. of days on which ·005 in. or more Rain fell...	14	18·6						
Wind :—Direction.....	N	NE	E	SE	S	SW	W	NW
No. of days.....	3	12	6	0	3	2	5	0
Mean Velocity in miles per hr.	3·3	5·4	10·0	0	6·6	3·0	3·9	0
Total No. of miles.....	238	1557	1440	0	477	144	472	0
Total No. of miles registered .....	4328						Mean* 6811·6	
Greatest hourly velocity (17th Noon, Dir. E. b S.)	20						36·9	

\* For the last 55 years.

## OCTOBER, 1922.

### DIFFERENCES.

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

Mean barometric pressure	...	...	...	+	0.241 in.
Monthly range	"	...	...	—	0.595 in.
Mean of highest daily temperatures	...	...	...	—	2.1°
Mean of lowest	"	"	...	—	0.6°
Mean daily range	"	...	...	—	1.5°
Adopted Mean temperature	...	...	...	—	1.6°
Total rainfall	...	...	...	—	3.957 in.

Ground Frost on 8th, 11th, 25th, 26th, 28th—31st. Hoar  
Frost on 29th, 30th and 31st. Hail on 30th. Solar Halo on 1st  
and 29th. Lunar Halo on 29th and 31st.

### EXTREME READINGS FOR OCTOBER,

During 75 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 in. or more rain fell	...	1903	.....	29
Least	"	"	.....	1920 ..... 8
*Greatest hourly velocity of wind	.....	1877 (15th)	.....	52 mls.
*Greatest No. of miles registered...	.....	1874	.....	9818
*Least	"	"	.....	1915 ..... 3965

\* Since 1867 only.

## NOVEMBER, 1922.

Results of Observations taken during the Month.		Mean for the last 75 years.						
Mean Reading of the Barometer .....	inches 29·715	29·468						
Highest " " on the 15th ... "	30·375	30·069						
Lowest " " on the 6th .. "	28·595	28·574						
Range of Barometer Readings.....	" 1·780	1·495						
Highest Reading of a Max. Therm. on the 10th ...	52·0	55·7						
Lowest Reading of a Min. Therm. on the 25th ...	25·7	25·4						
Range of Thermometer Readings .....	26·3	30·3						
Mean of Highest Daily Readings .....	47·7	47·2						
Mean of Lowest Daily Readings .....	37·8	36·8						
Mean Daily Range .....	9·9	10·4						
Deducted Mean. Temp. (from Mean of Max. and Min.)	42·4	41·6						
Mean Temperature from Dry Bulb.....	42·9	42·0						
Adopted Mean Temperature .....	42·7	41·8						
Mean Temperature of Evaporation .....	41·1	39·8						
Mean Temperature of Dew Point .....	39·2	38·2						
Mean elastic force of Vapour.....inches	0·240	0·231						
Mean weight of Vapour in a cub. ft. of air, grains	2·8	2·7						
Mean additional weight required for saturation ..	0·4	0·4						
Mean degree of Humidity (saturation 100).....	87	87						
Mean weight of a cubic foot of air .....	grains 547·8	544·6						
Mean amount of Cloud (0—10) .....	8·4	7·4						
Fall of Rain .....	inches 3·311	4·360						
Greatest Rainfall in one day (6th).....	" 1·320	0·974						
No. of days on which .005 in. or more Rain fell...	18	18·1						
Wind :—Direction .....	N	NE	E	SE	S	SW	W	NW
No. of days.....	0	1	1	1	4	1	14	8
Mean Velocity in miles per hr.	0	1·1	0·8	1·1	14·6	10·3	6·2	10·2
Total No. of miles.....	0	27	18	26	1638	247	2070	1958
Total No. of miles registered .....	5984	Mean*						
Greatest hourly velocity (1st, 8 a.m., Dir. S. by W.)	39	7198·9						
		40·8						

\* For the last 55 years. † And in other years.

## NOVEMBER, 1922.

### DIFFERENCES.

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

Mean barometric pressure	...	...	...	...	+	0.247 in.
Monthly range	"	"	"	"	+	0.285 in.
Mean of highest daily temperatures	...	...	...	...	+	0.5°
Mean of lowest	"	"	"	"	+	1.0°
Mean daily range	"	"	"	"	—	0.5°
Adopted mean temperature	...	...	...	...	+	0.9°
Total rainfall	...	...	...	...	—	1.049 in.

Ground Frost on 1st, 4th, 5th, 12th, 16th, 25th—27th. Heavy Rain on 6th. Hail on 2nd, 3rd, and 25th. Snow on 2nd. Hoar Frost on 4th. Fog on 3rd, 14th, 15th, and 16th. Solar Halo on 1st and 25th. Lunar Halo on 24th. Gale of Wind on 1st.

### EXTREME READINGS FOR NOVEMBER,

During 75 Years.

Highest reading of Barometer	...	1922 (15th)	.....	30.375 in.
Lowest	"	1891 (11th)	.....	27.938 in.
Highest temperature	.....	1900 (1st)	.....	62.4°
Lowest	"	1901 (15th)	.....	17.5°
Highest adopted mean temperature	†	1881	.....	47.0°
Lowest	"	1915	.....	36.3°
Greatest fall of rain	.....	1866	.....	9.026 in.
Least	"	1855	.....	1.158 in.
Greatest fall of rain in one day	...	1866 (16th)	.....	3.700 in.
Greatest No. of days on which				
.005 in. or more rain fell	...	1913	.....	28
Least	"	1848	.....	6
*Greatest hourly velocity of wind	...	1887 (1st)	.....	62 mls.
*Greatest No. of miles registered	...	1888	.....	12813
*Least	"	1915	.....	4893

\* Since 1867 only.

† And in other years.

## DECEMBER, 1922.

Results of Observations taken during the Month.		Mean for the last 7 years.						
Mean Reading of the Barometer .....	inches 29·307	29·429						
Highest " " on the 4th ..	" 30·032	30·056						
Lowest " " on the 30th ..	" 28·147	28·534						
Range of Barometer Readings.....	" 1·885	1·522						
Highest Reading of a Max. Therm. on 13th .....	53·5	52·9						
Lowest Reading of a Min. Therm. on the 10th ...	31·7	21·4						
Range of Thermometer Readings.....	21·8	31·5						
Mean of Highest Daily Readings .....	45·2	43·5						
Mean of Lowest Daily Readings .....	37·9	33·8						
Mean Daily Range .....	7·3	9·7						
Deduced Mean Temp. (from Mean. of Max. and Min.)	41·6	38·6						
Mean Temperature from Dry Bulb .....	42·4	39·2						
Adopted Mean Temperature .....	42·0	38·9						
Mean Temperature of Evaporation .....	40·6	37·3						
Mean Temperature of Dew Point .....	38·9	35·4						
Mean elastic force of Vapour .....	inches 0·237	0·208						
Mean weight of Vapour in a cub. ft. of air, grains	2·7	2·4						
Mean additional weight required for saturation ..	0·4	0·4						
Mean degree of Humidity (saturation 100) .....	89	87						
Mean weight of a cubic foot of air .....	grains 540·5	546·9						
Mean amount of Cloud (0—10) .....	9·0	7·7						
Fall of Rain .....	inches 5·293	4·740						
Greatest Rainfall in one day (20th).....	" 1·190	0·859						
No. of days on which ·005 in. or more Rain fell...	23	20·1						
Wind :—Direction .....	N	NE	E	SE	S	SW	W	NW
No. of days.....	4	2	0	0	4	10	9	2
Mean Velocity in miles per hr.	2·4	1·6	0	0	21·8	10·2	10·3	10·6
Total No. of miles.....	233	79	0	0	2088	2926	2214	751
Total No. of miles registered .....		8291	Mean*					
Greatest hourly velocity (22nd, 11 p.m., Dir. S S.W.)		40	7863·9					
			42·2					

\* For the last 55 years.

## DECEMBER, 1922.

### DIFFERENCES.

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

Mean barometric pressure	...	...	...	—	0.122 in.
Monthly range	"	...	...	+	0.363 in.
Mean of highest daily temperatures	...	...	...	+	1.7°
Mean of lowest	"	"	...	+	4.1°
Mean daily range	"	...	...	—	2.4°
Adopted mean temperature	...	...	...	+	3.1°
Total rainfall	...	...	...	+	0.553 in.

Ground Frost on 2nd, 10th, 15th, 18th, 20th, and 28th. Heavy Rain on 20th and 29th. Hail on 5th, 17th, 18th, 26th, 28th. Hoar Frost on 10th. Thunder on 22nd. Lightning on 18th, 19th and 22nd. Gale of Wind on 21st and 22nd. Fog on 10th and 11th. Snow on 20th and 27th. Solar Halo on 3rd and 31st. Lunar Halo on 25th.

### EXTREME READINGS FOR DECEMBER,

During 75 Years.

Highest reading of Barometer	...	1905 (12th)	.....	30.484 in.
Lowest	"	1886 (8th)	.....	27.350 in.
Highest temperature	.....	1876 (9th)	.....	58.1°
Lowest	"	1860 (24th)	.....	6.7°
Highest adopted mean temperature	.....	1857	.....	44.6°
Lowest	"	1878	.....	30.3°
Greatest fall of rain	.....	1918	.....	10.595 in.
Least	"	1890	.....	0.550 in.
Greatest fall of rain in one day	...	1870 (19th)	.....	1.962 in
Greatest No. of days on which				
.005 in. or more rain fell	...	1918	.....	30
Least	"	†1853	.....	8
*Greatest hourly velocity of wind...	...	1894 (22nd)	.....	72 mls.
*Greatest No. of miles registered	...	1898	.....	11265
*Least	"	1916	.....	4517

\* Since 1867 only.

† And in other years.



## Summary of Observations, 1922.

Results of Observations taken during the Year.	Mean for the last 75 Years.	
<i>Readings of Barometer in inches.</i>		
Mean of the Year .....	29·489	29·494
Highest Monthly Mean (November).....	29·715	29·744
Lowest     "     "     (December) .....	29·307	29·226
Highest Reading (November 15th) .....	30·375	30·293
Lowest     "     (December 30th) .....	28·147	28·208
Range .....	2·228	2·085
<i>Thermometer, Fahrenheit.</i>		
Highest Monthly Mean Temperature (August).....	55·1	58·6
Lowest     "     "     "     (January).....	37·5	35·7
Highest Reading of a Max. Therm. (June 1st).....	78·8	81·3
Lowest     "     Min.     "     (January 18th)	19·6	16·2
Range of Thermometer Readings .....	59·2	65·1
Mean of Highest Daily     "     .....	52·2	54·5
Mean of Lowest Daily     "     .....	41·3	41·0
Mean Daily Range .....	10·9	13·5
Deduced Mean Temp. (from mean of Max. and Min.)	45·7	46·8
Mean Temperature from Dry Bulb .....	46·7	47·1
Adopted Mean Temperature of the Year .....	46·2	47·0
Mean Temperature of Evaporation .....	43·9	44·6
Mean Temperature of Dew Point .....	41·3	42·1
Mean elastic force of Vapour ..... inches	0·266	0·274
Mean weight of Vapour in a cub. ft. of air...grns.	3·0	3·2
Mean additional weight required for saturation     "	0·7	0·7
Mean degree of Humidity (saturation 100) .....	83	83
Mean weight of a cubic foot of air .....grns.	539·8	539·1
Mean amount of Cloud (0—10) .....	7·9	7·3
Total fall of Rain .....	46·993	47·068
Greatest Monthly Rainfall (July) .....	6·458	7·589
Least     "     "     (October) .....	0·918	1·241
Greatest Rainfall in one day (July 5th).....     "	1·800	1·620
No. of days per Month on which ·005 inch or more Rain fell .....	18·3	17·1

### SUMMARY OF WIND, 1922.

Prevailing Direction	N	NE	E	SE	S	SW	W	NW
No. of days for each	38	39	41	6	37	33	152	19
Mean Velocity in miles per hour...	5.5	5.5	7.7	7.0	11.7	10.4	9.3	11.5
Total No. of miles for each Direction	5051	5138	7607	1012	10405	8244	33997	5254

		Mean for the last 55 years.
Total No. of miles registered .....	76708	85431.2
Greatest Monthly Total (January) .....	8391	9968.6
Least " " (October) .....	4328	4935.1
Greatest hourly velocity (April 15th) .....	41	50.5
Prevailing Direction of Wind .....	W.	

### DIFFERENCES, 1922.

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

Mean barometric pressure...	...	...	...	—	0.005 in.
Yearly range " "	...	...	...	+	0.143 in.
Mean of highest daily temperatures	...	...	...	—	2.3°
Mean of lowest " "	...	...	...	+	0.3°
Mean daily range ...	...	...	...	—	2.6°
Adopted mean temperature	...	...	...	—	0.8°
Total rainfall	...	...	...	—	0.075 in.

**ABSOLUTE EXTREMES  
FOR THE LAST 75 YEARS.**

*Readings of Barometer, in inches.*

Highest monthly mean .....	1891 (Feb.) .....	29·997
Lowest " " .....	1868 (Dec.) .....	28·984
Highest yearly " " .....	1921 .....	29·615
Lowest " " .....	1872 .....	29·319
Greatest monthly range .....	1886 (Dec.) .....	2·795
Least " " .....	1852 (July) .....	0·505
Highest reading .....	1896 (Jan. 9th) .....	30·597
Lowest " " .....	1886 (Dec. 8th) .....	27·350
Extreme range .....		3·247

*Thermometer, Fahrenheit.*

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

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

Greatest monthly mean .....	1852 (July) .....	5·1
Least " " .....	†1855 (Feb.) .....	1·4

† And on other dates.

**ABSOLUTE EXTREMES**  
**FOR THE LAST 75 YEARS—Continued.**

*Rainfall, in inches.*

Greatest Rainfall in one day .....	1866 (Nov. 16) ..	3·700
Greatest " " month .....	1870 (Oct.) .....	13·437
Least " " " .....	1859 (May) .....	0·249
Greatest " " year .....	1866 .....	62·093
Least " " " .....	1887 .....	31·250
Days on which ·005 in. or more Rain fell:		
Greatest No. in one month .....	1890 (Jan.) ... } and 1918 (Dec.) ... }	30
Least " " .....	1852 (Mar.) .....	3
Greatest " year .....	1872 .....	281
Least " " .....	1855 .....	135

\* *Wind.*

Greatest hourly velocity, in miles .....	1894 (Dec. 22)...	72
Greatest No. of miles registered in a month .....	1888 (Nov.) .....	12813
Least " " .....	1917 (Feb.) ...	3160
Greatest Mean No. " " .....	March .....	8473
Least " " " .....	September .....	6099
Greatest No. " " year .	1868 .....	102395
Least " " " " .....	1915 .....	70623

\* Record dates from 1867 only.

## DATES OF OCCASIONAL PHENOMENA.

1922	Frost	Hoar Frost	Snow	Hail	Heavy Rain
January	4, 5, 12-22, 24-27	...	13, 14, 16, 18, 24-26	11, 26, 27	15
February	2, 4-14, 19-22	...	4, 13, 18, 20-22	13, 18, 20-22	2, 3, 22
March	10, 11, 19-24, 26-31	...	10, 20, 21, 23, 24, 27-31	4, 8, 9, 27	5
April	1-9, 11, 12, 17-21, 23, 29, 30	5, 6, 7	1, 7, 8	3, 24, 27	23
May	2, 12, 13	...	12	4, 12	24, 27
June	...	...	...	...	5, 29
July	...	...	...	31	6, 7, 8, 16, 28
August	...	...	...	1	13, 18, 19, 30
September	... 10 ...	...	...	30	6
October	8, 11, 25, 26, 28-31	29, 30, 31	...	2, 3, 25	20, 29
November	1, 4, 5, 12, 16, 25, 27	4	2	5, 17, 18, 26-28	...
December	2, 10, 15, 18, 20, 28	10	20, 27	...	...

1922	Gales of Wind	Fog	Thunder	Lightning	Lunar Halo	Solar Halo	Aurora Borealis
January	1, 18	6, 7, 19	...	...	8	...	...
February	...	15, 16	...	...	7, 9	14	...
March	...	12	...	...	...	29	...
April	15	30	...	...	3	13	...
May	...	...	17, 21, 23	21, 23	5, 7, 8	9, 17	...
June	...	...	24	...	...	21	...
July	...	18	29, 31	29, 31	...	7, 14	...
August	...	21	28	28	...	30	...
September	...	4, 5	1	1	...	23, 26	...
October	...	3, 14, 15, 16	...	...	29, 31	1, 29	...
November	1	10, 11	...	...	24	1, 25	...
December	21, 22	...	22	18, 19, 22	25	3, 31	...

MONTHLY TOTALS FOR EACH HOUR OF RECORDED SUNSHINE.																	
1922. 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 ...	...	...	...	...	...	1.2	3.6	6.8	6.9	8.7	6.7	1.7	...	...	...	...	...
February ...	...	...	...	...	3.2	7.0	7.7	7.5	9.1	7.1	5.6	2.9	1.3	...	...	...	...
March ...	...	...	0.2	3.4	6.2	7.9	9.0	11.6	12.2	12.1	14.5	11.7	7.8	3.1	...	...	...
April ...	...	0.8	5.4	11.9	13.0	14.8	14.6	12.6	12.2	11.9	11.6	11.2	9.4	7.2	2.0	...	...
May ...	0.3	4.2	8.5	12.1	13.4	14.4	12.5	14.9	14.4	16.6	17.2	16.3	15.9	14.6	10.5	4.1	...
June ...	3.9	11.8	12.4	12.5	11.3	14.6	14.5	13.0	14.1	13.7	13.8	15.0	13.1	12.3	13.0	7.8	...
July ...	0.1	4.3	7.6	8.4	9.2	9.1	10.9	12.6	10.3	8.7	9.6	11.1	12.6	12.8	11.3	5.6	0.2
August ...	...	0.6	4.1	7.9	9.5	11.7	9.9	9.5	10.6	9.7	12.2	11.7	10.2	7.3	4.8	0.2	...
September ..	...	...	0.6	5.6	8.1	9.0	10.2	10.9	11.2	9.5	7.1	7.4	4.7	2.7	0.1	...	...
October ...	...	...	0.3	2.9	12.8	15.0	17.2	14.8	15.8	15.1	12.5	10.1	3.7	0.2	...	...	...
November...	...	...	...	0.2	2.1	5.2	7.3	7.3	7.9	6.6	6.4	2.3	0.1	...	...	...	...
December ...	...	...	...	...	...	0.8	3.1	5.6	5.2	4.1	1.7	0.1	...	...	...	...	...
Sums ...	4.3	21.7	39.1	64.9	88.8	110.7	120.5	127.1	129.9	123.8	118.9	101.5	78.8	60.2	41.7	17.7	0.2

**TOTAL AMOUNT OF SUNSHINE RECORDED ON EACH DAY.**

1922	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
January ...	...	2.6	2.9	3.3	0.2	...	...	1.5	...	2.9	0.1	5.7	...	...	...	...	5.5
February ...	5.6	...	...	...	0.1	...	...	0.3	...	3.6	6.0	4.6	0.3	0.7	...	...	0.3
March ...	0.6	1.3	...	5.2	...	3.7	3.4	2.0	1.4	2.2	0.1	1.9	7.7	9.6	2.4	4.1	5.3
April ...	4.5	6.2	5.5	11.0	2.2	8.4	0.3	...	3.9	3.4	3.9	0.1	7.8	...	7.0	1.3	5.3
May ...	...	8.1	1.3	7.8	5.3	1.2	10.5	12.3	3.7	1.3	1.5	4.2	13.9	3.5	4.2	0.9	4.3
June ...	10.4	4.8	13.7	14.7	13.0	14.7	14.6	12.1	1.0	8.7	14.6	15.2	0.3	10.9	4.5	3.7	6.1
July ...	...	0.2	6.1	7.4	1.4	4.2	8.6	0.1	1.2	9.5	13.0	7.6	...	4.8	10.1	...	8.3
August ...	6.7	1.5	3.3	2.6	2.5	7.0	...	3.4	0.2	4.2	7.4	...	5.7	9.3	7.4	1.3	7.6
September ..	3.3	0.4	0.6	9.1	5.4	1.6	1.9	3.4	6.0	11.4	0.8	...	...	...	7.0	...	5.5
October ...	4.9	1.1	...	...	0.8	7.1	9.0	2.8	0.6	1.8	5.4	0.1	6.1	8.4	8.6	6.1	8.1
November...	2.1	3.4	3.0	7.7	0.1	0.3	3.2	0.5	2.1	0.2	6.3	...	...	...	2.8	...	0.2
December ...	...	0.2	...	...	...	3.0	...	...	0.4	0.1	...	...	...	...	...	...	2.2

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

1922	18	19	20	21	22	23	24	25	26	27	28	29	30	31	MONTHLY	
															Total	Per cent.
January ...	1.1	...	2.1	...	3.8	...	1.1	...	...	...	0.5	2.3	...	...	35.6	14.4
February ...	2.3	...	4.5	1.1	1.8	3.4	0.5	6.6	...	2.0	7.7	...	...	...	51.4	18.9
March ...	0.2	...	4.5	6.5	9.3	2.9	...	8.3	2.1	1.1	3.5	2.0	0.6	7.8	99.7	27.2
April ...	4.1	11.8	11.5	3.3	5.0	3.1	4.0	5.5	0.4	5.0	3.7	9.0	1.4	...	138.6	33.1
May ...	3.9	1.6	3.5	0.5	3.2	3.2	8.9	12.2	6.5	12.7	13.2	14.3	12.1	10.1	189.9	38.5
June ...	2.0	0.5	2.1	8.0	0.1	2.6	...	3.5	0.6	...	0.8	9.6	4.0	...	196.8	38.8
July ...	12.5	2.5	1.2	1.7	4.4	1.2	5.0	5.0	0.1	8.9	3.2	...	7.1	9.1	144.4	28.4
August ...	5.9	...	4.6	8.1	...	8.8	0.4	5.0	5.6	0.8	...	6.4	3.6	0.6	119.9	26.2
September ..	6.1	...	3.4	0.3	6.7	0.5	...	0.5	1.6	2.6	...	8.9	...	...	87.0	23.0
October ...	1.7	4.8	3.4	3.5	6.0	1.3	...	5.7	4.5	2.4	6.9	3.7	0.9	4.7	120.4	36.9
November...	3.9	2.0	1.2	...	...	...	5.7	0.1	...	0.2	...	...	0.4	...	45.4	17.7
December ..	1.0	1.5	...	...	0.3	...	3.1	1.2	1.1	...	3.4	1.3	...	1.8	20.6	8.9



## SUMMARY OF SUNSHINE.

	BRIGHT SUNSHINE RECORDED					
	1922			Mean for the last 42 years		
	Number of		Percentage of Possible Sunshine	Number of		Percentage of Possible Sunshine
	Days	Hours		Days	Hours	
January ...	15	35·6	14·4	14·2	32·4	13·1
February ...	18	51·4	18·9	17·7	58·1	21·2
March ...	27	99·7	27·2	24·2	102·3	27·9
April ...	28	138·6	33·1	26·4	147·9	35·3
May ...	30	189·9	38·5	27·6	186·3	37·8
June ...	28	196·8	38·8	28·0	186·4	36·7
July ...	27	144·4	28·4	28·3	172·7	33·9
August ...	26	119·9	26·2	27·6	148·0	32·4
September ..	22	87·1	23·0	25·6	124·0	32·7
October ...	28	120·4	36·9	23·6	86·0	26·4
November ...	20	45·4	17·7	17·5	46·2	18·1
December ...	14	20·6	8·9	13·5	25·7	11·1
Year ...	283	1249·7	28·0	274·3	1316·1	29·5

**SUMMARY OF SUNSHINE—Continued.**  
**EXTREMES FOR THE LAST 42 YEARS.**

MONTH	Number of Days				Number of Hours				Percentage of Possible Sunshine			
	on which Sunshine was recorded											
	Greatest		Least		Greatest		Least		Greatest		Least	
Jan.	21	1881	8	1898	64.2	1881	12.3	1913	25.9	1881	5.0	1913
Feb.	24	1895	11	1882	89.3	1887	29.6	1882	32.8	1887	10.9	1882
Mar.	28	*1894	17	1904	168.6	1907	56.8	1912	46.1	1907	15.5	1912
Aprl.	30	*1909	22	1920	223.7	1893	80.7	1920	53.4	1893	19.3	1920
May	30	*1880	22	1886	266.6	1881	79.7	1906	54.1	1881	16.2	1906
June	30	*1896	24	*1888	272.5	1887	85.2	1912	53.6	1887	16.8	1912
July	31	*1882	24	1920	263.4	1911	98.0	1888	51.7	1911	19.3	1888
Aug.	31	*1886	23	1894	235.2	1899	74.1	1912	51.5	1899	16.2	1912
Sept.	30	1914	21	1897	176.5	1914	62.9	1896	46.6	1914	16.6	1896
Oct.	28	*1891	17	1889	134.9	1899	50.0	1889	41.4	1899	15.3	1889
Nov.	23	*1883	9	1897	86.6	1915	18.5	1891	33.8	1915	7.2	1891
Dec.	20	1917	6	1882	60.1	1886	7.4	1912	26.0	1886	3.2	1912
Year	300	1905	251	1903	1613.7	1887	927.6	1912	36.1	1887	20.7	1912

\*And in other years.

## HORIZONTAL MAGNETIC DIRECTION.

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

1922	MEANS OF *				Mean for the month	Mean daily range †	Highest reading of the month		Monthly range	
	Highest readings	Lowest readings	4 a. m. readings	4 p. m. readings*			15° +	15° +		Lowest reading of the month
January ...	38.7	35.1	37.5	37.3	37.2	12.0	52.0	12.0	40.0	
February ...	40.1	34.5	35.3	36.1	36.5	13.8	49.0	15.0	34.0	
March ...	39.5	33.5	35.1	36.7	36.3	15.8	55.0	15.0	40.0	
April ...	40.3	30.7	33.3	36.5	35.2	16.7	50.0	14.0	36.0	
May ...	37.5	29.5	32.1	36.3	33.9	14.9	55.0	6.0	49.0	
June ...	36.7	26.9	29.1	34.5	31.8	12.9	45.0	15.0	30.0	
July ...	35.7	25.3	28.7	33.9	30.9	14.0	41.0	10.0	31.0	
August ...	34.3	26.1	28.7	32.5	30.4	14.6	47.0	10.0	37.0	
September ...	33.1	25.1	26.3	29.9	28.6	15.7	46.0	3.0	43.0	
October ...	28.9	22.5	23.7	26.9	25.5	14.4	42.0	0.0	42.0	
November ...	24.7	20.7	22.3	22.9	22.7	8.4	33.0	4.0	29.0	
December ...	22.9	19.9	21.7	21.5	21.5	7.6	32.0	6.0	26.0	
Means ...	34.4	27.5	29.5	32.1	30.9	13.5	45.6	9.1	36.5	

Mean for the year ... 15° 30.9' 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.

1922	MEANS OF *					Mean for the month	Mean daily range †	Highest reading of the month	Lowest reading of the month	Monthly range
	Highest readings	Lowest readings	4 a. m. readings	4 p. m. readings	17000 +					
	17000 +	17000 +	17000 +	17000 +	17000 +					
January ...	331	316	325	327	325	50	389	243	146	
February ...	333	314	320	320	321	55	372	260	112	
March ...	321	296	313	316	311	63	394	230	164	
April ...	336	300	323	323	321	75	402	192	210	
May ...	325	288	312	321	312	65	394	235	159	
June ...	320	273	302	306	300	75	398	226	172	
July ...	321	272	297	311	299	75	376	196	180	
August ...	311	277	290	305	296	66	359	213	146	
September ...	296	264	288	289	284	63	368	157	211	
October ...	303	282	296	297	295	62	359	196	163	
November ...	306	290	306	301	301	40	342	235	107	
December ...	301	291	295	296	296	29	342	243	99	
Means ...	317	289	306	309	305	60	375	219	156	
					Mean for the year ... -17305 C. G. S. Units.					

\* For the 5 quietest days.

† Includes all days.

## ABSOLUTE MEASURES—SUMMARY.

DIRECTION			FORCE.		
1922	Declination Corrected	Inclination	Horizontal	Vertical	Total
	°   '   ''	°   '   ''	C. G. S. UNITS.		
	15 +	68 +	0·17000+	0·44000+	0·47000+
January ...	33·5	43·1	317	459	712
February ...	36·3	42·4	306	405	658
March ...	35·2	42·3	297	374	627
April ...	34·0	44·7	322	534	784
May ...	31·8	40·3	284	265	519
June ...	30·3	41·0	323	394	654
July ...	31·7	42·9	318	453	707
August ...	29·5	40·7	311	350	608
September ...	28·2	42·9	297	401	651
October ...	27·5	45·5	295	494	738
November ...	29·2	41·3	285	306	558
December ...	22·9	41·8	309	385	641
Means ...	15 30·9	68 42·4	0·17305	0·44402	0·47655

## DATES OF MAGNETIC DISTURBANCES.

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

1922	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1923
D.													D.
1	c	m	v.g.	m	c	c	g	s	c	c	m	m	1
2	s	s	m	m	c	m	m	c	s	m	g	s	2
3	c	m	m	c	c	s	c	c	s	s	g	c	3
4	c	m	s	c	s	s	c	c	s	s	m	c	4
5	c	s	v.g.	c	s	m	c	s	s	v.g.	s	m	5
6	s	m	c	c	s	m	s	s	s	v.g.	c	c	6
7	m	c	c	c	s	s	s	s	s	g	c	c	7
8	v.g.	m	c	m	v.g.	s	c	s	v.g.	g	c	c	8
9	s	g	c	v.g.	v.g.	c	c	m	g	m	c	c	9
10	m	c	m	m	g	c	c	m	g	m	g	m	10
11	s	c	m	m	c	c	s	m	m	m	c	m	11
12	s	g	m	m	c	s	c	m	m	s	c	s	12
13	s	m	v.g.	s	c	s	c	v.g.	m	s	c	s	13
14	c	m	v.g.	s	s	s	s	g	v.g.	m	c	g	14
15	c	g	s	m	s	c	m	s	m	c	c	m	15
16	g	v.g.	c	s	v.g.	m	g	s	c	c	c	c	16
17	g	m	g	s	m	m	s	c	s	m	s	c	17
18	m	m	m	c	s	c	s	c	c	s	c	c	18
19	m	s	m	c	m	s	s	c	c	c	c	c	19
20	m	s	m	s	s	c	s	s	g	g	c	c	20
21	c	s	s	m	m	s	c	s	m	c	s	c	21
22	c	c	m	v.g.	s	s	c	m	s	c	c	c	22
23	c	c	c	g	s	s	c	g	c	s	c	c	23
24	v.g.	c	c	m	s	s	m	m	c	g	c	s	24
25	v.g.	c	c	m	m	m	s	c	m	s	c	m	25
26	m	s	s	m	s	c	g	m	c	s	c	g	26
27	c	m	m	m	s	s	m	s	m	s	m	c	27
28	s	m	m	s	s	s	g	s	m	s	m	s	28
29	c		m	m	s	v.g.	m	m	c	s	g	m	29
30	c		g	s	c	g	m	m	m	s	m	s	30
31	g		m	s	s	s	c	m	m	v.g.	s	s	31
Total	c 6 m 6 g 4 vg 3	7 6 11 3 1	7 4 14 2 4	7 7 13 1 2	6 15 4 4 2	8 15 5 1 1	12 8 7 4 ...	6 11 10 3 1	8 8 8 4 2	6 11 7 4 3	17 4 5 4 ...	14 8 7 2 ...	

### DATES OF SOLAR OBSERVATIONS, AND DISC AREAS OF SPOTS AS MEASURED FROM THE DRAWINGS.

The unit is  $\frac{1}{5000}$ th of the visible surface.

n = note without a complete drawing.

1922	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1922
D.													D.
1		0.0	14.9	2.1		0.1			0.0	0.3	0.4		1
2	0.0		27.7	2.5	5.3	0.0	0.0	0.0	0.0	0.2	0.2	2.0	2
3	0.4			2.3	4.7	0.0	0.0	0.2	n		0.1		3
4	0.1		24.5	1.6	3.9	0.0	0.1	0.2	0.0		0.1	n	4
5		0.0		1.3	3.1	0.0	0.1	0.1	0.0		1.0		5
6			21.6	1.0		0.0	0.7	0.4	0.0	0.0		2.2	6
7			16.0	0.5	1.5	0.1	0.3		0.0	0.0	2.5		7
8	0.5	1.7	12.6		0.8	0.1		0.1	0.0	0.0	2.7		8
9		0.9	13.6	0.0	n	0.0	0.4	0.0	0.0	0.1	2.9	0.9	9
10	0.7	2.2	14.4	0.0	0.0	0.0	0.4	0.0	0.0				10
11		5.5		0.0	0.0	0.1		0.0	0.0	0.6	3.1		11
12	1.1	15.8	10.6	0.0	0.0	0.2	0.1						12
13		12.0	6.8	0.0	0.0			0.0		0.2			13
14		7.5	4.0		0.0	0.1	0.0	0.0		0.2			14
15			1.9	0.0	0.0	0.3	0.0	0.0	1.1	0.0			15
16			0.7	0.0		0.4		0.0		0.7			16
17	1.3	2.4	0.7	0.0	0.0	0.1	0.0	0.0	1.5	0.4	n	0.0	17
18	1.1	n		0.0	0.0		0.0	0.0	1.4		0.0	0.0	18
19				0.0	0.0		1.9			0.7	0.1	0.0	19
20	1.0	0.9	0.0	0.0	0.0	0.0		0.0	1.2	2.0	0.4		20
21		0.8	0.0	0.0		0.1	4.0	0.0	0.7	1.4			21
22	0.6	1.3	0.1	0.1	0.0		3.8		0.6	0.0		0.2	22
23		1.2	1.0	0.5	0.0	0.0	2.9	0.1	0.5	0.0			23
24	0.0	1.8		0.4	0.3		2.8		n		0.0	7.9	24
25		1.7	2.6	0.7	0.5	0.0	2.6	3.3	0.0	0.0	n	10.6	25
26			2.8		0.4	0.0		2.7	0.0	0.0		11.3	26
27		5.3	2.7	0.5	0.4		0.8		0.2	0.0	0.0		27
28	0.0	8.3	2.7	0.2	0.2		0.1			0.0		13.6	28
29	0.0		2.7	0.2	0.2	0.0		1.5	0.0	0.0		11.6	29
30			n	2.1	0.2	0.0	0.0	1.0		0.0	1.4		30
31			1.5		0.4					0.3		7.3	31
Daily Means	0.5	3.9	7.8	0.6	0.8	0.1	1.0	0.4	0.3	0.3	1.0	5.2	

## SUN-SPOT STATISTICS, 1922.

The numbering of the groups is in continuation of that in the annual Report for 1921. Any area less than one unit is entered as 0.0.

Date	No. of Group	Mean Latitude	Mean Longitude	Max. Area	Where Measured
Jan. 3-8 ...	96	- 7°·0	164°·3	0·4	Centre of group
Jan. 8-12 ...	97	+ 6°·5	66°·8	0·4	Centre of group
Jan. 8-12 ...	98	+10°·5	15°·0	0·2	Centre of group
Jan. 10 ...	99	+10°·3	101°·0	0·1	Centre of group
Jan. 12-22 ...	100	- 6°·1	329°·4	1·3	
Feb. 1 ...	101	- 5°·1	116°·6	0·0	Centre of group
Feb. 8-14 ...	102	+11°·9	40°·6	6·6	Gen. of pre'y gr'p
Feb. 8-14 ...	102	+ 9°·5	46°·4	6·6	Chief spot (1)
Feb. 8-14 ...	102	+ 9°·3	39°·0	6·6	Chief spot (2)
Feb. 8-17 ...	103	- 6°·6	337°·1	9·2	Chief spot
Feb. 20-Mar. 2 ...	104	- 6°·5	187°·7	1·5	
Feb. 24-25 ...	105	+14°·7	118°·9	0·7	Chief spot
Feb. 27-Mar. 8 ...	106	+ 6°·8	136°·5	21·5	Group (a)
Feb. 27-Mar. 8 ...	106	+ 7°·5	115°·8	21·5	Chief spot (1)
Feb. 27-Mar. 8 ...	106	+10°·0	105°·5	21·5	Chief spot (2)
Feb. 27-Mar. 8 ...	106	+11°·1	118°·0	21·5	Chief spot (3)
Feb. 28 ...	107	-10°·4	154°·2	0·2	Centre of group
Mar. 1-12 ...	108	+12°·8	50°·4	9·6	Chief spot (1)
Mar. 1-12 ...	108	+ 9°·6	52°·9	9·6	Chief spot (2)
Mar. 6-16 ...	109	- 4°·6	345°·2	6·9	Centre of group
Mar. 7-8 ...	110	+15°·7	338°·7	0·0	Centre of group
Mar. 9-17 ...	111	+ 7°·7	333°·3	3·6	Chief spot
Mar. 12-14 ...	112	-16°·9	24°·4	0·7	Centre of group
Mar. 17 ...	113	-11°·4	309°·1	0·3	Centre of group
Mar. 22 ...	114	- 8°·7	163°·8	0·1	
Mar. 23-Apr. 3 ...	115	+ 9°·7	133°·6	2·8	Chief spot (1)
Mar. 23-Apr. 3 ...	115	+ 8°·2	123°·5	2·8	Chief spot (2)
Mar. 23-Apr. 3 ...	115	+ 8°·0	103°·3	2·8	Chief spot (3)
Mar. 28-Apr. 9 ...	116	+11°·2	54°·4	1·2	Chief spot
Apr. 1-7 ...	117	+ 9°·4	12°·7	0·9	Chief spot
Apr. 22-29 ...	118	+ 5°·7	105°·5	0·5	Chief spot
Apr. 24-30 ...	119	+ 5°·6	58°·0	0·5	Chief spot
Apr. 30-May 8 ...	120	+ 8°·2	18°·4	5·3	Chief spot (1)
Apr. 30-May 8 ...	120	+ 8°·7	9°·9	5·3	Chief spot (2)
May 24-June 1 ...	121	+ 7°·7	22°·5	0·5	Chief spot



## SUN-SPOT STATISTICS, 1922—*Contd.*

Date	No. of Group	Mean Latitude	Mean Longitude	Max. Area	Where Measured
June 7-8 ... ..	122	+ 8°·6	231°·2	0·1	Chief spot
June 11 ... ..	123	+ 6°·4	210°·3	0·1	Centre of group
June 12-14 ... ..	124	+ 9°·8	139·0	0·2	Centre of group
June 15 ... ..	122a	+10°·8	233°·8	0·1	Centre of group
June 15-17 ... ..	125	— 8°·4	197°·1	0·4	Centre of group
June 21, June 25	126	— 6°·9	95°·2	0·1	Centre of group
July 4- 9 ... ..	127	+ 9°·1	243°·5	0·6	Centre of group
July 6-10 ... ..	128	— 9°·3	189°·5	0·2	Chief spot
July 9-12 ... ..	129	+11°·6	162°·0	0·2	Centre of group
July 10 ... ..	130	+12°·9	194°·5	0·0	Centre of group
July 19-28 ... )	131	— 5°·6	28°·9	4·0	Chief spot (1)
July 19-28 ... )	131	— 6°·2	21°·7	4·0	Chief group (2)
July 25 ... ..	132	— 6°·6	357°·4	0·1	Centre of group
Aug. 2- 6 ... ..	133	+10°·1	170°·5	0·3	Centre of group
Aug. 5- 6 ... ..	134	—10°·4	191°·8	0·1	
Aug. 23-26 ... )	135	—11°·9	344°·0	3·3	Chief spot (1)
Aug. 23-26 ... )	135	—13°·1	337°·4	3·3	Chief group (2)
Aug. 29-30 ... )	136	+14°·4	301°·4	1·5	Chief spot (1)
Aug. 29-30 ... )	136	+13°·8	294°·7	1·5	Chief group (2)
Sept. 1 ... ..	137	+11°·1	226°·8	0·0	
Sept. 15-23 ... ..	138	—11°·4	344°·6	1·5	Chief spot
Sept. 27 ... ..	139	+ 3°·7	223°·9	0·2	Centre of group
Oct. 1- 2 ... ..	140	— 8°·4	194°·9	0·3	Centre of group
Oct. 9-16 ... ..	141	+15°·1	359°·3	0·6	Centre of group
Oct. 11-14 ... ..	142	—10°·9	344°·6	0·0	
Oct. 16-20 ... ..	143	+13°·4	342°·4	0·5	Centre of group
Oct. 19-21 ... )	144	— 5°·6	355°·2	2·0	Chief spot (1)
Oct. 19-21 ... )	144	— 5°·5	350°·1	2·0	Chief group (2)
Oct. 31-Nov. 4 ...	145	—13°·6	93°·4	0·4	Centre of group
Nov. 5-11 ... ..	146	— 6°·0	0°·8	3·1	Chief spot
Nov. 19-20 ... ..	147	+ 4°·3	255°·2	0·4	Centre of group
Nov. 19 ... ..	148	+13°·1	186°·8	0·0	
Nov. 30-Dec. 9 ...	149	— 2°·9	51°·3	1·8	Chief spot
Dec. 2- 9 ... ..	150	— 5°·4	4°·0	0·4	Chief spot
Dec. 22 to — )	151	+ 6°·1	93°·5	13·0	Chief spot (1)
Dec. 22 „ — )	151	+ 6°·3	85°·6	13·0	Chief spot (2)
Dec. 25 „ — ...	152	+ 8°·8	67°·1	0·4	Centre of group
Dec. 25 „ — ...	153	— 3°·8	55°·5	0·3	

## DISTURBED SUN-SPOT AREAS, 1922.

No. of Area	Date	No. of Group	Mean Latitude	Mean Longitude	Max. Area	Mean Types
24	Jan. 8-12 ...	98	+10°·5	15°·0	0·2	I.
	Apr. 1-7 ...	117	+ 9°·4	12°·7	0·9	I.
	Apr. 30-May 8 )	120	+ 8°·2	18°·4	5·3	III <sub>a</sub> II <sub>a</sub> IV <sub>c</sub>
		120	+ 8°·7	9°·9	5·3	
May 24-June 1	121	+ 7°·7	22°·5	0·5	I.	
25	Feb. 8-14 )	102	+11°·9	40°·6	6·6	II <sub>c</sub>
		102	+ 9°·5	46°·4	6·6	
		102	+ 9°·3	39°·0	6·6	
	Mar. 1-12 )	108	+12°·8	50°·4	9·6	V.
		108	+ 9°·6	52°·9	9·6	
Mar. 28-Apr. 9	116	+11°·2	54°·4	1·2	IV <sub>a</sub>	
26	Nov. 30-Dec. 9	149	- 2°·9	51°·3	1·8	IV <sub>b</sub> IV <sub>a</sub>
	Dec. 25 ...	153	- 3°·8	55°·5	0·3	I.
27	Jan. 8-12 ...	97	+ 6°·5	66°·8	0·4	I.
	Apr. 24-30 ...	119	+ 5°·6	58°·0	0·5	I.
28	Jan. 10 ...	99	+10°·3	101°·0	0·1	I.
	Feb. 27-Mar. 8 )	106	+ 6°·8	136°·5	21·5	I.
		106	+ 7°·5	115°·8	21·5	
		106	+10°·0	105°·5	21·5	
		106	+11°·1	118°·0	21·5	
	Mar. 23-Apr. 3 )	115	+ 9°·7	133°·6	2·8	III <sub>a</sub> II <sub>a</sub>
		115	+ 8°·2	123°·5	2·8	
		115	+ 8°·0	103°·3	2·8	
June 12-14 ...	124	+ 9°·8	139°·0	0·2	IV <sub>b</sub>	
29	July 9-12 ...	129	+11°·6	162°·0	0·2	I.
	Aug. 2-6 ...	133	+10°·1	170°·5	0·3	I.
30	Jan. 3-8 ...	96	- 7°·0	164°·3	0·4	I.
	Mar. 22 ...	114	- 8°·7	163°·8	0·1	I.

DISTURBED SUN-SPOT AREAS, 1922.—*Cont.*

No. of Area	Date	No. of Group	Mean Latitude	Mean Longitude	Max. Area	Mean Types
31	Feb. 20-Mar. 2	104	— 6°·5	187°·7	1·5	IV <sub>a</sub>
	June 15-17 ...	125	— 8°·4	197°·1	0·4	I.
	July 6-10 ...	128	— 9°·3	189°·5	0·2	I.
	Aug. 5-6 ...	134	—10°·4	191°·8	0·1	I.
	Oct. 1-2 ...	140	— 8°·4	194°·9	0·3	I.
32	July 10 ...	130	+12°·9	194°·5	0·0	I.
	Nov. 19 ...	148	+13°·1	186°·8	0·0	I.
33	June 7-8 ...	122	+ 8°·6	231°·2	0·1	I.
	July 4-9 ...	127	+ 9°·1	243°·5	0·6	I.
	Sept. 1 ...	137	+11°·1	226°·8	0·0	I.
34	Mar. 7- 8 ...	110	+15°·7	338°·7	0·0	I.
	Oct. 9-16 ...	141	+15°·1	359°·3	0·6	I.
	Oct. 16-20 ...	143	+13°·4	342°·4	0·5	I.
35	Aug. 23-26 ...	135	—11°·9	344°·0	3·3	I IV <sub>c</sub>
	... )	135	—13°·1	337°·4	3·3	I V
	Sept. 15-23 ...	138	—11°·4	344°·6	1·5	IV <sub>a</sub>
	Oct. 11-14 ...	142	—10°·9	344°·6	0·0	I.
36	Jan. 12-22 ...	100	— 6°·1	329°·4	1·3	IV <sub>a</sub>
	Feb. 8-17 ...	103	— 6°·6	337°·1	9·2	IV <sub>b</sub> II <sub>a</sub>
	Mar. 6-16 ...	109	— 4°·6	345°·2	6·9	III <sub>b</sub>
	July 25 ...	132	— 6°·6	357°·4	0·1	I.
	Oct. 19-21 ...	144	— 5°·6	355°·2	2·0	
	... )	144	— 5°·5	350°·1	2·0	II <sub>a</sub>
	Nov. 5-11 ...	146	— 6°·0	0°·8	3·1	IV <sub>b</sub>
	Dec. 2- 9 ...	150	— 5°·4	4°·0	0·4	I.

