

METEOROLOGICAL OFFICE.

BRITISH METEOROLOGICAL AND MAGNETIC YEAR BOOK, 1919,
PART III., SECTION 2.

GEOPHYSICAL JOURNAL, 1919,

COMPRISING

DAILY VALUES OF THE METEOROLOGICAL AND GEOPHYSICAL ELEMENTS

AT THREE OBSERVATORIES OF THE METEOROLOGICAL OFFICE;

DAILY VALUES OF SOLAR RADIATION AT SOUTH KENSINGTON;

WIND COMPONENTS AT FIXED HOURS AT FOUR ANEMOGRAPH STATIONS;

TABULATIONS OF OCCASIONAL SOUNDINGS OF THE UPPER AIR;

AND RESULTS OF OBSERVATIONS OF CLOUD AND AURORA;

TOGETHER WITH AN ANNUAL SUPPLEMENT.

Published by Authority of the Meteorological Committee.



LONDON:

PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE.

To be purchased through any Bookseller or directly from
H.M. STATIONERY OFFICE at the following addresses:
IMPERIAL HOUSE, KINGSWAY, LONDON, W.C. 2, and 28 ABINGDON STREET, LONDON S.W. 1;
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1921.

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METEOROLOGICAL OFFICE.

BRITISH METEOROLOGICAL AND MAGNETIC YEAR-BOOK: GEOPHYSICAL JOURNAL.

INTRODUCTION TO THE TABLES FOR 1919.

THE Geophysical Journal gives daily values for the meteorological and geophysical elements observed at the three observatories of the Meteorological Office (Kew Observatory, Richmond, Surrey; Valencia Observatory, Cahirciveen, Co. Kerry; and Eskdalemuir Observatory, Dumfriesshire) and at the St Louis Observatory, Jersey. Data are given for Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology. Wind components are given for four additional anemograph stations.

The results of ascents at Upper Air Stations at Aberdeen, Eskdalemuir, Cahirciveen, South Farnborough, and Falmouth, together with nephoscope observations made at Aberdeen, and tables showing the occurrences of Aurora, are included in the Journal.

Greenwich Mean Time is used in all cases, and the hours are counted from midnight and numbered 0 to 23; the second midnight of the day is referred to as 24 h.

All the units employed are based on the C.G.S. system. Data to which the letters x and n are attached represent the maximum and minimum values in the column.

The tables are as follows:—

1. **Sunshine and Solar Radiation.** The total number of hours of bright sunshine as measured by the Campbell-Stokes Recorder is given for Westminster,* Richmond, Eskdalemuir, and Cahirciveen; also the percentage this represents of the "possible," regarded as the number of hours from sunrise to sunset. The Campbell-Stokes instrument records only bright sunshine, no trace being obtained in thick haze or when the sun is very near the horizon. Thus the total it gives is less than the number of hours during which the position of the sun is visible to the naked eye. While the result is somewhat arbitrary, the records from different instruments of this pattern show a close agreement. The "normal" values for Westminster, Richmond and Cahirciveen are from the 35 years 1881 to 1915; those for Eskdalemuir from the 5 years 1911 to 1915.

Solar radiation results are given for South Kensington, Richmond (Kew Observatory), and Eskdalemuir. At the two latter stations use is made of the Ångström pyrheliometer, which gives the intensity of the radiation received from the

* The exposure of the recorder at South Kensington was interrupted by building operations at the end of September 1918, and the record made at the Wesleyan Training College, Westminster, has been tabulated since that date.

sun by a surface which is normal to the line drawn from the instrument to the sun. At Richmond the observations are made within half an hour of noon; for this observatory the vertical component of the radiation, *i.e.* the intensity multiplied by the cosine of the zenith distance of the sun, is tabulated to facilitate comparison with the South Kensington records. The hour of the pyrheliometric observation at Eskdalemuir is given explicitly; the value is also given of $(p/p_0) \sec Z$, where p is the barometric pressure at the observatory in millibars at the time of the observation, p_0 is 1000 millibars, and Z is the zenith distance of the sun, so that $(p/p_0) \sec Z$ affords a measure of the mass of atmosphere through which the solar radiation has had to travel before reaching the earth. The entries in the columns headed "sky" at Richmond and Eskdalemuir are intended to show the presence or absence of any visible obstruction, such as haze, mist, or cloud, in the direct path of the solar radiation recorded. Observations are taken so far as possible in the absence of cloud; but upper cloud, when there is a great deal of it, cannot always be avoided, and, unless the cloud is very thin, the fall in the radiation recorded is conspicuous.

At South Kensington the radiation is measured by the Callendar Radiograph, which records the amount received on a horizontal surface from all sources. In bright sunshine the greater part of the radiation consists of the vertical component of the direct solar radiation, but even then an appreciable part comes from the general atmosphere and from clouds. Thus if a Callendar and an Ångström instrument were simultaneously recording side by side, one would naturally expect the radiation recorded by the former to exceed the vertical component of that recorded by the latter.

The intensity of radiation, whether at South Kensington, Richmond, or Eskdalemuir, is expressed in milliwatts per square centimetre. For conversion to the unit more ordinarily employed abroad, we may use

$$1 \text{ mw. per sq. cm.} = 0.01435 \text{ gramme-calorie per sq. cm. per minute.}$$

At South Kensington two measurements are given for the maximum radiation—the highest value shown on the trace of the Callendar instrument at whatever hour it occurs, and also the highest value recorded between 11 h. 30 m. and 12 h. 30 m. It is the latter that is most appropriate for comparison with Richmond. The daily total radiation at South Kensington, representing the integrated value of the radiation throughout the 24 hours, is also given, being expressed in joules (J) per sq. cm. A watt equals 1 joule per second, and therefore a uniform radiation at the rate of 1 milliwatt amounts in 24 hours to 86.4 joules. The daily total at South Kensington is also expressed as a percentage of the "planetary" radiation, *i.e.* the radiation that would be received if the earth's atmosphere were non-existent, assuming the average intensity of direct solar radiation in space at the earth's mean distance from the sun to be 135 milliwatts per sq. cm. This accepts Dr. Abbot's result, 1.93 gramme calories per sq. cm.; but it should be remembered that the scales of the Callendar and Ångström* instruments undoubtedly differ from that accepted at Washington.

2. Meteorology and Magnetism:—Cahirciveen (Valencia Observatory). This table is in the form adopted for Part III., Section I., of the Year-Book (Daily Readings at Meteorological Stations of the First and Second Orders). Pressure, temperature

* Ångström No. 24 was in use at Richmond during the year 1919. It is hoped that a discussion of a comparison between the scale of this instrument and that of an Abbot silver disc pyrheliometer will be published shortly.

wind velocity, and rainfall are taken from the self-recording instruments at the observatory. Some account of these instruments will be found in the Introduction to Hourly Values from Autographic Records, Meteorological Section, 1913. It may be noted here that the temperatures refer to a large louvered screen on the north wall of the Observatory, not to the Stevenson Screen, which contains the thermometers used for the observations printed in the Daily Weather Report.*

Pressure is given in "millibars" (1000 millibars = one megadyne per square centimetre). One millibar is approximately equivalent to the pressure of 0·75008 mm. or 0·02953 inch of mercury under standard conditions (273a, lat. 45°). Conversion Tables will be found in Hourly Values from Autographic Records, 1913, and in the Computer's Handbook. The necessary reductions of the readings of the barometer on account of temperature and latitude have been made.

Temperatures are given in units on the Kelvin Absolute Scale, *i.e.* in centigrade degrees measured from a zero 273° below the normal Freezing Point of water.† Temperatures at or below 273a (0° C.) are printed in small type. The extreme temperatures refer to the calendar day.‡

Vapour-Pressure, deduced from the readings of the dry and wet bulb thermometers, is given in millibars. For the computation of Vapour Pressure and of Relative Humidity tables depending on Glaisher's hypothesis, that the depression of the wet-bulb readings below the air-temperature is proportional to the depression of the dew point below the same temperature, are utilised.

Wind-Speed is expressed in metres per second. The values are estimated for periods of 60 minutes centering at the hours named. The Robinson anemograph § (9-inch cups, 24-inch arms, factor 2·2) is used for this purpose.

Wind-Direction in the present volume is given by the deviation from North, reckoned in degrees as a "veer," in the sense N, E, S, W. The general direction for the 60 minutes is estimated from the anemogram. || No direction is given when the anemogram shows a mean velocity for the hour smaller than 1·6 metres per second.

Precipitation is given in millimetres of equivalent rainfall. The rainfall is for the calendar day; previous to May 1st, 1914, the period was the 24 hours beginning at 10 h. 30 m., and from that date to the end of 1917 the 24 hours beginning at 9 h. †

The "normals" for Pressure, Temperature, and Precipitation are from the 45 years 1871 to 1915; those for Humidity from the 30 years 1886 to 1915; and those for Wind from the 35 years 1881 to 1915. Except in the case of Pressure, no allowance has been made for the removal of the observatory from Valencia Island to Cahirciveen in 1892.

The estimation of **cloud** amount and the symbols for **weather** are in accordance with the conventions of the International Meteorological Committee.

A summary of the weather for each day is given in the column headed **Remarks**, the international weather symbols and the letters of the Beaufort Notation being used as far as possible. These symbols and letters are as follows:—

* At Richmond and at Eskdalemuir the thermograph screens contain the thermometers used for the Daily Weather Service.

† The propriety of the definition has been discussed by F. J. W. Whipple, *Lond. Phys. Soc. Proc.*, vol. xxxi, 1919, p. 240.

‡ Extreme temperatures and rainfall for the 24 hours to 7 h. are printed in the Daily Weather Report and utilised in the Weekly Weather Report. For the Monthly Weather Report the figures of this Journal are used.

§ See below, p. vi.

|| Formerly it was the practice to take the direction at the exact hour. The present rule was adopted as from 1st May 1915. The Introductions to the *Geophysical Journal*, 1915, 1916, should be amended in this sense.

BEAUFORT NOTATION AND INTERNATIONAL WEATHER SYMBOLS.

b. blue sky. (Cloud amt. 0, 1, 2, 3	x. \lrcorner hoar frost.	h. \blacktriangle hail.
bc. some cloud. „ 4, 5, 6	\leftarrow ice crystals.	\triangle soft hail.
c. cloudy. „ 7, 8	∇ rime.	t. \mathbf{T} thunder.
o. overcast. „ 9, 10)	\sim glazed frost.	l. \lessgtr lightning.
g. gloomy, dull appearance.	e. water deposited copiously	$\mathbf{\boxtimes}$ thunderstorm.
u. ugly, threatening appearance.	on exposed surfaces,	\nearrow gale.
v. visibility, unusually clear	without rain falling.	q. squally.
atmosphere.	y. dry air.	\odot solar corona.
z. ∞ haze.	p. passing showers.	\oplus solar halo.
m. \equiv^0 mist, light fog.	d. drizzling rain.	\cup lunar corona.
f. \equiv fog.	r. \bullet rain.	\cup lunar halo.
fe. \equiv : wet fog, <i>i.e.</i> fog which	s. $*$ snow.	\frown rainbow.
deposits water copiously	\uparrow snow drift.	$\mathbf{\boxplus}$ aurora.
on exposed surfaces.	\boxtimes snow lying (more than half	$\mathbf{\boxminus}$ zodiacal light.
w. \cap dew.	the surrounding country	
	covered with snow).	

The figure ⁰ attached to a symbol indicates very slight, whilst the figure ² indicates strong or heavy: thus \bullet^0 = slight rain, \bullet^2 = heavy rain. When economy of space is necessary, morning, afternoon, and night are denoted by *a.*, *p.*, *n.* respectively. \nearrow is only used in the Remarks Column when the wind as recorded by the anemometer averages 17.2 m/s or more for at least an hour.

Table 2 also contains results for **Magnetic Horizontal Force, Declination, and Inclination** from absolute observations, usually two a month. The observations* are made at fixed hours on days not subject to abnormal magnetic disturbance, and may be regarded as referring: Horizontal Force to 11 h. 35 m., Declination to 10 h. 20 m., and Inclination to 14 h. 30 m. The unit of force employed, 1γ , represents 0.00001 C.G.S. magnetic unit. It is equal to the magnetic force due to an electrical current of 5 amperes in an infinitely long straight conductor a kilometre away. A memorandum by Dr. Chree on the probable errors in absolute observations of the magnetic elements is printed with the Introduction to the Geophysical Journal 1918.

Tables 3 and 4 contain corresponding observations for **Richmond (Kew Observatory)** and **Eskdalemuir, Dumfriesshire**, with the exception of the magnetic data. At Eskdalemuir the velocity of the wind is determined from the readings of a Dines Pressure-tube Anemograph. The periods from which the Richmond normal values are derived are: Pressure and Temperature 1871 to 1915, Humidity 1886 to 1915, Wind 1881 to 1915, and Rain 1871 to 1915. The "normals" for Eskdalemuir all refer to the 5 years 1911 to 1915.

5. **Geophysics, Richmond (Kew Observatory).** In addition to magnetic and electrical data, this Table contains the readings at 9 h. of thermometers placed in iron tubes in the ground with their bulbs at depths of 30 cm. and 120 cm. below the surface. The mean level of underground water is also given for each day, together with the highest and lowest levels recorded during the month. A description of the apparatus used will be found in the Annual Supplement for 1914. The variation of level through the year is shown by a graph which faces p. 108.

Magnetic Data for Richmond (Kew Observatory). The magnetic data published in the Geophysical Journal up to 1915 were maxima and minima derived from measurements of the magnetograms. The adoption by the London and South-Western Railway of electric traction for the line which passes some 1000 m. from the observatory has made the records useless for the determination of extreme values. The results of absolute observations* taken usually four times a month are now given.

* Notes on the observations are to be published in Hourly Values from Autographic Records, 1919.

The magnetic character of the day is determined by examination of the magnetograms, and is given on the scale approved by the International Magnetic Commission, "0" representing quiet, "1" moderately disturbed, and "2" highly disturbed conditions.

Values of the **Electrical Potential Gradient** in the open are given for 3 h., 9 h., 15 h., and 21 h., representing means for the sixty minutes centering at the hour. A factor, whose value is given, is applied to the electrograph curve readings to deduce the corresponding potential gradient in the open, *i.e.* the potential gradient as it would be if unaffected by the presence of buildings or apparatus. The gradient is measured in volts per metre. It is positive when the potential in the atmosphere exceeds that of the earth. A negative value is indicated by a short thick "-" before the number. When the fluctuations of potential are too large or rapid to permit of a satisfactory numerical estimate of the hourly mean, "z" is inserted with an appropriate sign to indicate whether the gradient was on the whole positive or negative, or too oscillatory to admit of the dominant sign being determined.

The factor for reduction to the open is usually determined month by month, from a comparison of the absolute values obtained from a standardised electrometer over a flat area with the corresponding readings from the electrograms.

The electric character of the day is indicated by the figures 0, 1, or 2 according to the character of the trace of the electrograph as regards negative potential gradient: thus 0 means no negative potential; 1, one or more excursions of limited duration to the negative side of the scale; 2, negative potential extending in the aggregate over at least three hours.

The charges on the ions, positive and negative, are determined by measurements with Ebert's Aspiration Apparatus, extending over fully half an hour between 14 h. and 16 h. The charge per cc. is multiplied by 10^{16} and given in coulombs* to facilitate comparison with the data in neighbouring columns.

In addition to all the ions with mobilities of the order of 1 cm. per second, the Ebert apparatus captures, it is believed, a very appreciable number of the slow-moving or Langevin ions. If all the Langevin ions were captured the figures given in the Table would probably, in most cases, be largely increased.

The figures published for the year 1919 are unfortunately subject to certain errors which are discussed in the Memorandum printed in the Annual Supplement (p. 111).

The Ebert apparatus is designed to determine not merely the number but also the mobility of the more mobile ions; the results of such determinations were given in the years 1911-1912 together with the deduced values of the conductivity and of the air-earth current. The figures were found, however, to present many inconsistencies, and the mobilities are no longer observed. The data now published for the air-earth current are derived from observations made with the apparatus designed

* In earlier volumes other units were used for the ionic charges.

In 1911 the number of ions was given. In computing the number the value 3.4×10^{-10} C.G.S. electrostatic unit or 11×10^{-20} coulomb was accepted as the charge upon an ion. Recent research has shown that this value was too low. Millikan's experiments (*Phil. Mag.*, Series 6, vol. xxxiv., 1917, p. 3) give 4.77×10^{-10} C.G.S. electrostatic unit, or 15.9×10^{-20} coulomb, for the ionic charge.

To reduce the 1911 entries to the form adopted in the current tables they must be multiplied by 11×10^{-4} .

For the years 1912-1915 the charge per cc. $\times 10^{20}$ is given in terms of the C.G.S. electromagnetic unit, which is equal to 10 coulombs. To reduce the entries for these four years to the present form, which was adopted for the year 1916, they must be divided by 1000.

To derive the number of ions per cc. from the entries in the present volume they must, if Millikan's results be accepted, be multiplied by 629. To derive the charge in C.G.S. electrostatic units per cubic metre multiply by 0.3.

by Mr. C. T. R. Wilson, combined with readings from the electrograms. Observations taken with the Wilson apparatus near 15 h. supply a value for the electrical conductivity, and this is combined with the mean value of the potential gradient in the open for the sixty minutes centering at 15 h., as derived from the electrograms. The observations are taken in a uniform way, and should be strictly comparable amongst themselves, but it is believed that multiplication by a factor exceeding unity would be required to give the true air-earth current.

6. Geophysics:—Eskdalemuir. This table contains magnetic and electrical data of the same general character as those for Richmond in Table 5, but with modifications. The Eskdalemuir magnetographs record the three rectangular components North, West, and Vertical. The extreme daily values, and their hours of occurrence, are given for each. In view of the uniformity of the temperature to which the magnetograph is exposed, no temperature correction has been applied.

In the electrical character statistics, 0, 1, and 2 have the same significance as at Richmond, but letters *a*, *b*, *c* are attached according to the range of oscillation of the potential gradient: *a* means that for no hour of the day was there a range as large as 1000 volts; *b* that a range of 1000 volts or more was reached in one hour at least, but in fewer than six hours; *c* that a range of 1000 volts or more was reached in at least six hours. These specifications must not be regarded as absolutely rigid criteria. After longer experience more definite specifications may be found possible.

7. Meteorology:—Jersey (St. Louis Observatory). Readings of pressure, temperature, humidity, wind direction and force, and amount of cloud, with type and direction, are given for 9 h., 14 h., and 21 h., together with the minimum temperature on grass, rainfall, and the duration of appreciable actinic strength of the sun's rays as registered by a Jordan recorder.* Remarks on the weather are also given. The first hour of observation was changed from 7 h. to 9 h. on 1st January 1919. The normals for the various elements are for different periods all ending in 1919. The number of years utilised in each case is given in the footnote.†

The observations for the years 1914, 1915, and 1916 were published as a special supplement to the Geophysical Journal, 1916.

8. Wind Components for four principal anemograph stations of the Meteorological Office, representing different parts of the country. As in Table 2, the wind velocities are expressed in metres per second, and represent mean values for the sixty minutes centering at the specified hours 3 h., 9 h., 15 h., and 21 h. The data at these four hours are not the resultant wind velocities, but their rectangular components in the North-South and East-West directions. North and South winds are treated separately, and so are East and West. The anemographs at Holyhead and Deerness are of the Robinson type, and of the same large size as those at Valencia and Kew Observatories, the arms being 610 mm., the diameter of the cups 230 mm., and the factor used for deriving the run of the wind from the run of the cups 2·2. The Scilly instrument is smaller, the arms being 305 mm., the diameter of the cups 127 mm., and the factor 2·8.

Recent investigations have shown that the correct factor depends on the speed. But it is not proposed to depart from the use of the constant factors until the

* Allowances based on personal observations are made for the times near sunrise and sunset when the sun is shining, but the light is not strong enough to give a trace. This is an important departure from the M.O. practice.

† Pressure, Air Temperature, and Rainfall, 26; Cloud Amount, 25; Humidity, 24; Grass Minimum, 23; Sunshine, 22; Wind, 16.

corrections have been determined with greater certainty.* The rule is that when the tabulated wind-speed is less than 1.6 m/s, components are not shewn, and the word "calm" is printed.

At Holyhead and Scilly there are also Dines pressure-tube anemographs, and the entries given under the heading "Maximum in a Gust" represent the highest speeds recorded by these instruments in the course of the day. The time of occurrence of the highest gust is also given. At Deerness, where there is only a Robinson cup anemograph, particulars are given as to the largest of the twenty-four mean hourly velocities, and the hour or hours of its occurrence. For Shoeburyness the hourly wind components as well as the gusts are derived from Dines records. Shoeburyness appears in the tables for 1919 in place of Yarmouth, the records for that station being incomplete.

9. **The Seismological Diary** consists in the main of results given by the **Galitzine Seismographs**† (two horizontal components and the vertical component) at **Eskdalemuir**, but includes data from a **Milne Seismograph** at **Richmond (Kew Observatory)**. The Eskdalemuir data include (i.) particulars of the earthquakes recorded, and (ii.) the amplitude and period of the microseisms shown by the North component Galitzine instrument on each day at 0 h., 6 h., 12 h., and 18 h. Disturbances attributed directly to wind or other purely local circumstance are excluded. The notation employed is as follows:—

P is the time of arrival of the first phase (longitudinal waves). S is the time of arrival of the second phase (transverse waves). L is the time of arrival of the long waves (surface waves).

PR₁, PR₂ . . . are longitudinal waves reflected once, twice . . . at the earth's surface, prior to their arrival at the station. SR₁, SR₂ . . . similarly denote reflected transverse waves. Any times given for reflected waves refer to the beginning of the disturbance at the observatory.

M₁, M₂ . . . are the times of successive maxima of the displacement of the ground, corrected, if necessary, for the lag of the instrument.

i is the sudden commencement of a phase. *i*P means a sudden commencement of the P phase. *e* means an indistinct commencement of a phase. F is the end.

T, the period in seconds, is the duration of a double oscillation (to-and-fro movement). μ represents a micron (0.001 mm.).

Δ is the distance in kilometres of the epicentre measured along the arc of the great circle passing through the station. α the azimuth of the epicentre (0° to 360°) measured from North through East. The distance is estimated from Klotz's Seismological Tables (*Publication of the Dominion Observatory, Ottawa*, vol. iii. No. 2), which are also used for computing the time at which the disturbance originated. The time of origination is denoted by the letter *O* and inserted in italics.

A₁, A₂ and A₃ are the amplitudes of the components of the true displacement of the ground from the position of rest, and are measured in microns. When the displacement shown by the North-South seismograph is to the North a + sign is shown; for a displacement to the South a - sign is used. Similarly + is used for displacements to the East and upwards, - for displacements to the West and downwards. When the oscillations are of a simple harmonic character no sign is prefixed to the amplitude.

All the microseisms recorded are believed to arise from other than local causes. Microseisms are practically always in evidence, and their period usually remains at least approximately constant during a good many minutes.

The group of waves of greatest amplitude occurring in the 30 minutes centering at the hour in question is selected, and the amplitude tabulated is the mean obtained from two or three waves in that group.

The period is derived from a measurement made on the same group.

The data given for Richmond include the times of commencement of the disturbance and the time of the largest displacement shown on the trace. Additional information is given under the heading "Remarks." The boom of the instrument is oriented North-South, and moves when the ground is tilted East

* Cf. Notes on the Robinson Anemometer, F. J. W. Whipple. *Advisory Committee for Aeronautics Reports and Memoranda*, No. 669, 1920.

† Vide *Geophysical Journal*, Annual Supplement, 1913; or G. W. Walker's *Modern Seismology*.

to West. It has, however, to be remembered that in reality the boom responds to ground movements of various kinds, and that the amplitude of the movement shown on the trace depends to a considerable extent on whether the oscillatory movement in the ground has a period near to or remote from the natural period of the boom. At the same time, a really large movement on the trace invariably means a large earthquake. Amplitudes, all measured on the trace in mm., are not recorded unless at least 1.0 mm. Those less than 0.2 mm. are characterised as very small, those between 0.2 and 0.5 mm. as small. During the year 1918 the period of the boom was approximately 18 seconds, and a movement of 1 mm. on the trace was produced by a tilting of from 0".40 to 0".50.

10. Soundings with Pilot Balloons. This table gives the results of **exploration of the free atmosphere** by means of pilot balloons. The soundings available are numerous; only those at Aberdeen, Eskdalemuir, Cahirciveen, South Farnborough, and Falmouth are included in this table.

The times refer to the beginning of the sounding; they are given to the nearest five minutes. Wind directions are given in degrees from True North (through East).

The wind velocity is derived from that of the balloon itself. This may be observed with two theodolites at the ends of a known base, or with one theodolite. As a rule, only one theodolite is employed, and the velocities are then deduced in the way explained in the Computer's Handbook, Section II.

The vertical velocities are calculated from the formula

$$V = 84 L^{\frac{1}{2}} / (W + L)^{\frac{1}{2}},$$

in which

L is the free lift of the balloon, *i.e.* the weight in grammes which the balloon can carry without rising,
 W is the weight of the balloon in grammes, and
 V is the vertical velocity in metres per minute.

The value 84 was adopted for the constant of this formula in place of 81 as from 1st September 1918. (M.O. Circular No. 27.)

The "Geostrophic Velocity" shown for each ascent is determined from the prevailing pressure gradient by the formula $v = \gamma / 2\rho\omega \sin \lambda$, in which γ is the horizontal pressure-gradient, ω the angular velocity of the earth, ρ the density of the air, λ the latitude, and v the required geostrophic velocity. The significance of geostrophic velocity is explained in the introduction to the Geophysical Journal for 1915. Reference may also be made to the Meteorological Glossary and to the Computer's Handbook, Section II. iii. The relation between actual winds and geostrophic winds has been discussed with reference to observations by J. S. Dines,* J. Fairgrieve,† and G. Dobson,‡ and from a theoretical standpoint by G. I. Taylor.§

The pressure gradient is derived from the charts of the Daily Weather Report International Section. If the hour of an ascent differs decidedly from a chart hour, results are usually calculated from each of the two charts which come nearest in time.

In the deduction of wind components, etc., the calculations are all carried out to 0.1 m/s (metre per second), but this degree of accuracy does not appear in the printed results except in the case of observed wind velocities under 5 m/s. Observed wind velocities of 5 m/s and over are given only to the nearest 0.5 m/s. Geostrophic or gradient wind velocities are given only to the nearest 1 m/s. Directions are given to

* "Advisory Committee for Aeronautics," *Fourth Report on Wind Structure*, 1914, p. 19.

† *Geophysical Memoir*, No. 9, 1914.

‡ *Q.J. Royal Met. Soc.*, 1914, p. 123.

§ *Phil. Trans. Roy. Soc., A*, 1915, p. 1 *Proc. Roy. Soc.*, 1916, p. 196.

the nearest 5° in the case of observed wind velocities, but only to the nearest 10° in the case of geostrophic or gradient wind velocities.

Details of seven soundings by registering balloons are given in the Annual Supplement, together with certain aeroplane observations.

11. **Nephoscope Observations.** This table gives the results of observations of **Cloud Motion at Aberdeen** taken with Fineman's nephoscope.

The nomenclature used for clouds is in accordance with the specifications given in "The International Cloud Atlas" and in the "Observer's Handbook." Information as to the usual heights of the several forms is given in the following table:—

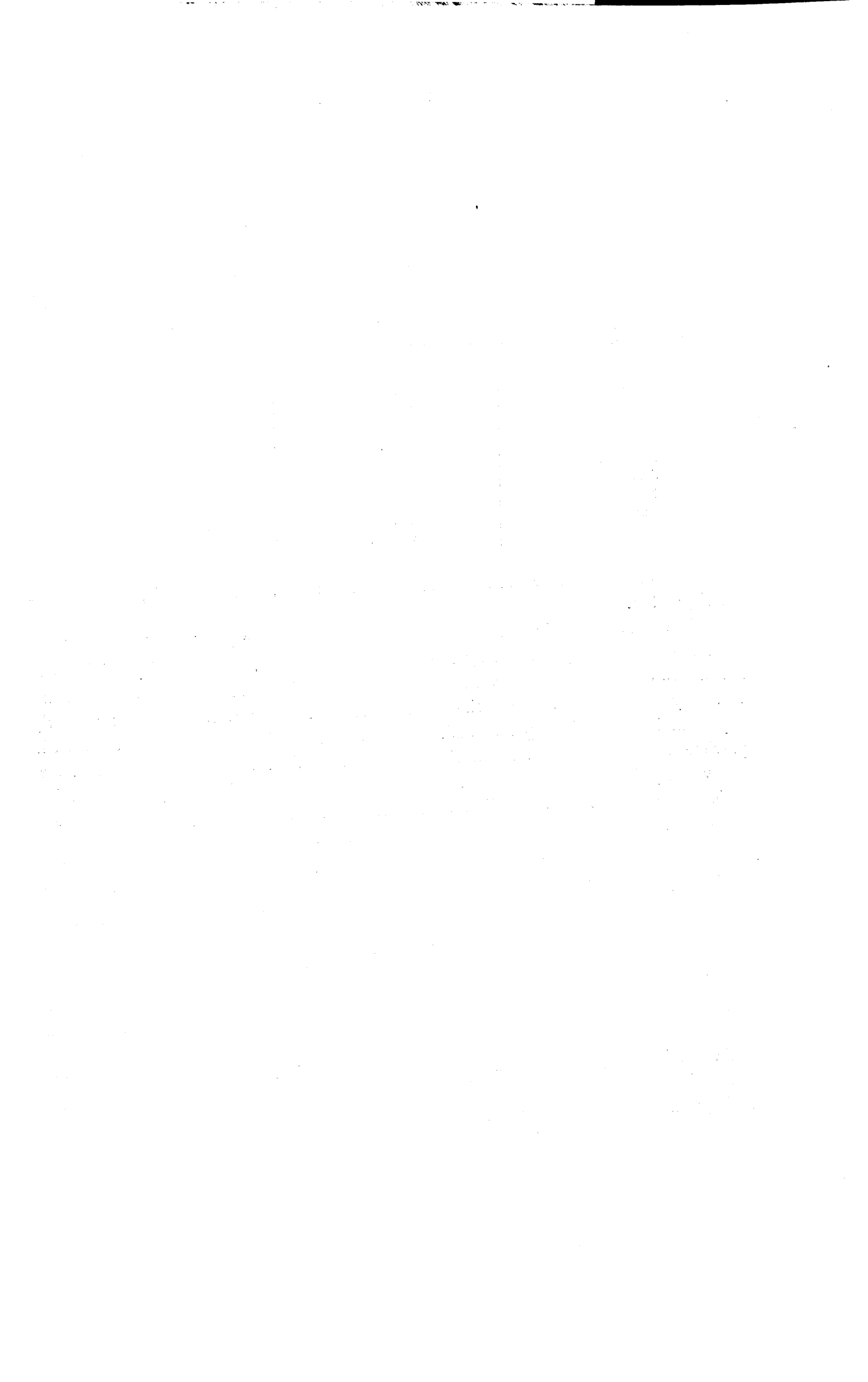
Form.	Abbreviation.	Height of base (metres).
Cirrus	Ci.	Mean 9000
Cirro-stratus	Ci-St.	"
Cirro-cumulus	Ci-Cu.	3000 to 7000
Alto-stratus	A-St.	"
Alto-cumulus	A-Cu.	"
Strato-cumulus	St-Cu.	Below 2000
Nimbus	Nb.	"
Cumulus	Cu.	Mean 1400
Cumulo-nimbus	Cu-Nb.	"
Stratus	St.	Below 1000

The following abbreviations are also used: *cuf.* = cumuliformis, *lent.* = lenticularis, and *fr.* = fracto.

The observations give what is termed for brevity the "velocity-height-ratio," *i.e.* the true cloud velocity divided by the height of the cloud. The velocity-height-ratio is equal to the instantaneous value of the angular velocity of the cloud about a point vertically beneath it, and on the same level as the observer. It is conveniently expressed in milliradians per second. For comparison with the nomenclature used in previous volumes it may be noted that for a low cloud at the height of one kilometre the velocity in metres per second is the same as the velocity-height-ratio in milliradians per second. A short discussion of the results for the five years 1912 to 1916 will be found in the Supplement to the 1916 volume.

12. **Aurora.** This table, introduced in January 1917, gives Aurora observations at various stations, and also shows the phases of the Moon and the "magnetic character" assigned for Richmond and Eskdalemuir. As "magnetic character" refers to a period of 24 hours beginning at midnight, it is convenient to show the characters for the two calendar days which include the night of the Aurora observations.

An **Annual Supplement** gives a summary of the Observations of the Temperature of the Upper Air made at Benson, Oxon, and at South Farnborough, as well as some electrical and magnetic data from Richmond (Kew Observatory) and Eskdalemuir. A discussion of the constants of the seismological instruments at Eskdalemuir is also included, together with a diagram showing the variation in the level of the underground water at Richmond.



METEOROLOGICAL OFFICE OBSERVATORIES—GEOPHYSICAL JOURNAL.

DAILY VALUES.—Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology.

Ninth Year.—No. 1. JANUARY 1919.]

Units based on the C.G.S. System.

[Price 1s.]

I. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.							SOUTH KINGSINGTON.—Lat. 51° 30' N. Long. 0° 10' W.							RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.					ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.					CAHIRCIVEEN.	
	Bright Sunshine.*		Radiation received on Horizontal Surface by Callendar Radiograph.					Bright Sunshine.*		Radiation at Noon by Angström Pyrheliometer.			Bright Sunshine.*		Radiation by Angström Pyrheliometer.			Bright Sunshine.*								
	Total.	Per cent. of Possible.	Daily Total.	Per cent. of Planetary.	Maximum.			Total.	Per cent. of Possible.	Intensity.	Vertical Component.	Sky.	Total.	Per cent. of Possible.	Time.	Sky.	p sec Z.	Intensity.	Total.	Per cent. of Possible.						
					Amount.	Time.	11.30 h. to 12.30 h.														hr.	%	mw/cm ² .	hr.	%	mw/cm ².	hr.	%	mw/cm^{2}.	hr.	%
1	0'0	0	90	13	6	13	42	5	0'0	0	...	0'0	0	0'0	0	0'8	10					
2	3'4	43	242	36	19	13	40	13	4'7	59	23	6	Ci	0'0	0	...	...	...	1'3	17			
3	2'9	37	278	41	22	11	50	22	3'1	39	...	...	...	0'0	0	...	...	...	1'7	22
4	1'3	16	160	23	17	11	25	15	2'1	27	...	...	...	0'0	0	...	...	...	4'7	59
5	0'0	0	111	16	12	11	50	12	0'0	0	...	...	...	0'0	0	...	...	...	3'0	38
6	1'3	16	230	33	27	12	25	27	2'3	29	3'3	45	12 19	Hazy	4'53	54	0'0	0					
7	0'0	0	151	21	22	13	35	17	0'2	3	...	...	...	0'0	0	...	...	...	0'7	9
8	0'6	8	111	15	22	12	40	12	0'4	5	4'0	55	12 26	Hazy	4'52	49	0'4	5					
9	2'9	36	231	32	26	11	45	26	2'4	30	...	...	...	0'0	0	...	...	...	0'0	0
10	1'1	14	212	29	17	12	50	9	2'1	26	38	11	Ci	1'7	23	...	...	...	0'3	4			
11	0'7	9	185	25	27	10	50	18	1'5	19	...	...	...	0'2	3	...	...	...	2'8	35
12	0'2	2	163	22	15	10	20	12	0'2	2	...	...	...	0'0	0	...	...	...	0'1	1
13	0'0	0	0	0	0	0'0	0	4'5	60	12 21	Ci	4'33	61	0'0	0					
14	0'0	0	70	9	9	11	40	9	0'0	0	...	...	...	0'0	0	...	...	...	1'6	19
15	0'2	2	170	22	18	13	45	12	0'0	0	...	...	...	2'3	30	...	...	...	2'9	35
16	3'6	43	282	35	27	11	20	20	3'2	39	47	14	Clear	0'3	4	...	...	...	1'8	22			
17	2'9	35	231	29	22	12	50	17	5'1	61	53	16	Clear	1'6	21	...	...	...	3'5	42			
18	1'0	12	181	22	19	11	50	19	2'3	27	6'7	86	12 20	Clear	4'09	70	0'4	5					
19	0'0	0	131	16	14	13	25	9	0'0	0	...	...	...	0'0	0	...	...	...	4'4	52
20	0'0	0	61	7	5	14	25	3	0'0	0	...	...	...	0'0	0	...	...	...	4'4	52
21	0'0	0	126	15	13	11	45	13	0'0	0	...	...	...	0'0	0	...	...	...	0'0	0
22	0'1	1	149	17	15	13	20	12	0'0	0	...	...	...	0'0	0	...	...	...	0'2	2
23	0'0	0	129	14	12	12	25	12	0'0	0	...	...	...	0'0	0	...	...	...	0'0	0
24	0'0	0	115	13	14	11	15	10	0'5	6	...	...	...	0'0	0	...	...	...	0'0	0
25	0'0	0	201	22	17	12	47	14	0'0	0	...	...	...	0'0	0	...	...	...	4'1	48
26	0'0	0	95	10	7	12	30	7	0'0	0	...	...	...	3'2	39	...	...	...	1'2	14
27	0'5	6	224	23	26	12	25	26	0'7	8	...	...	...	3'6	43	...	...	...	3'5	40
28	0'0	0	183	19	14	12	0	14	0'0	0	...	...	...	0'3	4	...	...	...	6'2	70
29	0'0	0	143	14	11	11	36	11	0'1	1	...	...	...	3'1	37	...	...	...	7'2	81
30	0'0	0	0	0	0	...	...	...	0'0	0	...	...	...	1'1	13	...	...	...	1'5	17
31	0'0	0	0	0	0	...	...	...	0'0	0	...	...	...	0'0	0	...	...	...	6'2	69
Means	0'74	9	150	18	15	—	—	—	1'00	12	—	—	—	1'16	15	—	—	—	2'10	26						
Normal	0'68	8	161	—	—	—	—	—	1'39	17	—	—	—	0'94	12	—	—	—	1'55	19						
	←35 years→		7 years		←35 years→		←35 years→		←35 years→		←35 years→		←5 years→		←35 years→		←35 years→		←35 years→							

2. METEOROLOGY AND MAGNETISM :—CAHIRCIVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W.

Heights above M. S. L.:—H=9.1 m. H_b=13.7 m. H_a=26.4 m. Above Ground: h₁=1.3 m. h₂=0.56 m. h₃=13.9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.		Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force, Declination West, and Inclination.	
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	9 h.	21 h.	9 h.	21 h.	9 h.	21 h.	9 h.	21 h.					
	mb.	mb.	a. 200+	a. 200+	a. 200+	a. 200+	millibar.	%	%	m/s.	m/s.	Tenths of Sky covered.	Tenths of Sky covered.	mm.	a. 200+				
1	1002.8	999.1	83.1	80.0	84	79	12.2	8.5	99	85	200	4	255	17	10	2	14.2	76	● n. and a. Fair p.
2	1002.1	993.4	80.1	79.0	81	77	8.2	8.2	81	87	245	10	245	13	7	5	11.4	77	Fair n. and a. ● ² to fair p.
3	993.9	986.3	78.2	76.4	79	75	6.7	6.4	76	83	260	11	...	1	3	5	2.5	75	Fine generally. ▲▲ p.
4	979.7	979.9	75.3	77.6	78	n 72	6.7	6.8	93	81	15	2	5	6	3	4	1.5	n 63	Fine n. ▲ a. Fine, with p. p.
5	983.1	988.0	78.2	78.6	80	76	7.0	7.0	79	78	5	7	360	3	5	3	0.7	73	p. n. Fine day.
6	976.8	956.8	77.6	79.3	80	74	7.4	8.6	87	90	150	5	350	4	10	10	x 44.5	71	Fine n. ● a. ● ² later.
7	958.2	978.6	78.9	79.4	81	78	8.7	8.8	94	92	230	5	350	2	10	3	8.2	78	● n. and a. Fair p. U
8	988.9	966.8	78.7	80.8	81	79	8.2	9.4	90	89	260	2	135	6	4	7	13.3	75	Fair, with p. n. and a. ● p.
9	980.0	994.1	79.3	78.1	81	77	8.5	7.7	89	87	275	22	245	13	10	7	8.9	78	o. p. n. ● a. ⊕▲U p.
10	991.8	998.1	76.7	78.0	79	76	7.1	7.5	89	86	175	6	265	10	10	8	6.0	75	o. ▲ a. and p.
11	998.7	1001.6	79.2	78.3	82	77	9.0	8.4	96	94	250	3	...	0	8	7	6.3	74	p. n. and a.
12	1000.2	1004.8	79.0	80.0	81	76	8.7	7.6	94	76	160	4	315	5	8	5	9.6	75	c. n. p. to ● ² a. p. to fine p.
13	1004.5	996.4	79.6	84.2	x 84	75	8.4	13.1	86	99	160	7	180	9	10	10	19.4	72	U n. ● all day.
14	1002.1	996.8	81.3	81.6	83	81	10.3	10.4	95	94	155	4	165	9	9	10	1.8	80	o. n. Fine a. o. to d. p.
15	997.8	998.4	79.2	79.1	82	79	8.5	8.1	90	86	220	6	215	8	10	10	4.2	79	p. and ▲ a. p. ▲ and < p.
16	998.9	1009.7	78.4	79.9	80	78	7.7	7.5	86	75	245	12	285	8	7	5	3.5	76	q. p. n. ▲ ² a. p. later.
17	1014.2	1014.2	79.1	78.8	81	78	7.3	7.4	78	81	295	5	65	3	6	8	1.0	75	q. p. n. Fine day.
18	1017.4	1016.2	77.3	81.6	83	75	7.4	10.2	89	92	...	1	125	4	7	10	1.2	74	Fine a. o. d. p.
19	1014.4	1008.3	81.8	80.6	83	80	10.5	8.9	93	85	275	3	135	5	4	4	5.8	81	● n. Fine day.
20	1002.2	1007.6	81.0	81.7	83	80	9.1	8.4	85	75	265	7	280	10	7	4	3.6	78	p. to ● ² a. Fair with p. later.
21	1010.8	1012.5	79.9	82.5	83	80	9.6	11.6	97	98	165	3	...	0	10	10	20.3	79	p. n. ● to ≡ ² later.
22	1020.8	1025.5	81.5	81.3	83	81	10.2	9.9	92	91	135	5	155	5	10	10	1.6	81	o. d. n. and a. ● ⁰ p.
23	1028.6	1029.7	81.7	82.7	83	x 82	10.6	11.8	96	98	155	6	170	3	10	10	1.2	80	o. d. n. and a. ≡ ⁰ to d. p.
24	1031.2	1030.2	82.5	82.5	83	x 82	11.6	11.3	98	96	175	3	175	5	10	10	3.1	82	● ⁰ a. Dull day. p. and ● ⁰ p.
25	1028.3	1022.5	78.8	80.9	82	79	8.6	8.3	94	78	...	1	225	6	3	10	5.2	76	● n. and a. Fine day. o. p.
26	1016.1	1012.6	79.2	77.9	81	76	7.1	7.0	75	81	265	11	290	7	8	3	5.8	76	o. q. ● n. q. p. during day.
27	1009.1	1015.8	78.2	78.1	80	77	7.1	6.0	81	n 69	305	15	360	9	10	▲	2.8	76	q. ▲ a. Fair later.
28	1018.4	1019.9	75.8	77.0	79	75	6.2	6.8	84	84	30	3	55	4	6	2	0.6	73	p. a. Fine day.
29	1021.4	1019.7	74.8	75.0	78	73	5.0	5.6	72	79	90	5	90	7	0	∞	...	69	U n. Fine with ∞.
30	1017.8	1019.7	76.0	77.5	78	75	5.2	6.7	n 69	80	85	5	80	5	6	1	∞	73	U n. Fine day. c. to o. ∞ p.
31	1022.0	1023.1	75.0	73.3	n 77	73	5.5	4.5	78	73	85	6	80	4	1	∞	...	73	Fine, with ∞.
Means	1004.3	1004.1	78.9	79.4	81.1	77.1	8.2	8.3	87	85	6.1	...	6.2	7.2	6.4	208.2	75.7	Monthly Totals or Means.	
Normal	1012.6	1012.8	79.8	79.9	82.3	77.6	8.6	8.6	87	87	6.4	...	6.4	...	...	148.2	...	Normals.	
	←45 years→		←30 years→		←35 years														

3. METEOROLOGY :—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m.

Heights above Ground :—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns: Day, Air Pressure at Station Level (9 h, 21 h), Air Temperature in Degrees Absolute (9 h, 21 h, Max., Min.), Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second (9 h, 21 h), Cloud Amount and Weather (9 h, 21 h), Rain 0 h. to 24 h., Min. Temp. on Grass., REMARKS.

45 years

30 years

35 years

45 years

4. METEOROLOGY :—ESKDALEMUIR, DUMFRIESSHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m.

Heights above Ground :—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns: Day, Air Pressure at Station Level (9 h, 21 h), Air Temperature in Degrees Absolute (9 h, 21 h, Max., Min.), Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second (9 h, 21 h), Cloud Amount and Weather (9 h, 21 h), Rain 0 h. to 24 h., Min. Temp. on Grass., REMARKS.

5. GEOPHYSICS:—RICHMOND (KEW OBSERVATORY).

Day.	Earth Temperature at 9 h.		Height above M. S. L. of Surface of Underground Water.		Magnetic Force.						Magnetic Character of Day.	Electric Character of Day.	Charge per cc. $\times 10^{16}$.		Air-Earth Current. $\times 10^{16}$.	Potential Gradient, Volts per metre. Factor 2.16.			
	0.3 m.	1.2 m.	Daily Mean.	Extremes.	Horizontal Comp't		Declination.		Inclination.				About 15 h.	About 15 h.		3 h.	9 h.	15 h.	21 h.
					Mean Time.	γ	Mean Time.	West.	Mean Time.	North.									
	<i>a.</i>	<i>a.</i>	cm.	cm.	h m	γ	h m	γ	h m	γ			coulomb.	amp/cm ² .	v/m.	v/m.	v/m.	v/m.	
1	200+	200+	262	261	...	...	...	...	...	...	0	2	...	...	475	635	-410	80	
2	78.1	80.8	264	...	11 17	18414	14 24	14 46.6	14 28	66 56.4	0	1	...	...	1.20	105	240	360	
3	78.2	80.9	264	...	...	...	...	...	...	...	2	2	0.22	0.22	0.70	55	515	700	-200
4	78.0	80.7	270	...	...	...	...	...	...	...	2	2	...	...	...	120	425	700	-280
5	77.9	80.6	277	...	...	...	...	...	...	...	2	1	...	...	...	400	425	320	160
6	77.6	80.3	284	...	...	...	...	...	...	...	1	0	0.32	0.22	0.65	410	465	465	330
7	77.6	80.3	291	...	...	...	...	...	...	...	1	2	0.41	0.17	0.75	105	-490	280	465
8	77.7	80.2	295	...	...	...	...	...	...	...	0	1	0.30	0.15	0.45	320	330	210	465
9	78.0	80.4	298	...	11 18	18400	14 25	14 46.6	14 19	66 58.9	0	1	...	...	...	65	280	\pm	435
10	77.9	80.2	300	...	...	...	...	...	...	...	0	2	0.30	0.02	0.70	265	425	505	\pm
11	77.4	80.2	304	...	...	...	...	...	...	...	0	1	...	...	...	170	900	770	650
12	76.7	80.2	311	...	...	...	...	...	...	...	0	1	...	...	...	625	-210	545	795
13	76.7	80.0	316	...	...	...	...	...	...	...	1	0	...	...	...	1100	490	610	635
14	76.9	79.9	320	...	...	...	...	...	...	...	1	1	...	...	...	170	330	250	145
15	78.9	79.9	322	...	...	...	...	...	...	...	0	1	0.54	0.34	0.55	160	305	400	-105
16	79.0	79.9	323	...	11 22	18426	14 25	14 50.2	14 32	66 58.3	2	1	0.58	0.41	0.45	210	160	160	555
17	78.2	79.9	327	...	...	...	...	...	...	...	1	1	0.22	0.30	0.65	330	665	360	860
18	77.0	79.9	330	...	...	...	...	...	...	...	2	0	...	...	...	465	635	425	465
19	76.2	79.9	333	...	...	...	...	...	...	...	2	0	...	...	...	570	875	635	875
20	76.2	79.9	336	337	...	...	...	...	...	...	1	2	...	...	...	145	0	120	-65
21	76.8	79.9	334	...	...	...	...	...	...	...	1	2	...	...	...	265	290	-410	-120
22	76.8	79.9	332	...	...	...	...	...	...	...	1	0	0.50	0.15	0.75	610	850	635	1100
23	75.9	79.7	332	...	11 16	18402	14 21	14 47.4	14 32	66 57.7	0	0	0.30	0.43	0.90	980	...	980	715
24	75.3	79.5	332	...	...	...	...	...	...	...	0	0	0.34	0.09	0.70	625	675	360	665
25	75.0	79.3	331	...	...	...	...	...	...	...	0	1	...	...	...	820	635	330	-160
26	75.0	79.3	330	...	...	...	...	...	...	...	0	1	...	...	...	265	940	290	715
27	75.1	79.0	327	...	...	...	...	...	...	...	0	2	...	...	...	890	665	820	-320
28	75.0	79.0	322	...	...	...	...	...	...	...	1	1	...	...	...	55	120	835	890
29	75.0	78.9	320	...	...	...	...	...	...	...	1	1	0.24	0.26	0.40	505	635	530	650
30	75.0	78.9	321	...	11 24	18405	14 23	14 52.3	14 14	66 57.4	0	0	0.54	0.13	1.20	265	635	665	475
31	74.9	78.8	322	...	...	...	...	...	...	...	1	0	0.71	0.28	1.95	290	515	755	755
M.	76.8	79.9	311	...	...	...	...	...	...	...	...	...	...	...	...	376*	452*	418*	398*
	76.8	79.7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

* Mean of 28 days.

6. GEOPHYSICS:—ESKDALEMUIR.

Day.	Magnetic Force.										Magnetic Character of Day.	Electric Character of Day.	Potential Gradient, Volts per metre. Factor 6.02.								
	North Component.			West Component.			Vertical Component.						3 h.	9 h.	15 h.	21 h.					
	Maximum. 15000 γ +.	Minimum. 15000 γ +.	Range.	Maximum. 4000 γ +.	Minimum. 4000 γ +.	Range.	Maximum. 44000 γ +.	Minimum. 44000 γ +.	Range.												
	h m	γ	γ	h m	γ	h m	γ	γ	h m	γ	h m	γ	γ	h m	γ			v/m.	v/m.	v/m.	v/m.
1	8 1	980	948	19 14	32	12 6	916	885	23 33	31	19 57	1111	1090	11 10	21	0	2 c	200	-1805	-405	-30
2	21 5	975	955	0 6	20	12 48	921	888	1 12	33	0 0	1101	1089	11 0	12	0	2 c	...	65	170	440
3	20 27	1145	864	20 40	281	18 48	942	746	20 4	196	20 27	1270	1086	18 45	184	2	0 a	335	235	675	305
4	19 22	1134	849	13 2	285	13 18	972	653	19 33	319	19 20	1321	1001	23 27	320	2	1 b	455	275	150	290
5	19 43	1064	846	3 14	218	19 49	937	729	16 43	208	16 42	1194	1011	0 2	183	2	1 b	140	-355	295	220
6	15 17	1003	890	15 0	113	22 37	951	813	21 15	138	15 9	1157	1062	1 52	95	1	0 a	210	250	575	580
7	20 37	979	915	10 6	64	23 17	920	869	20 0	51	19 58	1114	1081	24 0	33	0	1 b	600	170	-155	70
8	21 58	997	894	13 47	103	13 18	924	877	24 0	47	14 16	1113	1080	0 18	33	1	0 a	355	420	250	460
9	1 0	1012	939	13 6	73	11 13	916	867	0 33	49	18 30	1104	1080	1 20	24	0	2 c	-615	75	\pm	-70
10	6 36	977	939	11 34	38	14 20	915	870	21 44	45	21 50	1104	1090	0 23	14	0	2 c	55	225	\pm	430
11	7 16	982	949	12 28	33	13 50	918	888	22 18	30	15 10	1100	1093	4 10	7	0	2 c	-630	165	405	490
12	23 29	996	941	11 1	55	13 49	921	891	19 20	30	18 50	1106	1090	23 30	16	0	2 b	-260	370	295	335
13	5 55	1026	906	8 12	120	18 18	953	873	21 37	80	19 55	1114	1061	5 58	53	1	1 b	700	290	430	455
14	0 58	1025	911	6 18	114	7 22	962	867	8 20	95	18 51	1110	1065	7 29	45	1	2 b	-1445	340	590	395
15	22 2	988	932	12 26	56	14 36	932	850	22 18	82	21 39	1111	1079	6 25	32	1	1 b	495	205	255	190
16	21 19	1011	845	21 34	166	13 37	953	728	21 40	225	19 21	1181	1067	24 0	114	2	2 c	150	-70	-40	105
17	19 30	1010	891	11 44	119	7 26	942	814	20 30	128	19 5	1141	1025	3 54	116	1	1 b	105	115	190	285
18	19 36	1049	867	17 14	182	13 26	937	746	17 27	191	17 25	1186	1063	0 11	123	2	1 a	235	460	255	465
19	20 54	1044	895	21 13	149	2 24	940	824	19 49	116	19 48	1142	1063	2 36	79	1	1 a	235	210	480	220
20	23 13	1009	929	16 30	80	15 40	937	850	23 53	87	17 34	1122	1060	23 29	62	1	2 b	235	240	-105	-210
21	21 52	1011	940	2 45	71	14 40	921	835	21 23	86	21 15	1114	1068	0 0	46	1	2 c	-855	120	325	255
22	19 47	1006	936	10 50	70	0 35	937	843	19 35	94	19 34	1117	1072	24 0	45	1	0 a	285	275	205	575
23	22 5	994	937	18 16	57	14 59	916	863	18 24	53	18 40	1109	1072	0 10	37	0	0 a	360	225	325	200
24	23 30	996	942	14 18	54	13 45	929	860	23 17	69	22 53	1098	1081	0 0	17	0	0 a	170	125	480	495
25	5 31	985	947	11 51	38	13 43	920	883	4 10	37	21 30	1095	1085	5 2	10	0	2 c	495	-785	-555	395
26	22 21	990	952	13 5	38	14 3	922	881	22 55	41	0 0	1092	1082	13 30	10	0	2 c	\pm	150	190	510
27	8 6	986	956	12 59	30	14 3	914	884	9 19	30	23 10	10									

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W.

Heights above M.S.L.:—H = 54 m. H_b = 55 m. Above Ground:—h_t = 1.48 m. h_r = 1.72 m. h_a = 8 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Min. Temp. on Grass, Percentage of Humidity, Rain 0 h. to 24 h., and REMARKS. Rows include daily data from 1 to 31 and summary rows for Means and Normal.

JERSEY (ST LOUIS OBSERVATORY).

Table with columns: Day, Wind Direction and Force, Sunshine, Cloud Amount (tenths of Sky covered), Type of Cloud, and Direction whence coming, and Mean Amount. Rows include daily data from 1 to 31 and summary rows for Means and Normal.

* For method of estimation, see Introduction.

† The first hour of observation was changed to 9 h. on Jan. 1st, 1919.

8. WIND COMPONENTS: Metres per second at fixed hours, together with the greatest mean hourly velocity, or the greatest velocity attained in a gust, and the time of its occurrence.

NORTH WALES:—HOLYHEAD.

Height of Head above—Roof 8.8 m., Ground 13.7 m., M.S.L. 19.2 m.
Height of Cups above—Roof 4.6 m., Ground 7.6 m., M.S.L. 15.2 m.

SCOTLAND N.:—DEERNESS.

Height of Cups above—Roof 1.5 m., Ground 4.9 m., M.S.L. 57.3 m.

Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	Day.	3 h.				9 h.				15 h.				21 h.				Vel. in Max. Hourly Run.	Time of Max.							
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.									
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.				m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.									
1	8.5	12.8	...	5.3	...	10.9	2.2	8.7	...	13.0	...	24.6	23	25	1	11.3	2.2	13.7	5.7	4.0	1.6	2.2	1.4	14.8	
2	7.9	...	19.1	16.1	...	2.0	...	10.0	...	0.8	...	1.8	...	30.8	2	15	2	...	4.4	...	4.4	...	9.2	8.5	3.5	1.8	0.8	9.5
3	3.3	1.4	4.0	...	9.7	...	4.2	...	6.2	...	1.8	...	2.7	...	18.6	7	55	3	3.3	4.9	2.4	5.7	2.7	4.1	
4	2.3	1.3	1.9	...	2.5	...	2.5	...	7.6	...	12.0	20	40	4	1.2	5.8	...	2.9	...	6.9	...	7.4	...	7.4	...	9.0	6.3				
5	...	7.9	5.3	...	8.3	...	1.7	...	8.2	6.6	...	12.4	6	35	5	...	10.6	...	4.4	...	9.7	...	4.0	...	9.4	...	3.4	...	8.2	3.4				
6	...	6.1	2.5	4.7	7.1	...	4.8	...	2.0	...	5.1	5.1	13.5	23	45	6	...	11.2	...	4.6	...	13.8	...	2.7	...	10.0	2.0	5.2				
7	4.5	10.9	6.4	9.6	...	1.0	...	4.8	3.0	18.0	5	35	7	...	3.8	...	0.8	3.3	...	3.3	3.1	...	4.7	4.6	6.8				
8	4.4	...	...	4.4	1.7	...	...	...	2.5	3.0	...	...	7.9	...	...	3.3	14.6	...	...	...	23	25	8	4.9	...	...	4.9	9.0	...	...	6.0	10.0	...	...	4.1	6.9	...	...	6.9
9	13.0	...	...	5.4	11.2	...	4.6	...	10.9	...	10.9	...	9.5	...	14.1	...	28.4	...	...	...	19	40	9	4.0	...	...	4.0	3.6	...	...	8.7	5.0	...	12.1	7.3	...	...	10.9	
10	5.8	...	...	8.7	...	4.0	...	...	6.0	...	...	1.8	9.5	...	...	1.9	20.0	...	...	...	0	5	10	2.9	...	...	6.9	10.0	...	...	2.0	13.5	...	2.7	...	10.3	...	...	2.0
11	...	...	5.6	...	...	2.0	...	3.0	...	...	...	...	6.1	...	...	1.2	11.5	...	...	...	11	15	11	9.0	...	...	1.8	10.6	...	...	2.1	9.0	...	...	1.8	9.3	...	...	1.9
12	2.5	9.3	12	50	12	9.3	1.9	2.3	0.4	1.4	1.4				
13	1.3	...	...	0.9	1.3	...	...	0.9	7.1	...	...	1.4	10.8	...	...	...	19.0	...	...	...	23	50	13	4.2	...	...	0.8	...	...	...	4.6	11.8	...	...	4.9	12.7	...	...	12.7
14	10.0	...	...	2.0	...	...	0.5	2.6	...	...	...	...	...	...	...	0.6	19.1	...	...	...	2	20	14	14.5	...	...	9.7	5.6	...	...	...	1.8	...	...	...	...	...	...	...
15	6.9	...	...	...	...	4.0	...	...	1.8	...	4.3	...	...	...	...	6.2	14.3	...	...	...	15	35	15	4.4	...	...	4.4	8.6	...	...	8.6	4.5	...	1.9	...	3.6	...	1.5	...
16	4.6	...	...	6.8	...	4.4	...	6.6	...	4.1	...	10.0	...	4.5	10.9	...	18.5	...	...	...	17	0	16	2.4	...	...	1.0	...	4.5	...	1.9	...	1.8	...	0.8	...	2.2	...	1.4
17	...	4.9	11.8	...	...	2.2	11.3	...	...	3.9	9.4	...	...	4.6	6.8	...	16.0	...	...	...	3	25	17	...	1.7	2.5	...	...	1.8	2.7	...	...	5.6	5.6	...	2.8	6.7	...	...			
18	...	5.6	5.6	...	...	4.4	4.4	...	...	3.2	2.2	...	...	1.9	1.3	...	10.0	...	...	...	3	25	18	...	5.2	3.4	...	...	3.0	2.0	...	...	4.2	4.2	...	...	1.6	1.6	...
19	...	3.2	2.2	...	...	6.9	...	...	2.9	6.1	...	...	...	5.5	1.1	...	11.3	...	...	...	17	20	19	...	...	...	...	6.9	...	...	2.9	10.0	...	...	4.1	12.4	...	...	5.1
20	4.5	...	...	1.9	1.7	...	...	...	1.1	4.4	...	...	...	1.6	4.0	...	10.8	...	...	...	16	55	20	10.6	...	...	4.4	10.6	...	...	4.4	11.1	...	...	7.5	10.9	...	...	10.9
21	...	1.8	4.3	4.9	...	0.4	...	2.0	8.3	8	25	21	8.6	12.8	10.0	10.0	8.1	8.1	10.1	6.7				
22	4.0	...	...	...	...	...	...	...	...	1.3	...	0.9	...	2.5	...	1.7	9.7	...	...	...	4	15	22	8.2	...	...	3.4	8.9	...	...	...	8.2	...	...	3.4	8.5	...	...	3.5
23	4.8	...	...	2.0	...	...	...	...	...	3.6	...	...	...	4.2	...	0.8	?	...	...	...	?	?	23	7.1	...	...	1.4	3.3	...	...	...	3.6	...	...	1.5	9.6	...	...	6.4
24	7.1	1.4	...	7.1	...	1.4	...	7.1	6.8	...	1.3	12.8	?	?	24	7.9	6.9	5.5	...	1.1	...	5.5	2.3				
25	5.8	...	...	1.2	...	6.2	...	...	...	...	...	7.2	...	3.7	...	5.5	14.5	...	...	...	23	35	25	4.0	...	...	6.0	...	4.8	...	2.0	...	6.8	...	1.3	9.0	...	...	1.8
26	6.8	4.6	1.6	8.0	...	3.1	...	7.6	1.8	9.0	...	18.4	4	20	26	10.6	4.4	...	10.6	...	4.4	...	11.2	...	4.6	...	7.9	...	3.3				
27	...	2.2	10.9	1.9	...	9.6	9.5	9.5	11.5	7.7	...	20.5	20	15	27	8.0	1.6	...	2.1	...	0.9				
28	...	10.6	7.1	6.6	3.8	...	2.6	...	2.4	...	3.6	18.8	1	45	28	...	1.8	0.8	2.1	...	2.1	...	0.8	4.2				
29	...	3.1	4.7	1.1	...	2.8	2.9	...	6.9	...	10.9	13	0	29	...	5.5	...	2.3	2.6	6.4	1.6	4.0	5.2		
30	...	1.7	8.7	9.2	9.5	14.8	21	10	30	6.9	1.4	7.1	1.3	6.5	1.0	5.1				
31	0.8	3.8	...	3.7	...	5.5	...	1.6	...	8.0	1.3	...	6.8	13.5	14	30	31	0.6	3.2	...	0.4	...	2.0	...	3.0	...	1.3	...	1.3	0.9			
S+N & W+E } 155.9 149.7 114.9 147.1 124.7 128.9 137.1 134.0 S-N & W-E } 61.7 54.9 48.7 62.1 53.5 38.3 41.9 40.2																S+N & W+E } 177.9 110.7 189.7 111.3 181.6 117.4 168.0 120.7 S-N & W-E } 89.5 -69.7 103.9 -73.5 85.4 -57.8 108.2 -77.3																												

ENGLAND S.W.:—SCILLY.

Height of Head above—Ground 9.8 m., M.S.L. 49.7 m.
Height of Cups above—Ground 5.8 m., M.S.L. 45.7 m.

ENGLAND E.:—SHOEBURYNNESS.*

Height of Head above—Ground 27.4 m., M.S.L. 31.4 m.

Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.								
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.														
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.				m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.														
1	3.0	4.1	...	6.5	...	9.7	5.9	14.2	...	23.8	22	55	1	...	2.7	4.1	...	2.2	...	0.9	...	8.0	...	1.6	...	14.6	...	6.1	...	21.0	20	25	
2	...	6.2	15.1	2.4	12.3	4.4	...	6.6	11.7	...	24.3	5	15	2	1.7	...	8.6	...	3.8	...	9.1	...	3.0	...	7.3	...	4.9	...	4.9	...	19.5	5	10
3	...	2.2	11.1	0.9	4.6	5.3	5.3	...	19.1	1	25	3	7.6	2.1	4.9	1.0	3.8	9.1	14.9	3	50	
4	2.1	2.2	...	5.4	...	10.8	...	4.5	...	10.4	16.3	16	10	4	10.2	...	4.2	...	4.9	1.3	1.3	3.0	7.3	16.8	4	30	
5	...	9.2	3.8	8.8	10.8	10.0	4.1	...	17.0	1	30	5	...	0.8	...	3.9	...	4.3	1.1	5.4	...	2.0	...	4.8	10.1	20	0
6	...	7.7	5.1	...	...	3.5	...	3.5	...	13.9	...	2.8	9.8	...	9.8	...	25.0	...	...	...	19	40	6																					

9. SEISMOLOGICAL DIARY.

EARTHQUAKES:—ESKDALEMUIR.

Day.	Phase.	Time, G.M.T.			Period.	Amplitudes.			Δ .	Remarks.
		h	m	s		μ	μ	μ		
1	P	1	47	47	11700 Followed by another large disturbance whose initial phases are difficult to read owing to overlapping.	
	PR	1	52	14	...	...	...	...
	S	1	59	59	...	...	...	...
	L	2	23	30	...	...	...	...
	M	2	25	2	40	116	...	...
5	L	15	36	50	22	8		
5		20	37	to	Slight disturbance with long waves from 20 h. 51 m. to 20 h. 58 m.	
		21	50	...	...	...	...	...
6-7		23	0	to	Slight disturbance, confused by large microseisms.	
		0	50		
8		10	30	to	Slight disturbance.	
		10	50	...	...	...	...	...
						
						
18	P(?)	6	17	17		
	L	6	44	...	...	...	...	...
	L	7	1	26	...	...	...	...
	F	7	30	18	...	...	...	...
27	P	21	59	39	Slight disturbance.	
	F	22	50	...	...	...	...	...

MICROSEISMS OF N. COMPONENT:—ESKDALEMUIR.

Day.	0 h.		6 h.		12 h.		18 h.	
	A_N .	T.	A_N .	T.	A_N .	T.	A_N .	T.
1	μ	s	μ	s	μ	s	μ	s
2	1'4	4	...	...	2'3	4	2'3	4
3	1'7	4	1'5	4'5	1'7	5	2'2	5
4	2'3	6	1'5	6	1'9	6	1'6	6
5	1'8	6	1'3	6	1'5	6	1'2	5'5
6	1'8	5	1'4	3'5	1'2	4	1'1	5
7	1'3	8	1'1	4	1'4	4	2'8	6
8	3'1	6	2'8	6	2'3	8	4'8	8
9	3'2	8	3'5	7	2'5	8	1'9	6
10	1'9	5	1'9	6	2'3	5	1'8	5'5
11	1'9	5	2'7	5	3'1	6'5	3'0	6
12	2'5	6	2'8	6	2'3	6	2'3	6
13	1'7	5'5	1'3	6	1'3	6	1'4	4
14	1'4	5	1'6	6	3'1	6	2'6	5'5
15	3'0	6	2'6	5'5	3'1	6	3'6	8
16	4'7	8	3'6	7	1'9	6	1'8	6
17	2'1	5'5	1'6	6	1'6	5'5	1'2	5'5
18	1'2	6	0'9	6	1'0	5	1'0	5
19	0'8	6	0'8	5'5	0'8	4'5	0'8	6
20	0'9	6	1'2	4	1'4	7	1'1	6
21	1'5	6	1'2	6	2'3	6	1'6	6
22	1'8	6	1'8	5	1'6	6	1'6	4
23	1'4	5	1'0	4'5	1'0	4'5	1'1	4
24	0'9	6	1'0	6	1'2	5	1'6	6
25	1'0	5'5	0'9	6	1'0	5	1'1	4
26	1'1	4	1'1	4	1'4	5	1'6	4
27	1'5	5	2'4	6	3'2	6	4'4	6'5
28	3'9	8	3'5	7	3'6	6	2'3	6
29	2'3	6	1'8	5	2'4	4	1'1	4
30	0'9	5'5	1'0	4	0'9	4	0'9	4
31	0'8	4	1'1	4	0'9	5	1'0	4'5
	1'1	4	0'9	4	0'9	4	0'8	6

Means for Month $\left\{ \begin{array}{l} A_N = 1'8. \\ T = 5'5. \end{array} \right.$ Normals, 1911-18 $\left\{ \begin{array}{l} A_N = 2'5. \\ T = 6'1. \end{array} \right.$

EARTHQUAKES:—RICHMOND (KEW OBSERVATORY).

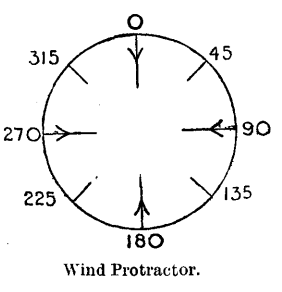
Day.	Times, G.M.T. of		Remarks.
	Commencement.	Max. Phase.	
1	h m 1 57	h m 3 41	Amplitude on trace 7'3 mm.
5	...	20 55	Small.
6-7	23 36	0 26	Small.
14	...	16 50	Very small.
18	...	7 0	Very small.

10. SOUNDINGS WITH PILOT BALLOONS.

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.														Cloud Observations.						
		Geostrophic.		By Anemometer.		At Heights above M.S.L.										Time, G.M.T. h. m.	Type.	Deg. from N.	mr/s.	Type.	Deg. from N.	mr/s.
		Deg. from N.	m/s.	Deg. from N.	m/s.	500 m.		1000 m.		2000 m.		3000 m.		4000 m.								
ESKDALEMUIR.																						
6	11 55	210	9	195	4'0	240	3'8	230	9'0	255	4'9	240	8'5	230	11'5	11 30	A.-Cu.	260	3'0	Ci.	...	...
8	9 15	?	?	ca lm		155	7'5	180	13'0	180	13'0	...	...	...	...	...	A.-St.	270	...	Ci.	...	...
13	8 0	?	?	360	1'0	145	4'4	165	5'5	230	1'6	...	...	...	...	...	...	...	...	Ci.	315	5'0
13	11 35	?	?	ca lm		160	5'5	190	7'0	195	3'9	250	6'0	315	11'5	...	...	...	...	Ci.	315	...
14	9 10	225	10	220	2'8	260	6'0	255	9'0	230	19'5	...	...	...	...	9 0	A.-Cu., St.	225	...	Ci.-St.	235	5'5
15	15 50	240	8	180	1'6	205	7'0	220	9'5	220	19'5	215	17'0	...	...	...	Nb.	225	...	A.-St.	...	...
18	7 55	?	?	ca lm		325	1'4	355	10'5	340	11'0	340	16'0	335	18'0	...	...	...	...	cloud	less	...
26	7 55	270	20	255	7'5	270	8'5	275	17'0	260	16'5	240	17'0	245	19'5	...	Fr.-Cu.	270	...	...	...	...
(For observations at lower levels, see above.)																						
13	11 35					5000 m.		6000 m.		7000 m.						...	...	...	...	Ci.	315	...
S. FARNBOROUGH.																						
3	8 10	250	11	225	6'5	265	18'5	270	17'0	255	15'5	...	...	...	...	...	...	...	...	Ci.	...	...
17	7 55	300	15	325	6'5	300	14'5	305	13'5	295	14'5	305	15'5	305	17'0	...	Cu.-Nb.	...	...	Ci.	...	...
18	7 50	?	?	ca lm		340	11'0	350	11'0	335	11'5	335	10'0	...	...	...	St.-Cu.	...	...	...	...	...
25	8 10	?	?	ca lm		155	4'2	25	5'0	30	3'6	50	2'4	...	...	...	St.-Cu.	...	...	...	...	...
FALMOUTH.																						
7	12 5	225	12	225	6'5	225	16'0	225	12'5	215	17'0	...	...	...	...	...	Cu.-Nb.	225	13'0	A.-St.	225	...
8	16 30	225	16	205	3'9	220	16'0	210	19'5	220	21'5	...	...	...	...	...	{ A.-Cu. Nb.	315 225	...	A.-St.	225	...
10	8 50	230	14	245	2'2	225	10'5	225	11'5	245	11'0	240	10'0	...	...	9 30	Cu.-Nb.	225	13'0	A.-St.	...	...
13	15 25	200	19	190	2'4	215	7'0	215	8'0	265	12'0	265	9'5	265	14'5	...	St.	...	...	...	...	...
16	11 5	270	15	255	12'5	255	25'5	255	27'5	260	26'0	...	...	...	...	11 35	Cu.	260	17'5	...	...	...
17	11 5	?	?	275	4'3	295	12'0	300	12'0	300	13'5	300	12'0	...	...	...	Cu.	290	15'5	A.-Cu.	305	7'5
18	8 50	?	?	15	1'0	10	3'2	345	3'7	30	3'7	345	15'5	340	47'0	...	Ci.-St., St.	315	...	Ci.	330	7'0
18	12 5	?	?	ca lm		340	1'8	315	1'9	305	3'4	345	20'5	...	...	12 30	Fr.-Cu.	335	3'5	Ci.-Cu.	335	6'5
21	11 55	?	?	280	3'9	295	10'0	285	10'0	300	9'0	315	11'0	...	...	12 25	Cu.-Nb.	295	11'0	A.-St.	295	...
23	11 20	?	?	10	1'6	105	1'3	25	1'9	355	5'5	15	12'0	25	13'0	12 30	St.	...	...	Ci.-St.	320	5'0
23	15 45	?	?	15	1'6	130	1'3	10	4'0	15	13'0	...	...	...	...	16 0	St.	...	...	Ci.-Cu.	20	4'8
24	9 5	?	?	110	4'3	115	6'0	140	4'7	45	10'5	...	...	...	...	9 30	{ Cu. Fr.-Cu.	110 110	19'0 13'5	Ci.-St.	...	...
CAHIRCIVEEN.																						
3	8 40	270	16	285	8'5	270	14'0	275	14'0	280	16'0	265	9'5	270	25'0	...	Cu.	270	...	St.	...	...
4	9 10	?	?	50	1'0	30	7'0	5	11'5	100	15'0	...	...	...	...	...	Cu.	360	...	St.-Cu.	360	...
4	12 25	45	15	15	5'5	360	8'0	5	13'0	360	17'0	10	13'0	360	13'5	...	Cu.	360	...	St.-Cu.	360	...
5	8 45	360	12	15	7'0	5	11'5	5	14'0	5	22'5	5	17'5	...	...	...	Cu.	25	...	A.-Cu., Ci.-Cu.	25	...
8	8 20	330	9	300	2'8	290	6'0	290	9'0	280	8'0	265	7'0	...	...	...	St., Cu.	270	...	Ci.-Cu., Ci.-St.	270	...
14	12 20	225	12	175	2'9	210	4'3	210	5'5	240	14'5	...	...	...	...	...	Cu.	205	...	A.-Cu.	245	...
17	8 35	300	13	315	5'0	295	9'0	295	12'0	295	16'0	300	14'0	...	...	...	Cu.	295	...	St.-Cu.	295	...
18	8 25	?	?	ca lm		160	7'0	230	1'8	295	5'5	310	11'0	310	19'0	...	A.-Cu.	315	...	A.-St., Ci.-Cu.	315	...
19	9 5	250	7	285	1'4	300	6'5	280	8'0	315	15'5	...	...	...	...	...	St.	295	...	Ci.-Cu.	245	...
20	8 40	270	11	275	4'2	280	9'5	290	13'0	285	12'0	...	...	...	...	...	{ A.-Cu. St.-Cu.	205 225	...	St.	270	...
28	8 35	340	12	35	6'5	360	10'5	345	11'0	355	13'5	...	...	...	...	...	Cu., Fr.-Cu.	360	...	...	...	...
29	8 20	90	7	80	3'4	85	7'5	95	4'3	75	10'0	60	8'0	35	8'0	...	Fr.-Cu.	...	...	cloud	less	...
30	8 25	120	6	95	6'5	125	6'5	140	6'5	90	6'5	120	6'0	140	3'3	...	A.-Cu.	90	...	Ci.-St., Ci.-Cu.	295	...
31	8 25	90	6	100	7'5	90	0'1	20	3'0	80	7'0	70	6'5	65	6'5	...	Fr.-Cu.	45	...	Ci.	45	...
31	16 25	90	6	100	3'6	100	7'5	135	3'5	75	6'0	30	10'0	30	13'5	...	Cu.	90	...	St.-A.-St., A.-Cu.	...	...
(For observations at lower levels, see above.)																						
4	12 25					5000 m.		6000 m.		7000 m.						...	...	...	...	Cu.	360	...
18	8 25															...	...	...	...	A.-Cu.	315	...
30	8 25															...	...	...	...	A.-Cu.	90	...
31	8 25															...	...	...	...	Fr.-Cu.	45	...
31	16 25															...	...	...	...	Cu.	90	...

Height of Station above M.S.L. = H.,
Anemometer above ground = h.

Eskdalemuir	H.	h.
	242 m.	15 m.
S. Farnborough	70 m.	31 m.
Falmouth	51 m.	12 m.
Cahiriveen	9 m.	13 m.



Notes on Pressure Distribution.

January 1919.

- 3 7 h. Trough stretching from W. to E. across the British Isles.
- 4 7 h., 13 h. Low over the British Isles; secondary over the Bay of Biscay.
- 5 7 h. Low over the British Isles, centred over the Channel.
- 6 13 h. Wedge over England; Lows W. of Cahirciveen and E. of the Shetlands.
- 7 13 h. Deep depression centred near Cahirciveen.
- 8 7 h. Low over the British Isles.
- 10 7 h. Low centred N. of Scotland.
- 13 7 h. Deep depression S.W. of Iceland; light gradient over the British Isles.
- 13 h., 18 h. Gradient steeper over the British Isles.
- 14 7 h., 13 h. } Deep depression centred W. of Iceland.
- 15 18 h. }
- 16 13 h. Deep depression N. of Scotland.
- 17 7 h., 13 h., 18 h. Extensive Low centred near Bergen.
- 18 7 h., 13 h. Shallow Low over the North Sea, light gradient.
- 19 7 h. Low over Iceland; wedge over England.
- 20 7 h. Shallow Low off W. of Ireland.
- 21 13 h. High over Scandinavia and the Bay of Biscay; Shallow Low N. of Ireland.
- 23 13 h., 18 h. }
- 24 7 h. } S.W. to N.E. ridge across the British Isles; deep depression over Arctic region.
- 25 7 h. }
- 26 7 h. Westerly type.
- 28 7 h. Extensive shallow Low covering Great Britain and France.
- 29 7 h. }
- 30 7 h. } Anticyclonic ridge across the British Isles.
- 31 7 h., 18 h. }

Notes on Ascents.

Eskdalemuir—

- 6th, 11 h. 55 m. Barometer steady but very low.
- 8th, 9 h. 15 m. Barometer rising quickly.
- 14th, 9 h. 10 m. Fog banks rolling over hills.
- 26th, 7 h. 55 m. Visibility excellent.

S. Farnborough—

- 18th, 7 h. 50 m. St.-Cu. sheet cleared off before start, detached St.-Cu. coming up.

Falmouth—

- 7th, 12 h. 5 m. Shower in the middle of ascent.
- 16th, 11 h. 5 m. Squally.
- 18th, 8 h. 50 m. } Ground mist.
- 12 h. 5 m. }
- 21st, 11 h. 55 m. Overcast.

11. NEPHOSCOPE OBSERVATIONS.

ABERDEEN. Taken at 13 h. G.M.T.

Day.	Type of Cloud.	Velocity-height-ratio.				Remarks.
		Degrees from N.	Milliradians per Second.	Components.		
				W.-E.	S.-N.	
		°	mr/s.	mr/s.	mr/s.	
1	St.-Cu.	225	2·8	+ 2·0	+ 2·0	St.-Cu. in lenticular sheets.
3	St.-Cu.	271	2·0	+ 2·0	0·0	St.-Cu. inclined to lenticular form.
7	St.-Cu.	168	10·0	- 2·1	+ 9·8	
8	St.-Cuf.	180	17·0	0·0	+ 17·0	St. in cumuliform masses.
10	Ci.	174	3·0	- 0·3	+ 3·0	Ci. to Ci.-St. in bands with radiant-point 174°.
17	Ci.	315	1·0	+ 0·7	- 0·7	"False" Ci. above Cu.-Nb.
27	Ci.	171	2·0	- 0·3	+ 2·0	"False" Ci. in heavy sheets and tufts.
28	Cu.-Nb.	50	12·5	- 9·6	- 8·0	Base of cloud measured.
29	St.-Cu.	95	8·3	- 8·3	+ 0·7	
31	St.-Cuf.	70	6·8	- 6·4	- 2·3	A very low cumuliform cloud, probably stratus originally.

Note.—The interval from January 11th to 26th was characterised by uniform cloud sheets of A.-St. and St. types, which could not be measured.

12. AURORA.

Day.	a.m. or p.m.	Moon.	Magnetic Character.		Aurora Observations.	
			Eskdalemuir.	Richmond.	Station.	Remarks.
2	...	●	—	...	Aberdeen	Seen late n., moderately bright yellow-green glow, with some streamers, but hidden by clouds.
3	p. a.	}	2, 2	2, 2	Eskdalemuir	Fine display, began 19 h. Glow 1 h. and 7 h.—9 h.
4					(and many other Scottish stations)	
					Seskin (Carrick-on-Suir)	20 h.—21 h., moderately faint.
					Valencia Observatory	Brilliant, from 19 h. 45 m.
					Roche's Point	22 h.
4	p.	...	2, 2	2, 2	Baltasound	
5	p.	...	2, 1	2, 1	Aberdeen	Glow seen between 17 h. and 18 h. through gap in clouds.
6	p.	...	1, 0	1, 1	Aberdeen	Faint arch type, late n.
					Balmoral	
7	p.	...	0, 1	1, 0	Paisley	
					Fort Augustus	
9	...	☽	...	...	Paisley	
					Baltasound	
16	p.	○	2, 1	2, 1	Aberdeen	Bright but short-lived, about 21 h., curtains and streamer type.
					Paisley	
17	p.	...	1, 2	1, 2	Donaghadee	18 h.
					Blacksod Point	Bright to N.N.W., 21 h. 30 m. to 22 h. 20 m.
					Aberdeen	Arch and glow, faint, 18 h.—20 h.
18	p.	...	2, 1	2, 2	Fort William	21 h.
					(and other Scottish stations)	
					Blacksod Point	In N.N.W. 19 h.—21 h.
19	p.	...	1, 1	2, 1	Baltasound	
24	...	☾	...	...	...
27	p.	...	0, 1	0, 1	Paisley	
28	p.	...	1, 1	1, 1	Baltasound	21 h.
					Fort William	
30	p.	...	0, 2	0, 1	Baltasound	
					Aberdeen	19 h.—24 h., glow type with detached glows, moderately bright.
31	p.	●	...	...	Leith	23 h.
					Glasgow	22 h.
					(and other Scottish stations)	

Note.—The two magnetic "characters" entered in each case refer to the two periods of 24 hours ending and beginning at midnight of the night in question.

METEOROLOGICAL OFFICE OBSERVATORIES—GEOPHYSICAL JOURNAL.

DAILY VALUES.—Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology.

Ninth Year.—No. 2. FEBRUARY 1919.]

Units based on the C.G.S. System.

[Price 1s.

I. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.			SOUTH KENSINGTON.—Lat. 51° 30' N. Long. 0° 10' W.						RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.					ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.					CAHIRCIVEEN.		
	Bright Sunshine.*		Radiation received on Horizontal Surface by Callendar Radiograph.	Radiation at Noon by Ångström Pyrheliometer.						Bright Sunshine.*		Radiation by Ångström Pyrheliometer.			Bright Sunshine.*							
	Total.	Per cent. of Possible.		Daily Total.	Per cent. of Planetary.	Maximum.		11.30 h. to 12.30 h.	Total.	Per cent. of Possible.	Intensity.	Vertical Component.	Sky.	Total.	Per cent. of Possible.	Time.	Sky.	p. sec Z. / °	Intensity.	Total.	Per cent. of Possible.	
						For Day.	Amount.															Time.
1	0'0	0	93	9	9	25	5	0'0	0	...	...	0'0	0	...	...	...	...	0'0	0	0'0	0
2	0'0	0	38	4	3	15	40	0'0	0	...	...	0'0	0	...	...	...	...	0'0	0	0'0	0
3	0'0	0	0	0	0	—	—	0'0	0	...	...	0'0	0	...	...	...	...	0'0	0	0'0	0
4	0'0	0	151	14	14	27	9	0'5	5	...	...	0'0	0	...	...	...	...	0'0	0	0'0	0
5	0'0	0	59	5	3	11	37	0'0	0	...	...	0'0	0	...	...	...	...	0'0	0	0'2	2
6	0'0	0	63	5	8	11	40	0'0	0	...	...	3'7	42	...	...	...	...	0'0	0	0'0	0
7	2'6	28	326	28	22	11	25	1'8	19	...	...	0'0	0	...	...	...	...	7'2	77	7'2	77
8	6'0	0	427	36	25	12	50	7'3	77	55	22	Hazy	1'4	15	...	...	...	6'8	72	7'8	82
9	3'7	39	323	26	22	12	10	4'6	48	47	19	Hazy	7'7	85	...	...	...	7'8	82	7'8	82
10	2'7	28	405	32	27	12	50	6'0	64	51	21	Clear	8'5	92	12 27	Clear	2'92	83	6'8	71		
11	3'3	34	366	29	23	12	0	0'1	1	9	4	Misty	0'2	2	...	...	...	0'0	0	0'0	0
12	2'8	29	361	28	25	13	0	4'2	43	...	...	...	2'5	27	...	...	...	0'0	0	0'0	0
13	0'8	8	248	19	20	13	47	1'9	19	...	...	...	0'2	2	...	...	...	0'0	0	0'0	0
14	0'0	0	138	10	12	14	0	0'0	0	...	...	...	4'5	47	...	...	...	0'0	0	0'0	0
15	0'3	3	246	18	21	11	9	0'5	5	...	...	...	0'0	0	...	...	...	1'4	14	1'4	14
16	0'0	0	124	9	6	11	52	0'0	0	...	...	...	0'1	1	...	...	...	3'5	36	3'5	36
17	0'0	0	140	10	13	10	50	0'0	0	...	...	...	1'5	15	...	...	...	0'0	0	0'0	0
18	0'0	0	161	11	10	14	20	0'0	0	...	...	...	2'8	29	...	...	...	3'6	36	3'6	36
19	0'0	0	178	12	20	11	45	0'0	0	...	...	...	0'2	2	...	...	...	0'0	0	0'0	0
20	0'0	0	181	12	12	10	55	0'0	0	...	...	...	0'0	0	...	...	...	0'4	4	0'4	4
21	0'5	5	328	22	26	11	50	0'5	5	...	...	...	0'0	0	...	...	...	1'3	13	1'3	13
22	0'0	0	230	15	18	10	5	0'1	1	...	...	...	0'0	0	...	...	...	2'4	23	2'4	23
23	0'0	0	135	9	13	10	6	0'0	0	...	...	...	0'5	5	...	...	...	0'6	6	0'6	6
24	0'0	0	109	7	11	9	8	0'0	0	...	...	...	7'0	69	...	...	...	6'6	63	6'6	63
25	1'3	12	430	26	29	13	55	2'0	19	...	...	...	3'2	31	...	...	...	2'7	26	2'7	26
26	0'0	0	161	10	23	12	0	0'0	0	...	...	...	2'6	25	...	...	...	6'8	64	6'8	64
27	0'0	0	167	10	16	13	22	0'0	0	...	...	...	2'2	21	...	...	...	9'3	88	9'3	88
28	0'0	0	212	12	23	11	12	0'4	4	6'2	59	12 26	Fr. Cu.	2'22	77	1'4	13	1'4	13
Means	0'89	9	207	15	16	—	—	1'07	11	—	—	—	1'96	21	—	—	—	2'46	25	2'46	25	
Normal	1'35	14	326	24	—	—	—	2'13	22	—	—	—	1'56	17	—	—	—	2'48	25	2'48	25	

2. METEOROLOGY AND MAGNETISM:—CAHIRCIVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W.

Heights above M. S. L.:—H=9'1 m. H_b=13'7 m. H_a=26'4 m. Above Ground: h_t=1'3 m. h_r=0'56 m. h_a=13'9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.				Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force, Declination West, and Inclination.	
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	Vapour Pressure.		Percentage.		9 h.		21 h.		9 h.	21 h.					
	mb.	mb.	a.	a.	a.	a.	millibar.	%	%	%	%	m/s.	m/s.	Tenths of Sky covered.	Tenths of Sky covered.	mm.	a.				
1	1020'7	1015'4	76'0	77'1	75	75	5'8	5'9	77	72	100	6	110	9	100	100	—	72	Fine n. Dull. ∞ during day.		
2	1013'7	1016'3	77'4	77'8	79	77	6'3	6'6	76	77	100	9	110	5	10	10	—	75	o. to fair. ∞		
3	1013'6	1009'2	78'8	80'5	81	77	8'0	8'9	87	86	135	6	125	6	8	9	8'4	73	o. d. n. and a. ● later.		
4	1003'7	996'0	80'9	82'0	82	80	9'4	9'5	89	83	120	7	100	6	10	10	4'9	79	p. n. and a. d. later. o. p.		
5	991'3	998'9	81'8	83'2	83	81	10'9	11'5	97	93	180	2	235	5	10	10	5'9	81	o. n. ● a.		
6	1004'1	1005'9	81'9	81'3	83	81	10'8	10'3	96	95	155	3	305	2	10	9	10'0	79	o. to d. a. ● later.		
7	1018'4	1022'1	78'1	80'4	83	78	8'0	8'3	91	81	—	0	110	9	2	2	—	74	Fine day. ⊕ p.		
8	1020'9	1022'5	79'4	80'4	82	79	6'7	6'0	70	78	115	9	125	13	6	2	—	77	Fine dry day.		
9	1025'1	1024'0	77'9	77'9	80	78	5'6	5'6	65	65	90	9	100	9	1	2	—	76	Fine q. ↗ 23 h.		
10	1018'5	1012'5	76'7	76'9	78	76	5'2	5'3	66	66	100	12	100	19	1	2	—	75	Fine q. ∞. ↗ p.		
11	1014'7	1015'9	77'5	77'8	79	77	5'9	6'1	70	71	105	14	105	9	8	8	—	75	Fine to fair.		
12	1013'6	1010'6	79'8	82'0	83	78	8'1	9'9	82	87	100	8	105	9	10	5	—	76	Dull day. Fine p.		
13	1005'4	1001'1	81'4	81'9	82	81	9'2	9'9	84	88	100	8	120	5	10	10	1'7	80	Dull day, with d. p. p.		
14	996'0	993'2	81'6	81'4	83	81	10'2	10'2	92	93	135	5	165	4	10	9	7'9	79	o. n. ● a. and p.		
15	989'8	988'7	81'1	81'4	83	80	8'5	9'3	79	85	95	5	100	3	8	9	—	78	Fine to fair.		
16	985'0	983'4	80'4	78'9	82	79	8'6	7'2	84	77	85	6	30	12	6	6	—	79	Fair.		
17	987'5	997'9	78'5	77'6	79	76	6'4	6'5	71	77	25	13	25	3	100	1	—	78	Dull day, with ∞. Fine p.		
18	1001'4	993'0	73'0	79'4	80	72	5'4	6'8	89	71	80	2	125	8	5	9	—	70	Fine, with ∞ to fair.		
19	977'7	974'6	82'6	82'0	83	79	11'2	10'6	94	93	170	7	170	6	10	8	11'5	78	● n. and a. Dull day. ↗ 4 h.		
20	973'6	990'3	81'8	81'5	83	79	10'8	8'7	96	79	235	8	285	6	9	8	2'5	80	p. to o. Fine evening.		
21	980'8	973'9	80'3	82'3	84	77	8'4	11'0	82	95	95	12	170	5	10	10	15'3	74	Fine to o. ●		
22	986'5	996'8	81'0	79'8	82	79	9'2	7'6	86	77	315	10	355	7	10	4	1'8	81	o. p. to fair. Fine evening.		
23	999'9	1001'7	76'8	77'0	80	75	6'0	6'8	75	84	—	1	60	2	8	2	—	74	c. ⊕ a. o. to b. ⊕ evening.		
24	999'6	999'2	77'4	77'1	80	74	5'5	5'8	66	71	90	6	85	5	4	0	—	73	Fine dry day. v.		
25	996'2	999'9	78'4	76'2	80	74	7'0	6'4	78	84	85	10	90	2	8	1	3'2	74	Fine to o. p. ▲. Fine p.		
26	1003'2	1009'8	72'8	77'9	80	72	5'5	6'7	92	77	—	0	25	4	4	0	—	70	Fine ∞ n. Fine ⊕ 14 h.		
27	1015'0	1016'2	74'5	75'9	81	74	6'1	6'6	89	88	—	0	—	0	2	0	—	71	∞ n. Fine v. ⊕ evening.		
28	1012'7	1005'2	77'2	79'1	80	72	6'0	7'1	73	75	90	5	100	9	1	10	0'2	70	∞ n. h. to o. v. ⊕		
Means	1002'5	1002'7	78'8	79'5	81'1	77'1	7'7	7'9	82	80	6'5	6'5	7'2	6'0	7'3	7'5	75'8	—	—	Monthly Totals or Means.	—
Normal	1011'4	1011'5	79'6	79'8	82'5	77'5	8'4	8'5	87	86	6'0	6'1	—	—	130'6	—	—	—	—	Normals.	—

* By Campbell-Stokes Sunshine Recorder. a denotes the maximum and n the minimum value in the column. Wt. 23/564—400—3/20—N. & Co., Ltd. Gp. XV. 2

3. METEOROLOGY :—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m.

Heights above Ground :—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns: Day, Air Pressure at Station Level (9h, 21h), Air Temperature in Degrees Absolute (9h, 21h, Max., Min.), Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second (9h, 21h), Cloud Amount and Weather (9h, 21h), Rain 0 h. to 24 h., Min. Temp. on Grass., and REMARKS. Includes monthly means and normals.

4. METEOROLOGY :—ESKDALEMUIR, DUMFRIESSHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m.

Heights above Ground :—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns: Day, Air Pressure at Station Level (9h, 21h), Air Temperature in Degrees Absolute (9h, 21h, Max., Min.), Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second (9h, 21h), Cloud Amount and Weather (9h, 21h), Rain 0 h. to 24 h., Min. Temp. on Grass., and REMARKS. Includes monthly means and normals.

5. GEOPHYSICS :—RICHMOND (KEW OBSERVATORY).

Day.	Earth Temperature at 9 h.		Height above M.S.L. of Surface of Underground Water.		Magnetic Force.						Magnetic Character of Day.	Electric Character of Day.	Charge per cc. $\times 10^{16}$.		Air-Earth Current $\times 10^{16}$.	Potential Gradient, Volts per metre. Factor 2.27.			
	0.3 m.	1.2 m.	Daily Mean.	Extremes.	Horizontal Comp't.		Declination.		Inclination.				About 15 h.	About 15 h.		3 h.	9 h.	15 h.	21 h.
					Mean Time.	γ	Mean Time.	West.	Mean Time.	North.									
	<i>a.</i>	<i>a.</i>	cm.	cm.	h m	γ	h m	°	h m	°			Coulomb.	Amp/cm ² .	v/m.	v/m.	v/m.	v/m.	
1	200+	200+	323	...	...	...	...	...	...	...	1	0	...	...	430	*	630	585	
2	74.7	78.8	323	...	...	...	...	...	...	...	1	0	...	...	280	335	560	420	
3	74.7	78.6	322	...	...	...	...	...	...	...	1	0	0.22	0.19	0.70	475	725	405	445
4	74.4	78.5	321	...	...	...	...	...	...	...	1	1	0.37	0.04	0.65	395	570	420	825
5	74.5	78.3	320	...	...	...	...	...	...	...	1	1	...	...	...	320	430	600	765?
6	74.8	78.4	317	...	11 29	18385	...	...	14 21	66 57.9	0	0	0.56	0.80	0.25	365?	615	765	850
7	74.9	78.3	315	...	...	...	...	...	...	...	0	0	0.50	0.17	0.55	375	585	560	725
8	74.6	78.2	312	...	...	...	...	...	...	...	0	0	...	...	...	210	475	475	895
9	74.1	78.0	311	...	...	...	...	...	...	...	0	0	...	...	...	*	*	570	810
10	74.0	78.0	311	...	...	...	...	...	...	...	0	0	0.60	0.19	0.85	*	*	630	840
11	73.9	78.0	308	...	...	...	...	...	...	...	0	0	0.30	...	0.35	700	*	560	770
12	73.9	77.9	305	...	...	...	...	...	...	...	0	0	...	...	...	615	*	525	840
13	73.8	77.9	303	...	11 30	18437	14 20	14 54.3	14 15	66 55.9	2	0	0.11	0.13	0.75	825	685	350	790
14	73.7	77.9	302	...	...	...	...	...	...	...	2	0	0.58	0.45	0.40	525	335	420†	895
15	73.7	77.8	300	...	...	...	...	...	...	...	1	0	...	...	...	835	755	500	780
16	73.8	77.8	299	299	...	...	...	...	...	...	1	2	...	...	...	280	405	-110	700
17	73.8	77.7	300	...	...	...	...	...	...	...	0	1	...	...	...	210	475	350	405
18	73.8	77.6	344	...	...	...	...	...	...	...	1	2	...	...	...	55	210	-225	390
19	73.9	77.4	397	...	...	...	...	...	...	...	0	1	0.19	0.34	1.10	420	585	85	195
20	74.8	77.5	407	...	11 17	18428	14 26	14 48.1	14 20	66 58.1	0	1	...	...	...	30	265	210	600
21	76.5	77.2	410	412	...	...	...	...	...	...	2	2	...	...	...	55	420	-195	335
22	77.9	77.4	408	...	...	...	...	...	...	...	2	1	...	...	...	165	295	125	180
23	78.3	77.6	404	...	...	...	...	...	...	...	1	0	...	...	...	140	280	210	390
24	77.7	77.8	399	...	...	...	...	...	...	...	0	0	0.39	0.15	0.50	445	560	585	725
25	77.0	77.9	394	...	...	...	...	...	...	...	0	1	...	...	...	390	500	460	560
26	76.5	77.9	390	...	...	...	...	...	...	...	0	1	...	...	...	320	475	-70	280
27	76.5	78.0	386	...	11 14	18403	14 19	14 48.3	14 18	66 57.4	1	1	0.17	0.17	0.65	85	225	225	70
28	76.8	78.0	381	...	...	...	...	...	...	...	2	0	0.52	0.22	0.25	210	390	365	420
M.	75.1	78.0	—	—	—	—	—	—	—	—	—	—	—	—	—	318‡	461‡	307‡	550‡
	77.1	79.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	←12 years→																		

* Jet frozen.

† Insulation found poor after this reading. Defect not improbably existent for several days.

‡ Mean of 23 days only.

6. GEOPHYSICS :—ESKDALEMUIR.

Day.	Magnetic Force.									Magnetic Character of Day.	Electric Character of Day.	Potential Gradient, Volts per metre. Factor 6.01.									
	North Component.			West Component.			Vertical Component.					3 h.	9 h.	15 h.	21 h.						
	Maximum. 15000 γ +.	Minimum. 15000 γ +.	Range.	Maximum. 4000 γ +.	Minimum. 4000 γ +.	Range.	Maximum. 44000 γ +.	Minimum. 44000 γ +.	Range.												
	h m	γ	γ	h m	γ	γ	h m	γ	γ	h m	γ	h m	γ	v/m.	v/m.	v/m.	v/m.				
1	16 35	1007	893	2 20	114	13 45	942	820	0 13	122	16 28	1121	1028	2 59	93	1	0 a	80	140	215	220
2	19 58	1040	893	10 43	147	12 31	943	792	16 53	151	16 50	1134	1055	11 43	79	1	0 a	65	205	125	155
3	20 29	1005	910	8 51	95	3 15	922	862	23 58	60	16 54	1114	1057	0 0	57	1	1 a	120	355	215	190
4	22 6	1012	920	12 42	92	13 35	955	841	18 0	114	16 45	1121	1049	2 32	72	1	1 a	185	80	120	55
5	19 14	1013	919	13 27	94	4 48	940	837	19 26	103	14 57	1112	1042	5 5	70	1	2 a	-35	55	205	135
6	22 43	1013	924	11 11	89	11 37	928	856	21 35	72	14 30	1093	1067	3 17	26	0	0 a	90	115	255	340
7	5 49	979	954	12 24	n 25	12 54	910	883	1 0	n 27	20 20	1087	1078	0 0	9	0	0 a	80	100	90	120
8	0 43	991	949	11 11	42	0 18	921	874	1 42	47	17 0	1089	1067	1 25	22	0	0 a	150	285	285	425
9	19 17	1035	948	20 20	87	14 18	921	861	19 7	60	21 20	1095	1073	11 45	22	1	0 a	320	625	320	455
10	5 34	990	943	12 47	47	13 4	929	886	8 32	43	15 55	1086	1077	13 2	9	0	0 a	310	405	350	790
11	22 26	988	959	12 3	29	13 55	910	883	8 29	n 27	0 0	1081	1073	11 15	8	0	0 a	220	355	395	215
12	22 33	996	959	11 15	37	13 7	924	888	8 57	36	8 30	1079	1072	13 30	n 7	0	0 a	90	290	375	575
13	21 56	1089	904	18 52	185	18 30	x 990	824	22 15	166	18 52	1183	1042	22 37	141	2	0 a	360	570	475	475
14	18 27	1043	922	19 50	121	14 8	921	781	18 15	140	18 15	1108	1040	1 26	68	1	0 a	325	630	405	620
15	21 41	1013	922	12 37	91	11 7	931	854	23 16	77	20 50	1097	1059	1 27	38	1	2 c	470	175	405	305
16	20 32	1014	893	16 34	121	11 20	926	794	16 47	132	16 50	1130	1069	9 27	61	1	1 b	385	-50	605	185
17	23 26	994	940	11 33	54	*	*	*	*	*	19 30	1085	1070	10 10	15	0	0 a	135	305	115	150
18	21 40	1010	949	21 57	61	? 13 15	? 922	? 851	? 18 15	? 71	18 29	1093	1068	0 22	25	0	0 a	80	175	170	505
19	23 8	1013	960	11 37	53	15 35	907	872	23 29	35	0 0	1088	1069	23 17	19	0	1 b	355	350	570	15
20	19 44	1017	961	16 17	56	12 25	939	868	3 58	71	23 47	1076	1056	11 0	20	0	2 c	175	-525	285	205
21	17 23	x 1122	894	11 47	x 228	14 24	953	n 700	19 34	x 253	19 30	x 1240	1014	24 0	x 226	2	1 b	205	325	215	70
22	19 31	1067	924	11 31	143	13 2	942	755	23 55	187	18 50	1107	1009	0 18	98	2	2 c	-55	35	140	355
23	18 50	1066	883	13 34	183	12 55	956	760	0 2	196	14 2	1129	1019	0 58	110	2	1 a	20	105	290	255
24	2 20	999	938	0 0	61	12 30	908	836	1 12	72	16 25	1081	1043	3 0	38	1	0 a	80	285	225	495
25	19 30	983	951	11 40	32	12 55	922	874	4 55	48	24 0	1082	1065	12 15	17	0	1 a	350	150	135	50
26	21 52	992	950	19 58	42	13 44	936	865	2 26	71	20 26	1093	1064	12 0	29	0	2 b	50	155	-5	70
27	21 30	1060	918	21 22	142	21 21	983	847	3 18	136	21 40	1229	1040	6 12	189	2	0 a	300	270	155	285
28	23 45	1056	n 854	3 21	202	0 29	981	793	3 38	188	0 0	1112	n 981	3 30	131	2	0 a	220	235	285	385
M.	—	1022	926	—	92	—	916†	835†	—	96†	—	1105	1052	—	54	—					

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W.

Heights above M. S. L. :—H = 54 m. H_b = 55 m. Above Ground :—h_c = 1.48 m. h_r = 1.72 m. h_a = 8 m.

Table with columns: Day, Air Pressure at Station Level (9 h., 14 h., 21 h., Mean of 3 Readings), Air Temperature in Degrees Absolute (9 h., 14 h., 21 h., Max., Min., Mean of 5 Readings), Min. Temp. on Grass, Percentage of Humidity (9 h., 14 h., 21 h., Mean), Rain 0 h. to 24 h., and REMARKS.

JERSEY (ST LOUIS OBSERVATORY).

Table with columns: Day, Wind Direction and Force (0-12 on the Beaufort Scale), Sunshine, Cloud Amount (tenths of Sky covered), Type of Cloud, and Direction whence coming, and Mean Amount.

* For method of estimation, see Introduction.

† The first hour of observation was changed to 9 h. on Jan. 1st, 1919.

9. SEISMOLOGICAL DIARY.

EARTHQUAKES :—ESKDALEMUIR.

MICROSEISMS OF N. COMPONENT :—ESKDALEMUIR.

Day.	Phase.	Time, G.M.T.			Period.	Amplitudes.			Δ.	Remarks.	
		h	m	s		A _{N.}	A _{E.}	A _{Z.}			
	L F	0	23		...	μ	μ	μ	km.	Slight disturbance. P probably at 0 h. 2 m. 46 s.	
		0	40		...	...	...	...	...
2	P i F	20	6	47		No well-marked long waves.
		20	10	1	...	...	...	...	...
		21	5		...	...	...	...	...
12	P e e L F	13	3	31		
		13	8	59	...	...	...	...	...
		13	16	48	...	...	...	...	...
		13	25		22	...	...	...	...
		14	30		...	...	...	...	...
12	L	21	29	to	...	...	...	...	...
		22	12		...	...	...	...	...
14		15	47	to	Faint disturbance.	
		16	14		...	...	...	...	...
15	L F	2	24	30	18		
		2	50		...	...	...	...	...
21		4	56	to	Slight disturbance.	
		5	30		...	...	...	...	...
24	i e M F	2	5	48		
		2	9	24	...	...	...	...	...
		2	10	51	20	17	...	...	...
		2	45		...	...	...	...	...

Day.	0 h.		6 h.		12 h.		18 h.	
	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.
1	0.7	6	0.8	6	1.6	6	1.6	4.5
2	0.9	6	1.4	6	1.6	6	1.5	6
3	1.6	6	1.1	5	1.1	5	0.9	5
4	1.0	4.5	1.1	4	1.1	4	1.1	4
5	1.1	4	0.9	5	1.1	4	1.1	4
6	1.1	4	1.1	4	0.9	5	1.3	3.5
7	1.1	4	1.1	4	1.1	4	1.2	5
8	1.2	4	1.3	5	1.6	5.5	1.6	6
9	1.4	6	1.9	5	1.9	5	2.3	6
10	2.3	6	2.2	6.5	2.4	7	2.6	8
11	3.9	7	3.1	6	2.3	6	1.6	6
12	1.4	6	0.9	6	1.3	8	0.8	7
13	0.8	6	0.7	6	0.3	4	0.3	4.5
14	0.1	4	0.1	3	0.8	4	1.0	4
15	0.8	6	1.0	5	1.5	6	1.7	5.5
16	2.3	6	1.8	5	1.6	6	1.0	6
17	1.6	6	1.7	4	2.3	5	1.6	6
18	1.6	6	1.7	6	1.5	4	1.5	5
19	1.8	5	2.0	5	2.3	4	2.3	4
20	1.9	5	2.0	4	2.3	5	2.9	4
21	2.3	6	2.5	6	2.5	5.5	...	...
22	2.3	5	1.6	6	2.0	5	1.9	6
23	1.6	6	2.3	4	1.8	5	2.3	4
24	1.6	6	1.9	5	3.1	4	2.0	4.5
25	...	...	1.0	5	2.1	4	1.5	4
26	1.9	4	1.2	4	1.2	4	1.1	4
27	1.4	4	1.2	4	1.1	4	0.7	4
28	0.5	4	0.6	4	1.1	4	1.1	4

Means for Month { A_{N.} = 1.5, T = 5.0. Normals, 1911-18 { A_{N.} = 2.6, T = 6.4.

EARTHQUAKES :—RICHMOND (KEW OBSERVATORY).

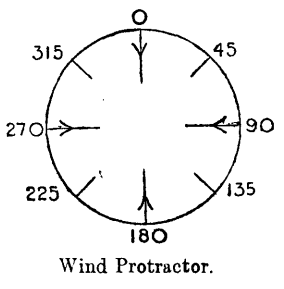
Day.	Times, G.M.T. of		Remarks.
	Commence-ment.	Max. Phase.	
1	h m	h m 0 26	Very small.
2	...	20 20	Small.
12	...	13 30	Very small.
15	...	2 28	Very small.
24	...	2 8	Small.

10. SOUNDINGS WITH PILOT BALLOONS.

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.														Cloud Observations.												
		Geostrophic.		By Anemometer.		At Heights above M.S.L.										Time, G.M.T. h. m.	Type.	Deg. from N.	mr/s.	Type.	Deg. from N.	mr/s.						
		Deg. from N.	m/s.	Deg. from N.	m/s.	500 m.		1000 m.		2000 m.		3000 m.		4000 m.														
ABERDEEN.																												
13	7 30	220	5	255	1'5	250	0'4	230	7'5	245	7'0	...	...	...	...	16 0	Ci.-Cu.	285	...	...	...	...		
14	7 30	270	3	225	1'0	90	1'5	315	2'0	245	2'5	15	0'5	...	...	...	St.-Cu.	250	...	...	...	...		
ESKDALEMUIR.																												
6	7 45	?	?	360	2'0	?	?	130	6'5	185	2'1	290	5'5	310	11'5	9 0	A.-Cu.	135	...	Ci.-St.	295	2'0						
7	11 35	?	?	60	2'3	125	6'0	140	7'5	255	5'0	300	10'0	...	...	9 0	A.-Cu.	305	3'5	Ci.-Cu.	295	3'2				
6	7 50	210	7	140	0'9	150	6'0	175	6'0	275	3'0	...	...	...	...	9 0	St.	150	15'0	A.-St.	225	...		
8	11 30	180	16	175	4'7	175	4'3	165	8'0	130	5'0	65	6'5	25	11'5	...	Ci.-Neb.	360	...	Ci.-St.	360	3'2						
9	11 45	225	11	—	calm	225	4'2	205	10'5	145	5'0	100	8'0	55	12'5	...	Ci.-St.	115	...	Ci.	65	2'5						
10	11 45	?	?	360	3'8	75	4'0	95	11'0	125	15'5	125	24'5	125	20'0	...	...	...	...	Ci.	135	...		
13	12 10	180	7	—	calm	230	4'0	255	6'5	280	6'0	...	...	...	...	...	A.-Cu.	280	...	...	...	...		
14	7 25	?	?	—	calm	245	2'0	240	5'5	275	4'8	265	4'5	...	...	...	A.-Cu.	315	...	...	...	...		
14	11 40	180	6	50	0'9	70	1'4	200	3'0	265	3'6	230	3'6	...	...	...	A.-Cu.	225	...	...	...	...		
21	9 20	?	?	—	calm	?	?	95	0'8	240	2'5	...	...	...	...	...	St.-Cu.	270	...	A.-Cu.	270	...	
24	12 5	?	?	360	3'0	345	2'1	340	2'7	360	4'1	330	9'0	345	14'0	...	Cu.	295	...	...	...	...		
25	7 25	90	6	360	6'0	45	9'0	45	9'0	30	5'5	10	11'5	...	...	...	St.-Cu.	45	...	Ci.	...	...				
27	7 25	40	10	360	5'0	360	11'0	30	20'5	60	3'9	...	...	...	...	...	St.	25	...	A.-Cu.	90	...	
28	7 30	—	—	—	calm	250	4'1	280	5'0	310	4'4	305	6'5	...	...	...	St.	225	...	...	...	...		
														5000 m.														
6	7 45	(For observations at lower levels, see above.)														280	8'5	9 0	A.-Cu.	135	...	Ci.-St.	295	2'0				
8	11 30															360	12'0	...	Ci.-Neb.	360	...	Ci.-St.	360	3'2				
SOUTH FARNBOROUGH.																												
7	12 5	45	16	45	8'0	65	9'5	70	11'5	60	9'0	70	15'5	...	...	...	...	...	...	Ci.	...	...				
8	7 45	100	10	70	3'1	135	11'5	125	16'0	95	10'0	30	12'0	...	...	...	...	...	...	...	...	...
11	7 40	?	?	70	3'1	105	10'5	110	13'0	115	14'5	...	...	...	...	...	...	...	...	...	...	...
12	7 50	?	?	70	?	130	9'5	145	9'5	135	12'0	...	...	...	...	...	...	...	...	...	...	...
28	9 45	20	10	—	light	10	6'0	20	4'2	360	4'5	345	6'0	...	...	...	Fr.-St.	...	...	...	...	...	
FALMOUTH.																												
3	14 20	?	?	—	calm	295	1'7	340	4'2	240	4'7	280	5'5	14 45	Cu.	315	...	A.-St.	cloudless	325	9'4					
8	8 55	140	11	120	5'5	125	15'0	135	23'0	55	3'4	...	...	...	...	...	...	...	...	...	...	...
CAHIRCIVEEN.																												
7	8 25	?	?	—	calm	?	?	310	2'4	320	9'5	325	12'0	310	16'0	...	St., Fr.-Cu.	...	...	Ci.	...	...				
7	12 5	?	?	160	2'1	160	3'9	190	3'4	260	1'3	330	4'1	310	14'5	...	Cu.	155	...	Ci.-St.	...	...				
18	7 55	?	?	60	2'5	200	2'4	220	2'8	335	4'6	310	6'0	...	...	...	St.	225	...	Ci.	315	...			
18	12 45	?	?	170	8'5	165	7'5	185	4'2	170	3'6	225	9'5	270	8'0	...	St.-Cu.	205	...	A.-St., Ci.-St.	...	...				
3	8 5	?	?	50	1'8	35	7'0	25	7'0	355	6'5	...	...	...	...	...	A.-St., St.	360	...	Ci., Ci.-Cu., Ci.-St.	270	...	
24	7 40	?	?	95	5'5	95	11'0	110	11'0	100	4'8	120	6'0	110	7'0	...	A.-Cu., Cu.	90	...	Ci., Ci.-Cu.	90	...						
29	7 40	?	?	—	calm	45	6'0	45	5'0	45	5'0	55	6'0	90	7'5	...	Cu., St.	...	...	Ci., Ci.-St.	115	...				
26	16 40	?	?	15	5'5	25	6'0	10	7'0	360	6'5	350	6'5	5	10'5	...	Cu.	25	...	St.-Cu.	25	...						
27	7 40	?	?	—	calm	5	5'0	5	9'5	5	10'0	5	15'5	...	...	...	St., Cu.	360	...	Ci.-Cu.	360	...			
27	16 40	?	?	335	5'5	360	6'0	345	7'0	360	7'0	5	9'5	...	...	...	Cu.	25	...	A.-Cu.	360	...			
														5000 m.		6000 m.		7000 m.										
18	12 45	(For observations at lower levels, see above.)														280	13'0	295	18'0	St.-Cu.	205	...	A.-St., Ci.-St.
24	7 40															110	8'0	105	9'0	95	7'5	...	A.-Cu., Cu.	90	...	Ci., Ci.-Cu.	90	...
26	7 40															85	8'0	Cu., St.	Ci., Ci.-St.	115	...

Height of Station above M.S.L. = H.,
Anemometer above ground = h.

	H.	h.
Aberdeen	14 m.	32 m.
Eskdalemuir	242 m.	15 m.
S. Farnborough	70 m.	31 m.
Falmouth	51 m.	12 m.
Cahiriveen	9 m.	13 m.



Notes on Pressure Distribution.

February 1919.

3 13 h. Extensive anticyclone covering the British Isles.
 6 7 h., 13 h. High over Scandinavia; shallow Low W. of Ireland; slight gradient.
 7 7 h., 13 h. Low over France and Iceland, ridge extending from Scandinavia to the British Isles.
 8 7 h., 13 h. } Anticyclone covering the British Isles, centred over the North Sea.
 9 13 h. }
 10 13 h. }
 11 7 h. " " " centred over Scotland.
 12 7 h. " " " centred over the North Sea.
 13 7 h., 13 h. " " " centred over Central Europe.
 14 7 h. Wedge over the British Isles.
 13 h. Low to the W. and High to the E. of the British Isles.
 18 7 h., 13 h. Deep depression over France, ridge over Ireland and Scotland.
 21 7 h. Low over the British Isles.
 23 7 h. Low over the British Isles, centred over the North Sea.
 24 7 h., 13 h. Pressure very uniform over the British Isles, but slightly high over the Irish Channel.
 25 7 h. E. to W. shallow trough across the British Isles, lowest over the Channel.
 26 7 h., 18 h. Low over the Channel growing deeper.
 27 7 h., 18 h. Shallow Low centred over the Channel.
 28 7 h. Wedge over the British Isles, High over the Azores and the Baltic.

Notes on Ascents.

Aberdeen—
 14th, 7 h. 30 m. Direction of cloud varying, general drift from 250°.

Eskdalemuir—
 6th, 11 h. 35 m. Sky clouded with A.-St. at 12 h. 30 m., moving from 200° at 4'4 mr/s.
 7th, 7 h. 50 m. Pressure rising fast.
 9th, 11 h. 45 m. Pressure very high (1040 mb.).
 25th, 7 h. 25 m. Visibility good.

South Farnborough—
 8th, 7 h. 45 m. Mist at surface, normal above.
 11th, 7 h. 40 m. Thin mist to 6000 ft. (aeroplane observation).
 28th, 9 h. 45 m. Mist clearing temporarily, Fr.-St. coming up.

Cahiriveen—
 23rd, 8 h. 5 m. St.-Cu. sheet cleared just before ascent.
 27th, 16 h. 40 m. Atmosphere very clear.

11. NEPHOSCOPE OBSERVATIONS.

ABERDEEN. Taken at 13 h. G.M.T.

Day.	Type of Cloud.	Velocity-height-ratio.				Remarks.
		Degrees from N.	Milliradians per Second.	Components.		
				W.-E.	S.-N.	
			mr/s.	mr/s.	mr/s.	
1	Nb.	45	8.0	- 5.7	- 5.7	Cumuliform Nb. below St.-Cu. sheet.
4	Ci.	308	4.0	+ 3.2	- 2.5	Ci. to Ci.-Cu. in high sheets.
5	Fr.-Cu.	70	6.2	- 5.8	- 2.1	Degraded broken Cu. and Cu.-Nb.
6	St.-Cu.	179	4.5	- 0.8	+ 4.5	Transition-type between Cu. and St.-Cu.
8	Fr.-St.	191	23.0	+ 4.4	+ 22.5	
11	St.-Cuf.	14	12.0	- 2.9	- 10.4	Broken St. Cumuliformis.
17	St.-Cu.	360	7.0	0.0	- 7.0	Heavy type of St.-Cu.
19	Ci.-St.	271	3.9	+ 3.9	- 0.1	Dense Ci.-St., becoming A.-St. Observation at 11 h.
25	Cu.-Nb.	30	11.0	- 5.5	- 9.5	Low small Cu.-Nb. beneath St.-Cu. sheet.
27	Nb.-Cuf.	64	10.0	- 9.0	- 4.4	Nb.-Cuf., really small low Cu.-Nb.

12. AURORA.

Day.	a. m. or p. m.	Moon.	Magnetic Character.		Aurora Observations.		
			Eskdalemuir.	Richmond.	Station.	Remarks.	
2	p.	...	1, 1	1, 1	Deerness Eskdalemuir	Glow, 22 h. Showing through clouds to N., 1 h.	
3	a.	...	1, 1	1, 1			Deerness
3	p.	...	1, 1	1, 1			Baltasound
4	p.	...	1, 1	1, 1	Deerness Aberdeen Eskdalemuir	Faint glow type, 19 h.-20 h. Showing through clouds to N., 21 h.	
7	...	☽	...	...	...	...
14	...	☉	...	...	...	...
22	p.	...	2, 2	2, 1	Armagh Blacksod Point Eskdalemuir (and other Scottish stations)	Vivid in N. W. Glow, with streamers, 21 h. 30 m.-1 h., 24th.	
23	p.	☾	2, 1	1, 0	Armagh Giggleswick Valencia Observatory	Glow seen low down in N. W., with some short but brilliant streamers, 20 h.-21 h. (See M. O. Circular, No. 35.)	
24	p.	...	1, 0	0, 0	Ford Malin Head Donaghadee Aberdeen Glasgow Eskdalemuir (and numerous other Scottish stations)	Streamers type, moderately bright, at night. 22 h. Bright glow, with arch N. E.-N. W., and till 1 h. on 28th.	
27	p.	...	2, 2	1, 2	Armagh Bidston Blacksod Point Newtownforbes Dublin (City) Holyhead Valencia Observatory Haverfordwest Roche's Point Sheepstor	Brilliant. 21 h. 12 m.-22 h. 10 m. Vivid in N. W., 21 h. 15 m. 19 h. 30 m.-20 h. 30 m. 21 h. In evening and at night; still visible 28th, 4 h. 21 h. and later. Arch N. E.-N. W. Brilliant 19 h.-23 h.; very bright 22 h.-22 h. 30 m. Very fine, ruddy streamers about 3 h. 30 m. 2 h.-3 h. Very brilliant, 2 h.-3 h. 20 m.	
28	a.	...	2, 2	1, 2	Southport Tavistock Sheepstor	Moderately faint arch, glow and streamers (slight), 19 h.-23 h.	
	p.	...	2, 2	2, 2	Deerness Gordon Castle Aberdeen Balmoral		

Note.—The two magnetic "characters" entered in each case refer to the two periods of 24 hours ending and beginning at the midnight of the night in question.

METEOROLOGICAL OFFICE OBSERVATORIES—GEOPHYSICAL JOURNAL.

DAILY VALUES.—*Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology.*

Ninth Year.—No. 3. MARCH 1919.]

Units based on the C.G.S. System.

[Price 1s.]

1. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.							SOUTH KENSINGTON.—Lat. 51° 30' N. Long. 0° 10' W.							RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.					ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.					CAHIRCIVEEN.	
	Bright Sunshine.*		Radiation received on Horizontal Surface by Calendar Radiograph.					Bright Sunshine.*		Radiation at Noon by Ångström Pyrheliometer.			Bright Sunshine.*		Radiation by Ångström Pyrheliometer.			Bright Sunshine.*								
	Total.	Per cent. of Possible.	Daily Total.	Per cent. of Planetary.	Maximum.			Total.	Per cent. of Possible.	Intensity.	Vertical Component.	Sky.	Total.	Per cent. of Possible.	Time.	Sky.	p sec Z.	Intensity.	Total.	Per cent. of Possible.						
					Amount.	Time.	11.30 h. to 12.30 h.																			
1	3'6	33	646	37	40	14	5	39	3'5	32	...	...	...	1'6	15	...	...	...	1'7	16
2	4'3	39	597	34	44	12	50	27	4'6	42	...	...	...	0'1	1	...	...	...	0'3	3
3	0'0	0	425	24	33	11	50	33	0'0	0	...	...	...	2'1	19	...	...	...	7'2	66
4	0'0	0	118	6	11	15	20	6	0'0	0	...	...	...	9'0	83	12 25	Hazy	2'09	0'0	0			
5	0'0	0	n 77	4	11	9	20	9	0'0	0	...	...	...	7'5	69	12 24	Clear	2'08	7'7	70			
6	7'0	63	870	5	50	13	40	46	8'3	75	...	...	...	1'5	14	...	...	...	0'3	3
7	0'0	0	314	16	31	12	55	29	0'0	0	...	...	...	0'0	0	...	...	...	2'7	24
8	0'4	4	355	18	34	13	50	21	0'0	0	...	...	...	0'0	0	...	...	...	0'0	0
9	0'8	7	378	19	44	11	30	44	0'3	3	...	...	...	0'6	5	...	...	...	1'3	12
10	0'1	1	301	15	24	9	30	12	0'0	0	...	...	...	0'0	0	...	...	...	0'0	0
11	0'1	1	335	16	30	14	30	18	0'0	0	...	...	...	0'4	3	...	...	...	0'8	7
12	0'4	3	301	15	37	10	30	17	0'8	7	...	...	...	3'1	27	...	...	...	8'7	76
13	7'5	65	1015	49	59	12	20	59	7'8	67	...	...	...	5'7	50	...	...	...	3'6	31
14	2'8	24	823	39	54	12	0	54	5'4	46	...	...	...	6'7	58	...	...	...	3'8	32
15	1'8	15	665	31	48	9	40	44	4'1	35	...	...	...	5'6	48	...	...	...	8'1	69
16	1'0	9	427	20	48	9	50	18	1'7	14	...	...	...	2'4	20	...	...	...	6'0	51
17	0'3	3	708	32	43	11	45	43	0'2	2	...	...	...	6'4	54	...	...	...	2'1	18
18	1'2	10	827	37	57	11	37	57	3'0	25	...	...	...	0'0	0	...	...	...	0'0	0
19	0'0	0	239	11	14	11	30	14	0'0	0	...	...	...	0'0	0	...	...	...	6'1	51
20	0'0	0	91	4	n 6	12	8	6	0'0	0	...	...	...	6'1	50	...	...	...	7'6	63
21	0'0	0	377	16	37	11	38	37	0'1	1	...	...	...	5'4	45	...	...	...	4'3	36
22	0'4	3	470	20	49	12	46	30	0'6	5	...	...	...	5'4	44	...	...	...	6'1	50
23	4'7	38	922	39	57	12	0	57	3'3	27	...	...	...	10'5	85	...	...	...	5'5	45
24	2'6	21	700	29	53	12	2	53	2'7	22	...	...	...	3'7	30	...	...	...	4'1	33
25	5'8	47	1056	43	55	11	46	55	6'1	49	...	...	...	1'9	15	...	...	...	10'4	84
26	3'4	27	1073	43	63	12	50	58	6'3	50	...	...	...	1'2	10	...	...	...	0'4	3
27	5'4	43	922	37	62	13	50	56	5'5	44	...	...	...	4'7	37	...	...	...	5'8	46
28	5'0	40	933	37	65	13	20	44	4'5	36	...	...	...	4'4	35	...	...	...	0'0	0
29	7'0	55	1407	55	62	11	27	59	7'6	60	...	...	...	4'1	32	...	...	...	1'7	13
30	7'1	56	1225	47	64	13	45	64	8'7	69	...	...	...	1'3	9	...	...	...	8'9	70
31	3'5	27	1067	41	57	13	55	52	5'6	44	...	...	...	7'2	56	...	...	...	10'2	80
Means	2'45	21	634	29	43	—	—	37	2'94	25	—	—	—	3'32	28	—	—	—	4'03	34						
Normal	2'39	20	570	26	—	—	—	—	3'39	29	—	—	—	3'06	26	—	—	—	3'97	34						

2. METEOROLOGY AND MAGNETISM:—CAHIRCIVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W.

Heights above M. S. L.:—H=9.1 m. H_b=13.7 m. H_a=26.4 m. Above Ground: h_t=1.3 m. h_r=0.56 m. h_a=13.9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.		Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force, Declination West, and Inclination.		
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	Vapour Pressure.	Percentage.	9 h.	21 h.	9 h.	21 h.	9 h.	21 h.						
	mb.	mb.	a.	a.	a.	a.	millibar.	%	m/s.	m/s.	Tenths of Sky covered.		mm.	a.						
1	997'0	995'1	200+ 81'4	200+ 82'9	200+ 84	200+ 78	10'5	11'4	96	94	150	6	185	6	10	2'9	77	o. p. n. and a. ● later.		
2	994'8	999'9	83'0	77'9	83	77	8'8	7'9	72	91	215	15	360	5	8	7'5	80	Fair to o. ●		
3	1008'2	1008'7	76'3	74'8	78	75	5'5	5'0	71	72	55	4	80	6	7	0'1	74	o. n. Fair to fine day.		
4	1005'5	1006'6	75'1	77'5	79	74	6'8	7'5	95	89	35	3	30	2	10	8'2	73	o. n. ✕ p. a. o. ∞ p.		
5	1011'2	1018'0	76'5	78'0	80	76	6'4	7'6	82	88	40	9	325	2	7∞	0'4	75	o. n. Fine ∞ day.		
6	1019'7	1011'6	79'4	81'5	82	77	8'6	10'4	90	94	260	5	220	7	7	4'4	74	Fine n. and a. o. p. d. p.		
7	1001'4	1003'5	80'5	78'9	83	78	9'2	8'7	89	94	265	5	—	0	10	6'7	79	● n. Dull day, fine evening.		
8	1007'1	1006'3	80'3	81'1	82	77	9'8	9'6	96	89	155	2	315	2	10	3'9	75	Fine to o. d. n. Dull day. ●°.		
9	1009'1	1005'7	78'0	79'9	82	77	8'1	8'5	93	86	—	0	175	5	8∞	1'6	—	o. to c. n. Fair to dull day.		
10	997'8	1002'5	82'2	79'6	84	79	10'7	8'4	93	86	225	7	240	3	10●	10'3	80	● n. and a. Dull p.		
11	1002'3	1004'5	78'5	78'2	81	77	7'9	6'6	87	75	—	1	335	2	9	0'1	77	o. n. and a. Fine p.		
12	1012'0	1016'6	78'8	77'5	81	77	7'6	7'1	83	84	350	2	—	1	3	0'1	74	Fine day. ⊕ p.		
13	1008'5	1017'3	80'6	77'6	82	76	8'2	7'4	79	87	295	5	35	4	10	14'3	75	● to p. a. Fine p.		
14	1021'7	1015'4	74'6	78'8	82	73	6'1	8'1	89	88	90	2	90	4	3∞	9'0	71	Fine n. and a. —. ●° p.		
15	1028'5	1033'1	79'4	80'7	83	79	7'9	9'6	83	92	10	4	—	0	4	8∞	0'5	78	o. p. n. and a. Fine day.	
16	1035'8	1040'5	81'4	80'1	83	79	10'5	7'3	96	72	285	4	5	4	10●	0'6	79	o. to c. p. ⊕ a. Fine p.		
17	1041'1	1036'5	77'1	79'5	82	75	7'5	7'7	91	80	—	0	170	3	6	0'9	73	Fine to fair. ⊕ a. o. p.		
18	1028'9	1018'7	82'3	82'6	84	79	11'3	11'2	97	94	245	2	230	4	10	8'5	78	o. d. to ●° a. Dull day. (20th)	19° 29'3	
19	1006'7	1003'6	79'0	77'7	83	76	8'0	6'4	86	75	315	11	335	3	8	5'4	78	● to fair. ⊕ a. p.		
20	1000'3	1000'4	75'8	77'3	80	74	6'7	6'8	90	82	—	1	25	8	2	2'4	72	Fair to c. ⊕ a. ● evening.		
21	1002'5	1003'6	75'8	76'3	n 77	75	5'6	6'9	76	89	25	8	—	1	5	—	74	Fine to fair day. ∞. o. evening. (22nd)	19° 32'8	
22	1004'6	1003'5	75'6	76'4	79	74	4'9	5'6	67	72	60	4	85	6	1∞	—	73	Fine to o., with ∞.		
23	1000'8	1001'8	76'2	75'2	79	74	5'4	5'7	70	79	70	6	60	5	8	—	74	c. to fine. ∞ (24th)		
24	1005'2	1010'5	74'8	75'6	78	73	5'0	5'8	72	80	55	6	90	3	7∞	—	72	Fine dry day. ∞		
25	1013'9	1016'6	76'6	74'4	79	n 72	4'9	4'9	n 62	72	90	4	—	1	0	—	72	Fine dry day.		
26	1013'5	1009'7	77'2	80'6	82	n 72	7'0	10'0	85	96	165	6	245	9	10	—	70	—. Fine to o. p. (26th)	17833'7	
27	1006'8	1011'7	79'6	78'1	82	77	6'5	6'8	67	78	310	13	325	9	7	4'2	77	● a. q ▲ during day. p. p.		
28	1013'2	1000'2	78'0	81'9	83	76	7'5	10'8	86	96	—	1	265	10	10●	13'7	75	▲ p. n. and a. ●° p.		
29	1009'																			

3. METEOROLOGY :—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level:—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m.

Heights above Ground :—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity, Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly means and normals for 45 years.

4. METEOROLOGY :—ESKDALEMUIR, DUMFRIESSHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level:—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m.

Heights above Ground :—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity, Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly means and normals for 45 years.

Temperatures at or below the normal freezing point of water are printed in small type.

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W.

Heights above M. S. L.:—H=54 m. H_b=55 m. Above Ground:—h_t=1.48 m. h_r=1.72 m. h_a=8 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Min. Temp. on Grass, Percentage of Humidity, Rain 0 h. to 24 h., REMARKS. Rows 1-31 and Means/Normal.

JERSEY (ST LOUIS OBSERVATORY).

Table with columns: Day, Wind Direction and Force, Sunshine, Cloud Amount, Type of Cloud, Direction whence coming, Mean Amount. Rows 1-31 and Means/Normal.

* For method of estimation, see Introduction. † The first hour of observation was changed to 9 h. on Jan. 1st, 1919. ‡ Except for rainfall the readings from the 15th to the 22nd refer to St. Aubin's, and to the observation hours 7 h., 13 h., and 21 h. G.M.T.

9. SEISMOLOGICAL DIARY.

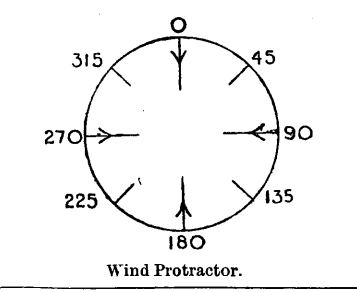
EARTHQUAKES:—ESKDALEMUIR.									MICROSEISMS OF N. COMPONENT:—ESKDALEMUIR.										
Day.	Phase.	Time, G.M.T.			Period.	Amplitudes.			Δ.	Remarks.	Day.	0 h.		6 h.		12 h.		18 h.	
		h	m	s		A _{N.}	A _{E.}	A _{Z.}				A _{N.}	T.	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.
1		14	34	to	...	μ	μ	μ	km.	Slight disturbance, masked by large microseisms and wind effects. Group of long waves from 14 h. 35 m. to 14 h. 42 m.	1	1'4	4	1'8	4	1'8	5'5	3'4	4
2	PR? S L M F	3	46	24	...	...	...	...	...	P indistinct, owing to microseisms.	2	2'6	6	4'7	5	4'1	6	4'0	6
		3	56	8	...	...	...	...	...		3	4'8	6	5'8	6	3'7	6	3'1	6
		4	23		...	...	...	...	...		4	2'7	6	1'8	6	2'1	4		4'5
		4	33	30	...	29	...	...	...		5	1'7	5	1'1	5	1'1	4	0'9	5
		5	45		...	...	...	...	...		6	1'1	4	1'0	4	0'9	4	1'2	4
2	S L M	12	14	35	...	...	...	...	...	Similar conditions to above. F confused with wind effects.	7	2'1	4	2'3	4	2'4	6	2'5	5'5
		12	42	30	...	...	...	...	...		8	2'5	6	2'0	6	1'6	6	2'5	6
		12	48		...	32	...	...	...		9	2'4	6	2'7	6	3'1	6	3'1	6
					...	...	...	...	...		10	3'1	6	2'5	7	2'0	6	2'6	6'5
					...	...	...	...	...		11	6'8	6	8'5	6	6'2	6	5'1	6
4		8	44	to	...	...	...	...	...	Slight disturbance. Early phases indistinct. Group of long waves at 9 h. 33 m.	12	2'7	6	2'1	5	1'8	5	1'5	6
		10	5		...	...	...	...	...		13	1'4	5	1'6	6	1'2	4	1'0	5
					...	...	...	...	...		14	1'4	4	1'4	5	1'8	5	1'5	6
					...	...	...	...	...		15	1'8	5	1'6	6	2'3	5	2'1	7
					...	...	...	...	...		16	2'7	6'5	3'0	6	3'2	8	2'8	7
					...	...	...	...	...		17	2'2	7	2'8	7	1'9	7	1'6	6
					...	...	...	...	...		18	1'3	6	0'9	5	1'0	5	1'1	4
					...	...	...	...	...		19	1'4	4	2'3	4	2'8	4	3'7	4
					...	...	...	...	...		20	3'5	4'5	2'0	6	2'3	4	1'4	4
					...	...	...	...	...		21	1'4	4	1'4	3	1'1	4	0'8	4
					...	...	...	...	...		22	0'9	4	1'0	3	0'9	4	0'3	3'5
					...	...	...	...	...		23	0'2	4	0'8	4	0'9	3'5	0'8	4
					...	...	...	...	...		24	0'9	4	1'0	4	1'1	4	1'0	4
					...	...	...	...	...		25	0'7	4	0'9	4	0'3	3	0'9	4
					...	...	...	...	...		26	0'9	4	1'0	4	0'9	4	1'1	4
					...	...	...	...	...		27	1'4	4	2'4	6	2'7	6	6'9	5
					...	...	...	...	...		28	5'2	5	3'9	6	2'2	5'5	2'1	6
					...	...	...	...	...		29	2'3	6	1'2	6	2'1	6	1'9	6
					...	...	...	...	...		30	1'8	5	1'7	5	1'2	6	2'0	4'5
					...	...	...	...	...		31	1'6	6	1'6	6	1'8	4	1'6	6
Means for Month { A _{N.} =2'1. T=5'1. Normals, 1911-18 { A _{N.} =1'7. T=5'7.																			
EARTHQUAKES:—RICHMOND (KEW OBSERVATORY).																			
Day.	Times, G.M.T. of				Remarks.														
	Commence-ment.	Max. Phase.																	
1	h m	h m			Small.														
2	...	4 39			Amplitude on trace 2'1 mm.														
2	...	13 0			Amplitude on trace 3'1 mm.														
4	...	9 23			Small.														
9	...	4 32			Amplitude on trace 1'4 mm.														
16	...	8 48			Small.														
21	...	2 5			Small.														

10. SOUNDINGS WITH PILOT BALLOONS.

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.										Cloud Observations.										
		Geostrophic.		By Anemometer.		At Heights above M.S.L.						Time, G.M.T. h. m.	Type.	Deg. from N. mr/s.	Type.	Deg. from N. mr/s.						
		Deg. from N.	m/s.	Deg. from N.	m/s.	500 m.		1000 m.		2000 m.							3000 m.		4000 m.			
						Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.					
ABERDEEN.																						
7 18	7 30 7 30	? ?	? ?	280 315	2'0 1'5	5 335	6'0 8'0	15 350	5'5 7'5	285 330	6'0 9'0	...	...	...	...	9 0	...	...	...	Ci.-St. Ci.	290 340?	3'0 ...
ESKDALEMUIR.																						
4 4	7 25	? ?	? ?	360 130	0'5 0'5	? 190	? 1'0	140 180	2'4 1'8	230 250	6'5 4'7	260 260	11'5 8'0	...	...	...	...	...	...	Ci. Ci.	...	...
4 5	11 35	? ?	? ?	calm	calm	35	3'2	50	4'8	15	5'5	350	4'7	...	...	...	...	...	...	A-St.	...	...
5 5	7 20	? ?	? ?	40	4'5	50	2'4	55	4'8	15	6'5	320	4'4	...	...	...	...	...	...	Ci.-St.	...	...
5 15	12 0 7 15	? ?	? ?	320	5'0	340	8'5	345	8'0	355	7'5	...	...	...	...	...	...	...	...	St-Cu.	360	...
17 17	7 30	330	11	305	6'5	325	7'0	330	10'5	330	14'5	330	23'0	...	...	...	...	...	...	Cu.	...	...
17 18	11 35 7 15	330 ?	13 ?	340	9'0	330	10'0	340	9'5	340	21'0	...	...	...	...	...	...	...	...	Cu.	360	...
18 21	7 15 11 15	? 90	? 17	calm	calm	215	2'4	250	3'7	320	8'5	...	...	...	...	...	...	...	...	A-St.	...	...
21 22	11 15 10 35	90 45	17 8	70	10'0	70	8'5	70	15'0	95	10'5	...	...	...	...	...	...	...	...	Cu.	...	...
22 22	10 35	45	8	30	4'0	50	4'4	70	6'0	80	9'5	...	...	...	...	...	...	...	...	St-Cu.	65	...
22 23	16 0 11 35	? ?	? ?	15	1'6	40	3'0	80	3'6	135	8'5	115	10'0	...	...	...	...	...	...	A-Cu.	115	4'0
23 29	11 35 7 25	? 340	? 11	90	0'2	25	2'0	355	0'9	30	8'0	315	3'6	285	7'5	...	...	...	...	A-Cu.	...	cloud less
29 31	7 25 7 20	340 360	11 10	290	10'0	325	9'5	325	17'5	340	11'5	...	...	...	...	...	...	...	...	A-Cu.	315	...
31 31	7 20 11 50	360 350	10 13	350	5'5	345	9'0	5	10'5	340	5'5	330	8'0	...	...	...	...	...	...	A-Cu.	...	...
31 31	11 50	350	13	325	10'0	320	7'0	350	11'0	330	4'8	...	...	...	...	...	...	...	...	Cu., A-Cu.	...	...
(For observations at lower levels, see above.)																						
4 23	11 35 11 35	...	...	...	...	...	...	...	...	5000 m. 255 17'0 295 7'5	...	6000 m. ...	...	...	...	...	...	...	...	Cu.	...	...
SOUTH FARNBOROUGH.																						
13 14	7 25 7 25	280 ?	10 ?	250 290	2'2 2'2	300 5	13'5 7'5	300 360	14'0 8'5	305 355	12'5 6'0	...	...	...	...	...	...	...	...	Ci.	...	cloud less
18 28	7 35 7 40	? 315	? 19	315 290	1'2 11'0	5 315	11'0 15'0	345 330	10'0 22'5	350 335	9'5 15'0	350 340	17'0 16'0	...	...	...	...	...	...	Ci.	...	...
31 31	7 25 7 25	? ?	? ?	260 260	7'5 7'5	275 275	5'5 5'5	275 275	6'5 6'5	265 265	7'5 7'5	250 250	7'0 7'0	250 250	13'0 13'0	...	...	...	...	Ci.	...	...
CAHIRCIVEEN.																						
5 9	16 55 8 5	? ?	? ?	360	7'0	350	9'5	350	13'0	360	11'0	...	...	...	...	...	...	...	...	Cu., St-Cu.	360	...
11 12	7 50 8 40	270 ?	6 ?	calm	calm	270	5'0	280	7'5	280	13'5	280	16'0	...	...	...	...	...	...	St.	270	...
12 12	7 50 8 40	270 ?	6 ?	calm	calm	? ?	? ?	310	5'5	290	7'5	...	...	...	...	...	...	...	...	Ci.-St.	...	...
12 12	8 40	? ?	? ?	360	2'4	340	7'0	345	11'5	340	14'0	345	17'5	...	...	...	...	...	...	Cu.	35	...
12 14	16 55 7 50	340 ?	6 ?	330	5'0	335	4'3	340	6'0	295	11'0	310	15'0	305	15'5	...	...	...	...	St.	...	Ci-Cu., Ci-St.
14 17	7 50 7 50	? ?	? ?	95	1'8	155	3'0	340	1'8	325	5'0	320	8'0	325	24'0	...	...	...	...	A-Cu.	315	...
17 20	7 50 7 40	? 330	? 9	50	2'7	80	2'7	160	1'3	290	3'4	285	6'5	285	13'0	...	...	...	...	St., A-St.	270	...
20 21	7 40 8 20	330 60	9 9	50	1'0	10	3'6	30	4'9	20	1'5	10	2'5	10	1'6	...	...	...	...	Cu.	45	...
21 22	8 20 7 40	60 ?	9 ?	25	8'5	20	13'5	40	10'0	35	9'0	...	...	...	...	...	...	...	...	Cu., St.	45	...
22 25	7 40 8 0	? 80	? 11	75	5'0	80	8'0	55	5'5	30	3'5	...	...	...	...	...	...	...	...	A., Cu.	245	...
25 25	8 0 12 40	80 ?	11 ?	65	4'5	80	7'0	70	10'5	20	5'5	...	...	...	...	...	...	...	...	Cu.	...	...
29 29	7 45 12 35	? ?	? ?	50	3'8	55	11'0	40	19'0	5	10'0	...	...	...	...	...	...	...	...	Cu., St-Cu.	45	...
29 30	12 35 7 55	? 315	? 12	50	4'8	20	7'5	15	8'0	350	8'0	320	12'0	290	22'0	...	...	...	...	Cu., St-Cu.	...	...
30 31	7 55 8 5	315 ?	12 ?	360	8'0	350	13'5	340	10'0	345	19'5	...	...	...	...	...	...	...	...	Cu., St-Cu.	335	...
31 31	8 5	? ?	? ?	25	4'3	10	7'0	5	13'0	360	11'0	5	9'5	...	...	...	...	...	...	Cu., St-Cu.	335	...
(For observations at lower levels, see above.)																						
20 20	7 40	...	...	5000 m. 295 2'6	6000 m. 105 5'5	7000 m. 120 19'0	8000 m. 120 18'5	9000 m. 120 10'5	10,000 m. 130 4'0	11,000 m. 125 1'2	...	...	...	...	...	...	...	...	...	Cu.	45	...

Height of Station above M.S.L. = H.,
Anemometer above ground = h.

Aberdeen 14 m. 32 m.
Eskdalemuir 242 m. 15 m.
S. Farnborough (Golf Course) 70 m. 31 m.
" (Pystock Tower) 89 m. 46 m.
Cahirciveen 9 m. 13 m.



Notes on Pressure Distribution.

March 1919.

4 7 h., 13 h. Irregular trough, English Channel to Scandinavia.
5 7 h., 13 h. Low centred near Land's End; High over the Azores.
7 7 h. " " " " over the Channel;
7 7 h. Low centred N. of Ireland and over Scandinavia. "
9 7 h. Low centred W. of Faeroe.
11 7 h. Deep depression N. of Scotland, light gradient over England and Ireland.
12 7 h., 18 h. Low centred over England.
13 7 h. Low W. of Ireland and over the North Sea.
14 7 h. Shallow Low over the North Sea; High over Scandinavia and the Azores.
15 7 h. Light gradient over the British Isles; High over Scandinavia and the Azores.
17 7 h., 13 h. } Anticyclone extending from the Azores to the British Isles.
18 7 h. }
20 7 h. Deep depression centred over the Channel; High over Iceland and Azores.
21 7 h., 13 h. " " " " S. of France; "
22 7 h. " " " " Western Germany; " "
22 18 h. }
23 13 h. } Low over Scandinavia and the Bay of Biscay.
25 7 h., 13 h. Ridge across the British Isles.
28 7 h. }
29 7 h., 13 h. } Deep depression moving northwards from Denmark to Norway.
30 7 h. }
31 7 h., 13 h. }

Notes on Ascents.

Eskdalemuir—
23rd, 11 h. 35 m. Visibility good.
29th, 7 h. 25 m. Visibility good.

S. Farnborough—
From Mar. 28th to July the anemometer referred to is that on Pystock Tower, not that on the Golf Course.

Cahirciveen—
9th, 8 h. 5 m. Solar halo.
11th, 7 h. 50 m. Overcast. Calm at the surface throughout ascent.
12th, 16 h. 55 m. Atmosphere exceptionally clear.
17th, 7 h. 50 m. Balloon went into A-Cu. sheet which developed temporarily.
20th, 7 h. 40 m. Cu. cloud seen later to the S.W. with very well-marked anvil extensions to the N.W. The top of the cloud agreed with the layer of high winds at 7000 m.

11. NEPHOSCOPE OBSERVATIONS.

ABERDEEN. Taken at 13 h. G.M.T.

Day.	Type of Cloud.	Velocity—height—ratio.				Remarks.
		Degrees from N.	Milliradians per Second.	Components.		
				W.—E.	S.—N.	
5	Ci.	272	2'0	+ 2'0	- 0'1	Observation at 12 h. Coarse floccular Ci., changing to Ci-Cu. Striated at 90° to direction.
7	Ci-St.	290	2'8	+ 2'6	- 1'0	Observation at 9 h. Fine bands of Ci. to Ci-St., radiant [point W.N.W. ⊕
11	Fr-Cu.	267	20'0	+ 20'0	+ 1'0	
12	Cu-Nb.	15	18'0	- 17'5	- 4'7	Small low type of Cu-Nb.
15	St-Cu.	16	3'7	- 1'0	- 3'6	Observation at 12 h.
17	Cu-Nb.	335	25'0	- 23'0	- 10'0	Bases of clouds measured; large "anvils" seen above in [N.E.
21	Cu.	84	6'0	- 6'0	- 0'6	
"	Cu-Nb.	85	2'0	- 2'0	- 0'2	Observation at 18 h.
22	St-Cu.	90	4'2	- 4'2	0'0	Observation at 7 h.
"	Cu.	275	5'2	+ 5'2	- 0'5	Observation at 18 h.; at 13 h. the cloud was eddying and [of no definite direction.
23	Cu-Nb.	340	8'3	+ 7'8	- 3'1	
"	Cu-Nb.	350	5'2	+ 5'1	- 0'9	Observation at 18 h.
24	Cu-Nb.	25	2'0	- 1'8	- 0'8	
"	St-Cu.	345	2'5	+ 0'6	- 2'4	Observation at 18 h. The St-Cu. was the remains of upper [portions of the previous Cu-Nb.
25	Cu.	207	2'6	+ 1'2	+ 2'3	
29	Fr-Cu.	315	11'0	+ 7'8	- 7'8	
31	Nb.	318	9'3	+ 5'0	- 6'9	Nb., really the degraded bases of Cu-Nb.

12. AURORA.

Day.	a.m. or p.m.	Moon.	Magnetic Character.		Aurora Observations.	
			Eskdalemuir.	Richmond.	Station.	Remarks.
2	p.	●	2, 1	2, 1	Deerness Gordon Castle Aberdeen Glasgow Paisley	Moderately faint arch and glow, 19 h.-22 h.
3	p.	...	1, 1	1, 1	Eskdalemuir	Glow, 21 h.
5	p.	...	1, 1	1, 2	Eskdalemuir	Glow, 21 h. to 1 h. on 4th.
6	a.	...	1, 1	1, 2	Gordon Castle	
6	p.	...	1, 1	2, 1	Deerness	Brilliant glow 1 h.
7	a.	...	1, 1	2, 1	Aberdeen	Moderately faint arch, 19 h.-24 h.
9	...	☽	...	...	Fort William	
16	...	○	...	...	Eskdalemuir	Glow 1 h.
17	p.	...	1, 0	1, 0	Tavistock	
19	p.	...	2, 2	1, 2	Armagh	Bright.
20	p.	...	2, 2	2, 2	Baltasound	
21	p.	...	2, 2	2, 2	Deerness	
22	p.	...	2, 1	2, 1	Paisley	22 h.
23	p.	☾	1, 0	1, 0	Eskdalemuir	
24	a.	...	1, 0	1, 0	Fort William	Streamers 20½ h; faint glow 21 h.
27	p.	...	1, 2	2, 2	Eskdalemuir	
28	a.	...	1, 2	2, 2	Inverness	Slight 1 h.
28	p.	...	2, 1	2, 1	Edinburgh	
30	p.	...	1, 1	1, 1	Glasgow	21 h.; glow and streamers 1 h.
31	p.	...	1, 1	1, 1	Eskdalemuir	
					Roche's Point	
					Aberdeen	Moderately faint arch and streamers between 21 h. and 23 h.
					Baltasound	
					Deerness	
					Fort William	

Note.—The two magnetic "characters" entered in each case refer to the two periods of 24 hours ending and beginning at the midnight of the night in question.

METEOROLOGICAL OFFICE OBSERVATORIES—GEOPHYSICAL JOURNAL.

DAILY VALUES.—Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology.

Ninth Year.—No. 4. APRIL 1919.]

Units based on the C.G.S. System.

[Price 1s.]

1. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.			SOUTH KENSINGTON.—Lat. 51° 30' N. Long. 0° 10' W.						RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.					ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.					CAHIRCIVEEN.			
	Bright Sunshine.*			Radiation received on Horizontal Surface by Callendar Radiograph.						Bright Sunshine.*		Radiation at Noon by Ångström Pyrheliometer.			Bright Sunshine.*		Radiation by Ångström Pyrheliometer.			Bright Sunshine.*			
	Total.	Per cent. of Possible.	Daily Total.	Per cent. of Planetary.	Maximum.						Total.	Per cent. of Possible.	Intensity.	Vertical Component.	Sky.	Total.	Per cent. of Possible.	Time.	Sky.	p sec Z. %	Intensity.	Total.	Per cent. of Possible.
					For Day.		11.30 h. to 12.30 h.	Total.	Per cent. of Possible.	Intensity.													
	hr.	%	j/cm ² .	%	mw/cm ² .	h.					m.	mw/cm ² .	hr.	%	mw/cm ² .	mw/cm ² .		hr.	%	h.	m.		mw/cm ².							hr.	%	hr.	%
1	0'0	0	n 206	8	15	13	25	14	0'4	3	...	...	...	5'8	45	...	...	...	...	9'7	75	...	...
Means	3'23	24	884	28	59	—	—	47	3'53	26	—	—	—	3'53	25	—	—	—	—	6'00	44	—	—
Normal	4'30	31	1016	33	—	—	—	—	5'23	38	—	—	—	4'70	34	—	—	—	—	5'33	39	—	—

2. METEOROLOGY AND MAGNETISM :—CAHIRCIVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W.

Heights above M. S. L. :—H = 9.1 m. H_b = 13.7 m. H_a = 26.4 m. Above Ground : h₁ = 1.3 m. h_r = 0.56 m. h_a = 13.9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.		Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force, Declination West, and Inclination.		
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	Vapour Pressure.	Percentage.		9 h.	21 h.	9 h.	21 h.	9 h.					21 h.	
	mb.	mb.	a.	a.	a.	a.	millibar.	%	%	m/s.	m/s.	Tenths of Sky covered.	mm.	a.						
1	1007'0	1015'2	77'5	77'9	n 80	n 74	5'8	6'3	69	72	5	10	45	6	3	1	2'5	73	* ⁰ a. Fine dry day.	<div style="display: flex; justify-content: space-between;"> { 19° 28' 3 68° 6' 4 } </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> { 19° 26' 9 68° 7' 4 } </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> { 17849 γ 19° 27' 0 } </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> { 17856 γ — } </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> { 17852 γ 19° 27' 6 } </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> { 68° 6' 6 } </div>
Means	1017'6	1018'0	81'9	81'0	83'8	78'7	9'1	9'2	80	84	5'9	5'1	7'1	6'6	50'5	77'3	Monthly Totals or Means.			
Normal	1011'6	1011'8	82'1	81'6	85'0	79'1	9'5	9'4	82	84	5'4	4'9	—	—	96'9	—	Normals.			

* By Campbell-Stokes Sunshine Recorder.

x denotes the maximum and n the minimum value in the column.

3. METEOROLOGY :—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m.

Heights above Ground :—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly totals and normals for 45 years.

4. METEOROLOGY :—ESKDALEMUIR, DUMFRIESSHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m.

Heights above Ground :—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity, Wind, Cloud Amount and Weather, Rain, Min. Temp. on Grass, REMARKS. Includes monthly totals and normals for 45 years.

Temperatures at or below the normal freezing point of water are printed in small type.

5. GEOPHYSICS :—RICHMOND (KEW OBSERVATORY).

Day.	Earth Temperature at 9 h.		Height above M.S.L. of Surface of Underground Water.		Magnetic Force.						Magnetic Character of Day.	Electric Character of Day.	Charge per cc. $\times 10^{16}$.		Air-Earth Current. $\times 10^{16}$.	Potential Gradient, Volts per metre. Factor 2.30.			
	0.3 m.	1.2 m.	Daily Mean.	Extremes.	Horizontal Comp't.		Declination.		Inclination.				About 15 h.	About 15 h.		3 h.	9 h.	15 h.	21 h.
					Mean Time.	γ	Mean Time.	West.	Mean Time.	North.									
	a.	a.	cm.	cm.	h m	γ	h m	°	h m	°	coulomb.	amp/cm ² .	v/m.	v/m.	v/m.	v/m.			
1	200+	200+	359	362	...	...	...	...	...	...	0.58	...	185	660	±	815	
2	76.8	78.7	355	...	...	...	...	...	14 51	66 57.2	0.13	0.13	0.70	620	645	435	560
3	76.0	78.8	353	...	11 10	18394	14 18	14 51.6	14 46	66 57.4	0	0	0.80	125	505	170	560		
4	76.1	78.8	351	...	...	...	14 18	14 49.2	14 35	66 59.3	1	0	0.75	535	815	630	620
5	77.3	78.8	348	...	...	...	...	...	...	...	0	0	...	195	535	210	380
6	77.8	78.8	...	...	...	...	...	...	...	...	1	1	...	55	365	210	265
7	78.9	78.8	346	...	...	...	...	...	...	...	2	0	0.26	110	265	185	255
8	80.0	78.9	343	...	...	...	...	...	...	...	1	1	0.82	125	280	110	420
9	80.8	79.0	339	...	...	...	...	...	...	...	1	2	0.55	350	350	±	420
10	80.0	79.0	334	...	...	...	...	...	...	...	1	2	0.43	350	350	±	420
11	79.7	79.1	329	...	11 8	18385	14 19	14 49.1	14 29	66 57.5	1	0	...	335	325	195	155		
12	80.6	79.2	325	...	...	...	...	...	...	...	0	0	0.22	140	185	240	195
13	81.3	79.4	322	...	...	...	...	...	...	...	0	1	...	-15	225	125	365
14	81.2	79.6	320	...	...	...	...	...	...	...	0	1	...	225	280	±	490
15	81.1	79.8	322	...	...	...	...	...	...	...	0	2	...	70	-110	210	295
16	81.0	79.9	319	...	...	...	...	...	...	...	0	2	0.15	70	225	±	-335
17	80.9	79.9	315	...	...	...	...	...	...	...	1	1	...	110	55	170	265
18	80.6	80.0	314	...	11 3	18354	14 19	14 51.3	14 32	67 0.4	2	0	0.26	255	465	185	280		
19	81.5	80.1	315	...	...	...	...	...	...	...	1	0	...	225	310	195	85
20	83.0	80.0	315	...	...	...	...	...	...	...	1	0	...	225	480	195	365
21	84.0	80.4	313	...	...	...	...	...	...	...	1	0	...	110	365	335	335
22	82.2	80.6	312	...	...	...	...	...	...	...	1	0	...	255	295	310	480
23	81.1	80.8	311	...	...	...	...	...	...	...	1	0	0.34	265	420	265	140
24	81.9	80.8	309	...	11 9	18392	14 21	14 51.2	...	...	1	0	0.17	110	310	185	110
25	81.9	80.9	305	...	...	...	...	...	14 33	66 58.8	1	2	0.13	155	225	-845	450
26	81.0	80.9	302	...	...	...	...	...	...	...	0	0	0.24	225	195	170	265
27	81.4	80.9	299	...	...	...	...	...	...	...	0	1	...	110	195	155	195
28	80.6	80.9	296	294	...	...	...	...	...	...	0	2	...	125	170	±	±
29	79.1	80.9	296	...	...	...	...	...	...	...	0	1	0.65	85	450	395	-30
30	79.3	80.9	300	...	...	...	...	...	14 38	66 55.9	1	2	...	185	310	±	325
M.	82.1	79.8	322	...	...	...	...	...	...	...	0	0	0.24	240	395	265	195
	81.1	80.8	...	...	...	...	...	...	...	...	...	...	...	194*	341*	196*	300*

* Mean of 24 days.

6. GEOPHYSICS :—ESKDALEMUIR.

Day.	Magnetic Force.												Magnetic Character of Day.	Electric Character of Day.	Potential Gradient, Volts per metre. Factor 6.06.						
	North Component.			West Component.			Vertical Component.			3 h.	9 h.	15 h.			21 h.						
	Maximum. 15000 γ +	Minimum. 15000 γ +	Range.	Maximum. 4000 γ +	Minimum. 4000 γ +	Range.	Maximum. 44000 γ +	Minimum. 44000 γ +	Range.												
	h m	γ	γ	h m	γ	h m	γ	h m	γ	h m	γ	h m	γ	v/m.	v/m.	v/m.	v/m.				
1	20 37	1043	916	11 11	127	13 55	927	812	20 25	115	20 26	1046	1007	12 35	39	1	1 c	375	1075	±	200
2	17 59	998	933	12 21	65	13 28	931	853	8 57	78	18 13	1035	1011	11 50	24	0	1 b	135	180	130	195
3	19 53	1007	936	12 16	71	14 58	940	859	9 13	81	16 16	1036	1013	12 30	23	0	2 c	-945	145	80	150
4	5 33	1018	903	11 7	115	4 57	931	859	11 10	72	15 55	1037	1007	5 48	30	1	1 a	235	540	130	55
5	20 13	1005	934	11 27	71	14 42	917	861	9 48	56	7 20	1029	1007	13 6	22	0	1 a	15	80	135	285
6	23 46	1032	922	11 11	110	13 49	947	753	23 46	194	21 6	1053	1003	12 26	50	1	1 a	55	120	45	115
7	23 13	1106	888	22 27	218	2 55	926	758	22 18	168	21 17	1042	<916	§	>126	2	1 b	145	200	150	95
8	22 5	1025	872	10 55	153	13 42	936	802	0 23	134	18 38	1106	890	2 17	216	2	2 c	-660	95	170	425
9	20 9	1063	918	11 28	145	14 8	936	840	22 8	96	19 22	1104	1050	6 9	54	1	1 b	260	235	245	250
10	22 7	1025	924	12 9	101	14 0	920	825	2 23	95	19 20	1116	1043	1 55	73	1	2 b	285	-1435	300	55
11	17 50	1008	937	12 29	71	13 58	938	857	2 58	81	18 15	1114	1068	11 25	46	1	1 b	45	50	100	150
12	16 37	1003	949	13 40	54	14 15	959	853	2 36	106	18 55	1139	1053	12 20	86	0	1 b	150	±	155	135
13	1 21	1029	946	11 47	83	15 4	914	846	2 17	68	21 16	1093	1059	12 25	34	0	1 c	120	100	730	195
14	19 56	1012	939	11 47	73	13 31	921	863	8 55	58	1 0	1081	1049	12 10	32	0	2 c	±	-1665	50	165
15	21 57	1038	945	11 30	93	13 25	927	855	9 3	72	21 48	1081	1056	12 40	25	1	2 c	655	±	210	-2030
16	18 16	1029	914	22 51	115	14 28	981	810	20 48	171	16 41	1138	1009	23 35	129	1	2 b	-145	-65	135	195
17	19 24	1095	852	9 27	243	15 1	970	779	20 45	191	16 51	1192	988	22 26	204	2	0 a	295	120	150	215
18	16 45	1047	881	4 11	166	16 47	947	818	21 12	129	16 56	1143	941	4 25	202	2	0 a	130	170	200	350
19	23 33	1034	897	11 16	137	14 19	928	840	3 5	88	19 19	1101	1022	2 56	79	1	1 a	365	80	165	120
20	16 10	1017	934	11 54	83	20 14	932	799	22 5	133	19 47	1114	1045	1 38	69	1	0 a	100	105	155	265
21	20 35	1032	917	10 47	115	13 53	926	836	23 49	90	19 45	1117	1033	2 0	84	1	0 a	155	245	270	1120
22	22 57	1071	922	11 3	149	13 46	928	804	23 19	124	18 20	1087	1004	23 55	83	1	0 a	460	215	400	200
23	19 25	1009	928	11 29	81	13 54	938	845	0 40	93	19 11	1092	1065	11 55	87	1	0 a	200	235	195	150
24	18 10	1037	943	15 34	94	13 48	928	843	19 42	85	19 24	1108	1060	11 55	48	1	2 b	215	185	150	165
25	19 23	1012	950	12 20	62	17 10	911	870	5 50	41	18 19	1089	1070	11 45	19	0	2 c	100	-380	70	85
26	18 57	1014	953	12 52	61	13 50	918	864	7 44	54	19 55	1083	1059	12 48	24	0	2 b	-20	325	200	310
27	18 55	1021	962	11 20	59	15 34	923	858	6 54	65	20 6	1087	1053	12 45	34	0	1 c	215	575	±	285
28	17 35	1026	969	12 0	57	13 33	915	869	6 23	46	19 0	1090	1055	12 55	35	0	1 c	575	±	200	235
29	16 34	1068	956	13 17	112	15 5	923	867	7 16	56	18 55	1112	1044	12 28	68	1	1 a	145	345	575	0
30	0 31	1040	938	10 38	102	13 51	934	854	6 33	80	21 30	1083	1054	12 14	29	1	1 a	150	1		

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W.

Heights above M.S.L.:—H = 54 m. H_p = 55 m. Above Ground:—h_t = 1.48 m. h_r = 1.72 m. h_a = 8 m.

Main meteorological data table with columns for Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Min. Temp. on Grass, Percentage of Humidity, Rain, and REMARKS. Includes monthly means and normal values.

JERSEY (ST LOUIS OBSERVATORY).

Cloud Amount (tenths of Sky covered), Type of Cloud, and Direction whence coming. Includes columns for Wind Direction and Force, Sunshine, Cloud Amount (Upper/Lower), and Mean Amount.

* For method of estimation, see Introduction.

† The first hour of observation was changed to 9 h. on Jan. 1st, 1919.

8. WIND COMPONENTS : Metres per second at fixed hours, together with the greatest mean hourly velocity, or the greatest velocity attained in a gust, and the time of its occurrence.

NORTH WALES :—HOLYHEAD.

Height of Head above—Roof 8·8 m., Ground 13·7 m., M.S.L. 19·2 m.
Height of Cups above—Roof 4·6 m., Ground 7·6 m., M.S.L. 15·2 m.

SCOTLAND N. :—DREERNES.

Height of Cups above—Roof 1·5 m., Ground 4·9 m., M.S.L. 57·6 m.

Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.			
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.			
1	3·9	...	...	0·4	...	...	2·0	...	3·7	...	5·5	...	1·4	...	3·3	12·2	10	5
2	...	Cal m	...	...	...	Cal m	...	...	2·7	1·8	...	3·5	...	3·5	...	8·2	21	55
3	1·6	...	4·0	...	...	4·3	...	1·6	...	4·0	...	...	...	Cal m	...	9·4	7	0
4	...	Cal m	...	0·6	...	1·5	...	...	0·6	2·9	...	2·7	...	4·1	...	9·3	22	30
5	...	...	6·6	...	...	5·9	...	1·5	...	7·4	...	1·1	...	5·5	...	11·7	14	45
6	...	...	6·2	...	...	6·9	...	4·0	...	4·0	...	4·7	...	4·7	...	10·7	18	0
7	2·5	...	2·5	...	4·9	...	3·3	...	6·6	...	4·4	...	4·1	...	2·7	...	12·8	16	10
8	1·4	...	1·4	...	...	5·2	...	5·7	...	3·8	...	4·0	...	6·0	...	13·8	17	20
9	0·8	...	4·2	7·9	5·9	...	5·9	...	1·3	...	3·0	...	11·8	11	45
10	3·5	...	3·5	...	5·5	...	2·3	...	4·0	...	4·0	...	4·7	...	4·7	...	12·2	6	20
11	5·8	...	5·8	...	8·1	...	5·4	...	4·7	...	7·1	...	3·8	...	5·7	...	17·5	3	55
12	4·0	...	4·0	...	6·0	...	6·0	...	3·7	...	3·7	...	0·7	...	3·5	...	15·7	10	30
13	2·9	...	6·9	...	3·1	...	7·6	...	6·8	...	4·6	...	5·7	...	3·8	...	15·6	22	20
14	9·1	...	...	3·8	...	5·8	...	9·1	...	3·8	...	1·8	...	1·8	...	18·5	5	45
15	...	6·4	2·6	...	...	9·0	9·0	...	12·0	12·0	...	...	11·6	11·6	...	24·1	15	40
16	...	13·4	13·4	...	...	13·4	9·0	...	...	7·3	3·0	...	1·8	0·8	...	24·3	4	0
17	...	0·8	3·8	...	4·4	...	4·4	...	4·4	...	4·4	...	3·6	...	2·4	...	11·5	10	5
18	3·5	...	3·5	...	3·6	...	2·4	...	4·3	...	1·8	...	4·0	...	1·6	...	8·0	11	45
19	1·5	...	0·6	...	...	Cal m	...	...	Cal m	...	...	...	4·8	2·0	...	12·6	22	0
20	...	2·2	...	11·3	...	2·1	...	10·6	...	3·6	...	8·8	...	2·3	...	5·5	16·5	3	5
21	...	0·8	...	1·8	...	3·0	...	2·0	...	0·7	3·5	...	0·5	2·6	...	8·2	0	35	
22	...	0·4	2·0	...	1·0	...	2·4	...	1·3	...	3·0	...	1·1	...	1·1	...	5·8	18	40
23	0·6	...	2·9	...	...	2·5	2·5	...	2·5	2·5	...	...	3·0	2·0	...	8·7	10	35
24	...	2·0	3·0	...	...	5·7	2·4	...	...	7·7	1·5	...	3·2	0·6	...	15·0	12	50
25	...	2·1	5·2	...	...	2·8	6·7	...	4·0	...	6·0	...	...	10·5	...	16·1	21	35
26	...	2·5	12·6	...	...	14·5	6·0	...	...	10·9	2·2	...	4·8	1·0	...	23·5	7	15
27	...	...	8·2	...	...	13·1	2·6	...	...	14·5	6·0	...	21·6	...	...	31·1	18	55
28	...	13·5	2·7	...	...	13·8	...	...	...	15·2	6·3	...	14·5	2·9	...	28·1	10	30
29	...	13·0	...	5·4	...	9·1	...	3·8	...	8·7	1·7	...	7·1	4·7	...	18·2	2	20	
30	...	6·8	4·6	...	...	4·4	4·4	...	...	1·8	2·7	...	2·2	3·2	...	10·8	22	55

Day.	3 h.				9 h.				15 h.				21 h.				Vel. in Max. Hourly Run.	Time of Max.	
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.			
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.			
1	...	5·6	...	5·6	...	7·3	...	3·0	...	2·1	0·9	...	...	3·3	...	9·2	1	1
2	3·5	...	8·5	...	2·2	...	10·9	...	...	5·2	...	2·1	...	2·7	...	4·1	11·1	9
3	...	3·1	...	4·7	...	2·1	...	5·2	...	1·0	...	11·8	...	4·8	4·9	...	8·2	24	
4	5·2	...	2·1	...	7·8	...	11·7	...	4·9	...	11·8	...	1·5	...	7·7	...	14·1	9, 11	
5	...	Cal m	...	...	...	5·7	...	13·7	...	...	2·5	12·6	...	...	3·6	8·8	15·1	10
6	...	Cal m	...	...	...	7·9	...	...	...	3·6	...	8·8	...	5·6	...	5·6	9·8	13, 14
7	5·2	...	3·4	...	2·7	...	4·1	...	...	Cal m	...	0·4	...	...	2·3	7·5	4	4
8	...	Cal m	...	...	...	2·0	...	...	...	2·7	...	1·8	4·2	...	0·8	5·9	19, 22	
9	2·0	...	0·4	...	4·4	...	4·4	...	1·7	...	8·7	...	2·8	...	2·8	8·9	15	15	
10	2·3	...	5·5	...	4·8	...	1·0	...	9·1	...	...	3·8	6·1	...	1·2	10·5	14	14
11	6·8	...	1·3	...	7·1	...	1·4	...	5·7	...	8·5	...	7·7	...	11·5	15·4	23	23	
12	6·7	...	6·7	...	7·4	...	7·4	...	4·1	...	10·0	...	4·4	...	4·4	14·4	9	9	
13	4·9	...	3·3	...	11·8	...	...	...	5·7	...	8·5	...	4·5	...	1·9	11·8	2	2
14	3·0	...	1·3	...	5·6	...	...	5·6	1·6	...	...	8·0	...	4·1	10·0	10·8	23, 24	
15	...	6·9	...	6·9	...	8·0	...	1·6	...	4·3	...	2·9	...	1·0	2·4	9·8	1, 3	1, 3	
16	...	2·1	...	2·1	...	3·0	3·0	...	...	4·9	7·4	...	...	1·6	4·0	11·5	16	16
17	2·8	...	1·1	...	10·0	...	2·0	...	3·6	...	2·4	...	4·4	...	6·6	10·2	9	9	
18	4·0	...	9·7	...	4·9	...	7·4	...	3·6	...	8·8	...	4·0	...	9·7	12·1	2	2	
19	5·7	...	8·5	...	...	4·1	10·0	...	7·8	7·8	...	...	5·1	5·1	...	11·5	11	11
20	...	2·0	4·8	...	...	3·8	5·7	...	...	5·1	1·0	...	...	Cal m	...	8·2	11	11
21	5·9	...	...	...	6·2	...	...	...	5·1	...	1·0	...	1·7	...	2·5	6·9	5	5
22	3·3	...	3·3	...	4·4	...	6·6	...	1·7	...	8·3	...	1·7	8·7	...	11·1	11	11	
23	...	2·3	5·5	...	...	4·2	4·2	...	4·3	1·8	...	...	2·8	1·1	...	6·2	12	12
24	...	Cal m	...	...	...	3·0	...	...	4·2	6·2	...	...	1·0	5·1	...	8·5	18	18
25	...	...	4·9	...	...	1·2	6·1	...	...	...	...	3·0	...	7·4	4·9	10·5	6	6
26	...	10·5	...	...	...	10·6	4·4	...	...	6·8	4·6	...	4·1	2·7	...	13·1	7	7
27	...	9·8	...	...	...	14·6	6·1	...	...	8·8	8·8	...	13·5	2·7	...	17·7	24	24
28	...	19·7	...	...	...	18·0	...	...	...	13·3	5·5	...	10·6	2·1	...	21·3	2	2
29	...	5·6	5·6	...	...	...	4·9	...	...	2·5	6·1	...	1·3	6·8	...	8·9	1	1
30	...	...	4·3	...	0·9	...	4·5	...	4·6	...	6·8	...	4·8	...	2·0	9·2	20	20

S+N & W+E	105·0	132·5	136·8	132·3	153·6	128·3	125·6	104·8
S-N & W-E	-30·6	87·9	-44·0	99·5	-30·2	87·1	-27·6	81·4

S+N & W+E	128·9	99·5	172·7	137·9	130·5	171·7	117·5	135·7
S-N & W-E	-6·3	60·9	18·9	103·1	-13·1	118·9	-3·5	76·9

ENGLAND S. W. :—SCILLY.

Height of Head above—Ground 9·8 m., M.S.L. 49·7 m.
Height of Cups above—Ground 5·8 m., M.S.L. 45·7 m.

ENGLAND E. :—SHOEBURYNES.*

Height of Head above—Ground 27·4 m., M.S.L. 31·4 m.

Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.			
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.			
1	...	2·2	5·4	...	...	3·1	1·3	...	...	1·3	...	3·1	...	5·8	...	18·1	2	30	
2	5·0	...	...	5·8	...	2·8	...	4·2	...	5·8	...	2·4	...	10·4	0	45	
3	...	2·1	1·4	...	0·7	...	0·3	...	3·5	1·5	...	2·5	...	...	...	5·1	14	45	
4	...	1·6	...	0·7	...	2·1	...	3·2	...	3·8	...	2·6	...	2·3	...	6·9	12	55	
5	...	1·5	...	1·5	...	2·5	...	...	...	2·8	...	0·6	...	4·3	1·8	...	8·2	18	55
6	...	3·3	3·3	...	...	3·5	1·5	...	...	4·6	1·9	...	...	3·1	1·3	...	10·9	11	25
7	...	4·7	4·7	...	...	0·8	1·9	...	4·3	...	1·8	...	5·8	...	2·4	...	12·1	22	15
8	...	4·6	6·9	...	...	1·1	5·3	...	1·1	...	5·7	...	2·1	5·0	...	11·4	21	55	
9	...	4·4	6·6	...	...	5·9	5·9	...	...	6·8	6·8	...	...	6·3	...	16·5	7	15	
10	...	2·6	13·1	...	...	2·1	10·6	...	...	10·4	...	...	...	10·4	...	16·9	3	25	
11	4·1	...	10·0	...	4·0	...	9·6	...	1·7	...	8·6	...	1·5	...	7·4	...	15·4	2	15
12	5·8	...	1·2	...	6·2	...	...	3·2	4·8	...	...	3·2	4·8	...	11·5	10	20
13	...	2·9	6·9	...	...	1·9	9·4	...	1·6	...	8·1	...	8·3	...	5·6	...	19·4	8	15
14	11·3	...	...	11·7	...	...	...	7·7	18·8	...	...	8·8	21·2	...	34·5	23	0
15	...	12·7	19·0	...	...	13·3	13·3	...	...	3·2	17·4	...	...	9·7	14·6	...	34·7	2	10
16	...	10·9	10·9	...	...	11·5	7·7	...	...	8·6	12·8	...	...	8·0	8·0	...	20·8	6	10
17	...	3·9	5·9	...	...	...	5·8	...	...	7·1	...	...	...	5·0	...	10			

9. SEISMOLOGICAL DIARY.

EARTHQUAKES:—ESKDALEMUIR.

MICROSEISMS OF N. COMPONENT:—ESKDALEMUIR.

Day.	Phase.	Time, G.M.T.	Period.	Amplitudes.			Δ.	Remarks.
				A _{N.}	A _{E.}	A _{Z.}		
2	P i _e L _n L _e L _n F	h m s 0 59 38 1 2 24 1 27 1 30 1 36 2 18	s 27 ...	μ 19 ...	μ	μ	km.	
17	O P _z P _n PR ₁ S L M F	11 28 36 11 41 57 11 42 5 11 45 39 11 53 4 12 14 12 15 10 14 15	... ... ... ... ... 26 ...	... ... ... ... ... 54 ...	... ... ... ... ... ... ...	... ... ... ... ... ... ...	10400	Clearly marked P on vertical record. A sharply marked group of long waves began at 12 h. 15 m. 16 s.
17	O P S L M F	20 53 6 21 4 58 21 14 49 21 32 21 42 24 0	... ... ... ... 21 ...	... ... ... ... 40 ...	... ... ... ... ... ...	... ... ... ... ... ...	8600	
18		5 30 to 5 32	... ...	... ...	... ...	... ...	...	Slight disturbance, with long waves at 5h. 41 m.
18	i L F	21 23 43 21 42 22 30	... 22 ...	... 9 ...	... ... ...	... ... ...	...
21	O P S L M F	11 26 18 11 35 19 11 43 25 11 52 11 52 14 13 30	... ... ... ... 33 ...	... ... ... ... 83 ...	... ... ... ... ... ...	... ... ... ... ... ...	6000	
22	e i L F L	3 4 3 3 13 49 3 43 4 30 23 6	... ... 27 ... 22	... ... ... ... ...	... ... ... ... ...	... ... ... ... ...	...
23	L	8 20 to 9 15	18 ...	... ...	... ...	... ...	...
27	P? S? L M _e M _n F	0 45 54 0 54 6 1 6 1 16 7 1 25 46 2 0	... ... ... 28 20 ...	... ... ... ... 24 ...	... ... ... 37 ... ...	... ... ... ... ... ...	6700	
30	...	...	...	...	...	...	...	Large disturbance. Photographic impression of light spot too faint for accurate reading, owing to rapidity of motion.

Day.	0 h.		6 h.		12 h.		18 h.	
	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.
1	μ	s	μ	s	μ	s	μ	s
2	1'4	5	1'7	5	0'9	5	0'9	5
3	1'1	4	0'7	5	0'6	4	0'3	4
4	0'9	4	0'8	4	0'7	4	1'0	4
5	0'9	5	0'9	5	1'0	4'5	0'9	5
6	1'0	4'5	1'2	4'5	1'2	4	1'8	5
7	2'3	4	1'0	5	2'3	4	1'8	5'5
8	2'5	4	2'0	4	1'8	4'5	1'8	4
9	1'7	5'5	1'1	5	1'5	4'5	1'1	4
10	1'1	4	1'1	4	1'2	4	1'2	4
11	1'1	4	1'2	4	1'0	4'5	1'6	5
12	1'6	6	1'7	5'5	1'7	6	2'1	4'5
13	1'8	6	2'3	5	2'8	6	2'5	5'5
14	2'7	5'5	2'9	6	2'7	6	2'7	6
15	1'8	5'5	2'3	4	1'8	5	2'0	6
16	2'1	5	2'3	6	1'6	6	1'9	5'5
17	1'8	5	1'5	5	1'3	4'5	1'1	4
18	1'1	4	1'0	4	?	?	1'1	4
19	0'9	4'5	1'1	4	1'1	4	1'0	4
20	1'0	4'5	1'1	4	1'1	4	1'1	4
21	1'1	4	1'0	6	0'9	6	1'1	4
22	1'1	4	0'6	4	?	?	0'8	4
23	0'9	4	0'9	4	0'9	4'5	1'1	4
24	0'9	4	0'9	4	0'5	4	1'0	4
25	1'0	4	0'8	4	0'2	4	0'2	4
26	0'2	4	0'2	4	0'3	4	0'3	4
27	0'9	4	1'1	4	1'1	4	1'1	4
28	0'9	6	1'1	4	1'0	5	...	...
29	1'4	4	1'1	5	1'1	4	0'9	4
30	1'1	4	0'9	4	0'5	4	0'2	4
30	0'3	4	0'3	4	?	?	0'3	4'5

Means for Month { A_N = 1'2. T = 4'5. Normals, 1911-18 { A_N = 1'2. T = 5'4.

EARTHQUAKES:—RICHMOND (KEW OBSERVATORY).

Day.	Times, G.M.T. of		Remarks.
	Commence-ment.	Max. Phase.	
17	h m ...	h m 13 22	
17	21 14	21 44	Amplitude on trace 3'3 mm.
21	...	11 57	„ „ 1'0 mm.
22	...	3 51	Very small.
27	...	1 24	Small.
30	7 37	9 13	Amplitude on trace > 17 mm.

11. NEPHOSCOPE OBSERVATIONS.

ABERDEEN. Taken at 13 h. G.M.T.

Day.	Type of Cloud.	Velocity-height-ratio.				Remarks.
		Degrees from N.	Milliradians per Second.	Components.		
				W.-E.	S.-N.	
			mr/s.	mr/s.	mr/s.	
1 13 h.	St-Cu.	58	6.0	- 5.1	- 3.2	Fused sheet of St.-Cu.
2 7 h.	Ci. to Ci-Cu.	350	2.0	+ 0.3	- 2.0	Ci. changing to Ci-St. and Ci-Cu.
" 13 h.	St-Cu.	328	4.2	+ 2.2	- 3.6	Fused sheet of heavy St-Cu.
" 18 h.	St-Cu.	328	6.1	+ 3.2	- 5.2	
4 7 h.	Ci. to Ci-Cu.	319	2.8	+ 1.8	- 2.1	Ci. to Ci-Cu. ⊕ visible.
" 13 h.	St-Cu.	311	7.1	+ 5.3	- 4.8	St-Cu. in lenticular bands.
" 18 h.	St-Cu.	300	4.6	+ 4.0	- 2.3	Heavy lenticular St-Cu.
5 7 h.	A-Cu.	300	3.1	+ 2.7	- 1.5	A-Cu. rather indefinite, measurement approximate.
" 13 h.	Cu.	295	20.0	+ 18.2	- 8.4	Cu. in large masses, obviously low altitude.
" 18 h.	St-Cu.	290	12.0	+ 11.3	- 4.1	Cu. to St-Cu., transitional type.
7 13 h.	St-Cu.	271	2.0	+ 2.0	0.0	
" 18 h.	St-Cu.	210	1.8	+ 0.9	+ 1.6	Heavy St-Cu.
8 13 h.	Cu.	240	1.8	+ 1.6	+ 0.9	
" 18 h.	Cu.	215	3.2	+ 1.8	+ 2.6	
9 13 h.	Cu. to Cu-Nb.	270	3.6	+ 3.6	0.0	Heavy Cu. to Cu-Nb.
" 18 h.	Cu-Nb.	280	8.2	+ 8.0	- 1.4	Basal part measured.
11 12 h.	St-Cu.	265	9.0	+ 9.0	+ 0.8	St-Cu. of low altitude.
" 18 h.	Ci-Cu.	265	3.7	+ 3.7	+ 0.3	
12 13 h.	Cu.	265	4.2	+ 4.2	+ 0.4	
" 18 h.	Cu.	266	3.4	+ 3.4	+ 0.2	
13 7 h.	False Ci.	272	4.0	+ 4.0	- 0.1	Heavy sheet of "false" Ci.
" 13 h.	False Ci.	274	4.0	+ 4.0	- 0.3	Cloud diffuse and indefinite, measurement approximate.
" 18 h.	False Ci.	260	1.9	+ 1.9	+ 0.3	
14 7 h.	St-Cuf.	175	10.0	- 0.9	+ 10.0	Average velocity given.
16 13 h.	Cu-Nb.	352	4.3	+ 0.6	- 4.3	
" 18 h.	Cu-Nb.	338	16.0	+ 6.0	- 14.8	Apical part measured. It had the form of St-Cu.
17 13 h.	St-Cu.	291	3.9	+ 3.6	- 1.4	
18 7 h.	False Ci.	278	2.7	+ 2.7	- 0.4	False Ci. becoming A-Cu.
" 13 h.	A-Cu.	261	3.3	+ 3.3	+ 0.5	A-Cu. in lenticular sheets.
" 18 h.	St-Cu.	259	3.1	+ 3.1	+ 0.5	Lenticular St-Cu.
20 13 h.	Cu.	340	5.0	+ 1.7	- 4.7	Cu. to St-Cu., transitional type.
21 13 h.	Ci-Cu.	295	2.8	+ 2.5	- 1.2	Flat, fused Ci-Cu.
23 13 h.	Cu.	306	8.2	+ 6.6	- 4.8	Cu. changing to small Cu-Nb.
" 18 h.	St-Cu.	315	8.2	+ 5.8	- 5.8	
24 13 h.	Cu.	305	5.0	+ 4.1	- 2.9	
26 13 h.	Cu-Nb.	344	13.0	+ 3.6	- 12.5	

12. AURORA.

Day.	a.m. or p.m.	Moon.	Magnetic Character.		Aurora Observations.	
			Eskdalemuir.	Richmond.	Station.	Remarks.
7	...	☽	...	...	{ Baltasound Deerness	Faint glow, 22 h.
8	p.	...	2, I	I, I		
15	...	○	...	...	{ Aberdeen Paisley	21 h.
20	p.	...	I, I	I, I		
23	...	☾	...	...	{ Tenbury Oxford	
29	p.	...	I, I	I, O		
30	...	●	...	...

Note.—The two magnetic "characters" entered in each case refer to the two periods of 24 hours ending and beginning at midnight of the night in question.

METEOROLOGICAL OFFICE OBSERVATORIES—GEOPHYSICAL JOURNAL.

DAILY VALUES.—Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology.

Ninth Year.—No. 5. MAY 1919.]

Units based on the C.G.S. System.

[Price 1s.]

I. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.			SOUTH KENSINGTON.—Lat. 51° 30' N. Long. 0° 10' W.						RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.					ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.					CAHIRCIVEEN.	
	Bright Sunshine.*			Radiation received on Horizontal Surface by Callendar Radiograph.						Bright Sunshine.*		Radiation at Noon by Ångström Pyrheliometer.			Bright Sunshine.*		Radiation by Ångström Pyrheliometer.			Bright Sunshine.*	
	Total.	Per cent. of Possible.	Daily Total.	Per cent. of Planetary.	Maximum.			11.30 h. to 12.30 h.	Total.	Per cent. of Possible.	Intensity.	Vertical Component.	Sky.	Total.	Per cent. of Possible.	Time.	Sky.	p. sec Z. %	Intensity.	Total.	Per cent. of Possible.
					Amount.	Time.															
1	1'0	7	963	28	66	12	48	52	0'1	1	...	...	...	2'9	19	...	...	...	0'0	0
2	0'0	0	n 413	12	36	11	55	36	0'0	0	...	...	...	9'7	64	...	...	...	5'4	36
3	4'2	28	1250	35	72	13	50	55	4'7	32	...	...	...	6'5	42	...	...	...	0'1	1
4	1'3	9	945	27	61	12	50	45	3'3	22	...	...	...	0'0	0	...	...	...	0'0	0
5	0'2	1	594	17	53	13	32	25	1'6	11	...	...	...	0'1	1	...	...	...	4'0	26
6	5'0	33	1397	39	68	11	42	68	0'1	1	...	...	...	0'0	0	...	...	...	12'8	85
7	0'0	0	631	17	49	13	45	25	0'8	5	...	...	...	5'2	33	...	...	...	n 14'1	93
8	6'2	41	1252	34	60	10	59	58	6'5	43	...	...	...	0'5	3	...	...	...	7'7	51
9	12'6	83	1985	54	69	12	0	69	12'0	79	...	...	...	9'9	63	...	...	...	0'0	0
10	6'2	41	1472	40	80	13	40	64	6'7	44	...	...	...	8'2	52	...	...	...	3'0	20
11	7'7	50	1711	46	79	11	37	79	3'9	25	...	...	...	2'9	18	...	...	...	5'3	34
12	1'9	12	861	23	65	14	55	16	2'5	16	...	...	...	0'3	2	...	...	...	0'8	5
13	12'5	81	1770	47	74	12	45	73	12'0	78	...	...	...	8'9	56	...	...	...	1'5	10
14	13'0	84	2054	55	68	12	45	67	12'9	83	...	...	...	13'4	84	...	...	...	2'3	15
15	10'8	70	1568	42	62	13	25	55	10'6	68	...	...	...	12'8	80	...	...	...	2'6	17
16	5'0	32	1259	33	62	10	15	61	4'7	30	...	...	...	6'2	39	...	...	...	1'2	8
17	11'8	76	2106	55	82	12	0	82	12'3	79	...	...	...	4'2	26	...	...	...	1'2	8
18	6'0	38	1548	40	68	12	35	60	6'6	42	...	...	...	3'7	23	...	...	...	7'0	45
19	3'8	24	2222	58	74	12	12	74	x 14'2	90	...	...	...	x 13'8	85	...	...	...	5'3	34
20	11'4	73	2310	60	x 86	12	7	x 86	11'3	72	...	...	...	10'9	66	...	...	...	2'0	13
21	12'7	80	x 2334	60	77	12	15	77	11'3	72	...	...	...	2'2	14	...	...	...	6'3	40
22	11'9	75	2168	56	81	12	10	81	11'6	73	...	...	...	11'9	72	...	...	...	9'7	62
23	13'0	82	2206	56	76	13	1	74	12'7	80	...	...	...	10'4	63	...	...	...	0'0	0
24	4'1	26	1482	38	73	10	35	68	6'1	38	...	...	...	3'4	21	...	...	...	3'9	24
25	1'5	9	913	23	54	16	0	22	0'6	4	...	...	...	6'2	37	...	...	...	0'0	0
26	6'1	38	1641	42	63	12	20	63	8'3	52	...	...	...	11'3	68	...	...	...	11'5	71
27	11'4	71	2046	52	74	11	35	74	10'6	66	...	...	...	13'3	80	...	...	...	6'2	39
28	11'9	74	2045	51	68	13	5	66	12'2	76	...	...	...	13'2	79	...	...	...	8'1	50
29	x 13'5	84	2081	52	69	11	28	69	13'5	84	...	...	...	11'0	65	...	...	...	4'3	27
30	12'5	77	2224	56	73	12	10	73	12'8	79	...	...	...	11'9	70	...	...	...	9'0	56
31	12'9	80	2042	51	68	12	33	67	12'6	78	...	...	...	7'7	46	...	...	...	13'9	85
Means	7'48	48	1597	42	68	—	—	61	7'71	50	—	—	—	7'19	45	—	—	—	4'81	31	
Normal	5'61	36	1478	39	—	—	—	—	6'48	42	—	—	—	5'23	33	—	—	—	6'55	42	
	← 35 years →			← 7 years →						← 35 years →					← 5 years →					← 35 years →	

2. METEOROLOGY AND MAGNETISM:—CAHIRCIVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W.

Heights above M. S. L.:—H = 9'1 m. H_b = 13'7 m. H_a = 26'4 m. Above Ground: h_t = 1'3 m. h_r = 0'56 m. h_a = 13'9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.		Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force, Declination West, and Inclination.		
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	9 h.	21 h.	9 h.	21 h.	9 h.	21 h.	9 h.	21 h.						
	mb.	mb.	a.	a.	a.	a.	millibar.	%	%	m/s.	m/s.	Tenths of Sky covered.	mm.	200+						
1	1013'2	1004'7	83'4	83'7	n 85	83	11'9	12'1	95	95	250	10	230	13	10	10	2'4	82	d. n. and a. Damp day.	
2	1002'7	1005'5	82'3	81'9	n 85	81	9'7	9'3	83	82	315	4	265	8	9	8	3'6	81	• n. o. a. Fine p.	
3	1005'0	1003'2	83'9	83'2	n 85	80	10'2	11'4	79	92	225	2	150	2	10	10	4'2	77	Fine n. o. a. • p.	
4	1003'6	1004'2	84'9	83'3	86	83	12'4	11'4	90	92	185	10	165	10	10	10	x 16'5	82	d. n. • a. o. day. • later.	
5	1000'7	1008'9	83'5	81'7	n 85	81	11'7	8'5	93	76	160	10	235	10	10	7	12'8	82	• n. p. a. p. day. Fair p.	
6	1017'3	1020'5	85'0	81'5	86	78	10'2	8'7	73	79	255	4	—	1	2	5	—	79	Fine day. ⊕ p.	
7	1021'2	1021'0	83'8	82'9	87	n 76	8'5	9'3	66	77	50	5	90	2	2	2	—	n 72	74	Fine and n. Very fine day. [∞ p.
8	1019'5	1016'3	85'4	83'2	87	78	8'7	10'3	61	84	75	3	—	1	0∞	9∞	—	74	Fine and n. Fine and ∞ a. o. and	
9	1009'8	1002'9	83'0	84'8	87	80	9'3	12'3	76	90	90	6	100	8	10	10∞	4'8	75	o. to e. and ∞ early. • a. o. and ∞	
10	1004'9	1003'8	84'5	84'5	87	83	11'0	11'2	81	83	150	6	155	10	8∞	8	—	80	o. and ∞ n. Fair and ∞ all day. [day.	
11	1001'3	1008'3	84'9	84'8	88	83	12'1	12'6	88	92	185	5	170	5	8	10	9'0	82	Fair n. • a. Fair day. Dull p.	
12	1008'0	1011'0	85'5	85'5	88	84	13'7	13'1	95	91	160	10	170	10	10	10	3'0	84	d. o. to o. a. o. q. and p. evening.	
13	1014'6	1011'9	85'0	87'9	90	84	13'6	13'9	98	83	155	7	110	8	10≡0	10	1'5	84	p. n. and a. Fair day. ⊕ and d. p.	
14	1005'7	1007'5	89'5	85'4	90	85	15'8	13'6	85	95	220	3	175	3	6	10	4'2	85	• early. Fair a. Dull evening.	
15	1010'0	1013'3	83'9	83'8	87	83	12'5	11'7	97	91	310	2	—	0	10	10	0'9	84	o. and d. early. o. a. Fair p.	
16	1008'5	1005'5	85'9	83'8	87	83	10'8	11'8	73	92	140	10	170	4	9	8	6'1	80	Fair n. and a. • day.	
17	1000'2	1006'9	83'9	83'8	86	83	12'4	11'7	96	91	175	10	195	4	10	7	15'7	81	• n. and early. • o. a. Fair p.	
18	1011'3	1013'8	86'0	84'5	89	83	11'1	10'3	75	76	195	4	135	5	6	2	—	81	c. to o. a. Fine dry day.	
19	1010'2	1007'5	86'0	84'7	89	82	10'1	12'3	68	90	110	11	135	11	7	10	7'3	80	Fine and dry a. o. to • p.	
20	1008'7	1010'8	85'4	85'5	88	84	12'0	12'4	84	86	155	9	150	9	10	8	—	83	o. n. and day. Fair evening.	
21	1011'7	1016'3	87'1	85'1	88	84	13'3	12'8	83	91	170	8	175	5	8	9	0'1	82	Fair day. Fair to o. evening.	
22	1018'8	1020'3	86'3	85'4	89	83	12'7	12'6	84	88	170	7	165	7	8	10	0'1	82	Fair and n. a. Fair day.	
23	1020'6	1023'3	86'1	85'2	86	84	13'3	13'8	89	98	170	9	195	3	10	10	11'7	84	o. to c. n. • a. and p. o. and d. evening.	
24	1025'2	1024'1	86'1	85'6	90	83	14'1	14'0	94	97	220	2	175	5	10	10	7'7	80	Fine day. • evening.	
25	1023'6	1023'9	86'2	87'0	89	85	14'8	14'9	98	94	185	2	—	0	10	10	6'9	85	• n. and a. o. day and evening.	
26	1023'4	1022'4	89'8	88'4	94	85	16'1	12'3	85	71	195	2	115	5	9	5	—	83	o. n. c. to o. and ∞ a. Fine day. —	
27	1020'8	1018'9	91'0	86'5	92	x 86	11'2	10'8	55	70	125	7	120	12	7	8	—	83	Fine n. Fine dry day. ⊕ p.	
28	1016'4	1017'0	87'9	87'8	91	x 86	12'1	12'3	72	74	90	9	100	5	8∞	8∞	—	84	Fair n. Fine and ∞ day.	
29	1014'0	1013'6	89'2	87'4	94	85	9'6	11'9	n 53	73	90	6	—	1	10	4	—	80	Fine dry day. ⊕ p.	
30	1012'2	1013'1	90'2	87'4	x 95	83	12'9	14'2	66	87	85	2	—	1	7∞	2∞	—	79	Fine and n. and a. Fine and ∞ day.	
31	1014'8	1016'8	90'2	88'8	94	83	15'6	14'6	80	82	—	0	—	0	0∞	3∞	—	79	Fine and n. and a. Very fine day and ∞	
Means	1012'2	1012'8	86'0	85'0	88'4	82'8	12'0	12'0	81	86	6'0	—	5'4	—	7'9	7'7	11'8'5	80'0	Monthly Totals or Means.	
Normal	1013'9	1014'3	84'8	83'8	87'5	81'0	11'0	10'9	79	84	5'0	—	4'3	—	—	—	7'9'3	—	Normals.	
	← 45 years →			← 30 years →				← 35 years →				← 35 years →				← 45 years →				

* By Campbell-Stokes Sunshine Recorder.

x denotes the maximum and n the minimum value in the column.

3. METEOROLOGY :—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m. Heights above Ground :—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns for Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, and REMARKS. Includes monthly totals and normals.

4. METEOROLOGY :—ESKDALEMUIR, DUMFRIESSHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m. Heights above Ground :—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns for Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, and REMARKS. Includes monthly totals and normals.

Temperatures at or below the normal freezing point of water are printed in small type.

* Mean of 30 days.

5. GEOPHYSICS:—RICHMOND (KEW OBSERVATORY).

Day.	Earth Temperature at 9 h.		Height above M.S.L. of Surface of Underground Water.		Magnetic Force.						Charge per cc. $\times 10^{16}$.		Air-Earth Current $\times 10^{16}$.	Potential Gradient, Volts per metre. Factor 2.27.							
	0.3 m.	1.2 m.	Daily Mean.	Extremes.	Horizontal Comp't.			Declination.		Inclination.		Magnetic Character of Day.	Electric Character of Day.	+	-	About 15 h.	About 15 h.	3 h.	9 h.	15 h.	21 h.
	h m	γ	cm.	cm.	h m	γ	h m	West.	h m	North.			Coulomb.	Amp/cm ² .	v/m.	v/m.	v/m.	v/m.			
1	200+	200+	313	...	11 8	18412	14 19	14 47'9	...	...	1	1	0.60	0.65	0.70	225	255	225	280
2	81.1	80.7	317	2	1	310	280	170	295
3	81.1	80.7	320	2	0	125	100	225	365
4	82.3	80.6	324	1	0	310	395	420	690
5	83.0	80.9	324	325	...	...	...	...	...	...	1	0	0.39	0.30	0.45	225	265	490	405
6	83.3	80.9	323	...	...	...	...	...	...	...	0	0	0.62	0.41	1.05	255	420	490	560
7	83.2	81.0	318	...	...	...	...	...	...	...	0	0	0.26	0.34	0.95	225	490	405	490
8	83.0	81.1	314	...	11 12	18415	14 22	14 46'8	14 46	66 57'5	0	0	0.39	0.00	0.60	335	660	560	535		
9	83.5	81.3	311	...	...	...	...	...	...	...	0	1	0.97	0.88	1.50	310	210	155	365
10	84.5	81.4	307	0	1	
11	85.0	81.6	304	...	...	...	...	...	...	...	0	0	...	...	...	255	280	155	110
12	85.7	81.8	300	...	...	...	...	...	...	...	0	0	0.80	0.30	1.00	140	185	195	—
13	85.4	81.9	298	...	...	...	...	...	...	...	2	0	0.37	0.24	0.50	—	—	195	—
14	86.2	82.0	299	...	...	...	...	...	...	...	1	0	0.45	0.13	1.85	—	—	535	380
15	87.0	82.1	294	...	11 13	18387	14 21	14 47'7	14 33	66 58'4	1	0	0.45	0.15	0.95	335	405	125	110		
16	87.5	82.3	292	...	...	...	...	...	...	...	1	0	0.24	0.17	1.20	85	100	185	125
17	87.2	82.8	290	...	...	...	...	...	...	...	1	0	...	...	...	155	240	140	225
18	87.1	82.9	287	...	...	...	...	...	...	...	1	0	...	...	...	140	210	255	335
19	86.8	83.0	285	...	...	...	...	...	...	...	1	0	0.67	0.58	1.65	280	550	480	450
20	86.3	83.2	283	...	...	...	...	...	...	...	1	0	0.45	0.30	0.90	280	185	155	520
21	86.6	83.5	281	...	...	...	...	...	...	...	2	0	1.25	0.60	1.10	295	210	140	450
22	86.8	83.6	279	...	11 4	18400	14 19	14 46'9	14 36	66 57'1	1	0	0.67	0.24	1.40	255	730	365	420		
23	86.9	83.7	278	...	...	...	...	...	...	...	1	0	1.14	1.03	0.40	185	280	70	210
24	87.5	83.8	271	...	...	...	...	...	...	...	2	0	...	...	...	155	185	155	55
25	87.7	83.8	270	...	...	...	...	...	...	...	1	1	...	...	...	85	125	140	170
26	87.4	83.9	268	...	...	...	...	...	...	...	1	0	0.71	0.32	1.20	210	450	435	295
27	87.1	84.2	266	...	...	...	...	...	...	...	1	0	0.58	0.43	1.35	225	350	395	240
28	86.9	84.0	264	...	...	...	...	...	...	...	0	0	0.52	0.19	1.05	395	505	490	480
29	86.9	84.1	263	...	...	...	14 18	14 50'1	...	...	0	0	0.69	0.69	1.30	255	395	420	560
30	87.1	84.2	262	...	11 6	18406	...	...	14 34	66 55'6	0	0	0.47	0.32	1.50	365	535	630	520
31	87.2	84.3	261	261	...	...	...	...	...	...	0	0	...	...	...	255	435	405	265
M.	85.4	82.5	292	—	—	—	—	—	—	—	—	—	—	—	—	242*	342*	307*	353*		
	85.1	83.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

* Mean of 27 days only.

6. GEOPHYSICS:—ESKDALEMUIR.

Day.	Magnetic Force.															Potential Gradient, Volts per metre. Factor 6.05.					
	North Component.					West Component.					Vertical Component.					Magnetic Character of Day.	Electric Character of Day.	3 h.	9 h.	15 h.	21 h.
	Maximum. 15000 γ +	Minimum. 15000 γ +	Range.	Maximum. 4000 γ +	Minimum. 4000 γ +	Range.	Maximum. 44000 γ +	Minimum. 44000 γ +	Range.	Maximum. 44000 γ +	Minimum. 44000 γ +	Range.									
1	h m	γ	γ	h m	γ	h m	γ	γ	h m	γ	h m	γ	γ	h m	γ	2	2 b	v/m.	v/m.	v/m.	v/m.
1	22 58	1076	957	11 27	119	23 1	929	868	7 7	61	21 30	1083	1059	12 50	24	2	110	100	70	-540	
2	17 9	1110	893	12 26	217	14 11	1014	789	3 53	225	17 3	1267	939	3 39	328	2	195	145	180	290	
3	21 13	1085	765	9 5	320	21 19	982	693	3 20	289	16 40	1131	<830	>301		2	145	-110	20	165	
4	20 8	1025	935	11 47	90	16 35	934	832	21 13	102	17 55	1121	1064	0 0	57	1	185	-360	360	215	
5	18 17	1032	909	11 5	123	14 10	924	804	3 32	120	20 5	1112	983	3 21	129	1	260	130	145	85	
6	19 0	1033	928	13 8	105	14 57	909	851	0 30	58	19 40	1102	1029	0 0	73	1	-215	490	130	-360	
7	20 8	1018	943	13 58	75	18 7	907	850	6 38	57	21 25	1095	1062	11 10	33	0	165	35	35	85	
8	19 11	1019	959	13 50	60	17 5	910	850	8 3	60	19 45	1084	1052	12 5	32	0	20	70	100	130	
9	19 18	1041	951	12 4	90	13 46	925	849	6 14	76	21 20	1083	1059	11 33	24	0	290	290	215	805	
10	19 8	1028	951	11 37	77	15 6	929	866	0 0	63	17 41	1093	1057	11 27	36	0	685	445	215	—	
11	22 50	1020	962	10 56	58	13 7	913	866	8 0	47	4 35	1083	1058	11 25	25	0	200	130	—	215	
12	22 14	1027	957	11 23	70	12 43	944	857	7 26	87	17 55	1101	1051	11 37	50	1	200	160	265	380	
13	17 40	1117	889	5 3	228	5 30	961	801	20 41	160	18 10	1122	959	5 29	163	2	100	230	245	375	
14	19 25	1050	889	10 3	161	12 54	936	789	1 25	147	18 31	1111	949	1 27	162	1	160	310	275	520	
15	19 10	1041	929	13 33	112	15 53	918	840	9 23	78	19 12	1095	1014	1 41	81	1	300	265	150	200	
16	20 13	1045	911	12 48	134	14 13	932	834	6 15	98	17 20	1091	1050	3 45	41	1	235	200	70	80	
17	18 20	1065	900	23 32	165	14 20	950	828	22 45	122	19 58	1139	1030	23 42	109	1	55	195	120	70	
18	0 17	1039	894	9 52	145	13 18	930	821	0 13	109	17 50	1095	1038	3 25	57	1	-35	325	230	430	
19	16 44	1038	933	11 39	105	14 45	946	836	6 55	110	17 40	1121	1061	11 17	60	1	395	360	200	660	
20	20 19	1069	936	12 0	133	14 45	925	801	4 32	124	20 13	1107	1042	4 20	65	1	275	160	165	225	
21	17 47	1160	938	19 37	222	19 28	1009	817	6 37	192	17 57	1168	1044	11 10	124	2	145	195	160	215	
22	1 48	1106	894	23 31	212	13 50	925	814	22 59	111	20 25	1099	975	23 48	124	1	135	160	100	70	
23	16 6	1025	920	13 41	105	12 46	918	853	7 20	65	16 37	1118	990	0 0	128	1	130	135	145	100	
24	16 27	1176	914	9 9	262	16 30	983	824	22 0	159	16 36	1216	1018	5 8	198	2	200	170	145	215	
25	16 6	1037	903	0 17	134	16 8	946	819	8 3	127	17 8	1115	1066	0 27	49	1	365	145	120	130	
26	17 45	1089	909	12 8	180	18 8	968	837	22 11	131	17 57	1210	1072	11 7	138	1	160	150	150	170	
27	19 41	1020	911	11 47	109	4 47	951	841	7 59	110	18 3	1111	1035	5 21	76	1	215	115	195	150	
28	18 33	1032	971	10 11	61																

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W.

Heights above M. S. L.:—H=54 m. H_b=55 m. Above Ground:—h_t=1.48 m. h_r=1.72 m. h_a=8 m.

Table with columns: Day, Air Pressure at Station Level (9 h, 14 h, 21 h, Mean of 3 Readings), Air Temperature in Degrees Absolute (9 h, 14 h, 21 h, Max, Min, Mean of 5 Readings), Min. Temp. on Grass, Percentage of Humidity (9 h, 14 h, 21 h, Mean), Rain 0 h. to 24 h., and REMARKS. Includes data for days 1-31 and means for 26 years.

JERSEY (ST LOUIS OBSERVATORY).

Table with columns: Day, Wind Direction and Force (0-12 on the Beaufort Scale) (9h, 14h, 21h), Mean of Force, Sunshine (Total, Per cent. of Possible), Cloud Amount (tenths of Sky covered), Type of Cloud, and Direction whence coming (Upper, Lower), and Mean Amount. Includes data for days 1-31 and means for 26 years.

* For method of estimation, see Introduction

† The first hour of observation was changed to 9 h. on Jan. 1st, 1919.

8. WIND COMPONENTS: Metres per second at fixed hours, together with the greatest mean hourly velocity, or the greatest velocity attained in a gust, and the time of its occurrence.

NORTH WALES:—HOLYHEAD.

Height of Head above—Roof 8'8 m., Ground 13'7 m., M.S.L. 19'2 m.
Height of Cups above—Roof 4'6 m., Ground 7'6 m., M.S.L. 15'2 m.

SCOTLAND N.:—DEERNES.

Height of Cups above—Roof 1'5 m., Ground 4'9 m., M.S.L. 5'3 m.

Table for North Wales: Holyhead. Columns: Day, 3 h., 9 h., 15 h., 21 h., Max. in a Gust., Time of Gust. Rows: 1-31. Includes summary statistics at the bottom.

Table for Scotland N.: Deernes. Columns: Day, 3 h., 9 h., 15 h., 21 h., Vel. in Hourly Run., Time of Max. Rows: 1-31. Includes summary statistics at the bottom.

ENGLAND S.W.:—SCILLY.

Height of Head above—Ground 9'8 m., M.S.L. 49'7 m.
Height of Cups above—Ground 5'8 m., M.S.L. 45'7 m.

ENGLAND E.:—SHOEBURYNESS.*

Height of Head above—Ground 27'4 m., M.S.L. 31'4 m.

Table for England S.W.: Scilly. Columns: Day, 3 h., 9 h., 15 h., 21 h., Max. in a Gust., Time of Gust. Rows: 1-31. Includes summary statistics at the bottom.

Table for England E.: Shoeburyness. Columns: Day, 3 h., 9 h., 15 h., 21 h., Max. in a Gust., Time of Gust. Rows: 1-31. Includes summary statistics at the bottom.

* The Anemograph at Great Yarmouth having been out of action during the greater part of the year 1919, data for Shoeburyness are now given in this table.

9. SEISMOLOGICAL DIARY.

EARTHQUAKES:—ESKDALEMUIR.								MICROSEISMS OF N. COMPONENT:—ESKDALEMUIR.											
Day.	Phase.	Time, G.M.T.			Period.	Amplitudes.			Δ.	Remarks.	Day.	0 h.		6 h.		12 h.		18 h.	
		h	m	s		A _{N.}	A _{E.}	A _{Z.}				A _{N.}	T.	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.
1		1	1	to	...	μ	μ	μ	km.	Faint disturbance.	1	1'1	4	1'5	6	1'6	6	2'3	6
1	O P S L L _n F _e i L M O P PR ₁ S SR ₁ L M F e _c e _n L F	1	20	8450		2	2'3	6	1'5	6	1'5	5	1'1	4
		5	17	7		3	1'2	4'5	1'1	4	0'9	5	1'0	4'5
		5	26	48		4	1'1	4	1'0	4'5	1'0	4	1'1	4
		5	42	30		5	1'1	4	1'1	4	1'0	4'5	1'1	4
		5	52	15		6	1'1	4	1'1	4	1'1	4	1'1	4
		6	50		7	1'8	4	1'6	4	1'1	4	1'0	4
2			2	27	10		8	1'1	3	0'7	3	0'3	3	0'1	4
		2	48	22		9	0'3	3	0'3	3	0'1	3	0'1	4
		3	20	20		10	0'1	3	0'1	4	0'4	5'5	0'1	4
3			0	32	1	9000	Epicentre in lat. 40° N., long. 147° W. (midway between Sitka and Hawaii). P very sharply defined on all three records.	11	0'3	3	0'5	4	0'7	5
	1	4	14	...	...	...	...	...		12	1'0	4'5	1'1	4	0'9	4	0'8	5
	1	7	38	...	...	...	...	...		13	1'1	4	1'0	4'5	1'1	4	0'8	5
	1	14	23	...	...	...	...	...		14	1'1	4	1'1	4	1'1	4	0'5	4'5
	1	19	30	...	...	...	...	...		15	0'9	4	0'9	4	0'1	4	0'5	4
	1	31	...	...	...	...	...	...		16	0'2	4	...	...	0'5	4	0'3	4
	1	43	22	...	102	...	...	...		17	0'3	4	0'5	4	0'9	5	0'9	4
4		23	24	6	...	...	...	...		18	1'3	3'5	0'9	4	1'1	3	0'6	4
	23	37	...	...	...	...	...	...		19	0'3	3'5	0'3	3	0'3	3	0'3	4
	0	55	20	...	...	...	...	...		20	0'3	4	0'9	4	1'0	4	1'0	4'5
5		6	1	to	...	...	...	...		21	1'1	4	0'9	5	0'9	5	0'8	6
	6	14	...	...	...	...	...	...		22	0'8	6	1'0	4'5	1'1	4	0'7	4
5		6	44	to	...	...	...	...		23	0'9	4	1'0	4	1'0	4	0'9	4
	16	55	...	...	...	...	...	...		24	0'9	5	...	...	1'1	4	0'5	5
5		19	14	to	...	...	...	...		25	0'6	4	0'5	4	0'9	4	0'3	4
	19	30	...	...	...	...	...	...		26	0'3	4	0'2	4	0'1	4	0'1	3
5		20	35	to	...	...	...	...		27	0'1	4	0'1	3	0'1	4	0'3	4
	20	42	...	...	...	...	...	...		28	0'3	3'5	0'3	4	0'2	4	0'2	4
6		4	50	to	...	...	...	...		29	0'2	4	0'1	4	?	?	0'1	3
	6	30	...	...	...	...	...	...		30	0'2	4	0'1	4	0'2	4	0'1	4
6		19	55	41	...	...	...	...		31	0'0	0	0'0	0	0'0	0	0'0	0
	19	59	22	...	...	...	...	...		Means for Month { A _N =0'7. T=4'0. Normals, 1911-18 { A _N =0'7. T=4'8.								
	20	2	24	...	...	...	...	...		EARTHQUAKES:—RICHMOND (KEW OBSERVATORY).								
	20	2	32	...	...	...	...	...		Day. Times, G.M.T. of Commencement. Max. Phase. Remarks.								
	20	11	...	...	...	...	...	...		1 h m 5 51 Small.								
7		5	34	42	...	...	...	...		2 ... 3 37								
	6	13	...	...	...	...	...	...		3 ... 1 45 Amplitude on trace > 17 mm.								
	6	32	9	21	...	8	...	...		5 ... 20 40 Very small.								
	6	36	21	20	...	6	...	...		6 ... 5 39 Very small.								
	8	5	...	...	...	...	...	...		6 20 3 20 52 Amplitude on trace 4'3 mm.								
8		10	48	to	...	...	...	...		7 ... 6 41 Small.								
	12	27	...	...	...	...	...	...		20 ... 5 4 Very small.								
10		18	15	to	...	...	...	...		22 ... 12 53 Very small.								
	18	47	...	...	...	...	...	...		27 ... 10 54 Very small.								
18		10	53	to	...	...	...	...		27 ... 18 19 Very small.								
	11	16	...	...	...	...	...	...		29 ... 11 48 Very small.								
18		23	11	to	...	...	...	...		Slight disturbance. The first three entries refer to movements which are doubtful as seismic effects: possibly they were due to wind.								
	23	31	...	...	...	...	...	...		Faint disturbance, with sinusoidal long waves of 18 seconds period at 0 h. 20 m.								
18		23	31	to	...	...	...	...		Slight disturbance. No well-marked initial phases. Group of smooth sinusoidal waves on E.-W. component at 4 h.								
	4	44	...	...	...	...	...	...		Long waves.								
20		5	18	to	...	...	...	...		Preliminary phases very faint.								
	4	40	42	...	...	...	...	...		Slight disturbance. Initial phases indistinct. Prominent group of long waves beginning 11 h. 38 m.								
	4	45	14	...	...	...	...	...						
	4	54	...	...	...	...	...	...					
22		5	0	18	...	...	...	...							
	5	0	18	...	...	...	...	...						
	5	20	...	...	...	...	...	...					
	12	3	38	...	...	...	...	...						
	12	9	10	...	...	...	...	...						
	12	9	14	...	...	...	...	...						
	12	13	41	...	...	...	...	...						
	12	13	43	...	...	...	...	...						
	12	31	...	...	...	...	...	...					
23		13	28	...	...	...	...	...						
	0	0	to	...	...	...	...	...						
	0	40	...	...	...	...	...	...					
23		3	31	to	...	...	...	...							
	4	30	...	...	...	...	...	...					
24		6	20	50	...	...	...	...							
	6	30	18	...	...	...	...	...						
	6	39	...	...	...	...	...	...					
	6	44	25	26	...	...	...	...							
	7	37	...	...	...	...	...	...					
27		10	50	to	...	...	...	...							
	11	10	...	...	...	...	...	...					
27		17	38	20	...	...	...	...							
	17	47	28	...	...	...	...	...						
	18	2	...	...	...	...	...	...					
29		18	54	...	...	...	...	...						
	11	30	to	...	...	...	...	...						
	12	30	...	...	...	...	...	...					

10. SOUNDINGS WITH PILOT BALLOONS.

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.										Cloud Observations.										
		Geostrophic.		By Anemometer.		At Heights above M.S.L.						Time, G.M.T. h. m.	Type.	Deg. from N. mr/s.	Type.	Deg. from N. mr/s.						
		Deg. from N.	m/s.	Deg. from N.	m/s.	500 m.		1000 m.		2000 m.							3000 m.		4000 m.			
ABERDEEN.																						
2	7 30	280	10	245	4'0	260	11'0	280	16'5	290	8'5	...	...	13 0	Cu.	275	4'5	...	...	...
3	7 30	270	7	270	2'5	290	5'5	285	8'0	255	6'5	255	13'5	13 0	Cu., Cu-Nb.	255	4'0	...	...	...
24	7 30	225	5	190	2'0	225	6'5	245	7'0	225	11'5	215	18'5	...	A-Cu.	235	3'0	...	...	...
27	7 30	?	?	180	2'5	220	7'0	240	6'5	225	3'5	...	...	...	...	...	...	cloud	less	...	
28	7 30	?	?	calm		325	2'5	255	2'0	295	6'0	330	9'0	11 0	A-Cu.	295	3'0	...	...	...
ESKDALEMUIR.																						
1	7 10	290	9	300	5'0	295	10'5	305	7'0	125	0'9	280	13'5	295	17'0	...	Fr-Cu.	270	...	Ci-St.
2	7 15	315	7	310	4'6	320	4'8	320	6'5	310	11'5	...	...	...	...	...	...	...	cloud	less	...
13	17 30	?	?	210	6'0	205	7'0	205	8'5	215	6'5	200	9'5	205	13'0	Ci.	225	2'5
15	12 10	175	9	100	8'0	125	7'5	150	6'0	155	10'0	155	14'0	...	A-Cu.	135	1'5	Ci-St.	150	1'5	...	
16	7 20	160	7	80	1'5	110	1'6	160	9'5	145	10'5	140	10'0	...	...	...	...	...	cloud	less	...
20	7 20	155	34	120	3'2	145	4'9	160	10'0	165	8'5	155	10'5	135	2'6	...	...	Ci., Ci-Neb.	280	...	...
20	12 0	170	24	140	9'0	150	15'0	150	11'5	165	13'5	175	9'0	135	4'0	...	Ci-St.	260	...	Ci.	260	0'5
20	17 40	170	21	130	4'8	150	7'5	160	10'0	190	8'0	155	3'5	...	A-St.	...	...	Ci-St.	200	...	...
21	17 35	180	12	150	4'2	165	9'5	175	12'5	175	15'0	180	14'0	190	7'5	...	A-St., A-Cu.	Ci.	200	1'0
22	7 15	180	7	25	1'4	120	3'5	175	10'0	190	7'5	165	14'0	175	16'5	...	...	Ci., Ci-St.	180	...	...
22	12 5	180	6	160	5'0	165	7'5	160	13'0	150	6'0	160	14'0	...	...	...	...	Ci.	180	...	...
22	17 35	180	6	195	3'0	195	4'6	165	7'5	175	9'5	...	...	17 30	A-St.	230	2'5	Ci-St.	200	3'0	...
23	7 10	?	?	calm		195	4'8	190	9'5	210	10'0	...	...	...	A-Cu.	225	...	Ci.	200	...	...
23	17 35	225	8	180	5'5	220	6'0	210	9'5	210	17'5	215	11'0	...	...	...	...	Ci., Ci-St.	225	...	...
26	7 25	?	?	calm		270	2'2	275	5'5	285	6'5	300	8'0	320	10'5	...	...	Ci-St.	220	1'5	...
26	11 50	?	?	315	2'0	280	1'1	295	1'9	300	4'8	320	8'0	310	7'0	...	...	Ci-haze	...	...	...
27	7 15	?	?	calm		200	2'7	205	3'9	190	2'2	210	1'3	5	7'0	...	...	...	...	...	...
27	11 0	?	?	170	2'0	205	1'5	200	2'1	195	2'0	335	3'7	350	5'5	...	...	...	...	...	...
28	11 15	?	?	145	3'5	180	3'5	245	3'1	265	2'5	75	0'4	...	...	...	...	Cu.	...	...	...
30	7 20	?	?	360	0'3	295	0'7	245	0'6	120	4'0	...	...	...	...	...	...	...	...	...	...
30	12 15	?	?	190	1'0	200	2'0	20	2'7	65	2'7	120	4'6	...	...	...	...	Cu.	...	...	...
31	7 20	?	?	calm		60	2'3	70	3'2	55	4'4	...	...	...	...	...	...	...	cloud	less	...
										5000 m.	6000 m.	7000 m.										
1	7 10					290	23'5			Fr-Cu.	270	...	Ci-St.
13	17 30					210	14'0			Ci.	225	2'5	...
20	12 0					170	4'4			Ci-St.	260	...	Ci.	260	0'5	...
22	7 15					170	17'0			7 55	Ci., Ci-St.	180
26	11 50					315	18'0	320	13'5	Ci-haze
27	7 15					5	11'5	355	17'0	355	29'5
SOUTH FARNBOROUGH.																						
3	6 35	270	12	270	5'0	275	7'5	275	8'5	265	11'0	...	...	...	St-Cu.	...	...	Ci.	...	...	...
6	7 40	?	?	45	2'5	125	2'5	80	3'4	115	2'5	185	1'3	...	Nb.	...	...	...	...	...	...
9	6 5	130	9	70	7'0	95	10'0	105	7'0	100	5'5	125	5'0	190	6'5	...	...	Ci.	...	...	...
10	6 15	180	9	110	8'0	165	10'0	140	10'5	125	16'0	120	16'5	...	Fr-Cu., St-Cu.	...	...	...	...	...	...
13	6 25	?	?	170	4'5	180	9'5	225	4'2	230	2'8	190	2'8	215	7'5	...	...	Ci.	...	...	...
14	6 25	130	15	90	6'0	125	17'5	120	14'5	135	11'5	125	14'0	...	...	...	...	Ci.	...	...	...
15	6 35	?	?	160	3'5	170	6'5	120	8'5	145	8'5	140	14'0	130	15'5	...	...	Ci.	...	...	...
17	6 30	?	?	250	3'0	235	6'5	240	4'1	195	6'5	185	11'0	185	11'0	...	A-Cu.	...	Ci.	...	...
19	6 25	100	9	?	?	85	10'5	85	7'0	65	5'5	85	7'5	...	...	...	...	cloud	less	...	
20	6 30	130	22	80	6'0	150	12'5	150	10'5	150	2'7	130	2'7	240	2'3	...	...	Ci.	...	...	...
21	6 25	170	15	110	7'0	150	13'5	145	13'5	165	10'0	175	6'5	160	2'8	...	...	Ci.	...	...	...
22	6 40	135	12	90	4'5	135	8'0	135	8'5	140	10'0	145	14'5	155	15'0	...	...	Ci., Ci-St.	...	...	...
23	6 40	?	?	70	2'0	115	6'5	130	8'5	155	6'5	150	7'5	...	...	...	...	cloud	less	...	
24	6 40	?	?	290	3'5	15	6'5	325	3'2	235	2'1	250	2'6	210	2'6	...	...	...	...	...	...
26	2 45	?	?	30	4'0	80	7'5	70	8'5	360	3'0	...	...	...	...	St-Cu.	...	...	...	...	...
26	3 40	?	?	30	3'0	75	7'0	75	6'0	340	3'1	...	...	...	...	St-Cu.	...	...	...	...	...
27	7 40	?	?	90	?	85	12'5	85	13'5	50	7'0	...	...	...	...	Fr-St.	...	...	...	...	...
28	6 55	?	?	90	3'0	90	7'5	85	8'5	65	6'5	45	4'7	10	5'0	...	...	cloud	less	...	
29	6 30	?	?	90	3'5	120	6'5	100	8'5	110	8'5	110	9'0	115	8'5	...	...	cloud	less	...	
30	7 15	?	?	70	7'5	90	10'5	80	10'5	90	11'5	100	10'5	105	9'5	...	Fr-St.	...	...	...	...
						5000 m.	6000 m.	7000 m.	8000 m.	9000 m.												
13	6 25					225	7'0	220	5'0	240	6'0	250	7'5	265	8'0	Ci.
15	6 35					125	15'0	140	15'5	Ci.
20	6 30					290	3'2	315	9'5	315	13'0	315	16'5	315	17'0	Ci.
21	6 25					185	5'5	205	6'5	215	9'5	Ci.
22	6 40					140	11'0	160	12'5	Ci., Ci-St.
29	6 30					95	6'5	...	...	...	...	...	...	...	...	...	...	...	cloud	less	...
						10,000 m.	11,000 m.	12,000 m.														
13	6 25					255	7'5	Ci.
20	6 30					320	20'5	315	19'0	315	19'0	315	12'5	Ci.

11. NEPHOSCOPE OBSERVATIONS.

ABERDEEN.

Day and Hour. G.M.T.	Type of Cloud.	Velocity-height-ratio.				Remarks.
		Degrees from N.	Milliradians per Second.	Components.		
				W.-E.	S.-N.	
			mr/s.	mr/s.	mr/s.	
1 7	Ci-Cu.	285	6.2	+ 6.0	- 1.6	Faint Ci-Cu. in curled wisps.
1 13	Cu.	276	7.6	+ 7.5	- 0.5	
1 18	Fr-Cu.	269	7.4	+ 7.4	+ 0.1	
2 13	Cu.	273	4.6	+ 4.6	- 0.2	
2 18	Cu.	249	4.0	+ 3.7	+ 1.4	
3 13	Cu. to Cu-Nb.	253	4.1	+ 3.9	+ 1.1	Cloud changing from Cu. to Cu-Nb., the latter predominant. St-Cu., low altitude, with "thunder-heads" forming.
11 13	St-Cu.	166	12.5	- 3.0	+ 12.1	
12 13	False Ci.	254	3.4	+ 3.3	+ 0.9	High velocity. Thundershowers evening. Cloud sheet was A-St. previously, but now thinned out into "false" Ci.
15 13	Ci.	170	1.2	- 0.2	+ 1.2	Ci. becoming Ci-St. in occasional patches.
22 13	Ci.	168	2.0	- 0.4	+ 2.0	Irregular Ci., becoming slight Ci-Cu. in places, faint ⊕.
23 18	False Ci.	215	2.1	+ 1.2	+ 1.7	False Ci. sheets, becoming A-Cu. later.
24 7	A-Cu.	235	2.8	+ 2.3	+ 1.6	
24 13	Cu-Nb.	225	4.2	+ 3.0	+ 3.0	A-Cu. with cloudlets of greatly varying sizes. Height, 3000 m. by Pilot Balloon. Base of cloud measured. ↖ to west, afternoon. St-Cu. of low altitude. Fine A-Cu. sheets.
25 13	St-Cu.	280	3.0	+ 3.0	- 0.5	
28 11	A-Cu.	295	3.0	+ 2.7	- 1.3	

General Note.—Several long spells of fog and stratus cloud occurred, preventing observational work.

12. AURORA.

Day.	a.m. or p.m.	Moon.	Magnetic Character.		Aurora Observations.	
			Eskdalemuir.	Richmond.	Station.	Remarks.
1	p.	...	2, 2	1, 2	Deerness Edinburgh Paisley Eskdalemuir Donaghadee	Brilliant, with streamers, 1 h.
2	p.	...	2, 2	2, 2		
3	a.	...	2, 2	2, 2		
6	p.	☾	2, 1	2, 1	Deerness	...
6	p.	☉	1, 0	0, 0	Deerness	...
15	...	☉	...	...	Tenbury	...
17	p.	...	1, 1	1, 1	Paisley	White streamers, 21 h. 30 m.-22 h.
19	p.	...	1, 1	1, 1	Tenbury	Long white streamers, 21 h. 30 m.-22 h.; patches of moving light, 21 h. 30 m.
22	...	☾	...	...	...	...
26	a.	...	1, 1	1, 1	Eskdalemuir	Faint glow, 1 h.

Note.—The two magnetic "characters" entered in each case refer to the two periods of 24 hours ending and beginning at midnight of the night in question.

METEOROLOGICAL OFFICE OBSERVATORIES—GEOPHYSICAL JOURNAL.

DAILY VALUES.—Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology.

Ninth Year.—No. 6. JUNE 1919.]

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I. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.			SOUTH KENSINGTON.—Lat. 51° 30' N. Long. 0° 10' W.						RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.			ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.					CAHIRCIVEEN.			
	Bright Sunshine.*		Radiation received on Horizontal Surface by Callendar Radiograph.						Bright Sunshine.*		Radiation at Noon by Ångström Pyrheliometer.			Bright Sunshine.*		Radiation by Ångström Pyrheliometer.			Bright Sunshine.*		
	Total.	Per cent. of Possible.	Daily Total.	Per cent. of Planetary.	Maximum.			11.30 h. to 12.30 h.	Total.	Per cent. of Possible.	Intensity.	Vertical Component.	Sky.	Total.	Per cent. of Possible.	Time.	Sky.	½ sec Z. po	Intensity.	Total.	Per cent. of Possible.
					Amount.	Time.	mw/cm².														
1	8'0	49	1519	38	56	11 44	56	6'9	43	...	...	...	4'2	25	...	...	...	...	10'2	63
2	4'2	26	1300	32	79	13 20	75	4'8	29	...	...	...	9'5	56	...	...	...	...	13'8	84
3	5'7	35	1413	35	78	13 25	72	5'2	32	...	...	...	6'1	36	...	...	...	...	13'2	80
4	0'4	2	570	14	38	7 30	20	0'3	2	...	...	...	4'5	26	...	...	...	...	4'6	28
5	4'8	29	1444	36	78	13 25	57	5'1	31	...	...	...	5'1	30	...	...	...	...	0'1	1
6	9'0	55	1763	43	78	10 35	59	8'4	51	...	...	...	0'1	1	...	...	...	...	10'6	4
7	14'0	85	2436	60	79	12 30	79	14'0	85	...	...	...	8'0	47	...	...	...	...	5'3	32
8	8'3	51	1933	47	91	12 0	91	7'7	47	...	...	...	7'0	41	...	...	...	...	4'0	24
9	8'5	52	1930	47	88	12 45	86	8'1	49	...	...	...	10'1	59	...	...	...	...	10'5	63
10	14'2	86	—	—	—	—	—	14'5	88	...	...	...	9'8	57	...	...	...	...	0'7	4
11	11'8	72	2074	50	75	13 45	74	11'7	71	...	...	...	1'7	10	...	...	...	...	0'5	3
12	10'8	65	2055	50	84	11 55	84	10'8	65	...	...	...	6'0	35	...	...	...	...	1'1	7
13	5'0	30	1252	30	77	14 22	68	5'0	30	...	...	...	6'8	39	...	...	...	...	5'7	34
14	8'2	50	1557	38	76	12 19	76	9'4	57	...	...	...	14'3	83	...	...	...	...	4'3	26
15	14'5	88	2502	61	80	12 56	79	13'6	82	...	...	...	0'8	5	...	...	...	...	6'8	41
16	15'0	91	2566	62	81	11 45	81	14'8	90	...	...	...	0'0	0	...	...	...	...	0'7	4
17	14'1	85	2455	60	84	12 15	84	12'8	77	...	...	...	10'2	59	...	...	...	...	3'8	23
18	7'9	48	1767	43	87	10 25	82	9'4	57	...	...	...	9'2	53	...	...	...	...	9'6	57
19	8'1	49	1898	46	86	12 10	86	7'1	43	...	...	...	0'1	1	...	...	...	...	2'9	17
20	0'0	0	300	7	14	10 30	8	0'0	0	...	...	...	5'0	29	...	...	...	...	6'6	40
21	11'9	72	2331	57	95	13 22	94	12'2	73	...	...	...	7'8	45	...	...	...	...	13'1	78
22	10'2	61	1967	48	87	11 5	82	9'7	58	...	...	...	0'0	0	...	...	...	...	0'3	2
23	5'5	33	1609	39	97	12 27	97	4'4	27	...	...	...	1'6	9	...	...	...	...	6'2	37
24	1'6	10	804	20	61	8 50	13	1'5	9	...	...	...	7'5	43	...	...	...	...	0'1	1
25	1'5	9	1121	27	77	10 15	56	1'7	10	...	...	...	6'5	38	...	...	...	...	4'8	29
26	3'7	22	1447	35	90	13 40	52	5'6	34	...	...	...	11'4	66	...	...	...	...	3'8	23
27	0'8	5	1004	24	56	11 12	48	1'0	6	...	...	...	5'4	31	...	...	...	...	2'4	14
28	4'1	25	1378	34	70	9 20	53	4'2	25	...	...	...	4'6	27	...	...	...	...	0'0	0
29	6'6	40	1501	37	90	11 26	65	8'0	48	...	...	...	9'7	56	...	...	...	...	8'2	53
30	2'6	16	992	24	82	13 10	51	2'3	14	...	...	...	4'0	23	...	...	...	...	1'5	9
Means	7'37	45	1563†	38†	74†	—	64†	7'33	45	—	—	—	5'90	35	—	—	—	—	5'17	32	
Normal	5'80	36	1559	38	—	—	—	6'57	40	—	—	—	5'43	32	—	—	—	—	6'27	38	
	←35 years→			7 years						←35 years→			←5 years→					←35 years→			

2. METEOROLOGY AND MAGNETISM:—CAHIRCIVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W. Heights above M. S. L.:—H=9.1 m. H_b=13.7 m. H_a=26.4 m. Above Ground: h_t=1.3 m. h_r=0.56 m. h_a=13.9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.		Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force. Declination West. and Inclination.	
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	Vapour Pressure.	Percentage.	9 h.	21 h.	9 h.	21 h.	9 h.	21 h.					
	mb.	mb.	200+	200+	200+	200+	millibar.	%	m/s.	m/s.	Tenths of Sky covered.	mm.	a.						
1	1018'7	1022'1	89'7	90'9	93	85	16'2	15'2	86	75	—	0	—	1	200	300	82	Fine and ∞ n. Fine and ∞ day.	
2	1025'7	1027'4	90'5	87'4	93	85	15'5	13'0	78	80	—	1	315	2	0	6	82	Fine n. Fine dry day.	
3	1028'1	1027'9	90'2	87'8	91	83	13'1	12'5	67	75	—	0	345	5	2	6	79	Fine and ∞ n. Fine day.	
4	1027'2	1025'2	88'4	86'7	91	86	14'4	14'0	83	90	320	3	310	3	9	10	83	Fair n. and day. o. evening.	
5	1022'7	1021'5	86'3	86'7	90	86	14'3	13'4	94	86	—	1	—	0	10	10	85	c. to o. n. o. to d. day.	
6	1018'7	1016'5	89'2	88'1	92	86	14'6	14'6	80	86	170	7	170	6	7	10	84	o. n. Fair day. ⊕ p.	
7	1010'2	1014'8	86'4	85'1	89	84	14'4	11'8	94	84	190	3	235	4	10	8	86	● n. ● to ● morning. Fair day.	
8	1011'3	1015'3	86'1	84'5	89	83	13'2	10'4	88	77	180	7	255	8	10	7	81	p. n. and morning. Fair day.	
9	1019'9	1025'4	87'8	85'5	89	82	11'9	12'7	71	88	200	6	230	3	6	5	79	Fine n. and morning. Fair day.	
10	1029'1	1022'5	86'4	87'3	89	82	13'0	15'5	85	96	160	5	170	7	10	10	79	Fair n. ● to fair a. ● and evening	
11	1018'1	1012'7	87'9	86'4	90	85	16'3	14'7	97	96	170	7	260	2	10	10	87	● to d. n. o. to c. a. o. and ● p.	
12	1015'2	1017'8	84'4	85'4	87	83	9'5	12'1	71	85	290	9	280	9	10	10	82	d. n. o. to c. a. o. p.	
13	1024'6	1029'4	85'7	84'8	88	82	10'8	11'7	74	85	320	7	305	2	9	3	82	o. n. Fair day. Fine evening.	
14	1027'5	1023'1	85'7	85'6	88	79	12'0	12'3	82	85	180	2	175	4	10	10	—	n 76	Fine and ∞ n. c. to o. a. and p.
15	1019'2	1016'2	87'9	86'5	90	85	13'2	13'5	79	88	175	7	175	7	8	10	84	o. n. o. to c. day. o. evening.	
16	1012'5	1017'0	87'2	84'8	88	82	15'3	11'7	95	85	185	8	300	3	10	7	47	86	o. n. ● a. Fair p.
17	1018'5	1019'9	86'4	85'7	89	80	11'9	11'5	78	79	160	2	245	5	10	9	—	77	Fair and ⊕ morning. Fair p.
18	1022'6	1017'0	88'0	86'0	89	83	12'0	11'9	71	80	255	5	175	8	5	10	0'8	81	Fine dry day. o. evening.
19	1012'0	1014'9	86'1	85'0	88	84	13'3	10'6	89	76	245	5	255	6	9	6	10'2	84	● n. and morning. Fine to o. day.
20	1015'7	1018'2	87'8	84'3	88	83	11'0	10'2	n 66	77	265	3	275	9	7	7	0'3	81	Fair n. and a. Fair and p. p.
21	1026'1	1028'4	85'5	85'2	89	83	13'9	12'0	96	85	330	4	195	3	4	7	0'2	81	p. morning. Fine day. c. to o. evening.
22	1023'2	1025'1	87'0	85'3	89	85	12'7	11'9	80	84	225	7	310	4	10	10	3'0	82	d. n. and a. o. evening.
23	1026'9	1029'5	85'6	84'6	87	84	11'6	10'3	80	76	320	10	330	11	8	8	—	83	o. n. Fair day.
24	1029'5	1021'7	85'9	85'9	87	84	11'8	14'6	80	99	295	5	285	10	10	10	10	83	c. n. and morning. o. a. d. to ● even.
25	1018'2	1024'7	85'7	85'4	88	84	13'7	12'4	94	87	345	11	5	7	10	5	0'3	85	o. to d. morning. o. a. Fair p.
26	1027'7	1025'6	85'0	85'6	87	81	10'6	13'7	76	95	330	6	325	2	7	10	0'2	78	Fine n. Fair day. o. to d. evening.
27	1024'5	1025'9	85'8	86'5	89	85	13'2	14'5	90	94	310	5	305	2	10	8	0'3	84	d. morning. c. to o. day.
28	1025'3	1024'7	86'4	85'5	88	85	13'6	11'9	89	83	290	8	335	7	10	10	—	85	o. to d. morning. o. day.
29	1025'7	1026'1	85'8	84'5	87	84	10'2	11'0	69	81	350	10	340	9	9	6	—	82	o. to c. n. and a. Fair p.
30	1020'5	1013'5	84'9	84'4	n 86	84	13'1	11'0	95	82	315	10	340	9	10	9	1'3	82	c. to o. n. o. and p. day.
Means	1021'5	1021'7	86'9	85'9	88'9	83'6	13'0	12'6	83	85	5'5	—	5'3	—	8'1	8'0	53'6	82*	Monthly Totals or Means.
Normal	1014'5	1014'7	87'2	86'3	89'8	83'7	13'2	13'0	80	84	4'7	—	4'1	—	—	—	90'5	—	Normals.
	←45 years→			←30 years→						←35 years→			←45 yrs.						

* By Campbell-Stokes Sunshine Recorder.

† Mean of 29 days only.

α denotes the maximum and n the minimum value in the column.

3. METEOROLOGY :—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m. Heights above Ground :—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly means and normals for 45 years.

4. METEOROLOGY :—ESKDALEMUIR, DUMFRIESHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m. Heights above Ground :—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly means and normals for 45 years.

Temperatures at or below the normal freezing point of water are printed in small type.

x denotes the maximum, and n the minimum, value in the column.

5. GEOPHYSICS:—RICHMOND (KEW OBSERVATORY).

Day.	Earth Temperature at 9 h.		Height above M. S. L. of Surface of Underground Water.		Magnetic Force.						Magnetic Character of Day.	Electric Character of Day.	Charge per cc. $\times 10^{20}$.		Air-Earth Current. $\times 10^{16}$.	Potential Gradient, Volts per metre. Factor 2.12.				
	0.3 m.	1.2 m.	Daily Mean.	Extremes.	Horizontal Comp't.		Declination.		Inclination.				+	-	About 15 h.	About 15 h.	3 h.	9 h.	15 h.	21 h.
					Mean Time.		Mean Time.	West.	Mean Time.	North.										
	<i>a.</i>	<i>a.</i>	cm.	cm.	h m	γ	h m	°	h m	°			coulomb.	amp/cm ² .	v/m.	v/m.	v/m.	v/m.		
1	200+	200+	261	261	...	...	...	...	...	...	0	I	...	...	130	260	210	310	
2	87.8	84.5	260	...	...	...	...	...	...	...	0	0	0.65	0.22	1.50	210	415	220	235
3	87.8	84.6	260	...	...	...	...	...	...	...	0	0	...	...	115	145	155	340	
4	86.9	84.8	260	...	...	...	...	...	...	...	0	I	...	...	130	145	50	180	
5	86.9	84.8	259	...	11 6	18398	14 19	14 46.5	14 31	66 55.3	0	0	...	...	0.75	105	130	105	130
6	87.6	84.8	257	...	...	...	...	...	...	...	0	0	...	...	0.85	195	155	115	105
7	88.7	84.8	255	...	...	...	...	...	...	...	0	0	...	...	180	155	145	210	
8	89.5	84.8	253	...	...	...	...	...	...	...	0	0	...	...	90	130	80	145	
9	89.2	84.9	251	...	...	...	...	...	...	...	I	0	...	...	115	145	105	115	
10	89.0	85.0	249	...	...	...	...	...	...	...	I	0	0.50	0.39	0.95	115	210	105	65
11	88.8	85.0	247	...	...	...	...	...	...	...	I	0	1.31	0.60	0.85	80	145	130	155
12	90.3	85.3	246	...	11 6	18371	14 19	14 50.6	14 34	66 57.4	0	2	0.00	0.62	...	170	65	80	115	
13	89.1	85.4	244	...	...	...	...	...	...	...	0	0	1.23	0.69	0.55	50	65	130	145
14	88.1	85.6	241	...	...	...	...	...	...	...	0	0	...	...	...	130	300	105	115
15	88.3	85.7	240	...	...	...	...	...	...	...	0	0	...	...	170	155	65	80	
16	89.0	85.8	240	...	...	...	...	...	...	...	0	0	1.05	0.69	0.80	65	170	90	235
17	89.5	85.8	240	...	...	...	...	...	...	...	0	0	0.56	0.26	1.00	210	245	115	180
18	90.2	85.8	239	...	...	...	...	...	...	...	0	0	0.28	0.24	0.65	170	145	90	145
19	90.7	85.8	238	...	11 3	18405	14 19	14 46.8	14 30	66 57.0	0	0	0.86	0.80	1.65	170	155	220	245	
20	90.1	85.9	238	...	...	...	...	...	...	...	0	I	...	...	...	115	155	440	340
21	88.9	86.0	237	...	...	...	...	...	...	...	0	I	...	...	...	115	210	145	170
22	88.5	86.3	236	...	...	...	...	...	...	...	I	0	...	...	220	245	115	170	
23	89.1	86.1	235	...	...	...	...	...	...	...	I	I	0.90	1.12	0.80	65	170	130	15
24	88.9	86.2	233	...	...	...	...	...	...	...	0	I	...	...	65	195	130	195	
25	87.4	86.2	232	...	...	...	...	...	...	...	I	I	0.58	0.75	1.30	170	210	245	210
26	87.0	86.1	231	...	11 4	18389	14 21	14 46.1	14 35	66 58.0	0	0	0.47	0.00	0.55	180	210	130	130	
27	86.1	86.0	231	...	...	...	...	...	...	...	I	0	0.50	0.00	0.60	210	275	65	105
28	87.0	86.0	231	...	...	...	...	...	...	...	0	I	...	...	...	210	170	15	50
29	86.8	86.0	230	230	...	...	...	...	...	...	0	I	...	...	...	90	130	105	195
30	86.6	85.9	230	230	...	...	...	...	...	...	0	0	0.84	0.93	0.65	105	145	105	210
M.	88.3	85.5	243	—	—	—	—	—	—	—	—	—	—	—	—	138	182	122	168	
	88.1	85.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	←-12 years→		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

6. GEOPHYSICS:—ESKDALEMUIR.

Day.	Magnetic Force.												Magnetic Character of Day.	Electric Character of Day.	Potential Gradient, Volts per metre.* Factor 5.96.						
	North Component.						West Component.								Vertical Component.			3 h.	9 h.	15 h.	21 h.
	Maximum. 15000 γ +.	Minimum. 15000 γ +.	Range.	Maximum. 4000 γ +.	Minimum. 4000 γ +.	Range.	Maximum. 44000 γ +.	Minimum. 44000 γ +.	Range.												
	h m	γ	γ	h m	γ	h m	γ	h m	γ	h m	γ	h m	γ	h m	γ	v/m.	v/m.	v/m.	v/m.		
1	21 27	1075	963	14 20	112	14 7	930	835	7 8	95	5 50	1099	1064	11 30	35	215	70	85	65		
2	17 41	1068	971	11 31	97	17 23	942	850	6 50	92	19 6	1106	1070	12 27	36	165	70	170	230		
3	17 5	1055	969	12 36	86	17 2	936	846	5 53	90	20 2	1094	1066	12 57	28	155	130	215	220		
4	15 58	1042	970	11 2	72	15 59	931	822	7 41	109	4 30	1094	1066	12 6	28	215	170	\pm	285		
5	16 30	1073	962	11 32	111	16 28	930	858	5 13	72	21 2	1099	1073	11 42	26	115	95	115	\pm		
6	19 2	1056	984	10 23	72	12 58	926	845	8 30	81	17 44	1108	1062	12 7	46	130	70	80	185		
7	18 14	1044	973	11 45	71	13 24	927	844	7 3	83	17 40	1104	1070	12 30	34	230	215	115	230		
8	20 48	1040	980	10 52	60	13 25	919	849	7 45	70	5 20	1097	1070	11 58	27	155	185	85	-285		
9	15 29	1075	960	16 29	115	15 45	973	824	8 20	149	16 27	1141	1066	24 0	75	105	130	115	145		
10	16 27	1060	n 918	8 33	142	13 33	963	n 814	6 22	149	15 42	1131	1020	3 24	111	200	105	105	130		
11	18 36	1065	933	10 4	132	16 24	930	n 814	7 5	116	18 5	1124	1049	3 23	75	\pm	130	70	165		
12	19 52	1052	937	10 18	115	13 52	939	825	8 37	114	17 30	1113	1015	2 37	98	\pm	480	\pm	145		
13	18 40	1039	943	10 26	96	13 16	934	825	7 21	109	19 0	1117	1068	1 8	49	105	-20	230	185		
14	22 0	1032	958	12 43	74	13 55	934	842	6 3	92	5 19	1109	1080	11 57	29	100	130	215	380		
15	19 45	1026	956	10 47	70	13 43	928	839	6 48	89	19 12	1109	1076	11 40	33	250	170	100	165		
16	21 11	1032	963	12 52	69	16 17	926	848	7 11	78	18 52	1111	1078	11 0	33	120	85	35	70		
17	1 7	1033	960	14 38	73	14 6	927	831	8 4	96	17 40	1117	1072	11 36	45	215	180	185	200		
18	20 22	1027	955	10 42	72	3 50	926	856	7 30	70	19 20	1117	1080	4 25	37	285	95	70	285		
19	19 42	1029	962	11 56	67	15 37	909	858	9 57	n 51	18 45	1118	1092	11 55	26	150	-1220	345	215		
20	20 1	1031	973	11 58	n 58	15 48	921	857	8 36	64	19 5	1114	1090	12 17	24	145	145	115	260		
21	18 4	1044	976	11 16	68	15 27	928	852	7 10	76	19 20	1125	1093	12 50	32	-645	260	150	285		
22	17 9	1056	976	10 55	80	22 24	937	849	8 29	88	18 45	1128	1076	12 25	52	280	\pm	85	145		
23	18 30	1065	947	11 45	118	16 26	937	833	6 30	104	20 20	n 1156	1085	3 35	71	20	70	80	210		
24	18 0	1077	960	9 37	117	14 33	952	832	2 0	120	18 35	1152	1076	5 0	76	95	155	145	-1075		
25	18 31	n 1112	957	11 45	n 155	18 30	943	823	22 57	120	19 45	1133	1094	12 10	39	130	135	95	70		
26	5 52	1033	948	11 22	85	14 3	919	817	1 1	102	16 52	1135	1079	0 41	56	215	215	220	145		
27	19 1	1047	949	11 15	98	15 36	944	838	7 17	106	20 20	1122	1104	9 26	18	100	150	165	130		
28	18 31	1052	974	9 42	78	14 2	925	837	5 45	88	21 48	1121	1098	11 18	23	70	170	130	145		
29	3 45	1037	965	12 24	72	14 4	947	844	0 32	103	17 45	1129	1087	11 26	42	105	155	95	230		
30	20 50	1027	963	11 55	64	14 17	933														

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W.

Heights above M.S.L.:—H = 54 m. H_b = 55 m. Above Ground:—h_t = 1.48 m. h_r = 1.72 m. h_a = 8 m.

Table with columns: Day, Air Pressure at Station Level (9 h, 14 h, 21 h, Mean of 3 Readings), Air Temperature in Degrees Absolute (9 h, 14 h, 21 h, Max, Min, Mean of 3 Readings), Min. Temp. on Grass, Percentage of Humidity (9 h, 14 h, 21 h, Mean), Rain 0 h. to 24 h., REMARKS, and Month Character.

JERSEY (ST LOUIS OBSERVATORY).

Table with columns: Day, Wind Direction and Force (0-12 on the Beaufort Scale), Sunshine, Cloud Amount (tenths of Sky covered), Type of Cloud, and Direction whence coming, and Mean Amount.

* For method of estimation, see Introduction.

† The first hour of observation was changed to 9 h. on Jan. 1st, 1919.

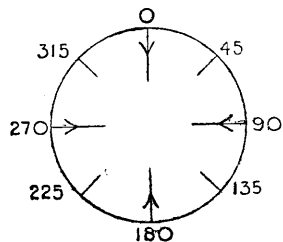
9. SEISMOLOGICAL DIARY.

EARTHQUAKES:—ESKDALEMUIR.								MICROSEISMS OF N. COMPONENT:—ESKDALEMUIR.											
Day.	Phase.	Time, G.M.T.			Period.	Amplitudes.			Δ.	Remarks.	Day.	0 h.		6 h.		12 h.		18 h.	
		h	m	s		A _{N.}	A _{E.}	A _{Z.}				A _{N.}	T.	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.
1	P PR? S L F	7	3	42	...	μ	μ	μ	8600	P sharply marked on vertical record.	1	0.0	0	0.0	0	0.0	0	0.1	3
		7	7	11	...	...	...	...	...		2	0.1	4.5	0.1	4	0.2	4	0.1	4
		7	14	2	...	...	...	...	...		3	0.3	4	0.2	4	0.3	4	0.3	4
		7	30		...	...	...	...	...		4	0.5	4	0.3	3.5	0.6	4	0.1	4
		8	12		...	...	...	...	...		5	1.0	4	0.6	4	0.6	4	0.2	4
					...	...	...	...	...		6	0.6	5	0.5	4	0.9	4	0.3	4
					...	...	...	...	...		7	0.6	4.5	0.8	4	0.2	4	1.0	4
					...	...	...	...	...		8	1.0	4	1.0	4	0.9	4	0.8	4
					...	...	...	...	...		9	0.9	6	0.9	6	0.9	6	0.9	5
9	L F	7	24	20	21	...	...	...	...		10	1.1	4	0.9	5	1.1	4	0.5	4.5
		7	49		...	...	...	...	...		11	0.3	4	0.3	4	0.2	4	0.3	3
					...	...	...	...	...		12	0.1	4	0.2	5	0.1	3	0.2	4
					...	...	...	...	...		13	0.3	3.5	?	?	0.9	6	1.1	4
					...	...	...	...	...		14	1.0	6	1.3	6	1.2	6	1.0	6
					...	...	...	...	...		15	1.5	6	1.2	4	1.2	5.5	1.0	4.5
					...	...	...	...	...		16	1.2	4	1.1	4	...	...	...	...
					...	...	...	...	...		17	1.0	4	...	...	0.6	4	0.6	3.5
					...	...	...	...	...		18	0.6	4	1.1	4	0.6	4	0.7	4
					...	...	...	...	...		19	0.8	3.5	0.9	4	1.1	4	1.4	7
					...	...	...	...	...		20	1.6	6	1.1	5	1.1	4	1.0	4.5
					...	...	...	...	...		21	1.1	4	0.5	4	1.0	4	0.5	4.5
					...	...	...	...	...		22	0.6	4	0.6	4	0.6	4	0.8	4
					...	...	...	...	...		23	0.7	4	1.1	4	1.1	4	1.5	4
24	...	19	25	to	...	...	...	...	...	Slight disturbance, including long waves of 18 secs. period.	24	1.0	5	1.1	4	1.1	4	1.0	4
		20	17		...	...	...	...	...		25	1.1	4	0.7	4	1.0	4	1.0	4
					...	...	...	...	...		26	1.1	4	1.1	4	1.1	4	0.9	4
					...	...	...	...	...		27	0.9	4	0.2	4	0.1	4	0.2	4
					...	...	...	...	...		28	0.8	4	0.3	4.5	1.1	4	1.0	4.5
					...	...	...	...	...		29	1.4	5	1.7	4	1.2	6	1.4	6
					...	...	...	...	...		30	0	0	1.1	4.5	1.2	4	1.1	4
28	L	5	36	to	...	...	...	...	...		Means for Month { A _N =0.7, T=4.2. Normals, 1911-18 { A _N =0.5, T=4.5.								
		6	0		...	...	...	...	...		EARTHQUAKES:—RICHMOND (KEW OBSERVATORY).								
					...	...	...	...	...		Times, G.M.T. of		Remarks.						
					...	...	...	...	...	Day.	Commence-ment.	Max. Phase.							
29	...	15	12	to	...	...	...	...	...	29	15	13	Moderate disturbance. Record much confused, with heavy wind effects.						
		15	30		...	...	...	...	...					
					...	...	...	...	...	1	h m	h m	Very small.						
					...	...	...	...	...		...	7 40							
					...	...	...	...	...	9	...	7 30	Small.						
														
29	O P S L Me	23	14	14	...	...	...	...	8420			19 32	Very small.						
		23	25	58	...	...	...	...	...					
		23	35	39	...	...	...	...	...					
		23	51		...	...	...	...	...					
		23	53	53	21	...	32	...	...								
														
30	L	8	0		...	...	...	...	...		29	23 13	Amp. on trace = 1.9 mm.						
														
					...	...	...	...	...		29	23 59							
														
					...	...	...	...	...		30	7 48	8 3	Small waves to 8 h. 34 m.					
														

10. SOUNDINGS WITH PILOT BALLOONS—*continued.*

Height of Station above M.S.L. = H.
Anemometer above ground = h.

	H.	h.
Aberdeen	14 m.	32 m.
Eskdalemuir	242 m.	15 m.
S. Farnborough	70 m.	31 m.
Falmouth	51 m.	12 m.
Cahiriveen	9 m.	13 m.



Wind Protractor.

Notes on Pressure Distribution.

June 1919.

During the whole month there was a persistent anticyclone over the Azores region.

1 7 h. High over the British Isles.
2 7 h. to 6 7 h. Atlantic anticyclone covering the British Isles.
7 7 h. Low centred W. of Iceland; Ridge from the Azores to Germany.
9 7 h. „ near the Farøe; „ „ „
10 7 h. Anticyclone centred over the Channel.
11 7 h. „ „ Holland.
12 7 h. Low centred over the Irish Sea.
14 7 h. Atlantic anticyclone covering the British Isles.
16 7 h. Deep depression centred over Iceland.
17 7 h., 13 h., 18 h. } Low over Iceland, High over the British Isles.
18 7 h., 13 h. }
19 7 h. South-westerly type.
20 7 h., 13 h. Low centred over the Farøe, High over England.
21 7 h., 18 h. Atlantic anticyclone covering the British Isles.
24 7 h. North-westerly type.
25 7 h., 18 h. } Atlantic anticyclone covering Iceland, the British Isles, and France,
26 13 h., 18 h. } extensive shallow Low over the Baltic.
27 7 h., 18 h. Anticyclone over the British Isles centred S. of Ireland, Low centred N. of Iceland.
28 7 h. Anticyclone over the British Isles centred S. of Ireland, Low centred N. of Shetlands.
30 7 h. North-westerly type.

Notes on Ascents.

Aberdeen—
10th, Solar halo at 13 h.

Eskdalemuir—
5th, 7 h. 25 m. Barometer unsteady.
9th, 7 h. 20 m. Barometer rising.
12th, 7 h. 30 m. Barometer falling fast.
17th, Solar halo at 7 h.
18th, 12 h. Sudden fall in wind speed between 1380 m. and 1750 m.
20th, Solar halo at 7 h.
26th, 12 h. Solar halo.

South Farnborough—
10th, 6 h. 35 m. Aeroplane pilot reported small Cu. at 1200 m. and no bumps above that level.
17th, 9 h. 25 m. Pilot reported bumpiness between 700 m. and 900 m.

Cahiriveen—
1st, 7 h. 30 m. Cloud nearly stationary. Very hazy at surface.
3rd, 16 h. 20 m. Balloon shivered.
17th, 7 h. 25 m. St-Cu. sheet developing during ascent.
21st, 7 h. 35 m. St-Cu dissolving away.
21st, 16 h. Fr-Cu. stationary over hills.

11. NEPHOSCOPE OBSERVATIONS.

ABERDEEN. Taken at 13 h. G.M.T.

Day and Hour. G.M.T.	Type of Cloud.	Velocity-height-ratio.				Remarks.
		Degrees from N.	Milliradians per Second.	Components.		
				W.-E.	S.-N.	
2 13	Cu.	344	11'0	+ 3'0	- 10'6	Cu. rather degraded.
3 18	A-Cu.	343	6'2	+ 5'9	- 1'8	A-Cu. becoming St-Cu. later and fusing. Some hazy Ci-St. above.
5 13	Ci-Cu.	328	4'0	+ 2'1	- 3'4	Ci-Cu. to high A-Cu., inclined to lenticular form.
6 13	Cu.	320	11'0	+ 7'1	- 3'2	
6 13	A-Cu.	302	3'3	+ 2'8	- 1'7	A-Cu. to high St-Cu.
6 18	A-Cu.	286	2'4	+ 2'3	- 0'7	A-Cu. in lenticular sheets.
7 15	St-Cu.	202	12'5	+ 4'7	+ 11'6	St-Cu. suddenly formed at 14 h. 30 m. Sudden squall at 17 h. 40 m., with violent eddying of cloud.
10 13	Cu.	269	4'3	+ 4'3	0'0	Hazy Ci-St. above, with ⊕.
11 13	Cu.	245	20'0	+ 18'2	+ 8'5	Fr-Cu.
12 13	A-Cu.	165	3'8	- 1'0	+ 3'7	Small faint A-Cu.
17 13	Ci-St.	235	5'1	+ 4'2	+ 2'9	Ci-St. to Ci-Cu., with Ci. threads intermingled.
18 13	Cu.	268	4'2	+ 4'2	+ 0'1	
20 13	Cu.	265	2'8	+ 2'8	+ 0'2	
21 13	Cu.	310	5'0	+ 3'8	- 3'2	
24 13	Cu.	330	12'5	+ 10'8	- 6'3	
25 13	Cu.	347	11'0	+ 2'5	- 10'7	
26 13	St-Cu.	335	10'0	+ 4'2	- 9'1	St-Cu., of low altitude, dispersing.
27 13	A-Cu.	305	2'2	+ 1'3	- 1'8	Ci-Cu. to high A-Cu., in lenticular sheets, fusing later.

12. AURORA.

None reported.

METEOROLOGICAL OFFICE OBSERVATORIES—GEOPHYSICAL JOURNAL.

DAILY VALUES.—Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology.
 Ninth Year.—No. 7. JULY 1919. Units based on the C.G.S. System. [Price 1s.]

I. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.—Lat. 51° 30' N. Long. 0° 10' W.							RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.					ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.					CAHIRCIVEEN.		
	Bright Sunshine.*		Radiation received on Horizontal Surface by Callendar Radiograph.					Bright Sunshine.*		Radiation at Noon by Ångström Pyrheliometer.			Bright Sunshine.*		Radiation by Ångström Pyrheliometer.			Bright Sunshine.*		
	Total.	Per cent. of Possible.	Daily Total.	Per cent. of Planetary.	Maximum.			Total.	Per cent. of Possible.	Intensity.	Vertical Component.	Sky.	Total.	Per cent. of Possible.	Time.	Sky.	p sec Z.	Intensity.	Total.	Per cent. of Possible.
					Amount.	Time.	11.30 h. to 12.30 h.													
1	0.7	4	920	22	77	13 32	58	0.7	4	...	...	9.7	57	...	...	...	...	9.6	58
2	0.9	5	870	21	75	11 15	56	2.0	12	...	...	6.2	36	...	...	...	...	3.7	22
3	3.6	22	1315	32	84	10 12	83	2.6	16	...	...	0.9	5	...	...	...	...	3.7	22
4	4.1	25	1343	33	70	11 40	70	4.7	29	...	...	0.0	0	...	...	...	...	5.3	32
5	1.7	10	913	22	78	12 52	74	1.4	9	...	...	0.1	1	...	...	...	...	3.5	21
6	2.7	16	1243	31	73	15 30	28	2.1	13	...	...	0.1	1	...	...	...	...	13.1	79
7	0.0	0	357	9	19	15 27	12	0.0	0	...	...	4.7	28	...	...	...	...	3.1	19
8	0.0	0	549	14	24	9 2	17	0.2	1	...	...	10.0	59	...	...	...	...	4.8	29
9	10.4	64	1829	45	76	14 40	70	11.0	67	50	44	Ci.	13.6	79	...	...	...	13.6	83
10	4.2	26	1437	36	67	10 12	58	4.5	28	...	...	11.8	69	...	...	...	...	9.8	60
11	10.6	65	1987	49	75	11 43	75	11.4	70	...	...	3.0	18	...	...	...	...	0.0	0
12	1.0	6	649	16	49	16 20	15	1.2	7	...	...	3.0	24	...	...	...	...	12.1	74
13	5.9	36	1385	35	87	11 15	86	5.0	31	...	...	7.7	45	...	...	...	...	9.1	56
14	1.6	10	995	25	56	8 55	36	1.1	7	...	...	12.4	73	...	...	...	...	2.7	17
15	3.6	22	1370	35	73	13 40	56	6.4	40	...	...	13.8	82	...	...	...	...	2.3	14
16	11.4	71	2303	58	83	11 48	83	12.6	78	67	58	Clear	2.8	17	...	...	...	0.0	0
17	0.5	3	809	21	45	13 5	10	0.0	0	...	...	1.4	9	...	...	...	...	4.2	26
18	7.0	48	1659	42	83	11 40	83	7.0	44	...	...	0.5	3	...	...	...	...	0.0	0
19	1.5	9	1166	30	70	11 3	26	1.0	6	...	...	8.3	49	...	...	...	...	4.9	31
20	0.0	0	283	7	13	9 20	10	0.0	0	...	...	0.2	1	...	...	...	...	9.2	57
21	8.5	52	1594	41	95	12 6	95	7.4	47	75	65	Clear	8.5	51	...	...	...	0.0	0
22	6.3	40	1173	30	84	12 40	74	6.8	43	63	54	Clear	7.1	43	...	...	...	6.7	44
23	0.5	3	821	21	56	13 30	53	0.5	3	...	...	7.3	44	...	...	...	...	0.5	3
24	0.1	1	727	19	50	14 14	20	0.0	0	...	...	8.7	53	...	...	...	...	7.3	46
25	0.1	1	685	18	69	12 40	21	0.6	4	...	...	11.3	68	...	...	...	...	14.1	89
26	10.3	66	1978	52	76	14 5	75	11.8	75	55	47	Ci.	7.4	45	...	...	...	8.8	56
27	0.4	3	1096	29	65	13 42	56	2.5	16	...	...	0.3	2	...	...	...	...	0.5	3
28	0.3	2	656	17	33	13 30	27	0.1	1	...	...	1.3	8	...	...	...	...	6.8	43
29	0.1	1	631	17	57	12 40	43	0.1	1	...	...	11.5	71	...	...	...	...	9.5	61
30	3.2	21	961	28	60	13 22	35	3.9	25	...	...	13.7	85	...	...	...	...	10.7	69
31	10.9	71	2048	55	77	13 25	75	10.5	68	...	...	0.2	1	...	...	...	...	1.3	8
Means	3.65	23	1177	30	64	—	—	3.84	24	—	—	6.06	37	—	—	—	—	5.84	37	
Normal	5.84	37	1311	33	—	—	—	6.48	41	—	—	5.00	30	—	—	—	—	5.13	32	

2. METEOROLOGY AND MAGNETISM:—CAHIRCIVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W. Heights above M. S. L.:—H=9.1 m. H_b=13.7 m. H_a=26.4 m. Above Ground: h_t=1.3 m. h_r=0.56 m. h_a=13.9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.		Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force, Declination West, and Inclination.		
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	Vapour Pressure.		Percentage.		9 h.	21 h.	9 h.	21 h.					mm.	200+
	mb.	mb.	a.	a.	a.	a.	millibar.	%	%	m/s.	m/s.	Tenths of Sky covered.								
			200+	200+	200+	200+														
1	1011.4	1010.6	85.3	84.6	88	84	11.0	10.3	78	76	30	4	345	7	9	7	0.1	82	Fair n. and morning. Fine day.	
2	1011.8	1013.2	85.8	85.3	87	84	12.0	12.9	82	91	345	6	335	3	10	10	0.4	82	c. n. c. to o. day.	
3	1013.2	1014.5	86.0	87.1	87	85	13.8	14.0	93	88	330	3	—	0	10	8	0.7	85	o. and d. n. o. a. Fair evening.	
4	1015.7	1015.6	87.1	85.3	90	82	12.3	12.3	77	87	25	6	35	4	5	10	2.0	78	Fair and d. n. Fair a. ● and T p.	
5	1014.9	1017.1	86.3	87.2	89	84	11.9	13.4	79	83	30	8	75	2	8	9	3.3	82	c. and p. n. c. to o. and d. a. c. to o. p. and T p.	
6	1019.5	1019.6	89.0	87.9	92	83	13.5	14.1	75	84	20	4	—	1	1	7	—	78	Fine and d. n. Fine dry day and ∞.	
7	1018.1	1018.0	89.0	86.8	90	84	15.4	13.9	86	89	—	1	305	2	2	8	—	80	c. and ∞ n. Fine and ∞ to o. day.	
8	1019.4	1023.6	86.1	84.9	89	84	12.9	11.2	86	81	335	5	345	5	10	4	—	84	c. and ∞ n. o. to c. a. Fair p.	
9	1025.9	1027.1	89.7	86.8	91	82	13.6	13.6	72	87	—	1	10	2	1	3	—	78	Fine and d. morning. Fine day.	
10	1026.0	1023.7	87.0	86.2	89	85	13.6	12.8	86	85	350	6	360	4	9	2	—	82	Fine to o. morning. Fine day.	
11	1020.9	1017.9	87.1	86.8	88	86	15.6	13.9	98	89	290	2	315	4	10	9	—	83	Fine n. o. to ∞ morning and day. c. evening.	
12	1021.3	1026.8	85.6	85.0	88	84	11.1	10.6	77	76	355	6	350	4	9	7	—	82	c. to o. n. and morning. Fine dry day.	
13	1028.7	1028.0	86.5	85.0	89	83	11.1	12.8	72	92	300	5	285	6	8	10	1.5	78	Fair n. and a. ● a. Fair day. o. to ● ⁰ p.	
14	1026.2	1026.3	87.6	86.4	89	86	14.4	13.6	93	89	305	8	—	1	10	7	0.4	78	d ⁰ morning. Fair day. d. evening.	
15	1023.2	1023.2	87.3	87.5	90	86	15.8	15.7	98	96	280	4	—	1	10	10	2.2	84	d. morning. Fair p. d. evening.	
16	1021.8	1019.2	88.1	87.9	89	86	14.8	16.3	87	97	—	1	220	2	9	10	3.1	85	d ⁰ n. o. day. ● evening.	
17	1018.4	1015.4	87.1	87.1	91	86	13.6	14.0	85	88	—	1	195	3	10	8	0.3	85	d ⁰ n. Fair day.	
18	1005.5	1003.0	87.1	86.5	89	86	15.6	14.5	98	94	170	8	265	5	10	10	12.4	85	p. to ● morning. ● to ● ⁰ a. o. and d.	
19	1007.9	1012.5	86.4	85.8	88	84	9.9	11.4	65	78	350	5	300	3	8	8	0.8	83	o. and p. n. Fair day. [evening.	
20	1017.6	1021.5	85.4	86.5	89	84	11.8	12.9	83	84	330	3	260	4	8	8	—	79	Fair n. and day.	
21	1019.6	1022.1	87.8	87.6	89	86	16.2	16.0	97	97	240	10	255	6	10	10	14.8	85	● ⁰ n. ● morning. ● ⁰ to d. a. o. to d. p.	
22	1019.5	1022.2	87.6	86.0	91	84	16.3	12.9	99	87	265	7	340	4	10	2	2.4	87	d. n. ● ⁰ to d. a. Fine and ⊕ p.	
23	1023.1	1024.2	87.4	88.3	90	81	13.5	16.4	83	95	320	2	345	4	10	10	—	78	Fine and d. n. and morning. c. to o. a.	
24	1024.5	1024.0	90.1	89.1	92	88	16.6	16.7	86	92	360	4	360	2	10	8	0.3	87	d ⁰ n. o. a. Fair to fine day. [o. and d ⁰ p.	
25	1023.2	1024.2	90.0	88.4	93	85	13.4	14.9	70	86	55	5	—	0	1	5	—	84	Fine and d. morning. Fine day.	
26	1023.1	1022.7	87.2	86.0	90	83	15.4	13.4	96	90	355	2	—	0	10	1	—	79	Fine n. ∞ morning. Fine day.	
27	1021.7	1021.1	87.7	87.9	90	83	13.6	13.7	82	82	20	2	—	1	10	7	—	80	Fine n. o. a. Fair p.	
28	1021.7	1023.0	89.3	87.7	91	86	14.9	14.2	81	86	—	0	—	1	10	6	—	84	Fair n. o. a. Fine p.	
29	1023.5	1023.8	89.7	88.0	91	82	16.0	15.4	85	91	—	1	—	0	3	7	—	78	Fine and d. n. Fine day. ∞ ⁰ p.	
30	1024.1	1024.5	88.2	85.4	91	83	15.9	12.1	93	85	—	0	—	0	7	2	—	79	Fair n. ∞ morning. Very fine day. 31st	
31	1021.6	1020.8	89.3	87.9	92	82	15.1	16.0	82	95	180	5	315	3	9	9	2.3	77	Fine and d. n. ● ⁰ to d ⁰ day. o. evening.	
Means	1019.8	1020.3	87.5	86.7	89.8	84.2	13.9	13.7	85	88	3.9	2.7	8.0	7.2	—	47.0	81.8	—	—	Monthly Totals or Means.
Normal	1014.0	1014.5	88.3	87.4	90.1	85.1	14.5	14.2	83	86	4.6	4.0	—	—	—	99.9	—	—	—	Normals.

* By Campbell-Stokes Sunshine Recorder. † Mean for 30 days only. x denotes the maximum and n the minimum value in the column.

3. METEOROLOGY:—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level:—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m.

Heights above Ground:—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns: Day, Air Pressure at Station Level (9h, 21h), Air Temperature in Degrees Absolute (9h, 21h, Max, Min), Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second (9h, 21h), Cloud Amount and Weather (9h, 21h), Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly totals and normals.

4. METEOROLOGY:—ESKDALEMUIR, DUMFRIESSHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level:—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m.

Heights above Ground:—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns: Day, Air Pressure at Station Level (9h, 21h), Air Temperature in Degrees Absolute (9h, 21h, Max, Min), Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second (9h, 21h), Cloud Amount and Weather (9h, 21h), Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly totals and normals.

Temperatures at or below the normal freezing point of water are printed in small type.

5. GEOPHYSICS :—RICHMOND (KEW OBSERVATORY).

Day.	Earth Temperature at 9 h.		Height above M. S. L. of Surface of Underground Water.		Magnetic Force.						Magnetic Character of Day.	Electric Character of Day.	Charge per cc. $\times 10^{20}$		Air-Earth Current $\times 10^{16}$.	Potential Gradient, Volts per metre. Factor 1.95.					
	0.3 m.	1.2 m.	Daily Mean.	Extremes.	Horizontal Comp't.		Declination.		Inclination.				+	-		About 15 h.	About 15 h.	3 h.	9 h.	15 h.	21 h.
					Mean Time.	γ	Mean Time.	West.	Mean Time.	North.												Mean Time.	North.
	<i>a.</i>	<i>a.</i>	cm.	cm.	h m	γ	h m	°	h m	°			Coulomb.	Amp/cm ² .	v/m.	v/m.	v/m.	v/m.			
1	200+	200+	231	231	...	...	...	...	...	...	1	2	...	...	-60	130	-415	50
2	86.7	85.9	231	...	...	...	...	...	...	...	0	1	...	...	-95	155	95	200
3	86.7	85.8	230	...	...	...	14 24	14 47.2	...	...	0	1	...	...	85	215	130	320
4	86.9	85.8	229	...	11 16	18404	...	...	14 28	66 56.7	0	1	...	...	225	145	120	285
5	87.4	85.8	228	...	...	...	...	...	...	...	0	1	...	...	320	355	355	240
6	87.7	85.7	228	...	...	...	...	...	...	...	0	0	...	...	190	240	155	190
7	87.6	85.8	227	...	...	...	...	...	...	...	1	0	...	...	95	295	355	450
8	87.1	85.8	226	...	...	...	...	...	...	...	1	0	0.35	0.39	200	215	95	295
9	86.2	85.9	225	...	...	...	...	...	...	...	1	1	0.47	0.18	215	295	240	155
10	88.5	85.9	223	...	11 3	18383	14 21	14 48.1	14 25	66 56.5	0	0	0.23	0.08	120	240	295	285			
11	88.9	85.8	222	...	...	...	...	...	...	...	1	0	0.08	0.04	105	215	145	60
12	89.9	85.9	221	...	...	...	...	...	...	...	1	1	...	...	145	±	145	240
13	88.1	86.0	221	...	...	...	...	...	...	...	1	1	...	...	120	165	120	165
14	88.1	86.0	220	...	...	...	...	...	...	...	0	1	0.08	0.06	155	180	145	200
15	88.0	86.0	220	...	...	...	...	...	...	...	0	0	0.64	0.37	120	215	165	490
16	87.2	86.0	220	...	...	...	...	...	14 29	66 55.8	0	0	0.21	0.18	190	215	145	180
17	89.3	86.1	220	...	11 2	18411	...	...	...	...	2	0	...	...	190	120	165	215
18	89.3	86.1	219	...	...	...	14 27	14 48.5	...	...	1	0	0.41	0.16	200	430	130	165
19	89.9	86.2	220	...	...	...	...	...	...	...	0	1	...	...	70	180	130	285
20	89.6	86.3	220	...	...	...	...	...	...	...	0	2	...	...	105	-60	200	155
21	87.9	86.5	219	...	...	...	...	...	...	...	0	0	0.31	0.31	225	295	215	240
22	88.6	86.5	219	...	...	...	...	...	...	...	1	1	0.41	0.23	95	285	130	225
23	88.5	86.5	219	...	...	...	...	...	14 34	66 58.9	2	0	...	...	85	180	60	165
24	88.2	86.5	218	...	11 4	18376	14 21	14 46.8	...	...	1	1	0.35	0.12	25	190	250	145	
25	88.0	86.5	218	...	...	...	...	...	...	...	0	1	0.16	0.14	120	190	200	215
26	88.3	86.6	217	217	...	...	...	...	...	...	0	1	...	...	240	225	145	95
27	89.5	86.5	217	217	...	...	...	...	...	...	0	1	...	...	60	165	120	165
28	89.1	86.6	218	...	...	...	...	...	...	...	0	0	...	...	145	275	180	225
29	88.1	86.6	220	...	...	...	...	...	...	...	0	0	0.29	0.16	60	190	190	370
30	87.8	86.6	220	...	...	...	...	...	...	...	0	0	0.21	0.16	190	295	250	215
31	87.7	86.6	220	...	...	...	...	...	14 32	66 54.7	0	0	0.64	0.25	95	95	...	190
M.	88.1	86.2	222	—	—	—	—	—	—	—	—	—	—	—	126†	215†	156†	222†			
	90.0	87.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
	← 12 years →																				

† Mean for 29 days.

6. GEOPHYSICS :—ESKDALEMUIR.

Day.	Magnetic Force.												Magnetic Character of Day.	Electric Character of Day.	Potential Gradient, Volts per metre. Factor 7.24 to 13" on 10, 9.63 after.						
	North Component.			West Component.			Vertical Component.			3 h.	9 h.	15 h.			21 h.						
	Maximum. 15000 γ +.	Minimum. 15000 γ +.	Range.	Maximum. 4000 γ +.	Minimum. 4000 γ +.	Range.	Maximum. 44000 γ +.	Minimum. 44000 γ +.	Range.												
	h m	γ	γ	h m	γ	γ	h m	γ	h m	γ	γ	h m	γ			v/m.	v/m.	v/m.	v/m.		
1	21 39	1098	969	11 37	129	21 38	938	847	8 3	91	18 28	1122	1091	12 30	31	1	1 b	150	260	85	85
2	18 44	1057	973	12 22	84	15 34	938	839	8 25	99	18 38	1120	1089	12 30	31	1	1 b	-145	160	130	165
3	18 42	1045	926	11 56	119	14 48	923	842	9 34	81	17 30	1132	1095	11 14	37	1	1 b	45	110	100	165
4	17 58	1039	960	12 1	79	15 53	921	847	8 15	74	19 12	1127	1095	11 53	32	0	0 a	225	130	95	145
5	0 7	1025	965	12 1	60	16 20	913	849	8 23	64	18 30	1124	1096	0 30	28	0	1 a	260	70	20	95
6	19 30	1034	968	11 18	66	14 20	921	839	9 9	82	4 5	1119	1098	13 18	21	0	1 a	30	15	85	130
7	17 48	1060	981	12 44	79	16 35	941	831	8 25	110	21 15	1137	1095	12 17	42	1	1 a	85	20	135	310
8	22 26	1066	950	13 57	116	14 17	950	828	5 57	122	17 23	1148	1063	3 18	85	1	0 a	180	305	200	320
9	22 1	1079	942	11 30	137	13 53	934	834	7 41	100	17 28	1125	1080	1 10	45	1	0 a	335	195	210	225
10	20 24	1058	933	11 10	125	15 22	930	850	6 25	80	18 25	1137	1108	12 55	29	1	0 a	450	180	385	325
11	19 46	1055	955	11 54	100	14 43	932	834	9 0	98	16 20	1126	1099	13 19	27	1	1 a	105	210	135	290
12	18 57	1063	959	12 20	104	15 3	932	851	6 44	81	18 50	1136	1094	11 55	42	0	†	240	210	†	†
13	19 10	1056	961	14 2	95	15 47	929	852	4 27	77	19 30	1133	1094	13 6	39	1	†	†	†	-20	200
14	17 55	1032	949	12 32	83	15 40	914	844	6 1	70	18 30	1127	1100	11 8	27	0	0 a	200	180	145	105
15	19 31	1031	976	11 4	55	14 35	922	852	8 50	70	7 0	1122	1102	12 42	20	0	0 a	290	335	155	405
16	19 37	1034	968	12 19	66	13 43	930	853	8 13	77	19 30	1122	1096	11 30	26	0	0 a	115	75	145	395
17	16 37	1146	977	13 33	169	16 46	1037	838	21 21	199	17 34	1261	1093	12 18	168	2	0 a	210	210	175	280
18	4 50	1035	930	10 11	105	14 15	930	835	5 22	95	15 33	1139	1065	2 12	74	1	†	175	145	*	*
19	20 3	1033	965	11 32	68	15 37	920	834	23 6	86	21 13	1137	1109	2 57	28	0	*	†	†	230	395
20	17 57	1036	972	12 7	64	15 15	931	830	0 54	101	5 40	1129	1101	11 50	28	0	†	†	†	65	135
21	1 17	1035	976	10 58	59	13 51	911	849	5 8	62	22 53	1123	1107	9 40	16	0	†	†	†	†	†
22	17 43	1091	961	14 19	130	17 43	968	834	7 24	134	19 40	1175	1087	11 49	88	1	0 a	95	155	190	200
23	1 8	1070	860	4 16	210	4 19	1002	831	8 8	171	17 10	1160	1002	4 37	158	2	0 a	105	135	200	175
24	17 53	1050	933	12 3	117	15 23	924	834	6 21	90	18 35	1139	1106	4 0	33	1	0 a	95	95	95	190
25	15 0	1032	971	11 21	61	15 0	931	850	5 38	81	16 40	1139	1106	2 42	33	0	0 a	385	145	175	30
26	16 53	1047	968	12 32	79	12 10	930	?	?	?	17 50	1132	1110	11 30	22	0	1 a	55	200	145	85
27	18 52	1033	970	12 36	63	13 37	931	861	5 33	70	17 45	1117	1098	12 12	19	0	1 a	95	85	115	20
28	23 52	1033	973	11 31	60	14 9	930	852	7 45	78	17 52	1130	1106	12 40	24	0	1 a</				

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W.

Heights above M. S. L. :—H = 54 m. H_b = 55 m. Above Ground :—h_t = 1.48 m. h_r = 1.72 m. h_a = 8 m.

Table with columns: Day, Air Pressure at Station Level (9 h, 14 h, 21 h, Mean of 3 Readings), Air Temperature in Degrees Absolute (9 h, 14 h, 21 h, Max, Min, Mean of 5 Readings), Min. Temp. on Grass, Percentage of Humidity (9 h, 14 h, 21 h, Mean), Rain 0 h. to 24 h., REMARKS, Earth Current Character.

JERSEY (ST LOUIS OBSERVATORY).

Table with columns: Day, Wind Direction and Force (0-12 on the Beaufort Scale), Sunshine, Cloud Amount (tenths of Sky covered), Type of Cloud, and Direction whence coming, Mean Amount.

* For method of estimation, see Introduction

† The first hour of observation was changed to 9 h. on Jan. 1st, 1919.

8. WIND COMPONENTS: Metres per second at fixed hours, together with the greatest mean hourly velocity, or the greatest velocity attained in a gust, and the time of its occurrence.

NORTH WALES:—HOLYHEAD.

Height of Head above—Roof 8.8 m., Ground 13.7 m., M.S.L. 19.2 m.
Height of Cups above—Roof 4.6 m., Ground 7.6 m., M.S.L. 15.2 m.

SCOTLAND N.:—DEBRNESS.

Height of Cups above—Roof 1.5 m., Ground 4.9 m., M.S.L. 57.3 m.

Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	Day.	3 h.				9 h.				15 h.				21 h.				Vel. in Max. Hourly Run.	Time of Max.												
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.			S.	N.	W.	E.								
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.				m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.			m/s.	m/s.	m/s.	m/s.								
1	10.9	...	2.2	...	7.4	1.5	8.5	3.5	9.6	1.9	19.4	16	50	1	6.9	2.9	10.2	9						
2	7.6	...	5.1	...	6.6	...	4.4	...	5.1	...	1.0	...	4.5	1.9	12.6	0	15	2	6.2	23						
3	3.1	1.0	7.4	1.5	7.1	1.4	4.8	...	1.0	...	14.0	7	10	3	5.2	...	2.1	3.0	1						
4	4.9	...	3.3	...	4.4	...	4.4	...	5.8	...	5.8	...	1.8	...	9.0	...	13.0	22	40	4	3.6	6.5	17						
5	8.2	3.8	...	5.7	...	3.1	...	4.7	...	11.3	3	35	5	5.2	...	2.1	5.2	6, 7						
6	Cal m	5.2	...	3.4	...	3.3	...	3.3	...	9.1	5	55	6	5.6	4.8	9						
7	1.8	...	2.7	...	4.1	...	2.7	...	2.9	...	4.3	...	1.3	...	3.0	...	7.5	8	30	7	1.6	1.6	2.4	18						
8	2.2	...	3.2	...	4.3	3.9	3.3	1.4	6.5	14	10	8	0.8	1.8	3.5	13						
9	4.8	2.0	4.0	1.6	1.9	1.3	1.3	0.9	7.3	11	50	9	1.1	5.5	1.5	14, 16						
10	1.3	0.9	4.9	3.5	...	0.7	...	2.0	9.0	7	5	10	...	6.9	3.8	11						
11	1.3	0.9	1.8	2.7	4.4	...	4.4	...	1.8	4.3	13.4	19	30	11	1.5	0.6	2.0	17						
12	6.2	4.2	7.4	4.9	7.1	1.4	9.3	1.9	14.0	20	35	12	...	7.5	5.8	9, 10						
13	8.5	5.7	6.3	6.3	3.4	8.2	5.3	7.9	14.0	23	5	13	...	Cal m	5.8	15						
14	3.0	7.3	4.6	6.8	3.0	3.0	6.0	6.0	11.8	7	20	14	...	1.8	1.8	5.3	13						
15	7.1	1.4	5.5	1.1	1.8	0.8	2.6	...	3.8	...	15.4	6	10	15	...	3.0	1.3	0.9	14						
16	3.5	3.5	2.3	0.3	...	1.6	...	2.2	...	1.4	...	7.0	1	45	16	1.6	4.0	4.3	10						
17	3.6	...	1.5	...	2.5	7.5	22	40	17	...	Cal m	8, 9						
18	3.6	...	2.4	...	7.3	6.6	6.1	...	1.2	...	14.3	22	25	18	1.1	...	1.7	5.8	24						
19	5.2	...	3.4	...	2.5	6.1	3.5	4.7	5.6	13.6	1	5	19	4.7	1.9	2						
20	5.8	1.2	6.4	2.6	2.8	2.8	0.8	1.8	8.5	10	30	20	...	2.3	2.3	2.9	13						
21	2.0	4.8	0.9	4.2	...	4.2	...	2.7	...	4.1	...	10.6	22	25	21	...	2.3	2.3	4.9	24						
22	3.2	...	0.6	...	6.6	4.4	3.5	8.5	7.6	3.1	14.5	22	40	22	...	4.1	10.0	6.9	1						
23	8.5	5.7	6.5	6.5	3.3	3.3	4.3	15.6	0	15	23	...	4.7	3.1	4.0	9						
24	4.1	2.7	4.8	1.0	2.4	1.0	3.6	2.4	9.4	23	40	24	...	3.1	4.7	4.2	12, 15						
25	5.1	1.0	3.5	0.7	4.2	...	0.8	...	Cal m	9.0	0	10	25	...	4.5	1.9	7.1	13, 21						
26	2.3	0.4	3.5	0.7	1.7	1.1	6.0	15	40	26	...	6.1	2	7.9	8						
27	2.4	1.0	1.6	3.4	...	5.2	...	2.5	...	1.7	...	9.1	13	25	27	...	4.9	6.9	9, 10						
28	1.2	...	5.8	...	0.4	0.6	...	3.2	3.2	...	8.3	1	0	28	...	3.0	5.1	8						
29	2.7	3.3	6.4	7	35	29	...	3.3	3.3	3.3	16, 17						
30	2.0	2.3	3.3	5.5	13	15	30	5.6	1.3	11						
31	3.0	...	3.0	...	5.8	7.4	...	7.4	...	2.9	...	6.9	...	17.0	14	5	31	11.1	23						
S+N & W+E	117.9	84.7	127.1	95.3	119.7	88.7	105.6	80.2																	S+N & W+E	82.0	81.3	141.1	96.8	135.7	108.1	110.4	87.6																
S-N & W-E	-80.1	22.5	-89.5	35.5	-73.9	28.5	-68.0	28.4																	S-N & W-E	-64.2	55.3	-50.7	69.0	-72.5	82.8	-69.2	64.8																

ENGLAND S.W.:—SOILLY.

Height of Head above—Ground 9.8 m., M.S.L. 49.7 m.
Height of Cups above—Ground 5.8 m., M.S.L. 45.7 m.

ENGLAND E.:—SHOEBURYNESS.*

Height of Head above—Ground 27.4 m., M.S.L. 31.4 m.

Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.										
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.												
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.				m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.			m/s.	m/s.	m/s.	m/s.						
1	7.7	3.2	9.6	6.9	4.6	3.5	2.3	16.0	22	30	1	...	3.0	7.9	17
2	5.0	5.0	5.6	3.7	4.1	4.1	3.0	4.5	10.2	0	15	2	...	Cal m	1.0	25
3	1.6	2.4	1.2	1.8	1.3	3.1	0.3	0.7	4.9	0	20	3	...	4.0	4.3	5				
4	1.5	1.5	2.1	...	1.4	...	3.9	...	1.6	...	4.1	0.8	5.6	18	40	4	5.6	...	2.3	2.6	3				

9. SEISMOLOGICAL DIARY.

EARTHQUAKES:—ESKDALEMUIR.								MICROSEISMS OF N. COMPONENT:—ESKDALEMUIR.										
Day.	Phase.	Time, G.M.T.			Amplitudes.			Δ.	Remarks.	Day.	0 h.		6 h.		12 h.		18 h.	
		h	m	s	Period.	A _{N.}	A _{E.}				A _{Z.}	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.
		h	m	s	s	μ	μ	μ	km.		μ	s	μ	s	μ	s	μ	s
4	L F	14	3	30	18	...	...	...	...		0.9	4.5	1.0	4	1.0	4	1.0	4
		14	24		...	...	...	...	...		0.3	4	0.3	3	0.1	3.5	0.3	3.5
4		23	30	to	...	...	...	...	Faint disturbance.		0.3	2	0.4	3.5	0.4	3.5	0.5	4
		24	0		...	...	...	...			0.1	2.5	...	...	...	...	...	...
6	O P S L M _e F	7	4	23	...	...	...	...	8500		...	...	...	...	...	...	...	...
		7	16	10	...	...	...	...			0.1	4	0.3	4	0.3	4	0.6	4
		7	25	56	...	...	...	...			0.8	4	0.9	5	0.6	4	0.9	4
		7	41	45	...	...	...	...			0.8	4	1.0	4	1.1	4	0.9	4
		7	45	33	22	...	13	...			0.8	4	0.2	4	0.9	4	0.3	4
		8	18		...	...	...	...			0.5	4	0.2	4	0.2	4	0.1	3
		14	48	to	...	...	...	...	Slight disturbance, with long waves of 19 seconds period at 15 h. 16 m.		0.5	4	0.3	4	0.2	4	0.3	3.5
		16	5		...	...	...	...			0.2	4	0.2	4	0.7	4	0.7	5.5
8	O P PR ₁ PR ₂ S L M _n M _n F	21	16	25	...	...	...	...	7660	P marked on both horizontal components with unusual sharpness. Azimuth of epicentre 146° or 326°, indeterminate owing to absence of vertical record. Anti-epicentral waves well marked.	1.0	4.5	1.0	4.5	0.7	5	0.6	4.5
		21	19	16	...	...	...	...			0.9	4	0.7	4	...	...	...	...
		21	20	41	...	...	...	...			0.1	4	0.1	3.5	0.3	2.5	0.1	3
		21	25	28	...	...	...	...			0.1	4	0.0	0	0.1	4	0.1	4
		21	39		...	...	...	...			0.2	4	0.1	4	0.1	4	0.3	3.5
		21	41	39	24	...	59	...			0.2	4	0.2	4	0.3	2	0.1	3
		21	49	36	21	...	75	...			0.2	4	0.2	4	0.1	4	0.3	3.5
		1	15		...	...	...	...			0.4	3	0.1	4	0.1	4	0.1	4
9		19	43	to	...	...	...	...	Slight disturbance. P probably at 19 h. 42 m. 22s.		0.3	4	0.3	3.5	0.9	4	1.0	4
		20	30		...	...	...	...			0.7	4	0.3	4	0.5	4	0.6	4
11	P(?) L F	0	51	20	...	...	...	...			0.3	4	0.1	4	0.1	4	0.3	3.5
		1	5		...	...	...	...			0.2	4	0.1	4	0.1	4	0.3	3
		1	45		...	...	...	...			0.2	4	0.2	4	0.3	2	0.1	3
12	i _e L F	22	32	21	...	...	...	...			0.2	4	0.2	4	0.1	4	0.3	3.5
		22	37		16	...	...	...			0.4	3	0.1	4	0.1	4	0.1	4
		23			...	...	...	...			0.3	4	0.3	3.5	0.9	4	1.0	4
14		13	52	to	...	...	...	...	Prolonged slight disturbance. No noticeable preliminary phases. Chiefly groups of long waves of 17 seconds period.		0.7	4	0.3	4	0.5	4	0.6	4
		15	30		...	...	...	...			0.3	4	0.3	4	0.4	3.5	0.3	4
16		4	31		...	...	...	...	Slight disturbance. L probably at 4 h. 51 m.		0.3	4	0.1	3	0.0	0	0.0	0
		5	22		...	...	...	...			0.3	3	0.3	3	0.0	0	0.0	0
17		10	30	to	...	...	...	...	Slight disturbance.		...	...	...	...	...	...	...	...
		11	7		...	...	...	...			...	...	...	...	...	...	...	...
17	L F	16	56		...	...	...	...			...	...	...	...	...	...	...	...
		17	30		...	...	...	...			...	...	...	...	...	...	...	...
18		17	12	to	...	...	...	...	Slight disturbance. L probably at 7 h. 18 m.		...	...	...	...	...	...	...	...
		7	33		...	...	...	...			...	...	...	...	...	...	...	...
22		22	23	to	...	...	...	...	Slight disturbance. Well-marked groups of long waves of 16 seconds period at 22 h. 47 m. to 22 h. 52 m. on E.-W. trace.		...	...	...	...	...	...	...	...
		23			...	...	...	...			...	...	...	...	...	...	...	...
24	O P S SR ₁ L M _R F	2	3	25	...	...	...	...			...	...	...	...	...	...	...	...
		2	12	50	...	...	...	...			...	...	...	...	...	...	...	...
		2	20	21	...	...	...	...			...	...	...	...	...	...	...	...
		2	24	27	...	...	...	...			...	...	...	...	...	...	...	...
		2	31		...	...	...	...			...	...	...	...	...	...	...	...
		2	38	22	18	44	...	...			...	...	...	...	...	...	...	...
		3	51		...	...	...	...			...	...	...	...	...	...	...	...

Means for Month { A_N=0.3, T=3.0. Normals, 1911-18 { A_N=0.3, T=4.4.

EARTHQUAKES:—RICHMOND (KEW OBSERVATORY).

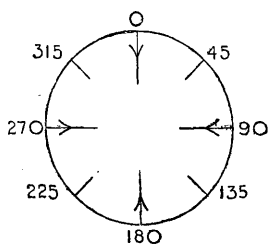
Day.	Times, G.M.T. of		Remarks.
	Commencement.	Max. Phase.	
4	h m	h m	Small.
	...	23 41	
8	21 25	21 49	Amplitude on trace 1.4 mm.
12	...	22 39	Small.
14	...	14 42	Succession of small waves.
17	...	10 41	Small.
17	...	17 9	Small.
22	...	22 45	Very small.
24	2 23	2 33	

10. SOUNDINGS WITH PILOT BALLOONS.

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.												Cloud Observations.														
		Geostrophic.		By Anemometer.		At Heights above M.S.L.								Time, G.M.T. h. m.	Type.	Deg. from N. nr/s.	Type.	Deg. from N. nr/s.										
		Deg. from N.	m/s.	Deg. from N.	m/s.	500 m.		1000 m.		2000 m.		3000 m.							4000 m.									
		Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.											
ABERDEEN.																												
8	17 0	?	?	80	2'0	360	6'0	360	6'0	360	4'5	...	...	...	...	18 0	...	...	...	...	70	2'0
16	7 30	270	5	calm		290	2'5	230	4'5	260	9'5	265	11'0	...	...	13 0	St-Cu.	230	5'0	A-Cu.	235	3'0				
21	7 30	315	5	295	6'0	310	14'5	320	13'5	260	3'0	...	...	...	...	13 0	...	...	...	Ci-Cu.	160	2'5
ESKDALEMUIR.																												
7	17 25	?	?	205	1'0	235	2'7	350	3'8	45	2'6	15	2'3	85	4'2	...	Cu.	350					
8	11 45	?	?	60	5'5	20	3'8	25	5'0	65	2'2	25	4'0	60	5'0	11 10	Cu.	20	...	Ci.	95	1'5						
8	17 20	?	?	70	4'0	40	5'5	15	6'5	20	5'0	...	...	...	...	17 15	Cu.	70	...	Ci.	85	1'5		
9	7 50	350	7	80	0'5	230	1'6	320	2'6	340	6'0	345	9'5	355	9'0	8 30	...	...	...	Ci-St.	5	2'5			
10	17 40	330	5	300	7'5	300	4'5	285	4'0	355	2'0	305	4'8	340	5'0	...	...	...	...	Ci.	...	...				
11	17 35	280	7	270	7'0	260	11'0	260	16'0	265	18'0	...	...	...	...	...	Cu., Fr-Cu.	270	...	A-Cu., Ci.	250	...	
12	7 15	315	6	290	5'5	295	10'0	300	8'0	315	14'0	...	...	...	...	7 45	Fr-Cu.	295	...	Ci.	200	6'5		
12	12 10	335	7	315	8'0	305	14'5	315	7'0	320	11'0	...	...	...	...	12 30	Cu-Nb.	335	5'5	...	...	...			
12	17 25	340	7	355	5'5	350	3'9	345	8'0	320	6'5	...	...	...	...	...	Cu-Nb.	...	...	...	...	...	
14	11 45	320	8	315	3'5	305	1'8	330	4'0	340	14'0	...	...	...	...	...	Cu.	...	...	...	...	...	
15	12 15	30	5	360	0'3	355	2'2	310	3'0	355	8'5	...	...	...	...	12 0	Cu.	320	4'5	Ci.	345	3'5		
15	17 35	270	5	190	5'5	220	4'9	260	4'9	320	9'0	...	...	...	...	17 15	Cu.	...	...	Ci-Cu.	320	...
21	17 35	340	7	265	6'5	275	8'5	265	11'0	275	20'0	...	...	...	...	17 30	Cu-Nb.	270	...	A-Cu.	270	7'0		
25	12 5	?	?	40	4'5	40	6'5	10	4'8	360	8'0	15	8'0	...	...	...	Fr-Cu.	25	...	...	...	...		
26	18 5	45	5	60	4'9	50	5'0	360	3'4	300	7'0	325	11'5	...	...	18 30	...	...	...	A-Cu.	315	4'0	
29	7 20	360	8	10	0'6	5	7'0	10	10'5	20	7'5	50	12'0	40	16'5	7 0	Cu.	20	11'5	Ci.	45	2'5						
29	11 50	360	7	50	4'6	30	3'2	15	4'1	40	6'5	30	10'0	30	9'5	...	Cu.	30	...	Ci-St.	25	...						
29	17 40	360	5	75	1'5	125	2'7	230	1'3	305	5'5	320	7'0	...	...	...	St-Cu.	340	...	...	...	...		
30	7 15	315	5	calm		250	4'2	260	5'5	280	7'5	...	...	...	...	...	Fr-St.	255	...	Ci.	...	...				
30	17 30	315	6	280	4'5	290	4'9	255	5'0	305	7'5	285	15'0	325	2'2	...	...	...	...	cloud	less	...		
SOUTH FARNBOROUGH.																												
7	17 25	(For observations at lower levels, see above.)												5000 m.	6000 m.	...	Cu.	350	...	...	...				
10	17 40	(For observations at lower levels, see above.)												110	5'5	...	...	...	...	...	...	...
29	7 20	(For observations at lower levels, see above.)												345	7'0	360	6'5	...	...	...	...	...	
29	11 50	(For observations at lower levels, see above.)												35	16'0	7 0	Cu.	20	11'5	Ci.	45	2'5		
30	11 50	(For observations at lower levels, see above.)												20	11'5					
30	17 30	(For observations at lower levels, see above.)												340	3'1	cloud	less			
SOUTH FARNBOROUGH.																												
3	6 40	270	10	260	7'0	295	8'0	280	10'5	270	12'0	...	...	...	...	...	St-Cu.	...	...	A-Cu.	...	...				
4	6 35	225	7	180	2'0	210	3'0	225	6'0	225	6'5	...	...	...	...	...	A-Cu.	230	...	Ci., Ci-Cu.	...	...				
9	6 30	350	6	calm		330	6'5	355	6'0	355	8'5	...	...	...	...	...	...	...	...	Ci., Ci-St.	...	...				
10	6 35	340	5	335	3'3	15	5'5	330	6'0	260	6'5	10	5'5	15	9'0	...	...	...	...	...	...	...
11	6 30	?	?	300	1'4	305	7'0	325	6'5	345	5'5	30	8'5	...	...	...	A-Cu.	...	...	Ci.	340	...	
14	7 30	320	10	315	9'0	295	8'5	295	9'5	315	13'5	...	...	...	...	...	Nb.	...	...	A-Cu.	...	...				
15	7 0	360	12	335	4'5	350	11'0	360	13'5	345	17'5	...	...	...	...	...	St-Cu., A-Cu.	...	...	Ci-St., Ci-Cu.	...	...				
16	10 10	270	4	225	2'7	260	5'5	270	4'5	325	8'0	335	8'5	...	...	...	Cu.	...	...	Ci-Cu.	...	...				
21	6 35	300	16	295	8'0	300	10'0	300	11'0	295	14'0	300	15'5	300	16'5	...	A-St.	...	...	...	...	...	
22	18 20	315	9	205	5'5	315	5'0	305	8'5	315	14'5	...	...	...	...	...	Cu.	...	...	...	...	...	
26	8 0	360	4	15	1'3	15	2'8	5	11'5	340	11'0	340	7'5	345	9'0	...	Fr-St.	...	...	...	...	...	
28	6 30	?	?	360	1'5	355	8'0	340	8'5	355	8'0	360	8'5	...	...	...	St-Cu., Cu.	...	...	A-Cu.	...	...				
31	6 25	250	5	calm		285	2'2	75	2'8	330	5'5	40	4'4	355	3'7	...	...	...	...	cloud	less	...		
SOUTH FARNBOROUGH.																												
10	6 35	(For observations at lower levels, see above.)												5000 m.	6000 m.	7000 m.	8000 m.	9000 m.					
21	6 35	(For observations at lower levels, see above.)												15	8'5	20	11'0					
26	8 0	(For observations at lower levels, see above.)												305	14'0	305	19'5					
31	6 25	(For observations at lower levels, see above.)												340	12'0	335	16'0					
31	6 25	(For observations at lower levels, see above.)												25	4'4	10	8'5	5	8'0	5	7'0	5	7'5	cloud	less

Height of Station above M.S.L. = H.,
Anemometer above ground = h.

Aberdeen	H.	h.
	14 m.	32 m.
Eskdalemuir	242 m.	15 m.
S. Farnborough	70 m.	31 m.
Cahiriveen	9 m.	13 m.



Wind Protractor.

Note.—On July 9, the Golf Course Anemometer again came into use.

Notes on Pressure Distribution.

Throughout the whole month there was an extensive anticyclone over the Azores region which oscillated to the north and east.

- July 1919.
- 3 7 h., 18 h. Low centred near Spurn Head.
 - 4 7 h. Shallow Low over England.
 - 6th-17th. High over the British Isles.
 - 20 7 h. } Shallow Low over the North Sea.
 - 22 18 h. }
 - 25th-31st. High over the British Isles.

Notes on Ascents.

- Aberdeen—**
- 8th, 17 h. True Cirrus in bands having a radiating point in ESE.
 - 16th, 7 h. 30 m. At 7 h. there was 3/4ths of hazy Ci-St., with solar halo, but after 8 h. 30 m. a rapid growth of St-Cu. took place.
 - 21st, 7 h. 30 m. Upper sheet of closed cloud opening out into Ci-Cu. showing fine example of straight edge to cloud layer, edge lying SE.-NW. The continued backing of air currents as compared with that at 1 km. is noteworthy.
- Eskdalemuir—**
- 9th, Solar halo at 8 h.
 - 12th, 17 h. 25 m. Visibility good.
 - 15th, 17 h. 35 m. Ci-Cu. changing to A-Cu. during flight.
- S. Farnborough—**
- 10th, 6 h. 35 m. Misty, sharp temperature inversion between 2000 and 2500 m.
 - 31st, 6 h. 35 m. Misty up to 1680 m. according to aeroplane pilot.
- Cahiriveen—**
- 9th, 11 h. 50 m. Atmosphere exceptionally clear.
 - 25th, 7 h. 40 m. } Atmosphere very clear.
 - 11 h. 45 m. }

10. SOUNDINGS WITH PILOT BALLOONS—*continued.*

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.												Cloud Observations.									
		Geostrophic.		By Anemometer.		At Heights above M.S.L.								Time, G.M.T. h. m.	Type.	Deg. from N. mr/s.	Type.	Deg. from N. mr/s.					
		Deg. from N.	m/s.	Deg. from N.	m/s.	500 m.		1000 m.		2000 m.		3000 m.							4000 m.				
						Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.						
CAHIRCIVEEN.																							
3	16 50	360	7	360	7.0	30	4.1	55	3.7	75	6.0	...	...	...	...	...	Cu.	360	...	A-Cu.	90	...
4	7 40	20	6	25	5.5	25	10.0	25	11.5	30	14.5	40	3.2	...	...	...	Cu-St.	25	...	A-St., A-Cu.	360	...
6	7 20	?	?	50	6.5	55	6.0	60	7.0	55	9.5	70	9.5	50	9.0	...	A-Cu.	5	2.0	Ci-St.	335	...	
7	7 50	?	?	calm		315	1.4	45	0.1	50	5.5	...	...	...	...	...	Cu.	...	...	Ci.	45	...
9	7 10	?	?	calm		360	1.4	280	1.2	60	3.2	85	6.0	75	7.0	...	St-Cu.	25	...	Ci.	50	2.0	
9	11 50	?	?	360	7.0	30	3.0	35	3.7	60	2.7	80	5.0	75	4.2	13 0	Cu.	65	...	Ci.	65	3.0	
10	12 25	?	?	340	10.5	35	3.8	350	7.0	345	6.0	350	7.0	10	7.0	...	Cu.	360	...	Ci-Cu.	45	...	
12	12 30	?	?	350	10.5	350	9.0	360	9.0	335	13.0	...	...	...	...	...	Cu., Fr-Cu.	360	...	...	...	...
12	16 40	360	9	350	10.0	355	12.0	360	10.5	345	16.0	340	16.5	...	...	...	Cu.	360	10.0	Ci.	...	...
13	7 20	330	13	325	4.3	320	7.0	335	4.3	320	11.5	325	13.5	Cu.	...	Ci., Ci-Cu.	335	...
17	17 15	250	11	230	5.5	245	4.9	245	8.5	235	11.5	250	12.5	245	11.5
20	7 40	285	8	300	4.6	305	6.0	305	7.0	310	9.0	300	10.5	Cu., St-Cu.	315
22	17 10	315	6	335	6.0	5	7.0	345	9.0	325	20.0	...	...	...	...	...	Cu.	360	...	Ci-Cu.	315	...
25	7 40	225	5	65	6.5	20	4.7	30	4.0	25	9.0	20	9.0	10	7.0	...	Cu.	45
25	11 45	225	4	75	3.8	120	0.6	55	4.9	40	7.5	10	4.0	355	6.0	...	Cu.	115
26	17 10	?	?	275	4.3	235	1.8	225	2.8	285	2.5	325	5.0	350	6.5	...	Cu.	270
29	7 50	?	?	calm		55	3.5	55	2.3	50	5.0	20	5.5	...	Cu.	45	...	A-Cu.
30	12 15	?	?	260	3.0	245	1.9	195	3.9	185	4.6	165	4.0	Cu.	180
6	7 20	(For observations at lower levels, see above.)						5000 m.	6000 m.	7000 m.	8000 m.	Cu.	Ci.	45	...
9	7 10							50	12.0	...	...	...	...	...	...	...	...	...	...	Ci.	50	2.0
9	11 50							65	10.5	St-Cu.	45
9	12 25							65	7.5	45	7.5	55	8.0	60	11.0	13 0	Cu.	65	...	Ci.	65	3.0	
9	7 50							20	11.0	Cu.	360	...	Ci-Cu.	45	...
9	7 50							50	7.0	50	8.0	70	130	...	...	...	Cu.	45	...	A-Cu.	...	...

11. NEPHOSCOPE OBSERVATIONS.

ABERDEEN.

Day and Hour, G.M.T.	Type of Cloud.	Velocity-height-ratio.				Remarks.
		Degrees from N.	Milliradians per Second.	Components.		
				W.-E.	S.-N.	
1 18	Ci-Cu.	35	4.2	- 2.4	- 3.4	Coarse Ci. to Ci-Cu., fused to A-Cu. later. Formed rapidly Incipient flat A-Cu. [at 18 h. True Ci. R-pt. E.S.E. ⊕ afternoon. St-Cuf. below, moving from 310° approximately. Ci. of Very slight traces of Ci. [coarse type.
2 13	A-Cu.	60	5.5	- 4.8	- 2.8	
8 18	Ci.	70	2.0	- 1.9	- 0.7	
9 13	Ci.	30	2.2	- 1.1	- 1.9	
11 15	{ Ci. Cu.	230 262	1.7 5.2	+ 1.3 + 5.2	+ 1.1 + 0.7	
14 13	Cu.	335	11.0	+ 4.6	- 9.7	Slight small Cu. True Ci. R-pt. N., rapidly increasing in quantity. Ci-Cu. to high A-Cu., with lower layer of St-Cu. Ci-Cu. to A-Cu.
15 13	Ci.	350	2.7	+ 0.5	- 2.7	
16 13	{ A-Cu. St-Cu.	233 232	3.1 5.0	+ 2.5 + 3.9	+ 1.9 + 3.1	
16 18	{ Ci-Cu. Ci.	230 285	2.2 1.7	+ 1.7 + 1.6	+ 1.4 - 0.4	
17 13	{ Cu	255	4.2	+ 4.1	+ 1.1	
18 13	Ci. Cu.	217	1.5	+ 0.9	+ 1.2	[A-St. Hazy Ci-Cu. in lenticular patches, eventually fused into A-St. opening into fine Ci-Cu. in long perfectly straight bands. Also some slight Ci-Cu. low in E., moving from about 25°.
21 13	Ci. Cu.	161	2.5	- 0.8	+ 2.4	
29 13	Cu.	330	7.9	+ 3.9	- 6.8	

12. AURORA.

None reported.

METEOROLOGICAL OFFICE OBSERVATORIES—GEOPHYSICAL JOURNAL.

DAILY VALUES.—*Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology.*
 Ninth Year.—No. 8. AUGUST 1919. Units based on the C.G.S. System. [Price 1s.]

1. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.			SOUTH KENSINGTON.—Lat. 51° 30' N. Long. 0° 10' W.							RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.				ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.					CAHIRCIVEEN.			
	Bright Sunshine.*			Radiation received on Horizontal Surface by Callendar Radiograph.							Bright Sunshine.*				Radiation at Noon by Ångström Pyrheliometer.					Bright Sunshine.*			
	Total.	Per cent. of Possible.	hr.	j/cm ² .	Per cent. of Planetary.	Maximum.			Total.	Per cent. of Possible.	hr.	%	Radiation at Noon by Ångström Pyrheliometer.			Total.	Per cent. of Possible.	Radiation by Ångström Pyrheliometer.				Total.	Per cent. of Possible.
						For Day.	11.30 h. to 12.30 h.	11.30 h. to 12.30 h.					Intensity.	Vertical Component.	Sky.			Time.	Sky.	p sec Z.	Intensity.		
hr.	%	Amount.	Time.	Amount.	Time.	Amount.	hr.	%	Intensity.	Vertical Component.	Sky.	hr.	%	Time.	Sky.	p sec Z.	Intensity.	hr.	%				
hr.	%	mw/cm ² .	h. m.	mw/cm ² .	h. m.	mw/cm ² .	hr.	%	mw/cm ² .	mw/cm ² .	Sky.	hr.	%	h. m.	Sky.	p sec Z.	mw/cm ² .	hr.	%				
1	7.4	48	1729	47	82	13 4	79	7.8	51	...	...	0.4	3	...	...	...	...	0.1	0
2	7.1	46	1510	41	76	13 0	69	8.0	52	...	...	8.3	52	...	...	...	...	0.0	0
3	6.8	44	1428	39	84	13 30	55	6.8	45	...	...	1.2	8	...	...	...	...	7.5	49
4	2.5	16	1103	30	81	10 38	46	1.9	13	...	...	0.0	0	...	...	...	...	0.0	0
5	1.3	8	855	24	63	11 8	25	0.3	2	...	...	8.0	51	...	...	...	...	8.2	54
6	11.0	73	2009	56	73	12 25	73	10.4	69	...	...	9.4	61	...	...	...	...	8.1	54
7	11.0	73	1559	44	76	14 12	34	9.4	62	...	...	12.1	83	12 20	Clear	1.27	95	10.2	67		
8	13.2	88	2106	59	75	12 40	72	13.1	87	72	59	Clear	0.2	1	...	...	...	11.0	73	
9	13.3	89	2095	59	75	11 59	75	13.3	89	75	61	Clear	9.6	62	12 21	Cl.	1.28	87	1.6	11			
10	12.6	85	1928	55	73	13 6	67	12.0	81	...	...	7.3	48	...	...	...	...	8.9	59
11	13.2	90	2066	59	71	12 22	71	12.9	87	65	52	Clear	2.9	19	...	...	...	6.6	44	
12	11.5	78	1837	53	66	11 48	66	11.3	77	...	...	8.3	55	...	...	...	...	3.6	24
13	11.8	81	2052	60	76	13 16	73	12.2	83	77	62	Clear	1.7	11	...	...	...	8.0	54	
14	10.3	71	1754	51	81	11 50	81	11.1	76	74	59	Clear	8.3	55	12 21	Cl.-St.	1.31	101	9.9	68			
15	9.8	67	1767	52	67	10 15	65	10.1	70	70	55	Hazy	9.9	66	...	...	...	4.2	29	
16	7.5	52	1620	48	75	12 35	74	7.3	51	57	45	Cl.	4.7	31	...	...	...	12.1	83	
17	11.4	79	1828	55	75	12 35	74	11.0	76	...	...	8.5	57	...	...	...	...	2.0	14
18	7.0	49	1582	48	80	11 20	76	5.8	41	75	59	Clear	9.8	66	...	...	...	3.9	27	
19	0.2	1	456	14	41	11 40	41	0.3	2	...	...	5.2	35	...	...	...	...	6.4	44
20	0.1	0	465	14	38	17 15	20	0.1	1	...	...	3.5	24	...	...	...	...	8.5	60
21	11.0	77	1781	55	83	12 40	80	10.9	76	77	60	Clear	9.5	65	...	...	...	10.3	72	
22	5.6	39	1220	38	79	12 30	79	6.0	42	...	...	3.5	24	...	...	...	...	0.0	0
23	4.4	31	1112	35	67	11 25	66	3.9	28	...	...	0.5	3	...	...	...	...	1.3	10
24	2.5	18	895	28	76	12 10	76	2.9	21	...	...	6.6	46	...	...	...	...	2.7	19
25	0.3	0	570	18	48	11 15	32	0.5	3	...	...	0.0	0	...	...	...	...	0.2	1
26	5.9	43	1125	36	80	12 20	80	6.2	45	65	49	Cl.	0.1	1	...	...	...	6.2	44	
27	8.6	62	1489	48	77	11 30	77	8.9	64	71	53	Clear	2.7	19	...	...	...	8.2	59	
28	0.6	5	465	15	38	14 32	28	0.6	5	...	...	0.0	0	...	...	...	...	0.0	0
29	2.2	16	621	21	68	11 2	15	2.3	17	...	...	6.6	56	...	...	...	...	10.3	75
30	9.8	72	1564	52	80	11 25	78	9.3	68	...	...	4.7	47	...	...	...	...	1.1	10
31	10.0	74	1693	57	81	12 55	77	10.2	75	...	...	8.5	61	...	...	...	...	5.9	43
Means	7.42	52	1429	43	71	—	62	7.32	51	—	—	5.23	36	—	—	—	—	5.39	37				
Normal	5.48	38	1198	36	—	—	—	6.03	42	—	—	4.32	29	—	—	—	—	5.00	35				

2. METEOROLOGY AND MAGNETISM:—CAHIRCIVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W. Heights above M. S. L.:—H = 9.1 m. H_b = 13.7 m. H_a = 26.4 m. Above Ground: h_t = 1.3 m. h_r = 0.56 m. h_a = 13.9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.		Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force, Declination West, and Inclination.	
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	Vapour Pressure.		Percentage.		9 h.	21 h.	9 h.	21 h.					9 h.	21 h.
	mb.	mb.	a.	a.	a.	a.	millibar.	%	%	m/s.	m/s.	Tenths of Sky covered.	mm.	a.	9 h.	21 h.			
	200+	200+	200+	200+	200+	200+	millibar.	%	%	m/s.	m/s.	Tenths of Sky covered.	mm.	200+	9 h.	21 h.			
1	1024.0	1025.5	89.1	88.1	91	87	15.2	16.7	84	98	285	3	290	2	9	10	0.7	85	o. n. o. and d ^o . day. d. evening.
2	1024.4	1024.6	89.2	87.4	90	87	17.3	14.0	95	86	270	3	340	3	10	7	1.5	88	d. n. o. and d. day. e. evening.
3	1024.6	1023.6	88.1	88.7	92	86	12.6	15.7	74	89	315	3	—	1	9	9	—	84	Fair n. and day. o. evening.
4	1017.4	1016.0	89.0	87.4	91	87	17.1	15.3	95	94	265	4	320	6	10	9	1.9	88	• ^o n. o. and p ^o . day.
5	1018.3	1021.5	88.2	86.9	91	86	14.9	13.8	87	88	345	4	335	4	5	7	0.3	—	o. and d ^o . n. Fair day.
6	1022.4	1023.7	87.1	87.4	90	86	13.7	14.2	86	87	340	5	345	4	10	7	—	—	d ^o . n. Fine day. Fair evening.
7	1023.8	1023.4	89.9	87.0	91	83	15.5	14.4	81	91	—	0	—	0	6	5	0.1	n 78	• ^o n. Fine a. o. to fair, p.
8	1020.2	1016.8	87.6	88.6	95	85	15.1	14.7	92	84	65	2	—	0	1	4	0.1	81	≡ ^o to ≡ morning. Very fine dry day.
9	1016.4	1019.3	90.1	89.7	93	87	16.8	17.4	87	92	70	2	200	2	10	7	—	81	o. and ∞ morning. Fair to fine day. ⊕
10	1022.0	1024.3	91.4	89.3	93	87	17.6	15.8	84	86	—	1	—	0	8	9	—	83	o. morning. Fair to fine day. [p.]
11	1025.7	1025.8	90.2	87.4	92	85	15.4	14.2	79	87	—	0	—	0	9	1	—	86	o. and ∞ morning. Fine day.
12	1024.5	1022.8	90.7	90.7	94	84	17.7	18.1	88	90	155	3	215	2	10	7	—	82	o. morning. Fair day.
13	1021.5	1021.3	91.8	91.0	94	90	20.0	18.6	93	91	220	4	—	1	10	8	0.3	87	c. to o. and p ^o . n. and morning. Fair p.
14	1020.2	1019.9	91.6	90.4	95	88	20.0	17.9	94	91	240	2	190	2	8	1	1.2	88	c. to o. and p. morning. Fair p.
15	1015.7	1011.3	92.0	91.1	95	88	17.4	18.9	80	92	95	3	175	2	9	9	0.1	85	Fair and dry a. c. to o. p.
16	1015.9	1019.3	92.2	89.9	94	88	17.4	17.4	79	91	275	2	210	2	6	3	1.5	85	o. and p. morning. Fair to fine day.
17	1018.6	1010.2	91.8	91.4	93	89	18.7	19.1	87	91	175	7	180	10	9	10	7.8	86	Fair n. and morning. o. day. • ^o to • evening.
18	1015.1	1013.3	90.9	88.3	92	87	15.0	15.5	74	90	270	3	185	3	8	10	4.3	84	o. n. Fair a. o. p. o. to • evening.
19	1011.5	1012.0	90.2	88.0	92	86	15.9	14.7	82	87	—	1	190	3	7	10	6.7	85	• n. Fair day. o. evening.
20	1007.6	1015.0	89.2	87.2	90	86	16.8	11.6	92	72	235	8	290	5	9	3	5.9	85	o. n. p ^o . morning. Fine day.
21	1018.7	1019.5	89.2	88.0	91	85	14.6	13.5	80	80	—	1	215	3	4	8	0.4	81	Fine n. and a. Fine and dry day.
22	1019.7	1021.7	89.6	89.0	91	87	15.2	15.5	81	86	245	7	250	2	10	10	0.3	83	p ^o . n. o. day and evening.
23	1020.7	1019.6	89.8	88.4	92	88	17.9	15.1	94	87	—	1	—	0	10	8	0.2	88	o. n. and morning. Fair to o. day.
24	1018.9	1015.6	90.4	89.0	92	87	16.5	16.4	84	91	—	0	190	3	6	9	—	84	o to c. morning. Fair. a. o. p.
25	1002.2	997.1	90.5	88.7	91	88	18.7	17.0	94	96	235	7	245	6	10	10	7.4	86	o. n. • morning. o. to p ^o . a. and p.
26	996.0	1001.5	87.1	86.0	88	85	11.8	10.3	74	69	315	13	320	10	8	7	0.5	85	o. n. and morning. Fair day. — and p ^o . p.
27	1003.1	999.5	87.6	86.1	89	85	11.5	12.0	70	80	295	3	115	5	7	10	0.5	81	Fair n. Fine dry day. o. and p. evening.
28	993.1	1004.3	86.9	82.3	88	82	13.8	10.0	88	86	75	4	40	4	10	10	14.5	84	p. n. • day. p ^o . evening.
29	1011.8	1016.0	83.5	84.4	n 86	82	8.5	9.1	67	68	360	6	315	6	6	6	8.3	79	p. n. p ^o . morning. p ^o . a. Fine dry day. p ^o .
30	1009.6	1009.2	86.1	86.2	89	83	14.2	13.3	95	88	180	4	30	4	10	7	7.6	80	p. morning. d. to • a. Fair p. [evening.]
31	1015.0	1013.3	86.6	86.7	89	n 81	13.1	14.6	85	94	—	1	175	6	3	10	0.2	n 78	Fine and • n. c. to o. day. o. and p ^o . evening.
Means	1016.1	1016.4	89.3	88.1	91.4	86.0	15.7	15.0	85	87	3.4	—	3.1	—	7.9	7.5	72.3	83.8	Monthly Totals or Means.
Normal	1012.7	1013.1	88.3	87.4	90.9	85.3													

3. METEOROLOGY :—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m. Heights above Ground :—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly totals and normals.

4. METEOROLOGY :—ESKDALEMUIR, DUMFRIESSHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m. Heights above Ground :—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity, Wind, Cloud Amount, Rain, Min. Temp., REMARKS. Includes monthly totals and normals.

Temperatures at or below the normal freezing point of water are printed in small type

x denotes the maximum and n the minimum value in the column.

5. GEOPHYSICS:—RICHMOND (KEW OBSERVATORY).

Day.	Earth Temperature at 9 h.		Height above M. S. L. of Surface of Underground Water.		Magnetic Force.						Magnetic Character of Day.	Electric Character of Day.	Charge per cc. $\times 10^{20}$.		Air-Earth Current. $\times 10^{16}$.	Potential Gradient, Volts per metre. Factor 2.33.			
	0.3 m.	1.2 m.	Daily Mean.	Extremes.	Horizontal Comp't.		Declination.		Inclination.				About 15 h.	About 15 h.	3 h.	9 h.	15 h.	21 h.	
					Mean Time.	γ	Mean Time.	West.	Mean Time.	North.									Mean Time.	North.
	a.	a.	cm.	cm.	h m	γ	h m		h m			coulomb.	amp/cm ² .	v/m.	v/m.	v/m.	v/m.		
1	200+	200+	219	220	11 17	18386	14 27	14 47'2	...	...	...	0.25	0.35	0.45	170	155	130	255
2	89.2	86.6	218	...	...	...	...	...	...	...	...	...	...	...	170	145	115	170
3	90.0	86.6	218	...	...	...	...	...	...	...	...	...	...	...	130	155	115	100
4	89.6	86.8	217	...	...	...	...	...	...	...	...	...	...	...	115	230	55	230
5	88.9	86.7	216	...	...	...	...	...	...	...	...	0.33	0.23	0.55	70	230	85	155
6	89.0	86.8	214	...	...	...	...	...	...	...	...	.55	.43	0.75	200	155	145	145
7	89.7	86.9	213	...	11 3	18380	14 33	14 42'6	...	...	...	.23	.33	1.35	170	200	155	145
8	89.1	87.0	211	...	...	...	...	...	14 33	66 56'4	...	.53	.41	0.80	230	270	130	155
9	90.1	87.1	210	...	...	...	...	...	...	...	...	...	...	...	200	230	100	170
10	90.8	87.1	208	...	...	...	...	...	...	...	...	...	...	...	115	155	70	85
11	91.1	87.3	207	...	...	...	...	...	...	...	...	0.33	0.18	0.60	85	240	130	100
12	91.2	87.4	206	...	...	...	...	...	...	...	...	.41	.14	1.20†	85	130	130*	85*
13	91.4	87.4	206	...	...	...	...	...	...	...	...	1.03	.96	0.55†	85*	100*	70*	0*
14	91.8	87.6	206	...	11 4	18359	14 21	14 47'6	...	...	...	0.78	.57	0.75†	70*	145*	85*	145*
15	92.8	87.9	206	...	...	...	...	...	14 36	66 58'0	...	.47	.06	0.95†	55*	155*	115*	145*
16	92.0	87.9	206	...	...	...	...	...	...	...	...	...	...	...	170*	215*	100	230
17	91.9	87.8	206	...	...	...	...	...	...	...	...	...	...	...	115	230	85	200
18	92.2	87.8	207	...	...	...	...	...	...	...	...	0.88	0.98	0.95	185	200	145	115
19	92.0	87.9	205	...	...	...	...	...	...	...	...	...	...	...	100	130	100	115
20	91.7	88.1	205	...	...	...	...	...	...	...	...	...	...	...	45	85	155	285
21	90.7	88.0	204	...	11 36	18389	...	...	14 50	66 58'2	...	0.90	0.90	0.95	130	270	145	130
22	89.9	88.0	203	...	...	...	...	...	...	...	...	...	...	...	155	185	100	200
23	89.7	87.9	202	...	...	...	...	...	...	...	...	...	...	...	115	170	70	170
24	89.9	87.9	201	...	...	...	...	...	...	...	...	...	...	...	85	85	100	115
25	89.4	87.9	201	...	...	...	...	...	...	...	...	...	...	...	70	155	145	170
26	89.8	87.9	202	...	...	...	...	...	...	...	...	...	...	...	55	215	170	200
27	88.9	87.9	201	...	...	...	...	...	...	...	...	...	...	...	115	200	115	240
28	87.9	87.9	201	201	11 18	18381	14 15	14 48'8	15 18	66 57'8	...	...	...	...	230	±	130	185
29	88.6	87.8	201	...	...	...	...	...	...	...	...	...	...	...	70	315	315	-30
30	87.3	87.8	203	...	...	...	...	...	...	...	...	...	...	...	155	270	170	340
31	87.6	87.6	204	...	...	...	...	...	...	...	...	...	...	...	130	300	145	115
M.	90.1	87.5	207	—	—	—	—	—	—	—	—	—	—	—	122†	191†	123†	156†	
	89.7	88.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

* The behaviour of the instrument during this period was somewhat doubtful, more especially at 21 h. on 13th, and 3 h. and 9 h. on 14th.
 † These values share any uncertainty affecting the potential gradient.
 ‡ Mean for 30 days.

6. GEOPHYSICS:—ESKDALEMUIR.

Day.	Magnetic Force.												Magnetic Character of Day.	Electric Character of Day.	Potential Gradient, Volts per metre. Factor 3.77.					
	North Component.						West Component.			Vertical Component.					3 h.	9 h.	15 h.	21 h.		
	Maximum. 15000 γ +	Minimum. 15000 γ +	Range.	Maximum. 4000 γ +	Minimum. 4000 γ +	Range.	Maximum. 44000 γ +	Minimum. 44000 γ +	Range.	Maximum. 44000 γ +	Minimum. 44000 γ +	Range.								
	h m	γ	γ	h m	γ	h m	γ	γ	h m	γ	h m	γ	γ	h m	γ	v/m.	v/m.	v/m.	v/m.	
1	17 4	1100	943	11 49	157	14 47	930	856	8 10	74	18 18	1162	1097	12 24	65	100	75	55	160	
2	1 5	1063	966	12 23	97	16 15	924	830	1 44	94	18 50	1133	1094	1 24	39	80	105	80	115	
3	4 3	1033	964	10 57	69	16 5	921	832	4 48	89	20 55	1126	1086	2 46	40	80	80	125	155	
4	17 56	1051	961	11 13	90	15 44	931	841	8 30	90	18 20	1146	1097	13 1	49	200	145	150	160	
5	21 37	1053	961	12 59	92	13 42	938	851	22 9	87	14 47	1129	1094	12 1	35	300	175	135	310	
6	16 16	1027	975	11 17	52	13 52	911	845	0 43	66	19 20	1121	1091	12 2	30	265	115	220	335	
7	19 52	1045	962	11 55	83	15 18	910	843	7 54	67	20 6	1133	1093	23 59	40	150	150	265	205	
8	22 5	1048	962	10 36	86	14 56	943	836	7 7	107	16 30	1140	1078	0 40	62	160	125	185	375	
9	19 53	1031	963	11 39	68	13 13	931	848	7 2	83	15 40	1131	1093	2 10	38	130	205	145	270	
10	19 17	1043	982	11 0	61	13 9	925	848	7 51	77	4 57	1120	1091	12 41	29	380	145	160	145	
11	16 46	1242	665	9 54	577	16 48	1098	<660	9 2	<438	15 30	>1344	<845	23 22	>499	2	80	105	75	170
12	7 14	1120	<627	1 48	493	1 53	984	649	2 1	335	18 59	1148	849	2 13	299	2	220	115	80	150
13	19 43	987	920	11 11	67	13 24	883	844	7 4	39	16 46	1140	1117	11 38	23	0	175	40	50	210
14	19 13	1004	940	10 15	64	12 47	911	837	7 20	74	5 23	1137	1110	12 26	27	0	145	225	160	340
15	19 3	1034	955	11 53	79	14 31	932	832	7 40	100	20 10	1138	1112	13 39	26	1	265	180	240	35
16	18 22	1025	947	11 14	78	13 50	917	806	1 56	111	18 20	1137	1097	1 42	40	0	*	35	0	310
17	0 49	1034	961	12 32	73	13 44	923	819	1 36	104	22 14	1134	1098	12 50	36	1	170	170	130	**
18	21 0	1066	944	11 53	122	13 14	914	854	6 13	60	17 42	1134	1075	24 0	59	1	±	160	160	130
19	20 20	1103	862	12 55	241	3 52	954	812	0 16	142	18 8	1169	1019	4 39	150	2	185	**	150	310
20	15 12	1032	929	4 16	103	15 13	914	818	7 50	96	16 8	1154	1084	0 59	70	1	325	115	±	220
21	22 55	1014	956	10 0	58	2 1	909	828	8 24	81	6 40	1133	1104	2 23	29	0	140	190	220	150
22	20 56	1020	959	9 33	61	13 46	917	840	8 30	77	18 5	1140	1110	12 5	30	0	105	80	190	330
23	22 6	1057	949	12 43	108	14 10	930	841	6 14	89	16 31	1168	1107	1 45	61	1	55	145	205	310
24	17 32	1039	968	11 31	71	13 34	910	849	5 38	61	5 31	1126	1106	12 40	20	0	130	140	115	180
25	22 20	1051	968	10 8	83	13 48	912	831	23 36	81	21 50	1134	1101	11 14	33	1	335	5	-145	-140
26	17 49	1037	934	13 48	103	14 2	949	833	1 2	116	18 27	1172	1095	11 35	77	1	-415	265	115	220
27	16 56	1026	963	10 56	63	14 30	916	840	4 29	76	16 10	1145	1097	4 15	48	0	-150	75	175	**
28	21 6	1062	954	9 39	108	13 14	945	815	23 30	130	18 5	1135	1095	23 47	40	1	145	175	±	120
29	23 2	1024	920	9 53	104	12 56	929	817	0 11	112	15 50	1128	1095	10 42	33	0	375	265	±	310
30	21 19	1027	964	11 31	63															

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W.

Heights above M.S.L. :—H = 54 m. H_b = 55 m. Above Ground :—h_t = 1.48 m. h_r = 1.72 m. h_a = 8 m.

Main meteorological data table with columns for Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Min. Temp. on Grass, Percentage of Humidity, Rain, and Remarks. Includes daily data from 1 to 31 and monthly means.

JERSEY (ST LOUIS OBSERVATORY).

Cloud and wind data table with columns for Day, Wind Direction and Force, Sunshine, Cloud Amount (Upper/Lower), and Mean Amount. Includes daily data from 1 to 31 and monthly means.

* For method of estimation, see Introduction.

† The first hour of observation was changed to 9 h. on Jan. 1st, 1919.

8. WIND COMPONENTS: Metres per second at fixed hours, together with the greatest mean hourly velocity, or the greatest velocity attained in a gust, and the time of its occurrence.

NORTH WALES:—HOLYHEAD.														SCOTLAND N.:—DEERNESS.																													
Height of Head above—Roof 8.8 m., Ground 13.7 m., M.S.L. 19.2 m. Height of Cups above—Roof 4.6 m., Ground 7.6 m., M.S.L. 15.2 m.														Height of Cups above—Roof 1.5 m., Ground 4.9 m., M.S.L. 57.3 m.																													
Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	Day.	3 h.				9 h.				15 h.				21 h.				Vel. in Max. Hourly Run.	Time of Max.						
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.			S.	N.	W.	E.		
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	h	m	h	m		
1	...	3.4	8.2	...	...	1.5	7.7	...	4.0	...	4.0	...	...	7.9	...	14.1	20	40	1	...	...	9.8	...	...	9.8	...	...	6.9	...	0.9	...	2.1	...	11.5	12	12		
2	6.2	...	1.9	...	9.6	...	...	1.1	5.5	...	...	4.7	4.7	...	17.1	10	15	2	...	...	5.8	...	...	9.3	...	...	11.5	...	3.8	9.1	...	13.8	18	18				
3	...	5.4	8.1	...	...	6.0	6.0	...	...	1.3	6.5	...	2.0	...	3.0	...	13.3	0	5	3	...	...	4.4	6.6	...	...	5.8	...	...	2.6	6.4	...	3.7	3.7	...	9.8	1	1
4	...	0.4	2.3	...	5.7	...	3.8	...	2.1	...	5.2	...	...	1.0	5.1	...	12.6	10	45	4	...	0.4	2.0	...	1.7	...	1.1	...	2.5	...	...	1.7	...	Cal m	...	3.6	10, 11, 12, 14	3.6	
5	...	5.2	2.1	5.8	1.2	4.3	1.8	Cal m	...	10.2	8	15	5	2.2	1.4	2.3	5.5	...	1.5	...	7.7	...	1.2	...	5.8	...	7.9	14-16	7.9				
6	...	1.6	...	1.6	...	3.7	5.5	...	...	1.7	2.5	...	...	3.3	1.4	...	11.2	4	20	6	...	...	7.9	...	...	11.5	...	...	2.9	14.8	...	...	1.5	7.7	...	15.4	16	15.4
7	...	0.4	2.3	...	...	3.8	2.6	...	...	0.9	2.1	...	2.5	...	2.5	...	8.1	10	55	7	...	3.3	7.9	...	...	1.6	8.0	...	...	1.7	8.3	...	...	3.3	...	8.9	11, 13	8.9
8	...	1.4	...	1.4	...	2.5	...	2.5	...	...	Cal m	...	...	Cal m	...	5.6	7	45	8	...	...	2.6	...	...	1.8	4.3	...	...	1.2	5.8	...	...	2.3	...	5.9	15	5.9	
9	...	Cal m	Cal m	...	2.3	...	2.3	Cal m	...	3.8	13	15	9	3.0	0.6	3.2	...	2.0	2.6	...	0.5	...	0.5	...	3.6	9-16	3.6				
10	...	0.9	...	2.1	...	2.7	...	1.8	...	1.7	2.5	...	...	1.1	1.7	...	7.8	5	45	10	3.1	...	7.6	...	1.9	...	9.6	...	2.0	10.3	...	...	7.5	...	10.5	15	10.5		
11	...	Cal m	1.4	...	3.3	0.5	2.6	...	3.0	...	3.0	...	6.7	23	20	11	7.9	8.5	...	1.9	...	9.6	...	3.8	...	5.7	...	10.8	16	10.8				
12	...	2.3	...	2.3	...	4.0	...	4.0	...	1.1	1.7	...	2.0	...	4.8	...	9.9	19	35	12	3.3	...	7.9	...	4.7	...	4.0	...	4.0	...	1.4	3.3	...	3.3	...	9.8	1, 2	9.8					
13	...	2.6	...	3.8	...	3.1	...	4.7	...	2.5	...	6.1	...	1.3	3.0	...	11.5	15	0	13	3.0	...	2.5	...	6.1	...	1.7	...	8.3	...	1.5	...	7.7	...	9.8	17	9.8				
14	...	0.9	...	4.5	...	1.9	9.6	...	...	4.7	...	3.1	...	...	Cal m	...	16.0	8	45	14	1.3	...	6.8	...	...	10.8	...	...	1.9	9.3	...	1.3	6.8	...	13.1	10	13.1	
15	...	Cal m	...	...	3.8	...	2.6	...	...	1.1	...	1.7	0.4	...	2.3	...	9.8	18	55	15	...	Cal m	...	...	2.6	...	...	5.5	...	...	3.7	4.9	...	...	6.9	17	6.9	
16	...	4.8	...	2.0	...	4.4	...	4.4	...	3.7	...	3.7	...	2.6	...	3.8	...	9.9	11	30	16	1.6	...	...	1.6	3.0	...	2.0	1.7	...	1.1	...	1.2	6.1	...	7.2	8	7.2			
17	7.9	...	3.7	...	3.7	...	6.2	...	4.2	...	8.2	...	3.4	...	16.3	23	5	17	...	Cal m	2.3	...	5.5	...	3.2	...	2.2	10.1	6.7	...	12.5	22, 24	12.5				
18	...	10.6	...	4.4	...	1.0	4.8	...	5.5	...	2.3	...	4.5	...	1.9	...	18.8	2	20	18	7.9	9.8	...	6.6	...	7.3	...	10.9	...	5.7	...	3.8	...	13.4	13	13.4				
19	...	3.2	...	2.2	...	4.2	...	0.8	0.4	...	2.0	...	3.7	...	3.7	...	9.0	20	35	19	6.2	...	4.2	...	4.6	...	6.8	...	3.0	...	7.3	...	2.4	...	5.7	...	11.1	1	11.1				
20	...	1.6	...	1.6	...	4.0	...	4.0	...	6.3	...	6.3	...	3.1	7.6	...	13.7	15	35	20	4.1	...	2.7	...	5.8	...	1.2	...	3.8	2.6	...	0.8	3.8	...	5.9	9, 13, 16	5.9				
21	...	3.5	8.5	...	...	2.5	6.1	...	4.7	...	3.1	...	2.9	...	4.3	...	11.1	4	35	21	0.9	...	4.5	...	1.4	...	7.1	...	...	11.5	...	0.8	...	4.2	...	11.5	15	11.5	
22	...	2.3	...	5.5	...	3.4	...	8.2	...	3.4	...	5.2	...	0.6	3.2	...	15.3	10	50	22	2.5	...	1.7	Cal m	2.5	6.1	3.0	...	3.0	...	7.2	16	7.2				
23	5.9	...	1.3	...	6.8	...	0.8	...	4.2	2.5	2.5	...	12.9	4	45	23	4.6	3.8	5.7	6.0	6.0	...	3.5	3.5	...	0.6	...	8.5	15, 16	8.5			
24	...	5.5	...	1.1	...	2.9	...	0.6	...	2.3	0.4	...	...	Cal m	...	7.4	1	15	24	...	5.5	3.7	...	...	3.3	4.9	...	...	5.2	2.1	...	...	1.5	0.6	...	7.9	1	7.9
25	...	1.5	0.6	...	1.8	...	...	4.3	8.3	...	1.7	...	3.3	...	4.9	...	14.5	15	10	25	...	Cal m	...	3.0	...	...	3.0	...	...	3.0	...	6.2	...	...	...	7.2	24	7.2
26	...	3.3	...	4.9	...	2.9	...	6.9	...	2.0	10.0	...	...	6.4	15.4	...	23.0	22	30	26	...	1.5	...	7.7	...	8.6	...	12.8	...	12.5	...	12.5	...	9.3	9.3	17.7	15	17.7			
27	...	9.0	13.4	8.6	12.8	2.4	5.7	...	1.3	...	3.0	...	22.4	5	35	27	...	6.0	...	9.0	...	10.8	12.5	13.9	5.7			
28	...	3.2	...	0.6	12.5	...	8.0	...	12.0	...	11.2	...	4.6	...	19.5	11	45	28	8.7	5.8	1.5	7.4	1.3	6.8	0.5	2.6			
29	...	10.6	...	7.1	...	7.7	...	1.5	...	6.6	4.4	...	...	5.6	5.6	...	17.2	17	15	29	...	0.6	3.2	...	...	0.9	4.5	...	...	7.5	...	...	1.8	4.3	...	9.5	14	9.5
30	...	5.8	8.7	3.4	8.2	...	2.0	...	3.0	Cal m	...	12.8	3	15	30	...	0.4	2.3			
31	...	6.2	5.7	2.4	2.8	1.1	...	1.6	...	4.0	31			
S+N & W+E	97.9	117.0	105.3	152.9	94.7	116.9	78.8	107.3	S+N & W+E	65.1	131.2	86.2	159.7	93.4	184.9	84.3	124.8			
S-N & W-E	-19.7	99.4	-12.1	113.5	11.9	83.3	-0.2	93.5	S-N & W-E	3.5	94.6	4.2	130.1	-11.2	137.3	-1.3	92.8

ENGLAND S.W.:—SCILLY.														ENGLAND E.:—SHOEBURYNNESS.*																										
Height of Head above—Ground 9.8 m., M.S.L. 49.7 m. Height of Cups above—Ground 5.8 m., M.S.L. 45.7 m.														Height of Head above—Ground 27.4 m., M.S.L. 31.4 m.																										
Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.			
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.					
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	h	m	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	h	m		
1	5.8	2.1	2.1	2.3	2.3	4.1	4.1	...	7.7	3	40	1	2.0	...	4.8	1.1	...	5.7	2.1	5.1	1.2	6.3	...	12.2	20	40
2	...	3.3	3.3	...	...	3.1	3.3	...	...	2.2	5.4	...	...	3.4	8.1	...	10.6	16	45	2	1.0	...	4.8	...	...	1.6	8.0	...	...	1.2	6.3	...	...	1.0	5.1	...	17.1	16	30
3	...	4.9	1.0	...	...	4.6	1.9	...	...	2.1	2.1	...	...	2.7	2.7	...	8.1	2	5	3	...	2.4	3.6	...	...	5.6	5.6	...	...	3.4	5.1	...	...	1.7	1.2	...	15.2	11	30
4	...	3.0	3.0	...	...	2.6	3.8	...	...	...	10.0	...	...	4.6	6.9	...	12.1	18	40	4	...	0.5	2.6	...	0.9	...	4.5	...	5.6	...	4.3	...	4.3	...	11.0	16	5		
5	...	4.6	...	...	...	6.3	...	...	...	4.6	1.9	...	...	4.2	...	...	9.0	2	40	5	1.0	...	1.5	...	...	Cal m	...	...	Cal m	...	...	2.8	...	1.1	...	7.6	19	30	
6	...	3.0	3.0	...	...	2.1	2.1	...	...	1.3	3.1	...	...	3.1	1.3	...	5.5	18	45	6	...	1.9	0.8	...	0.6	...	2.9	...	...	1.0	5.1	...	...	5.1	2.1	...	10.7	14	20
7	...	0.3	0.2	...	...	1.4	0.9	...	...	3.5	...	2.3	...	1.1	...	2.7	5.0	19	10	7	...	3.9	3.9	...	...	4.8	2.0	...	...	3.1	1.3	...	...	3.7	...	1.5	...	10.4	

9. SEISMOLOGICAL DIARY.

EARTHQUAKES:—ESKDALEMUIR.

MICROSEISMS OF N. COMPONENT:—ESKDALEMUIR.

Day.	Phase.	Time, G.M.T.	Period.	Amplitudes.			Δ.	Remarks.
				A _{N.}	A _{E.}	A _{Z.}		
		h m s	s	μ	μ	μ	km.	
3	e	18 31 55	...	...	...	...	...
	L	18 52	...	...	...	...	...
	F	19 30	...	...	...	...	...
7	L	17 16	18	...	...	...	...
	F	17 36	...	...	...	...	...
8	P	5 24 50	...	...	...	5400	...
	S	5 31 54	...	...	...	...	...
	L	5 41	...	...	...	...	...
	F	5 6 10	...	...	...	...	...
18	P	17 14 20	...	...	...	8450	...
	PR	17 17 45	...	...	...	...	...
	S	17 24 3	...	...	...	...	...
	L	17 40	...	...	...	...	...
19		0 42 to	...	...	...	...	Slight disturbance.
		0 50	...	...	...	...	...
19	e	20 29 20	...	...	...	...	...
	L	20 36	...	...	...	...	...
	F	20 55	...	...	...	...	...
22	e	22 44 57	...	...	...	...	...
	L	22 48	...	...	...	...	...
	F	23 7	...	...	...	...	...
25	L	20 31	24	...	...	...	...
	F	21 15	...	...	...	...	...
27	L	6 10	...	...	...	...	Earlier phases masked by wind effects.
	F	7	...	...	...	...	...
28	L	20 17	25	...	...	...	...
	F	20 37	...	...	...	...	...
				
				
				
29	O	5 51 52	...	...	...	8450	...
	P	6 3 36	...	...	...	...	...
	S	6 13 18	...	...	...	...	...
	L	6 29 30	...	...	...	...	...
	M	6 46 11	27	44	...	...	...
31	P	17 39 48	...	...	...	7650	Δ deduced from PR - P. Times of S and L doubtful.
	PR	17 42 56	...	...	...	...	...
	S	17 48 46	...	...	...	...	...
	L	18 2 30	...	...	...	...	...
	F	20 30	...	...	...	...	...

Day.	0 h.		6 h.		12 h.		18 h.	
	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.
	μ	s	μ	s	μ	s	μ	s
1	0.6	5.5	0.7	6	0.7	5.5	0.5	5
2	0.8	4	0.8	5	0.5	5	0.8	5.5
3	1.0	5	1.0	5	1.0	4.5	1.0	5
4	0.8	5.5	0.7	4	0.6	4.5	0.7	4
5	0.5	5	0.7	5	0.7	4	0.3	4
6	0.2	4	0.0	3	0.1	3	0.1	3.5
7	0.6	4	0.8	4	0.5	5	0.8	5
8	0.7	4.5	0.5	4.5	0.3	4.5	0.2	4.5
9	0.1	4	0.1	4	0.1	4	0.0	0
10	0.1	3	0.1	4	0.1	4	0.2	4.5
11	0.2	4	0.2	4	0.3	4	0.3	4
12	0.5	4.5	0.5	5.5	0.5	5	0.8	5
13	0.6	5	0.8	5.5	0.9	5	1.1	4
14	0.8	6	0.7	5.5	0.7	5	0.6	5
15	0.7	4	0.8	4	0.3	4	0.6	4
16	0.3	4	0.2	4	0.5	4	0.1	3
17	0.3	4	0.7	4.5	0.5	4.5	0.9	5
18	1.1	4.5	1.6	6	1.2	5.5	1.5	5
19	2.0	4.5	1.7	5	0.8	6	0.8	5.5
20	0.9	5	0.7	5.5	0.5	5	0.8	4
21	0.5	4	0.4	4.5	0.6	4	0.6	4
22	0.8	4	0.3	4	0.5	3.5	0.4	3.5
23	0.5	4	0.2	4	0.3	3	0.0	2.5
24	0.0	0	0.1	3	0.0	0	0.0	0
25	0.0	0	0.1	3	0.3	3	1.1	3
26	1.0	3.5	1.3	3	1.1	4	1.1	4.5
27	1.1	4	1.3	3.5	0.9	4	1.1	4
28	1.1	4	0.8	4.5	0.8	4	0.9	3.5
29	1.4	4	...	...	1.1	4	0.9	4.5
30	0.8	4.5	0.6	4.5	0.7	4.5	0.6	4
31	0.8	5	0.7	4	0.2	4	...	...

Means for Month { A_N = 0.6, T = 4.2. Normals, 1911-18 { A_N = 0.4, T = 4.4.

EARTHQUAKES:—RICHMOND (KEW OBSERVATORY).

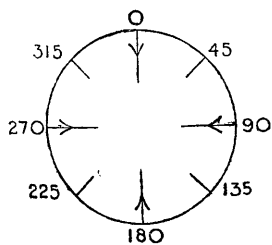
Day.	Times, G.M.T. of		Remarks.
	Commence-ment.	Max. Phase.	
	h m	h m	
3	...	19 5	Very small.
18	...	17 38	Succession of very small waves.
19	...	4 28	Very small.
19	...	20 40	Very small.
22	...	22 49	Very small.
25	...	20 40	Succession of very small waves.
27	...	6 30	Succession of small waves.
28	...	20 32	Very small.
29	6 9	6 57	
31	17 52	{ 18 31.5 19 1	} Equal maxima.

10. SOUNDINGS WITH PILOT BALLOONS.

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.										Cloud Observations.										
		Geostrophic.		By Anemometer.		At Heights above M.S.L.						Time, G.M.T. h. m.	Type.	Deg. from N. mr/s.	Type.	Deg. from N. mr/s.						
		Deg. from N.	m/s.	Deg. from N.	m/s.	500 m.		1000 m.		2000 m.							3000 m.		4000 m.			
						Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.						Deg. from N.	m/s.	Deg. from N.	m/s.		
ABERDEEN.																						
12	7 30	260	8	calm	300	3.5	305	10.5	275	19.5	...	...	15	0	Cu.	275	2.0	Ci-Cu.	270	0.5
20	7 30	240	7	215	3.5	230	10.5	240	8.5	230	11.0	...	13	0	St-Cu.	...	...	Ci-Cu.	225	1.5
25	7 30	?	?	305	1.5	140	5.5	170	3.0	240	4.0	300	4.5	280	7.5	...	...	Ci-St.	...	...
28	7 30	?	?	280	3.0	315	12.5	315	11.0	295	8.0	...	...	...	...	...	...	Ci., Ci-St.	...	...
ESKDALEMUIR.																						
5	17 25	280	6	290	4.4	300	5.5	280	4.4	350	8.0	...	...	...	Cu.	315	...	...	...	...
9	12 10	?	?	230	3.0	240	4.7	270	3.1	220	8.0	240	8.0	...	Cu.	270	4.5	Ci-St.	225	3.5		
10	17 40	315	6	315	11.5	320	10.5	330	11.5	315	6.5	...	...	...	Cu.	...	...	A-St.	360	...
11	17 30	270	10	270	2.5	255	5.5	280	15.5	290	18.0	...	...	...	Fr-Cu.	...	...	Ci-St.	315	1.0
14	12 50	?	?	315	7.0	305	5.5	320	4.6	320	11.0	...	...	...	Fr-Cu., Cu.	315	...	Ci., Ci-St.	295	5.5
14	17 35	?	?	240	3.5	240	6.5	255	5.0	325	5.5	395	9.5	...	Cu., Cu-Nb.	270	...	...	...	...
15	7 20	?	?	calm	235	3.0	240	4.2	250	9.0	275	10.0	270	15.5	...	A-Cu.	245	...	Ci-St.	260	1.0	
15	11 50	?	?	190	4.0	210	1.7	240	6.0	275	8.0	240	10.5	...	A-Cu.	245	...	Ci.	280	4.0		
17	7 25	225	10	210	4.0	240	6.0	265	14.5	260	18.0	6	45	Cu.	A-Cu.	240	6.5	
20	7 25	240	8	185	4.5	205	7.5	225	8.5	245	13.0	7	50	St.	215	...	Ci-St.	225	6.5	
21	17 30	270	10	270	2.6	265	5.5	260	6.0	270	19.0	15	0	St-Cu.	270	...	A-St.	270	...	
24	7 15	?	?	calm	15	6.5	335	2.0	320	8.0	315	14.5	305	18.5	7	0	St-Cu.	Ci-St.	290	5.5
28	7 20	?	?	calm	75	1.5	95	2.3	210	3.5	230	8.0	235	7.5	...	A-Cu.	A-St.	
29	7 15	310	9	280	2.4	300	3.2	295	14.0	310	12.5	9	0	Cu., A-Cu.	Ci.	225	1.5	
31	7 10	315	11	150	1.0	350	4.3	315	2.8	280	6.5	320	10.0	300	8.0	Cu.	280	...	Ci.	300	1.0	
SOUTH FARNBOROUGH.																						
5	6 35	340	7	280	5.0	350	9.5	350	6.0	330	8.5	...	...	...	St., St-Cu.	...	...	A-Cu.	...	...
6	9 5	310	10	290	5.0	280	5.5	285	5.0	320	7.0	340	11.5	350	15.0	Fr-Cu.	Ci.	
7	6 25	?	?	310	5.0	355	10.5	340	10.5	340	10.5	325	17.5	...	Fr-Cu.	...	...	Ci.	...	...
7	14 35	?	?	360	5.0	345	4.8	335	6.0	340	10.5	...	...	...	Fr-Cu.	...	...	Ci.	...	...
8	6 30	?	?	300	3.7	240	4.0	335	3.8	335	3.9	325	11.0	310	7.5	...	...	Ci.	...	...
8	13 50	?	?	255	2.0	240	2.1	215	2.0	325	3.5	280	5.0	290	7.5	...	...	Ci.	...	...
9	6 35	?	?	335	2.5	170	7.5	195	5.5	205	8.5	230	7.0	235	9.5	A-St.	Ci.	
11	6 25	350	7	305	0.4	15	8.0	350	7.0	355	9.0	315	10.5	305	8.5	...	...	Ci.	...	...
12	6 40	?	?	190	1.0	205	2.5	190	3.7	225	3.9	210	3.7	240	6.0	...	...	cloud	less	...
13	6 30	?	?	305	2.3	10	5.0	320	3.8	285	6.0	285	14.0	295	12.0	...	...	cloud	less	...
15	9 35	?	?	135	2.4	155	3.7	140	4.0	265	4.0	280	6.0	280	11.0	St-Cu.	...	...	...	...
15	13 10	?	?	90	5.5	150	2.0	185	3.4	275	4.2	295	9.5	275	8.0	Cu.	...	...	...	...
16	6 30	225	7	180	6.0	215	6.5	225	14.0	200	15.0	205	14.5	...	St-Cu.	...	...	...	...
21	6 30	300	7	225	5.5	315	7.5	295	7.5	270	12.0	265	17.0	265	17.5	Fr-St.	...	Ci., Ci-Cu.	...	...
22	6 35	260	11	240	7.0	255	10.5	260	11.5	290	16.0	...	...	...	St-Cu., Nb.	...	...	Ci.	...	...
23	6 25	280	9	260	7.0	280	9.5	300	13.5	290	10.5	290	16.0	...	St., A-Cu.	...	...	Ci., Ci-Cu.	...	...
27	7 10	280	20	270	13.0	270	14.5	280	25.5	280	30.0	...	...	...	Fr-St., St-Cu.	...	...	...	...
29	9 0	270	8	260	6.0	250	4.6	240	9.0	230	14.0	235	16.5	...	Cu., Fr-Cu.	...	...	A-Cu.	...	...
30	6 30	270	8	290	7.0	290	10.0	280	10.5	255	8.0	280	10.5	280	12.5	Cu.	...	A-St.	...	...
8	6 30	(For observations at lower levels, see above.)		5000 m.		6000 m.		7000 m.		8000 m.		9000 m.		10,000 m.		Ci.	
8	13 50			295	11.0	300	15.0	295	16.0	295	22.5	285	21.0	295	27.0	Ci.	
9	6 35			275	13.5	265	14.0	270	17.0	265	20.5	265	23.5	Ci.	
11	6 25			245	15.0	245	16.5	250	18.0	250	22.5	255	23.0	A-St.	
12	6 40			290	11.5	Ci.
12	6 40			250	6.5	225	7.5	230	9.5	250	11.5	225	9.5	cloud	less	...
13	6 30	290	14.5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	cloud	less	...
15	13 10	290	6.0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Cu.	...	...
21	6 30	255	29.0	255	32.5	...	...	...	...	...	...	...	...	...	...	...	...	Fr-St.	...	Ci., Ci-Cu.
30	6 30	290	12.0	300	8.0	...	...	...	...	...	...	...	...	...	...	...	...	Cu.	...	A-St.

Height of Station above M.S.L. = H.,
Anemometer above ground = h.

Aberdeen	14 m.	32 m.
Eskdalemuir	242 m.	15 m.
S. Farnborough (Golf Course)	70 m.	31 m.
Cahirveeen	9 m.	13 m.



Notes on Pressure Distribution.

August 1919.

During the whole month there was a persistent anticyclone over the Azores region, frequently extending to the British Isles and the Continent.

- 5th to 15th. High over the British Isles.
- 16th, 7 h. Shallow Low to the N. of Ireland; wedge over Scandinavia.
- 17th, 7 h. S.W.-N.E. ridge over the British Isles.
- 18th, 7 h. Westerly type.
- 20th, 7 h. Shallow Low N.W. of Ireland; High over the Continent.
- 21st to 23rd. Anticyclone centred over the Bay of Biscay; shallow Low over Scandinavian region.
- 24th, 7 h. Shallow Low centred to the W. of Ireland; depression centred near Vardø; ridge along the British Isles.
- 25th, 7 h. Deep depression centred near Leith.
- 28th, 7 h. Scotland between two Lows, one centred near Land's End, the other near Bergen.
- 29th, 7 h. Extensive Low covering the British Isles, centred near Bergen.
- 30th, 7 h. Low W. of Norway; anticyclone from the Azores to Germany.
- 31st, 7 h. secondary over the channel.

Notes on Ascents.

- Aberdeen—
25th, Ci-St., with solar halo.
- Eskdalemuir—
14th, 12 h. 50 m. Solar halo.
20th, 7 h. 25 m. Solar halo.
- South Farnborough—
15th, 13 h. 10 m. Balloon intercepted by Cu. during 33rd and 34th minute. Cu. was being formed artificially by the outbreak of fire E. of the Observatory. This Cu. eventually hid the balloon from view.
- Cahirveeen—
7th, 7 h. 15 m. Very calm at the surface, extending up to 300 m.
9th, 17 h. 5 m. St-Cu. sheet developed during ascent.
10th, 7 h. 45 m. Low foggy cloud developed during ascent.
23rd, 17 h. 10 m. Trace of solar halo.

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 Ninth Year.—No. 9. SEPTEMBER 1919. Units based on the C.G.S. System. [Price 1s.]

1. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.			SOUTH KENSINGTON.—Lat. 51° 30' N. Long. 0° 10' W.						RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.					ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.					CAHRCIVEEN.	
	Bright Sunshine.*		Radiation received on Horizontal Surface by Callendar Radiograph.						Bright Sunshine.*		Radiation at Noon by Ångström Pyrheliometer.			Bright Sunshine.*		Radiation by Ångström Pyrheliometer.			Bright Sunshine.*		
	Total.	Per cent. of Possible.	Daily Total.	Per cent. of Planetary.	Maximum.			Total.	Per cent. of Possible.	Intensity.	Vertical Component.	Sky.	Total.	Per cent. of Possible.	Time.	Sky.	p sec Z.	Intensity.	Total.	Per cent. of Possible.	
					Amount.	Time.															11.30 h. to 12.30 h.
1	4'0	30	1428	49	80	12	30	80	4'7	35	...	...	...	0'0	0	...	...	...	0'0	2
2	2'9	21	863	30	64	12	54	53	2'2	16	...	...	...	5'2	38	...	...	...	8'7	64
3	0'2	1	637	22	53	11	40	53	0'7	5	9'7	71	12 17	Clear	1'45	90	10'4	77
4	4'1	31	954	33	57	10	40	48	3'7	28	...	...	...	0'4	3	...	...	...	8'8	66
5	8'0	61	1298	46	71	12	10	71	7'7	58	...	...	...	5'2	38	...	...	...	4'7	35
6	4'8	37	1126	40	66	13	25	52	5'3	41	...	...	...	2'3	17	...	...	...	4'0	31
7	6'3	48	1347	49	67	13	55	63	5'5	42	...	...	...	9'2	69	...	...	...	21'4	86
8	6'8	52	1125	41	68	13	2	64	6'8	52	56	40	...	0'0	0	...	...	...	0'0	0
9	11'0	85	1544	57	59	12	50	57	11'5	89	71	49	Clear	0'7	5	...	...	...	3'1	24
10	11'2	86	1664	62	67	11	58	67	7'9	61	75	52	Clear	4'3	33	...	...	...	11'2	86
11	10'4	81	1465	55	61	12	12	61	10'8	84	75	51	Clear	5'6	43	...	...	...	0'4	2
12	9'7	76	1406	53	57	11	40	57	11'1	87	70	48	Clear	0'0	0	...	...	...	7'3	56
13	0'0	0	221	9	15	10	37	11	0'0	0	...	...	...	0'0	0	...	...	...	5'3	41
14	0'0	0	500	19	34	12	55	24	0'0	0	...	...	...	8'7	67	...	...	...	6'2	49
15	0'0	0	—	—	—	—	—	—	0'0	0	...	...	...	11'6	91	...	...	...	10'5	83
16	2'9	23	692	27	54	10	20	51	2'7	21	...	...	...	7'4	58	...	...	...	6'8	54
17	8'3	66	1151	46	54	12	10	54	9'1	73	47	31	Hazy	1'6	13	...	...	...	0'7	5
18	8'3	66	1203	49	54	11	55	54	8'5	68	53	35	Hazy	4'3	34	...	...	...	1'5	12
19	1'4	11	526	22	50	14	18	36	1'5	12	...	...	...	7'0	56	...	...	...	7'0	56
20	7'3	59	1343	56	64	11	7	63	7'6	62	78	50	Clear	4'8	39	...	...	...	8'5	68
21	7'7	63	1119	47	66	12	4	66	7'8	64	...	...	...	8'3	68	...	...	...	2'5	20
22	0'2	1	522	22	34	9	14	33	0'2	1	...	...	...	2'2	18	...	...	...	0'0	0
23	1'6	13	575	25	71	12	25	71	1'3	11	...	...	...	6'2	51	...	...	...	6'6	55
24	5'1	42	1078	48	58	13	0	56	5'9	49	70	43	...	0'0	0	...	...	...	0'0	0
25	3'0	25	664	30	63	12	35	47	1'9	16	...	...	...	0'0	0	...	...	...	3'0	25
26	0'1	0	264	12	28	9	14	14	0'1	1	...	...	...	3'0	25	...	...	...	8'0	67
27	4'9	41	1046	48	57	11	34	57	5'7	48	45	27	...	10'6	90	...	...	...	8'0	67
28	5'3	45	965	45	63	12	50	56	5'7	48	...	...	...	7'4	63	...	...	...	7'3	62
29	8'5	73	1146	54	51	12	30	51	8'9	77	...	...	...	0'0	0	...	...	...	0'8	7
30	6'9	59	1006	48	54	12	5	54	7'7	66	...	...	...	0'4	3	...	...	...	0'2	2
Means	5'03	40	963†	38	55	—	—	51	5'10	41	—	—	—	4'20	34	—	—	—	5'10	41	
Normal	4'23	34	926	37	—	—	—	—	4'83	39	—	—	—	4'30	34	—	—	—	4'43	36	

† Mean of 29 days only.

2. METEOROLOGY AND MAGNETISM:—CAHRCIVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W. Heights above M. S. L.:—H=9.1 m. H_b=13.7 m. H_a=26.4 m. Above Ground: h_t=1.3 m. h_r=0.56 m. h_a=13.9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.				Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force, Declination West, and Inclination.
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	Vapour Pressure.		Percentage.		9 h.		21 h.		9 h.	21 h.				
	mb.	mb.	a.	a.	a.	a.	millibar.	%	%	m/s.	m/s.	Tenths of Sky covered.	mm.	a.						
1	1005.1	1002.5	89.2	87.1	91	87	18.0	15.0	99	94	215	5	195	3	10	9	8.8	86	● n. and a. o. and p ^o . day.	(17845 γ 19° 27' 3 68° 4' 6 17829 γ 19° 23' 8 68° 5' 7 17837 γ 19° 25' 6 68° 5' 2
2	1000.5	1002.8	88.5	86.1	91	85	15.5	13.6	89	91	210	5	250	2	6	8	1.0	84	Fair n. and a. Fine and p. day.	
3	1002.9	997.2	87.9	88.0	91	83	13.9	15.5	83	92	170	5	145	12	5	10	18.1	79	Fine n. and morning and p. Fine day.	
4	994.5	997.6	89.8	89.5	91	88	16.5	16.2	87	87	175	8	175	10	8	8	17.9	86	● ² n. Fine day. [● ² evening.	
5	1000.0	1009.8	88.9	88.4	91	87	16.7	15.8	93	91	180	7	245	5	10	10	3.4	88	p. n. Fair and p. day.	
6	1017.9	1018.7	88.5	88.2	90	86	14.6	16.4	84	96	280	4	180	5	6	10	4.0	85	p. to fine morning. o. to ● p.	
7	1024.7	1026.4	87.9	84.8	89	82	12.1	11.8	72	86	5	3	—	0	3	1	—	84	● n. Fine morning and day.	
8	1024.7	1025.3	87.6	89.0	91	82	16.3	17.1	99	95	185	3	195	3	10	10	1.3	80	Fine n. o. to d. morning and day.	
9	1025.5	1023.6	89.1	88.1	91	88	17.2	14.5	95	85	155	7	160	7	10	8	—	88	o. n. o. to d. a. Fair p.	
10	1020.2	1017.2	90.7	89.9	94	87	15.0	17.8	75	93	325	5	175	2	0	3	—	84	Fine n. Very fine day. [K p.	
11	1015.8	1018.4	89.0	85.7	90	85	17.8	13.0	99	89	50	8	25	10	10	10	5.1	87	Fine n. o. to morning. p. and T day.	
12	1020.9	1022.4	84.5	85.9	88	84	10.3	11.2	77	76	20	8	20	5	4	7	1.9	82	< and p. n. Fair day and evening.	
13	1022.6	1021.9	84.9	85.9	87	83	10.2	10.8	74	73	35	4	40	5	6	7	—	82	Fair n. and day.	
14	1022.7	1024.6	85.9	85.8	88	83	11.5	11.6	78	79	—	0	60	3	5	8	—	80	Fair n. and day.	
15	1027.2	1027.4	83.5	83.9	89	80	9.8	11.2	78	87	—	0	—	0	0	100	—	75	Fine and n. Very fine day.	
16	1027.6	1027.8	84.9	86.1	90	81	12.3	13.5	89	90	—	1	—	0	0	0	600	78	Fine and n. Fine and a. Fair p.	
17	1027.4	1023.8	88.5	88.1	91	86	15.7	16.0	90	94	240	9	—	0	0	100	10	84	c. n. o. and a. c. to o. day. ● ^o evening.	
18	1018.7	1017.9	88.2	84.9	89	85	16.8	11.0	98	80	345	13	330	8	10	7	1.3	83	o. n. o. and p ^o . morning. [evening.	
19	1020.4	1016.6	84.2	82.4	85	82	9.5	10.5	72	89	360	14	295	5	10	8	2.5	82	c. to o. morning. Fair to fine day. p ^o .	
20	1016.0	1014.3	83.0	83.2	85	80	8.3	8.3	68	67	—	0	350	9	7	8	3.0	78	p. n. p. and q. morning. [● ² p.	
21	1010.8	1004.9	82.4	84.4	86	81	9.5	12.7	81	95	240	13	180	5	3	10	5.9	77	c. to b. morning. Fair to dull day. ● ^o to	
22	999.4	992.3	86.7	85.9	88	84	13.5	14.0	87	95	10	6	260	5	10	8	4.7	83	o. n. d. and p ^o . day. ● p.	
23	1003.3	1009.5	84.1	81.3	86	80	8.9	9.4	68	86	235	8	—	1	5	3	0.4	80	Fair n. p. morning. Fair day.	
24	1007.9	1011.5	87.0	86.8	88	81	14.9	14.9	94	95	220	4	250	5	10	10	0.3	77	Fine n. o. to d ^o . a. and p.	
25	1014.2	1010.4	87.7	87.8	90	86	15.2	15.7	92	94	315	9	220	7	10	10	0.3	86	d ^o . n. o. to c. day.	
26	1010.5	1016.7	85.6	83.5	88	82	10.4	9.4	72	75	5	2	320	4	2	7	2.1	82	o. to p. n. and morning. Fine day.	
27	1018.8	1021.8	83.6	82.3	85	80	9.7	8.6	76	74	—	0	5	6	7	5	0.8	78	d ^o . n. Fine day. Fair p.	
28	1024.4	1023.1	81.6	82.3	85	87	9.8	11.0	88	95	185	6	—	0	5	4	1.2			

3. METEOROLOGY :—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m. Heights above Ground :—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly totals and means for 45 years, 30 years, and 35 years.

4. METEOROLOGY :—ESKDALEMUIR, DUMFRIESHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m. Heights above Ground :—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly totals and means for 45 years, 30 years, and 35 years.

Temperatures at or below the normal freezing point of water are printed in small type.

* 29 days only.

5. GEOPHYSICS :—RICHMOND (KEW OBSERVATORY).

Day.	Earth Temperature at 9 h.		Height above M.S.L. of Surface of Underground Water.		Magnetic Force.						Magnetic Character of Day.	Electric Character of Day.	Charge per cc. $\times 10^{20}$.		Air-Earth Current $\times 10^{16}$.	Potential Gradient, Volts per metre. Factor 2.40.			
	0.3 m.	1.2 m.	Daily Mean.	Extremes.	Horizontal Comp't.		Declination.		Inclination.				About 15 h.	About 15 h.		3 h.	9 h.	15 h.	21 h.
					Mean Time.	γ	Mean Time.	West.	Mean Time.	North.									
	<i>a.</i>	<i>a.</i>	cm.	cm.	h m	γ	h m	°	h m	°	Coulomb.	Amp/cm ² .	v/m.	v/m.	v/m.	v/m.			
1	200+	200+	206	...	...	...	...	...	...	...	...	...	145	310	235	295
2	87.4	87.5	207	...	...	...	...	...	...	...	...	...	190	175	145	235
3	88.5	87.4	206	...	...	...	...	...	...	...	...	...	—	130	205	160
4	89.8	87.4	204	...	10 55	18369	14 23	14 47.9	15 37	66 59.4	...	...	15	235	75	145	
5	89.8	87.4	202	0.59	0.37	0.55	175	220	160	235		
6	90.5	87.4	201	...	...	...	...	...	...	...	...	...	145	265	190	205
7	89.9	87.4	199	...	...	...	...	...	...	...	...	...	175	310	190	175
8	90.5	87.6	199	199	...	...	...	...	...	...	...	...	205	310	205	190
9	90.1	87.6	199	0.49	0.12	1.20	160	310	250	295		
10	90.2	87.6	199	...	...	...	...	...	...	...	...	...	190	395	235	295
11	90.3	87.7	200	...	10 58	18358	14 22	14 46.1	15 20	67 0.4	0.98	0.33	2.80	145	380	175	175		
12	90.9	87.9	201	...	...	...	...	...	...	...	...	...	145	235	145	235
13	91.0	87.9	202	...	...	...	...	...	...	...	...	...	120	145	130	105
14	89.9	87.9	204	...	...	...	...	...	...	...	...	...	—	—	—	—
15	89.0	87.9	207	...	...	...	...	...	...	...	...	...	—	—	370	425
16	88.4	87.9	209	...	...	...	...	...	...	...	...	...	265	455	395	295
17	88.0	87.9	211	211	0.18	0.29	0.85	145	380	220	235		
18	88.0	87.9	211	211	11 4	18376	14 27	14 43.3	14 46	67 0.0	0.29	0.23	0.85	205	280	175	205		
19	88.4	87.8	209	0.10	0.33	0.45	120	220	190	355		
20	86.0	87.7	207	...	...	...	...	...	...	...	...	...	235	280	145	220
21	85.6	87.7	206	...	...	...	...	...	...	...	...	...	175	220	130	295
22	85.0	87.2	205	...	...	...	...	...	...	...	...	...	235	295	175	190
23	85.8	87.5	204	0.47	0.04	0.85	-75	120	265	340		
24	85.0	87.2	203	...	...	...	...	...	...	...	...	...	280	—	250	265
25	86.0	86.9	203	...	11 15	18402	14 21	14 47.5	14 37	66 57.3	0.35	0.35	1.05	60	175	220	265		
26	86.9	86.9	203	...	...	...	...	...	...	...	...	...	120	145	90	355
27	85.7	86.7	202	...	...	...	...	...	...	...	...	...	220	265	145	205
28	84.7	86.7	203	...	...	...	...	...	...	...	...	...	220	295	175	—
29	83.2	86.7	207	0.43	0.39	1.00	355	—	175	455		
30	82.7	86.4	208	0.49	0.45	1.05	235	410	175	380		
M.	87.8	87.4	204	—	—	—	—	—	—	—	—	—	156†	272†	186†	247†			

† 24 days only.

6. GEOPHYSICS :—ESKDALEMUIR.

Day.	Magnetic Force.															Magnetic Character of Day.	Electric Character of Day.	Potential Gradient, Volts per metre. Factor 6.05.			
	North Component.					West Component.					Vertical Component.							3 h.	9 h.	15 h.	21 h.
	Maximum. 15000 γ +.	Minimum. 15000 γ +.	Range.	Maximum. 4000 γ +.	Minimum. 4000 γ +.	Range.	Maximum. 44000 γ +.	Minimum. 44000 γ +.	Range.	Maximum. 44000 γ +.	Minimum. 44000 γ +.	Range.									
1	h m	γ	γ	h m	γ	h m	γ	h m	γ	h m	γ	h m	γ	h m	γ	0	? 2 a	v/m.	v/m.	v/m.	v/m.
2	19 3	1025	976	10 55	49	13 16	902	849	6 36	53	3 11	1117	1096	11 42	21	2	1 b	60	30	185	290
3	21 2	1165	909	23 10	256	17 17	940	738	20 52	202	20 50	1183	966	23 35	217	1	? 1 a	*	45	200	145
4	18 6	1029	956	10 21	73	13 20	930	760	0 15	170	19 15	1155	1006	0 0	149	0	1 b	200	175	-180	340
5	21 3	1029	915	0 21	114	13 5	919	797	1 13	122	17 15	1149	1004	0 32	145	1	1 b	220	305	120	335
6	23 18	1018	949	11 54	69	13 11	905	846	23 34	59	17 10	1129	1098	11 30	31	0	1 b	230	265	170	180
7	3 9	1043	861	23 21	182	16 38	939	780	22 43	159	18 24	1178	951	23 40	227	1	1 b	70	210	175	175
8	3 9	1034	866	0 32	168	13 46	913	765	1 14	148	19 0	1124	916	0 26	208	1	1 a	175	155	30	340
9	18 21	1023	965	10 19	58	13 10	905	845	21 33	60	19 9	1115	1092	2 15	23	0	1 a	105	315	120	155
10	17 10	1068	916	21 30	152	16 14	941	781	22 29	160	18 22	1171	1000	21 31	171	1	1 a	410	210	185	355
11	20 42	1036	951	9 52	85	13 56	915	811	21 59	104	21 28	1114	1089	12 10	25	1	1 a	205	240	150	195
12	0 8	1031	931	11 47	100	13 13	909	823	6 30	86	16 5	1104	1082	12 21	22	1	1 a	25	390	100	z+
13	19 19	1018	944	11 2	74	14 7	906	838	8 46	68	7 18	1103	1086	12 15	17	0	2 c	75	185	145	150
14	17 23	1038	957	11 40	81	13 12	924	822	23 38	102	18 25	1134	1074	12 20	60	1	1 a	140	120	140	180
15	16 50	1034	940	10 35	94	14 17	914	839	0 2	75	16 40	1126	1075	11 6	51	0	1 a	110	150	225	395
16	21 32	1034	935	11 8	99	14 10	919	837	19 21	82	19 16	1151	1081	10 26	70	1	1 a	95	245	275	360
17	6 2	1029	940	11 21	89	15 22	917	816	3 20	101	19 10	1111	1036	3 0	75	1	1 a	305	225	210	395
18	19 40	1024	924	11 13	100	13 47	908	840	6 53	68	18 54	1098	1069	2 35	29	1	1 a	160	95	80	85
19	22 23	1053	945	12 48	108	14 23	899	802	22 51	97	17 14	1101	1055	24 0	46	1	1 b	150	245	325	170
20	17 23	1225	754	21 54	471	17 48	988	661	19 53	327	16 44	1313	857	22 8	456	2	1 b	85	150	55	325
21	23 28	1048	777	0 47	271	0 31	935	738	0 7	197	16 32	1159	839	0 50	320	1	1 b	265	95	160	185
22	21 4	1043	905	1 48	138	1 54	919	798	1 16	121	15 50	1113	983	2 25	130	1	1 a	-615	225	125	270
23	19 52	1032	947	10 48	85	14 18	901	813	23 59	88	16 48	1091	1063	11 40	28	1	2 c	110	135	155	240
24	23 49	1061	948	11 48	113	23 49	916	812	0 4	104	19 50	1102	1054	24 0	48	1	1 a	185	-55	-270	45
25	19 11	1095	929	19 46	166	14 36	988	738	18 58	250	18 58	1242	1028	0 39	214	2	2 b	35	-270	175	225
26	4 46	1022	948	15 49	74	14 5	930	783	2 18	147	18 21	1106	975	3 6	131	1	1 b	-145	180	z±	250
27	23 18	1066	934	12 13	132	14 53	908	848	8 22	60	17 5	1090	1057	24 0	33	1	2 c	110	215	175	830
28	? 0 1	? 1024	945	11 10	? 79	?	?	845	5 15	?	?	? 1056	? 0 1	?	?	0	1 a	170	205	180	-190
29	? 20 45	? 1026	? 963	? 9 54	? 63	?	?	829	23 21	?	? 7 5	? 1084	?	?	?	0	1 a	360	105	-1075	105
30	? 20 21	? 1022	? 957	? 11 14	? 65	15 18	898	830	0 24	68	20 52	1096	1066	13 0	30	0	2 c	70	140	155	120
M.	—	1047	924	—	123	—	921†	802†	—	119†	—	1134†	1027	—	107†	—	—	134†	158†	84†	241†

z denotes the maximum and n the minimum value in the column. Potential gradient is reckoned as positive if the potential increases upwards. For indeterminate potential gradient the following notation is used: -z+ Indeterminate, positive value; - Indeterminate, negative value; z± Indeterminate in magnitude and sign.
 † Sheet fogged. † Mean for 28 days only. ** Insulation faulty. * Light failed. ‡ Mean for 26 days only.

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W. Heights above M. S. L. :—H = 54 m. H_p = 55 m. Above Ground :—h_t = 1.48 m. h_r = 1.72 m. h_a = 8 m.

Main meteorological data table with columns for Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Min. Temp. on Grass, Percentage of Humidity, Rain 0 h. to 24 h., and REMARKS. Includes monthly means and normal values.

JERSEY (ST LOUIS OBSERVATORY).

Cloud Amount (tenths of Sky covered), Type of Cloud, and Direction whence coming. Table with columns for Day, Wind Direction and Force, Sunshine, Cloud Amount (Upper/Lower), and Mean Amount.

* For method of estimation, see Introduction.

† The first hour of observation was changed to 9 h. on Jan. 1st, 1919.

8. WIND COMPONENTS : Metres per second at fixed hours, together with the greatest mean hourly velocity, or the greatest velocity attained in a gust, and the time of its occurrence.

NORTH WALES :—HOLYHEAD.														SCOTLAND N. :—DEERNES.																								
Height of Head above—Roof 8·8 m., Ground 13·7 m., M.S.L. 19·2 m. Height of Cups above—Roof 4·6 m., Ground 7·6 m., M.S.L. 15·2 m.														Height of Cups above—Roof 1·5 m., Ground 4·9 m., M.S.L. 57·3 m.																								
Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	Day.	3 h.				9 h.				15 h.				21 h.				Vel. in Max. Hourly Run.	Time of Max.	
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.			
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	hrs.
1	6·0	...	4·0	...	3·2	...	3·4	...	9·4	...	3·9	...	9·4	...	3·9	...	18·0	13	50	1	...	...	...	...	3·6	...	...	1·5	?	?	?	?				
2	4·7	...	3·1	...	3·1	...	4·7	...	5·7	...	2·4	...	4·8	...	2·0	...	12·7	16	45	2	...	Cal m	...	2·5	...	1·7	2·6	...	0·5	3·2	...	2·2	4·3	23				
3	3·2	...	2·2	...	1·3	...	0·9	...	...	2·6	0·5	...	0·3	...	1·6	...	9·2	0	40	3	3·2	...	0·6	4·9	...	...	1·6	...	...	...	Cal m	...	5·6	8		
4	3·0	...	...	...	9·4	...	...	3·9	7·6	...	3·1	...	6·1	...	2·5	...	19·1	10	45	4	...	Cal m	...	0·7	...	...	3·5	...	...	...	...	...	?	?
5	7·2	...	...	...	8·0	...	...	1·6	...	9·1	...	3·8	...	7·3	...	3·0	...	17·5	15	50	5	4·5	...	0·9	6·7	...	...	2·8	5·2	...	3·4	10·0	...	2·0	10·5	20
6	3·7	...	3·7	...	2·5	...	6·1	...	3·3	...	3·3	...	2·9	...	4·3	...	12·8	10	25	6	7·9	...	...	5·6	...	...	2·6	...	3·8	...	1·8	...	2·7	...	8·9	2
7	3·7	...	3·7	...	3·0	...	7·3	...	...	2·5	1·7	...	...	...	...	...	11·7	8	50	7	6·5	...	1·3	...	...	7·6	...	4·4	...	10·6	...	6·6	...	9·8	14	
8	...	Cal m	...	...	5·2	...	3·4	...	5·5	...	3·7	...	4·7	...	3·1	...	13·3	12	0	8	5·8	...	5·8	...	5·8	...	2·1	...	2·1	...	4·0	...	1·6	...	10·8	23
9	2·5	...	2·5	...	1·3	...	3·0	...	5·5	...	3·7	...	4·5	...	1·9	...	10·8	18	45	9	4·4	...	10·6	6·2	...	2·3	...	2·3	...	6·1	...	1·2	...	13·1	1	
10	4·9	...	3·3	...	5·7	...	2·4	...	5·2	...	2·1	...	3·3	...	1·4	...	12·3	12	5	10	3·4	...	5·2	9·8	...	1·4	...	2·2	...	6·5	...	1·3	...	9·8	9, 10	
11	3·6	...	1·5	...	5·1	...	1·0	...	2·5	...	2·5	...	6·8	...	4·6	...	14·0	18	0	11	2·2	...	3·2	...	...	4·6	...	1·1	...	5·5	...	...	6·9	...	9·8	5
12	...	9·8	...	6·6	...	8·6	...	8·6	...	5·4	...	8·1	...	4·0	...	9·7	16·5	2	30	12	3·6	3·9	1·9	4·5	Cal m	...	5·2	...	13	
13	...	2·3	...	11·6	...	2·0	...	10·3	...	3·3	...	7·9	...	2·9	...	6·9	15·0	0	30	13	...	Cal m	...	0·5	...	2·6	1·8	4·3	...	0·4	2·3	...	4·6	...	15	
14	...	1·4	...	7·1	...	1·6	...	8·0	...	3·8	...	5·7	...	5·3	...	5·3	10·8	9	20	14	1·7	...	2·5	...	1·3	...	3·0	...	0·8	3·0	...	0·6	1·5	...	4·6	...	11, 12	
15	...	1·2	...	6·1	...	1·2	...	6·1	...	0·7	...	3·5	...	...	...	...	9·2	8	40	15	...	...	1·6	...	...	2·4	...	2·4	...	1·4	...	2·2	...	6·2	...	12
16	...	Cal m	1·6	1·6	...	4·0	7·0	11	5	16	2·7	...	1·8	...	4·5	0·9	...	2·3	...	2·3	...	4·1	...	2·7	...	5·6	...	8, 14
17	1·3	...	0·9	...	2·2	...	1·4	...	3·8	...	2·6	...	1·8	...	2·7	...	8·8	14	15	17	...	0·7	3·5	...	1·9	...	9·3	7·9	...	1·1	...	0·7	...	9·5	9	
18	3·7	...	3·7	...	4·6	...	6·8	8·9	2·3	11·6	...	18·8	23	45	18	4·3	5·5	1·1	1·9	...	7·3	4·2	0·8	...	16·1	24	
19	...	10·5	10·5	...	15·2	6·3	...	13·1	2·6	...	7·6	5·1	...	...	...	23·3	12	10	19	...	14·0	5·8	...	...	12·0	8·0	...	...	7·6	7·6	...	8·5	5·7	...	16·4	1
20	...	10·6	7·1	...	13·7	5·7	...	10·9	7·3	...	14·0	5·8	...	...	...	22·5	8	35	20	...	14·0	5·8	...	...	16·1	6·7	...	...	14·2	5·9	...	10·9	7·3	...	17·7	8
21	...	11·2	4·6	...	9·0	6·0	...	3·7	3·7	...	1·0	...	...	...	...	20·3	0	25	21	...	10·6	4·4	...	...	7·1	4·7	...	...	5·2	...	3·0	...	2·0	...	12·1	1
22	4·2	...	6·2	...	3·7	...	5·5	...	2·3	...	11·7	...	6·4	2·6	...	17·4	12	35	22	...	4·2	...	4·2	...	0·9	...	2·1	...	2·1	0·9	...	6·2	4·2	...	9·8	23		
23	...	4·7	...	4·7	...	8·5	...	3·5	...	6·1	1·2	...	3·3	1·4	...	14·1	8	0	23	...	...	11·6	...	...	9·3	9·3	...	...	7·8	7·8	...	0·4	2·3	...	16·4	3
24	...	5·6	...	7·6	...	7·6	...	3·5	...	8·5	...	3·1	...	7·6	...	19·9	11	10	24	...	6·7	...	2·8	...	13·4	...	...	1·9	...	9·3	...	...	12·1	...	13·4	9
25	1·5	...	7·4	...	4·2	...	6·2	...	6·5	...	6·5	...	9·6	...	6·4	...	19·8	22	35	25	...	...	9·2	...	...	6·6	...	...	3·3	...	8·5	...	...	10·8	2	
26	10·6	...	7·1	9·8	2·4	11·9	...	9·0	9·0	22·0	11	10	26	...	8·4	...	12·5	2·4	5·7	10·0	4·1	...	4·0	9·7	...	15·4	4	
27	...	6·0	6·0	...	3·7	3·7	...	3·8	2·6	...	6·6	...	...	...	...	13·8	23	15	27	...	...	6·7	6·7	...	7·4	7·4	...	...	5·8	8·7	...	3·4	5·2	...	11·5	1, 12
28	...	5·6	...	...	7·4	...	1·5	...	4·5	...	0·9	...	1·4	1·4	...	12·4	2	15	28	...	...	2·3	2·3	...	...	Cal m	...	...	1·9	1·3	...	...	Cal m	...	6·9	2
29	2·4	...	5·7	...	4·9	...	7·4	...	8·1	...	8·1	...	6·7	...	6·7	...	19·0	14	25	29	...	5·9	...	...	...	12·5	...	...	4·9	...	4·9	...	4·9	...	13·1	13
30	5·6	...	5·6	...	6·6	...	4·4	...	7·4	...	1·5	...	7·2	...	...	14·8	22	55	30	...	8·1	...	8·1	...	4·8	...	2·0	...	4·8	...	1·0	5·8	...	11·5	3	
S+N&W+E	135·1	130·5	157·5	148·1	149·8	137·9	142·3	115·6											S+N&W+E	139·8	114·0	142·5	116·7	95·4	114·6	109·2	95·0											
S-N&W-E	8·5	58·3	9·7	61·1	24·2	85·7	3·1	59·4											S-N&W-E	20·0	111·0	13·9	100·5	-12·4	104·8	32·0	78·0											

ENGLAND S.W. :—SCILLY.																		
Height of Head above—Ground 9·8 m., M.S.L. 49·7 m. Height of Cups above—Ground 5·8 m., M.S.L. 45·7 m.																		
Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.		
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	h m
1	4·5	...	0·9	5·8	...	2·4	...	6·6	...	1·3	...	6·3	...	...	...	10·7	17	5
2	6·2	...	1·2	...	...	2·1	...	1·4	...	...	...	1·1	...	2·7	...	10·2	3	25
3	0·5	...	1·2	...	0·3	...	0·7	...	1·9	...	0·8	...	4·9	...	1·0	11·4	23	55
4	9·8	...	...	2·0	5·9	...	3·9	...	6·2	...	1·2	5·7	...	...	1·1	15·8	2	15
5	7·8	...	1·5	...	7·0	...	...	1·4	5·7	...	1·1	...	2·7	...	2·7	11·1	7	10
6	...	...	4·2	...	...	1·4	2·1	...	...	2·8	4·2	...	1·1	2·7	...	6·3	11	35
7	...	...	4·6	...	1·8	...	2·7	...	...	1·4	2·1	...	...	0·3	0·2	8·9	11	30
8	...	Cal m	...	...	0·3	0·2	...	1·8	1·2	...	...	...	...	...	...	2·0	6	0
9	...	Cal m	...	...	1·9	0·8	...	1·3	...	...	3·1	1·6	...	3·9	...	6·5	21	55
10	3·0	...	3·0	2·6	...	6·2	2·7	...	6·6	2·1	...	...	5·0	...	10·4	12	55	
11	1·9	...	4·6	2·6	...	3·8	4·1	...	4·1	1·4	...	...	0·9	...	8·0	0	0	
12	2·3	...	1·0	1·6	...	2·4	...	...	5·8	2·4	...	...	6·7	...	11·6	18	15	
13	...	7·1	...	...	4·2	...	...	...	2·7	...	1·1	...	4·5	...	3·0	10·8	2	35
14	...	3·3	...	3·3	...	2·7	...	2·7	...	3·8	...	3·8	...	4·7	...	10·1	19	20
15	...	2·8	...	4·2	...	1·1	...	2·7	...	...	6·3	...	...	...	8·8	13·1	23	5
16	2·0	...	9·8	1·8	...	9·0	1·6	...	8·1	1·5	...	...	7·8	...	14·7	4	45	
17	3·0	...	7·3	4·6	...	6·9	3·7	...	...	5·6	3·8	...	...	3·8	11·8?	0	55	
18	...	Cal m	...	1·8	...	1·2	...	3·2	4·8	...	...	4·8	3·2	...	12·5?	23	15	
19	...	9·4	6·3	...	11·1	2·2	...	11·5	2·3	...	...	8·9	3·7	...	17·9?	8	50	
20	...	4·5	10·8	...	14·7	2·9	...	15·1	3·0	...	...	12·7	2·5	...	24·7	5	20	
21	...	10·4	4·3	...	6·6	1·3	...	2·7	2·7	...	0·4	...	2·1	...	18·9	1	30	
22	3·5	...	3·5	...	5·9	5·9	...	...	10·0	...	2·7	...	6·6	...	16·6	20	5	
23	...	8·8	...	...	7·3	...	3·0	...	8·9	...	3·7	...	6·6	...	13			

9. SEISMOLOGICAL DIARY.

EARTHQUAKES:—ESKDALEMUR.								MICROSEISMS OF N. COMPONENT:—ESKDALEMUR.									
Day.	Phase.	Time, G.M.T.	Period.	Amplitudes.			Δ .	Remarks.	Day.	0 h.		6 h.		12 h.		18 h.	
				A_N .	A_E .	A_Z .				A_N .	T.	A_N .	T.	A_N .	T.	A_N .	T.
		h m s to	s	μ	μ	μ	km.		μ	s	μ	s	μ	s	μ	s	
1		20 30 21 30	...	...	...	...	...	Slight disturbance.	1	0.7	4	0.7	4	0.7	4	0.9	4
			...	...	...	...	...		2	1.1	4	1.1	4	1.0	4	0.9	4
			...	...	...	...	...		3	0.9	4	0.9	4	0.7	4	0.5	4
			...	...	...	...	...		4	0.9	4.5	0.8	4	0.9	5	...	...
			...	...	...	...	...		5	...	...	...	...	1.0	5	1.2	4
			...	...	...	...	...		6	1.1	4	0.9	4	0.5	5	0.1	4
			...	...	...	...	...		7	0.2	4	0.3	4	0.3	3	0.6	4.5
6	i _E i _N L F	9 47 34 9 47 39 9 57 10 52	...	...	...	...	...		8	1.5	8	1.5	7	1.5	6	1.4	6
			...	...	...	...	...		9	1.1	5	0.9	5	0.3	5	0.3	5
			...	...	...	...	...		10	0.6	4	0.9	4	0.9	4	1.1	4
			...	...	...	...	...		11	0.9	5	0.9	4	0.8	4	0.8	4
			...	...	...	...	...		12	0.6	4	0.5	4	0.3	4.5	0.4	3.5
			...	...	...	...	...		13	0.4	4	0.3	3	0.2	4	0.2	4.5
			...	...	...	...	...		14	0.2	4	0.1	3	0.1	4	0.1	4
			...	...	...	...	...		15	0.1	4	0.4	6	0.7	5.5	0.8	6
10		17 5 to 17 18	...	...	...	...	...	Slight disturbance.	16	0.8	5	0.9	6	0.8	6	0.7	5
			...	...	...	...	...		17	0.9	5	0.8	6	1.2	5.5	1.4	6.5
			...	...	...	...	...		18	1.1	6	0.9	5	1.1	5	2.0	4.5
			...	...	...	...	...		19	1.5	5	1.9	5	1.7	5	1.5	5
			...	...	...	...	...		20	1.6	6	1.6	6	1.6	6	1.6	6
			...	...	...	...	...		21	1.5	6	1.1	6	1.0	5	0.9	5
			...	...	...	...	...		22	0.8	5	1.0	4	0.9	5	1.2	4
12		6 40 to 8 26	...	...	...	...	...	Prolonged slight disturbance, including several groups of long waves of low amplitude and 17 seconds period.	23	2.3	4	2.3	4	1.8	5	1.1	5
			...	...	...	...	...		24	1.1	4	1.1	4	1.8	4	1.4	4
			...	...	...	...	...		25	1.0	5	1.1	4	1.0	5.5	1.2	5.5
			...	...	...	...	...		26	1.4	4	1.2	4	1.8	5	1.9	5
			...	...	...	...	...		27	2.4	4	1.5	5	2.0	5	1.4	4
			...	...	...	...	...		28	1.2	4	0.9	4	0.9	5	0.6	6
			...	...	...	...	...		29	0.9	5	1.8	5	2.0	5	2.4	5
12		14 to 15 30	...	...	...	...	...	Slight disturbance.	30	3.9	4	2.6	5	3.0	4.5	1.8	5.5
			...	...	...	...	...		Means for Month $\left\{ \begin{array}{l} A_N=1.1. \\ T=4.7. \end{array} \right.$ Normals, 1911-18 $\left\{ \begin{array}{l} A_N=0.7. \\ T=4.9. \end{array} \right.$								
13	i L F	12 43 11 13 2 14 35	...	...	...	...	...		EARTHQUAKES:—RICHMOND (KEW OBSERVATORY).								
15	P L M _N M _E F	17 53 28 18 11 18 18 16 18 19 21 19	...	...	...	...	...		Day.	Times, G.M.T. of		Remarks.					
			...	...	...	...	...			Commence- ment.	Max. Phase.						
19		13	...	...	...	...	...	Slight disturbance in progress; record almost entirely masked by microseisms and large wind effects.	1	h m ...	h m 20 40	Very small.					
			...	...	...	...	...		6	...	9 57	Very small.					
			...	...	...	...	...		10	...	17 5	Very small.					
			...	...	...	...	...		12	...	14 40	Very small.					
			...	...	...	...	...		13	...	13 12	Very small.					
			...	...	...	...	...		15	...	18 20	Small.					
			...	...	...	...	...		19	...	13 48	Very small.					
26	P L M _N F	9 30 52 9 55 10 1 13 10 40	...	...	...	...	...		26	9 34	10 4						
			...	...	...	...	...		26	20 23	20 49	Succession of very small waves.					

10. SOUNDINGS WITH PILOT BALLOONS—*continued.*

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.										Cloud Observations.											
		Geostrophic.		By Anemometer.		At Heights above M.S.L.					Time, G.M.T. h. m.	Type.	Deg. from N. mr/s.	Type.	Deg. from N. mr/s.								
		Deg. from N.	m/s.	Deg. from N.	m/s.	500 m.		1000 m.		2000 m.						3000 m.		4000 m.					
						Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.						m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	
CAHIRCIVEEN.																							
2	17 10	260	15	250	5'0	260	7'5	260	9'0	265	7'5	265	9'5	...	...	...	Cu.	270	...	...	...	...
3	7 45	240	10	160	10'5	185	9'0	190	10'0	215	12'0	210	10'5	205	9'0	...	Cu.	180	...	Ci-St.	180	...	
7	7 20	?	?	360	4'0	345	9'5	345	9'5	305	6'5	305	12'0	290	10'5	...	Cu.	360	...	...	...	...
10	7 40	230	13	160	5'0	185	13'5	195	22'5	250	8'0	...	...	...	...	...	...	...	...	cloud	less	...
10	12 15	240	9	160	10'0	190	13'0	200	22'0	245	6'5	215	18'0	...	...	...	...	...	...	cloud	less	...
13	7 25	60	16	45	8'0	30	11'0	25	15'0	40	5'0	330	2'8	...	...	...	Cu.	45	...	Ci., Ci-Cu.	225	...
15	7 25	?	?	30	1'3	50	5'5	50	6'0	45	4'0	30	4'5	20	7'0	...	...	...	...	cloud	less	...
16	7 25	?	?	calm	...	...	160	5'0	25	3'6	355	3'1	40	6'0	...	...	...	...	...	A-Cu.	...	...
21	7 30	325	10	calm	...	345	2'6	300	5'5	315	8'0	320	6'0	330	21'0	8 25	Cu., St-Cu.	...	...	A-Cu.	350	4'0
23	16 25	315	9	320	5'0	340	5'5	335	7'5	315	9'5	...	...	...	...	...	Cu-St.	335	...	Ci-Cu.	360	...
26	7 45	310	15	320	6'0	310	13'0	300	14'0	275	17'0	...	...	...	...	...	Cu.	295	...	...	...	...
27	12 5	?	?	45	4'3	355	10'5	345	10'5	340	11'0	...	...	...	...	...	Cu.	340	...	A-Cu.	340	...
27	16 20	?	?	355	8'0	350	11'0	345	13'0	340	13'5	335	13'0	335	19'0	...	Cu.	340	...	...	...	...
28	7 50	?	?	calm	...	...	340	8'5	350	11'0	...	...	...	...	...	...	Cu. & St-Cu.	340	...	A-St-Cu.	350	...
				5000 m.	6000 m.	7000 m.	8000 m.	9000 m.	10,000 m.														
7	7 20	(For observations at lower levels, see above.)		305	17'0	300	19'0	295	25'5	Cu.	360	cloud	less	...
15	7 25			25	8'0	40	11'0	55	22'5	55	29'5	45	29'0	45	36'0	cloud	less	...
16	7 25			55	5'0	35	8'0	45	12'0	40	15'0	...	...	...	...	...	...	...	...	A-Cu.	...	...
21	7 30			335	20'0	...	...	...	...	...	...	...	...	...	...	8 25	Cu., St-Cu.	...	...	A-Cu.	350	4'0

11. NEPHOSCOPE OBSERVATIONS.

ABERDEEN.

Day and Hour, G.M.T.	Type of Cloud.	Velocity-height-ratio.				Remarks.
		Degrees from N.	Milliradians per Second.	Components.		
				W.-E.	S.-N.	
2 13	Ci-Cu.	192	6'0	+ 1'2	+ 5'9	Ci-Cu. bands, opened from A-St. sheet.
3 13	Cu.	225	10'0	+ 7'1	+ 7'1	
4 16	St-Cu.	179	4'2	- 0'1	+ 4'1	Thin fused St-Cu.
5 18	St-Cu.	198	7'1	+ 2'2	+ 6'8	High fused St-Cu.
6 13	Cu.	235	12'0	+ 9'8	+ 6'9	
8 13	Ci-Cu.	273	6'2	+ 6'2	- 0'3	Rather indefinite Ci-Cu. sheets.
9 13	St-Cu.	276	7'1	+ 7'1	- 0'7	A-Cu. to high St-Cu.
10 7	Ci-Cu.	265	3'1	+ 3'1	+ 0'3	Sheets of Ci-Cu., rapidly dispersing.
12 13	A-Cu.	244	6'0	+ 5'4	+ 2'6	A-Cu. partially formed, fused again later into A-St.
13 13	St-Cu.	305	2'8	+ 2'3	- 1'6	Low layer of St-Cu.
17 13	A-Cu.	272	4'1	+ 4'1	- 0'1	Sheets of "false" Ci. forming incipient A-Cu.
18 13	Cu.	255	6'6	+ 6'4	+ 1'7	
19 13	Cu-Nb.	330	12'5	+ 6'3	+ 10'8	Main mass of cloud measured.
25 13	A-Cu.	275	3'3	+ 3'3	- 0'3	Small quantity of A-Cu. above, with Cu. below.
	Cu.	285	7'0	+ 6'8	- 1'8	

12. AURORA.

Day.	a.m. or p.m.	Moon.	Magnetic Character.		Aurora Observations.	
			Eskdalemuir.	Richmond.	Station.	Remarks.
2	...	D	...	...	Aberdeen ...	Faint glow, 21 h.-22 h.
2	p.	...	2, 1	2, 1	Dublin (city) Cahiriveen Deerness Wick	22 h. Glow, 23 h.
3	p.	...	1, 1	1, 1	Inverness Aberdeen Paisley	Faint arch, 21 h.-24 h.
6	p.	...	1, 1	1, 1	Aberdeen	Moderately faint, streamer curtain, greenish, 21 h.-24 h.
9	p.	...	1, 1	1, 1	Edinburgh	
10	...	○	...	...	Aberdeen ...	Faint arch and glow, late <i>n.</i>
10	p.	...	1, 1	1, 1	Paisley Deerness	
11	p.	...	1, 0	1, 0	Seskin (Carrick-on-Suir)	Faint, 21 h.
13	p.	...	1, 0	1, 1	Aberdeen	Faint arch and streamers, 21 h. onwards
14	p.	...	0, 1	1, 1	Aberdeen Fort William	Faint glow, <i>n.</i>
16	...	☾	...	...	Paisley ...	
16	p.	...	1, 1	1, 1	Aberdeen Arbroath Edinburgh Eskdalemuir Stonyhurst	Bright arch and streamer curtain, 20 h.-23 h. Streamers, 21 h. Brilliant streamers, 21 h. 10 m.
19	p.	...	2, 2	2, 2	Hutton (Preston) Meltham (Yorks) Worksop Raunds Ross-on-Wye Oxford	21 h. 15 m. 21 h. One very fine streamer, 21 h. 20 m. Orange rays and streamers in N. and N.W., 21 h. 30 m. Very bright, with streamers, ten or more at times, 21 h
20	p.	...	2, 1	2, 1	Aberdeen Braemar Fort William Edinburgh Paisley Eskdalemuir Oxford	Glow seen between clouds during <i>n.</i> 21 h. Glow, 20 h. 45 m.-21 h. 15 m.
22	p.	...	1, 1	1, 1	Eskdalemuir	Faint glow, 21 h.
23	...	...	1, 2	1, 2	Deerness Aberdeen Eskdalemuir Seskin (Carrick-on-Suir)	Glow seen between clouds, 21 h.-22 h. Glow, 21 h. Faint, 22 h.
24	...	●	...	...	Aberdeen ...	Moderately faint glow behind clouds, <i>n.</i>
24	p.	...	2, 1	2, 1	Rhyl	
26	p.	...	1, 0	1, 0	Guernsey	24 h.
27	p.	...	0, 0	0, 0	Rothesay	
29	p.	...	0, 0	0, 0	Baltasound	

Note.—The two magnetic "characters" entered in each case refer to the two periods of 24 hours ending and beginning at midnight of the night in question.

METEOROLOGICAL OFFICE OBSERVATORIES—GEOPHYSICAL JOURNAL.

DAILY VALUES.—*Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology.*
 Ninth Year.—No. 10. OCTOBER 1919.] Units based on the C.G.S. System. [Price 1s.

1. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.			SOUTH KENSINGTON.—Lat. 51° 30' N. Long. 0° 10' W.						RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.			ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.				CAHIRCIVEEN.			
	Bright Sunshine.*		Radiation received on Horizontal Surface by Callendar Radiograph.						Bright Sunshine.*		Radiation at Noon by Ångström Pyrheliometer.			Bright Sunshine.*		Radiation by Ångström Pyrheliometer.		Bright Sunshine.*		
	Total.	Per cent. of Possible.	Daily Total.	Per cent. of Planetary.	Maximum.			Total.	Per cent. of Possible.	Intensity.	Vertical Component.	Sky.	Total.	Per cent. of Possible.	Time.	Sky.	p sec Z.	Intensity.	Total.	Per cent. of Possible.
					Amount.	Time.	11.30 h. to 12.30 h.													
hr.	%	j/cm ² .	%	mw/cm ² .	h. m.	mw/cm ² .	hr.	%	mw/cm ² .	mw/cm ² .	Clear	hr.	%	h. m.		%	mw/cm ² .	hr.	%	
1	3.0	26	597	29	43	10 55	42	4.5	39	...	...	0.6	5	...	...	...	...	8.4	72
2	3.0	26	569	28	2 52	10 32	31	4.0	35	...	...	9.1	79	...	...	...	...	1.3	11
3	8.2	71	1073	53	48	11 47	48	9.8	85	61	35	0.0	0	...	...	...	...	4.3	37
4	5.8	51	786	40	42	11 20	40	8.1	71	33	19	0.0	0	...	...	...	...	0.0	0
5	0.0	0	237	12	13	13 10	12	0.0	0	...	...	0.0	0	...	...	...	...	0.0	0
6	0.0	0	389	20	24	13 21	14	1.4	12	...	...	0.0	0	...	...	...	...	1.8	16
7	4.4	40	646	34	2 52	11 15	42	4.3	38	32	17	8.7	78	...	...	...	...	8.2	73
8	7.3	66	927	50	40	11 24	39	7.8	70	64	35	6.2	56	...	...	...	...	6.1	55
9	5.9	54	714	39	2 52	13 0	43	6.7	60	72	39	7.1	65	...	...	...	...	9.5	86
10	1.2	10	624	34	50	10 35	39	1.3	12	...	...	0.0	0	...	...	...	...	1.2	10
11	4.0	37	626	35	2 52	13 25	47	4.5	41	...	...	6.3	58	...	...	...	...	1.9	17
12	0.0	0	316	18	34	10 23	16	0.0	0	...	...	1.1	10	...	...	...	...	2.3	21
13	7.8	73	705	41	50	11 45	2 50	7.4	69	...	...	1.6	15	...	...	...	...	7.8	72
14	2.7	25	689	41	49	11 50	36	3.0	30	...	...	6.3	60	...	...	...	...	4.4	41
15	5.2	49	694	42	50	11 56	2 50	5.8	54	53	27	8.4	80	...	...	...	...	2.2	22
16	8.3	78	805	49	41	11 15	40	8.9	84	...	...	6.8	65	...	...	...	...	4.9	46
17	8.1	76	727	45	37	11 50	37	7.5	71	58	29	0.0	0	...	...	...	...	0.2	1
18	0.3	2	398	25	30	12 55	27	2.4	23	...	...	0.0	0	...	...	...	...	3.2	30
19	0.0	0	357	23	21	11 50	21	5.1	49	...	...	0.1	1	...	...	...	...	0.0	0
20	0.7	6	400	26	34	12 35	30	1.8	17	16	7	0.0	0	...	...	...	...	0.0	0
21	3.0	29	448	30	33	12 55	32	3.7	36	45	21	5.4	54	...	...	...	...	6.0	58
22	4.8	47	526	35	34	12 17	34	5.2	50	56	26	1.5	15	...	...	...	...	0.4	3
23	4.1	40	529	36	34	12 50	31	3.3	32	60	28	0.0	0	...	...	...	...	0.0	0
24	0.0	0	126	9	8	11 20	6	0.0	0	...	...	0.0	0	...	...	...	...	3.0	30
25	0.0	0	233	17	24	12 25	24	0.0	0	...	...	8.7	89	...	...	...	...	7.5	75
26	4.5	45	504	36	34	12 35	30	5.0	50	54	24	8.7	90	...	...	...	...	3.3	33
27	2.1	21	287	21	30	9 42	22	2.5	25	46	20	7.5	78	...	...	...	...	4.4	44
28	4.2	42	493	37	33	10 20	32	5.3	54	...	...	7.1	74	...	...	...	...	1.5	15
29	0.0	0	142	11	13	14 18	3	0.2	2	...	...	2.3	24	...	...	...	...	8.6	88
30	1.6	16	361	28	25	12 10	25	1.7	17	...	...	0.1	1	...	...	...	...	8.0	82
31	0.0	0	204	16	19	11 49	19	0.3	3	...	...	1.5	16	...	...	...	...	8.4	87
Means	3.23	31	520	32	36	—	31	3.94	38	—	—	3.39	33	—	—	—	—	3.84	37	
Normal	2.26	22	483	29	—	—	—	2.97	28	—	—	2.48	24	—	—	—	—	3.26	31	

2. METEOROLOGY AND MAGNETISM:—CAHIRCIVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W. Heights above M. S. L.:—H=9.1 m. H_b=13.7 m. H_a=26.4 m. Above Ground: h₁=1.3 m. h₂=0.56 m. h₃=13.9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.		Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force, Declination West, and Inclination.		
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	Vapour Pressure.	Percentage.	9 h.	21 h.	9 h.	21 h.	9 h.	21 h.						
	mb.	mb.	a.	a.	a.	a.	millibar.	%	%	m/s.	m/s.	Tenths of Sky covered.	mm.	a.						
			200+	200+	200+	200+								200+						
1	994.1	1004.7	84.6	83.5	87	83	10.8	9.5	80	75	245	7	290	9	1	3	19.5	80.5	● n. Fine and p. morning. Fair day. [evening.]	
2	1015.2	1021.5	84.5	85.8	80	83	10.8	14.1	80	96	295	5	—	1	6	10	1.3	79.5	Fair and p. o. and morning. o. to d. p.	
3	1022.1	1022.7	86.5	86.9	89	85	14.9	14.6	97	93	175	5	175	8	7	10	—	83.4	o. to c. n. Fine day. o. evening.	
4	1023.6	1025.5	87.4	87.2	88	87	15.9	15.9	98	99	175	7	180	4	10	10	6.9	86.3	o. n. d. to ● day.	
5	1027.4	1027.5	87.9	87.3	88	87	16.3	16.0	97	99	165	5	170	3	10	10	1.3	86.9	d. n. and morning. o. day and evening.	
6	1027.2	1028.2	87.5	86.8	90	86	16.2	14.9	99	95	—	0	—	0	10	4	0.1	84.3	o. n. ≡ to ≡ morning. o. to c. day. Fine	
7	1029.4	1030.5	88.0	85.5	91	84	14.5	12.5	86	87	90	2	—	0	200	100	—	82.0	Fine and n. Fine and ∞ day. [evening.]	
8	1031.3	1031.0	86.0	86.4	90	81	13.2	13.1	89	86	90	2	55	4	9	2	—	78.0	Fine and n. o. and ∞ morning. Fair	
9	1032.7	1033.4	83.4	82.4	86	80	9.1	9.4	73	80	65	4	50	4	1	2	—	78.6	Fine n. Very fine day. [day]	
10	1030.0	1023.1	82.4	84.4	85	80	8.6	11.9	74	89	25	2	10	2	6	9	—	74.3	Fine n. Fair a. c. to o. p. 9th	178.11 γ
11	1017.3	1015.4	85.5	85.0	87	84	12.5	11.4	87	82	355	2	360	3	9	9	—	80.5	o. to c. n. and morning. o. a. Fair p.	19° 26.3'
12	1009.8	1009.5	84.7	82.5	86	81	12.3	8.3	90	70	325	6	360	6	8	6	2.2	80.1	c. to o. n. Fair day. p. evening. [day]	
13	1009.3	1012.0	81.4	81.7	83	80	7.7	8.4	70	75	340	9	350	5	6	4	3.9	77.9	q. and p. n. and morning. Fair p. and	
14	1013.6	1017.7	81.4	81.0	83	79	8.6	7.4	79	69	350	7	5	6	9	1	1.5	75.7	c. and p. n. p. a. Fair to fine and dry day.	
15	1022.2	1027.0	81.8	83.1	84	79	8.0	9.5	71	77	330	6	340	5	7	10	0.6	73.6	p. morning. Fair day. o. and p. evening.	
16	1030.6	1032.4	84.5	83.9	86	83	12.1	12.4	90	96	315	5	—	1	10	10	1.4	78.8	o. n. and a. Fine to fair day. p. evening.	
17	1031.7	1029.9	84.2	84.3	86	83	12.2	10.2	92	77	165	2	130	3	9	7	0.2	80.9	p. n. o. a. Fair p. 16th	68° 6.3'
18	1028.3	1027.3	85.2	85.5	87	84	10.4	11.7	74	81	160	7	150	5	8	10	—	81.4	c. to o. n. and morning. Fair day. o.	
19	1025.7	1023.4	86.6	86.7	88	85	14.5	14.0	94	90	150	8	165	8	10	10	1.4	83.6	o. n. ● a. o. p. [evening.]	
20	1022.4	1024.7	86.9	86.7	88	86	14.8	15.1	94	97	170	8	170	5	10	10	11.2	85.7	● n. and morning. p. a. d. to ● p.	
21	1023.2	1020.0	87.2	86.7	89	85	13.2	13.8	82	89	130	3	145	8	7	10	0.3	83.1	o. to c. n. Fair day. o. evening.	
22	1018.2	1016.1	86.0	86.6	88	86	14.3	15.0	96	97	200	4	170	7	10	10	8.2	85.6	o. n. ● morning. ● to d. p.	19° 28.2'
23	1014.1	1018.9	85.6	83.1	88	83	13.9	8.1	96	66	330	2	15	11	8	10	3.5	85.2	● n. and morning. c. to o. day.	
24	1020.8	1023.6	81.1	82.2	83	81	8.4	6.9	78	60	10	12	10	10	7	3	2.2	79.1	p. and q. morning. Fair to fine and dry day.	
25	1028.0	1031.3	81.1	82.3	83	80	8.0	8.4	74	72	50	6	25	3	7	10	—	79.0	Fair and dry morning. Fine to o. p.	
26	1031.7	1031.6	82.0	80.6	84	79	9.8	8.4	86	81	350	3	40	3	8	7	—	76.4	Fair n. and a. Fair to o. p.	68° 6.4'
27	1030.0	1026.6	80.6	79.5	83	76	8.1	7.5	78	78	30	3	45	2	8	5	0.3	73.0	Fair to fine a. Fair p.	
28	1023.1	1021.9	77.8	77.6	81	77	7.2	7.1	84	84	—	0	—	0	9	2	—	74.2	Fair to o. day. Fine evening.	178.35 γ
29	1022.5	1020.6	75.8	75.8	81	74	6.2	5.9	84	80	—	1	—	0	9	1	—	71.1	— n. Fine dry day. 31st	—
30	1020.1	1022.9	75.0	80.4	82	73	5.9	7.3	84	81	95	2	70	2	2	3	—	69.1	— n. Very fine day.	—
31	1028.8	1031.2	76.1	79.2	83	74	6.4	8.3	84	77	—	1	85	7	100	3	—	72.0	Fine n. and morning. ∞ a. Fine day.	178.23 γ
Means	1024.4	1025.3	83.5	83.6	85.8	81.5	11.1	10.9	85	83	4.4	—	4.4	6.9	6.4	66.0	79.3	Monthly Totals or Means.	10° 27.2'	
Normal	1010.7	1010.9	83.7	83.6	86.6	81.1	11.1	11.0	86	86	5.2	—	5.1	—	—	144.5	—	Normals.	68° 6.4'	

* By Campbell-Stokes Sunshine Recorder.

x denotes the maximum and n the minimum value in the column.

3. METEOROLOGY :—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level:—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m. Heights above Ground:—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly totals and normals.

4. METEOROLOGY :—ESKDALEMUIR, DUMFRIESSHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level:—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m. Heights above Ground:—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity, Wind, Cloud Amount and Weather, Rain, Min. Temp. on Grass, REMARKS. Includes monthly totals and normals.

Temperatures at or below the normal freezing point of water are printed in small type.

x denotes the maximum and n the minimum value in the column.

5. GEOPHYSICS:—RICHMOND (KEW OBSERVATORY).

Day.	Earth Temperature at 9 h.		Height above M.S.L. of Surface of Underground Water.		Magnetic Force.						Magnetic Character of Day.	Electric Character of Day.	Charge per cc. $\times 10^{20}$.		Air-Earth Current. $\times 10^{16}$.	Potential Gradient, Volts per metre. Factor 2.18.			
	0.3 m.	1.2 m.	Daily Mean.	Extremes.	Horizontal Comp't.		Declination.		Inclination.				About 15 h.	About 15 h.		3 h.	9 h.	15 h.	21 h.
					Mean Time.	γ	Mean Time.	West.	Mean Time.	North.									
	u.	u.	cm.	cm.	h m	γ	h m	°	h m	°			coulomb.	amp/cm ² .	v/m.	v/m.	v/m.	v/m.	
1	200+	200+	208	...	...	...	...	...	...	...	2	I	0.39	0.08	160	320	105	200
2	83.4	86.2	206	...	11 14	18331	14 18	14 43'5	14 34	67 0'9	2	I	0.06	...	105	215	z-	270	
3	84.4	86.1	203	...	...	...	...	...	...	...	2	0	.62	0.21	145	390	200	240
4	83.2	85.9	202	...	...	...	...	...	...	...	2	0	...	...	215	430	335	160
5	82.9	85.9	200	...	...	...	...	...	...	...	2	0	...	...	190	295	350	255
6	82.9	85.7	198	...	...	...	...	...	...	...	2	0	0.18	0.18	215	270	230	200
7	84.1	85.6	197	...	...	...	...	...	...	...	1	0	.43	.21	320	215	455	415
8	84.0	85.4	196	...	...	...	...	...	...	...	1	0	.68	.04	230	310	360	390
9	83.7	85.4	195	...	11 10	18353	14 20	14 46'7	14 25	66 58'6	2	0	.74	.51	105	280	310	280	
10	83.9	85.3	196	...	...	...	...	...	...	...	1	0	.12	.04	215	320	190	280
11	82.4	85.1	197	...	...	...	...	...	...	...	1	I	...	...	310	360	280	335
12	81.5	85.0	200	...	...	...	...	...	...	...	0	I	...	...	270	320	145	295
13	80.8	85.0	205	...	...	...	...	...	...	...	0	I	0.33	0.55	160	280	135	160
14	81.0	84.8	208	...	...	...	...	...	...	...	0	0	.64	.27	200	335	190	525
15	80.4	84.6	209	209	...	...	...	...	...	...	1	0	.18	.29	335	415	200	175
16	79.7	84.6	208	...	11 10	18384	...	...	14 31	66 59'1	2	0	.35	...	215	270	175	240
17	79.5	84.4	207	...	...	...	14 14	14 47'2	...	...	1	0	.29	.25	230	525	175	335
18	79.0	84.2	205	...	...	...	...	...	...	...	1	I	...	...	550	350	200	200
19	79.4	83.9	203	...	...	...	...	...	...	...	0	0	...	...	470	145	240	175
20	79.7	83.9	201	...	...	...	...	...	...	...	0	0	0.37	0.18	605	710	240	320
21	80.0	83.6	201	...	...	...	...	...	...	...	0	0	.29	.16	320	320	255	415
22	80.4	83.5	199	...	...	...	...	...	...	...	1	0	.51	.06	295	815	230	280
23	80.0	83.4	197	...	...	...	...	...	...	...	1	0	...	...	105	...	...	...
24	79.6	83.4	196	...	11 18	18365	14 26	14 42'4	14 35	66 59'6	1	0	.23	.21	360	615	390	320	
25	80.2	83.2	195	...	...	...	...	...	...	...	0	I	...	...	230	390	55	280
26	80.8	83.2	195	194	...	...	...	...	...	...	0	0	...	...	295	430	135	190
27	80.8	83.2	197	...	...	...	...	...	...	...	1	0	...	...	120	480	190	320
28	79.9	82.9	201	...	...	...	...	...	...	...	1	I	0.37	0.18	145	230	135	240
29	79.9	82.9	204	...	...	...	...	...	...	...	2	0	.33	.04	160	230	215	360
30	79.0	82.9	205	...	...	...	...	...	...	...	1	2	...	...	255	160	400	335
31	79.1	82.9	205	...	11 8	18382	14 17	14 41'5	14 31	66 58'1	1	I	0.35	0.27	z±	645	590	495	
M.	84.0	85.6	201	—	—	—	—	—	—	—	—	—	—	—	254*	372*	240*	291*	

* Mean for 29 days only.

6. GEOPHYSICS:—ESKDALEMUIR.

Day.	Magnetic Force.									Magnetic Character of Day.	Electric Character of Day.	Potential Gradient, Volts per metre. Factor 6.06.				
	North Component.			West Component.			Vertical Component.					3 h.	9 h.	15 h.	21 h.	
	Maximum. 15000 γ +	Minimum. 15000 γ +	Range.	Maximum. 4000 γ +	Minimum. 4000 γ +	Range.	Maximum. 44000 γ +	Minimum. 44000 γ +	Range.							
	h m	γ	γ	h m	γ	γ	h m	γ	h m	γ	γ	v/m.	v/m.	v/m.	v/m.	
1	22 13	1193	<634	22 13	1089	591	23 27	498	18 45	>1310	941	23 50	335	230	-5	440
2	19 5	992	<634	14 6	891	599	0 15	292	18 45	1126	913	0 27	305	125	135	225
3	21 44	1112	815	6 54	922	780	21 38	142	18 0	1106	1021	6 30	125	60	85	260
4	19 54	1125	795	21 56	997	759	21 28	238	19 52	1257	1030	24 0	75	100	245	445
5	16 54	1336	907	13 42	429	6 52	1173	788	6 52	1018	0 6	>397	525	410	280	610
6	20 3	1053	853	2 5	200	2 32	927	783	8 17	1102	1000	3 41	235	400	155	275
7	19 54	1044	926	14 28	118	13 52	906	834	16 47	1109	1056	0 38	110	110	295	560
8	22 16	1048	935	12 0	113	14 19	897	790	21 30	1085	1028	2 37	330	260	410	240
9	20 48	1038	921	11 7	117	13 35	927	790	0 2	1140	1038	0 55	175	140	225	225
10	22 6	1038	920	10 56	118	14 27	895	835	22 37	1086	1066	23 59	105	250	200	270
11	22 46	1016	949	11 54	67	14 4	901	828	9 16	1081	1054	3 25	95	200	140	170
12	21 9	1018	957	12 55	61	14 8	912	832	23 33	1078	1062	12 30	325	125	-215	260
13	21 6	1027	963	9 45	64	13 50	903	839	9 0	1085	1065	12 27	130	225	z±	375
14	6 6	1012	953	10 57	59	13 38	901	843	9 37	1082	1066	12 10	-10	325	220	385
15	5 18	1012	961	14 2	51	12 3	910	796	20 24	1089	1056	12 5	205	150	200	405
16	4 4	1024	906	6 19	118	6 29	949	789	1 35	1096	976	5 35	230	390	235	235
17	19 19	1061	928	20 22	133	16 7	927	809	19 17	1193	1048	3 40	50	260	+	+
18	0 58	1019	931	12 10	88	15 14	927	815	16 10	1142	1039	4 15	+	+	100	290
19	22 16	1013	948	14 21	65	15 10	900	832	21 38	1085	1068	4 10	215	95	125	355
20	23 43	1006	947	10 23	59	13 46	894	845	8 42	1081	1065	11 27	220	220	260	230
21	0 30	1017	958	13 37	59	13 19	892	846	9 40	1073	1058	1 35	125	180	335	825
22	7 10	1018	954	13 18	64	12 59	948	843	11 31	1101	1052	10 38	635	495	380	230
23	5 31	1012	913	6 33	99	13 41	886	781	5 23	1082	952	4 50	185	-1145	-40	-785
24	19 46	996	949	11 13	47	2 44	887	836	8 57	1077	1059	3 9	-105	80	95	115
25	23 25	1014	954	11 56	60	13 7	882	840	9 4	1073	1062	13 30	65	100	165	760
26	17 54	1059	956	11 43	103	14 43	912	795	19 32	1147	1056	17 53	290	150	205	200
27	2 20	1030	939	11 13	91	2 27	940	798	6 26	1072	957	2 59	120	160	255	245
28	19 36	1082	906	11 26	176	7 15	941	745	19 26	1116	1036	24 0	145	150	210	z+
29	2 31	995	929	11 32	66	12 18	908	829	16 54	1105	1014	1 40	125	35	100	-10
30	20 52	1068	943	12 39	125	12 2	883	808	22 53	1080	1046	21 36	-160	0	120	175
31	3 32	1018	953	10 27	65	5 3	897	808	1 30	1076	1025	5 37	95	50	-140	-50
M.	—	1045†	927†	—	118	—	927	797	—	1104†	1033†	—	186*	137*	165*	z-*

z denotes the maximum and n the minimum value in the column. Potential gradient is reckoned as positive if the potential increases upwards. For indeterminate potential gradient the following notation is used:—z+ Indeterminate, positive value; z- Indeterminate, negative value; z± Indeterminate in magnitude and sign.
 † Clock stopped. ‡ Mean for 29 days only. § Between 18 h. 30 m. and 18 h. 45 m.; and between 18 h. 49 m. and 19 h. 16 m. * Mean of 27 days.

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W.

Heights above M.S.L.:—H=54 m. H_b=55 m. Above Ground:—h_t=1.48 m. h_r=1.72 m. h_a=8 m.

Main meteorological data table with columns for Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Min. Temp. of Grass, Percentage of Humidity, Rain, and REMARKS. Includes daily observations from Oct 1 to 31 and monthly means.

JERSEY (ST LOUIS OBSERVATORY).

Cloud Amount (tenths of sky covered), Type of Cloud, and Direction whence coming. Table with columns for Day, Wind Direction and Force, Sunshine, Cloud Amount (Upper/Lower), and Mean Amount.

* For method of estimation, see Introduction.

† The first hour of observation was changed to 9 h. on Jan. 1st, 1919.

‡ Radiant in N.

8. WIND COMPONENTS: Metres per second at fixed hours, together with the greatest mean hourly velocity, or the greatest velocity attained in a gust, and the time of its occurrence.

NORTH WALES:—HOLYHEAD.

Height of Head above—Roof 8.8 m., Ground 13.7 m., M.S.L. 19.2 m.
Height of Cups above—Roof 4.6 m., Ground 7.6 m., M.S.L. 15.2 m.

SCOTLAND N.:—DEERNESS.

Height of Cups above—Roof 1.5 m., Ground 4.9 m., M.S.L. 57.3 m.

Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	Day.	3 h.				9 h.				15 h.				21 h.				Vel. in Max. Hourly Run.	Time of Max.				
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.			S.	N.	W.	E.
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.				m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.			m/s.	m/s.	m/s.	m/s.
1	6.8	1.3	9.0	1.8	3.1	4.7	1.9	9.6	15.3	10	50	1	9.3	1.9	11.3	2.2	10.9	7.3	7.6	5.1	14.1	12	
2	...	7.5	11.1	6.2	9.2	3.8	5.7	5.3	5.3	17.3	3	0	2	6.4	...	2.6	1.8	9.0	3.3	7.9	1.2	5.8	...	11.1	7	
3	...	2.3	2.3	...	1.5	...	3.6	...	5.0	...	3.3	...	5.2	...	2.1	...	...	8.9	22	15	3	...	0.9	4.5	...	4.5	...	1.9	...	7.4	...	...	1.5	9.5	...	...	9.5	21, 23
4	5.7	...	2.4	...	6.2	...	2.6	...	6.1	...	1.2	...	2.9	...	0.6	...	...	10.7	8	20	4	6.9	...	...	...	1.6	...	...	...	2.0	...	...	3.0	...	...	...	6.9	1-3
5	3.2	...	0.6	...	4.2	...	0.8	...	3.6	...	1.5	...	1.9	...	1.3	...	...	8.4	10	15	5	3.3	...	...	3.3	3.9	...	...	1.9	...	4.5	...	4.9	...	...	4.9	6.6	8, 24
6	2.5	...	1.7	...	4.7	...	3.1	...	2.5	...	1.7	...	...	...	...	...	Cal m	12.0	23	25	6	4.9	...	4.9	...	...	2.9	6.9	...	...	5.3	7.9	...	1.4	1.4	...	10.8	4
7	1.7	...	...	8.7	1.3	...	...	6.5	1.9	...	1.3	...	...	...	...	...	Cal m	14.8	1	0	7	...	Cal m	...	...	2.8	...	...	3.6	...	1.5	...	3.1	...	4.7	...	11.1	24
8	...	Cal m	...	...	3.6	...	...	...	7.2	...	...	...	9.4	...	3.9	...	...	15.4	19	0	8	...	...	10.2	...	...	5.8	5.8	...	...	8.8	3.6	...	10.3	4.3	...	12.5	2
9	...	1.4	...	7.1	...	2.5	...	6.1	...	5.7	...	3.8	...	5.5	...	1.1	...	12.0	3	15	9	...	6.7	2.8	...	...	7.9	3.3	...	...	9.4	3.9	...	7.1	4.7	...	10.5	16
10	...	4.9	...	3.3	...	5.5	...	1.1	...	5.1	5.1	...	...	4.5	...	1.9	...	13.8	16	45	10	...	2.9	4.3	...	...	3.3	...	...	5.2	...	...	4.3	...	...	5.2	3, 15, 20	
11	...	6.1	...	2.5	...	1.0	...	2.4	...	1.4	...	1.4	...	...	...	...	Cal m	10.1	5	30	11	...	3.3	...	1.4	...	2.1	0.9	...	...	1.8	2.7	...	Cal m	...	...	5.2	1
12	2.0	...	4.8	...	4.0	6.0	...	...	10.4	7.0	...	...	11.5	7.7	...	...	...	19.7	19	35	12	...	2.3	0.4	...	...	7.4	7.4	...	...	6.6	4.4	...	5.2	...	...	10.5	9
13	...	11.5	7.7	...	...	10.5	10.5	...	11.1	7.5	...	...	5.5	1.1	...	...	...	21.0	12	40	13	...	8.9	...	...	...	8.5	...	...	...	6.6	...	...	5.6	...	...	11.5	6
14	...	10.4	7.0	...	...	8.1	8.1	...	...	7.6	5.1	...	...	9.7	4.0	...	...	15.8	4	25	14	...	4.7	3.1	...	...	8.8	3.6	...	...	9.2	6.2	...	2.4	5.7	...	11.1	15
15	...	8.8	3.6	...	...	9.0	9.0	...	...	9.4	3.9	...	...	12.1	5.0	...	...	19.0	16	35	15	...	4.0	4.0	...	...	8.5	3.5	...	...	9.2	6.2	...	8.7	5.8	...	13.1	18
16	...	10.3	2.0	...	...	6.9	...	2.9	...	6.9	2.9	...	...	2.1	2.1	...	...	18.3	3	45	16	...	8.1	5.4	...	...	5.1	5.1	...	...	4.3	...	7.0	...	10.4	...	12.5	21
17	...	1.2	5.8	...	...	0.9	4.5	...	0.9	...	4.5	...	1.7	...	2.5	...	...	10.5	4	0	17	...	3.5	8.5	...	...	6.6	...	...	...	6.6	...	3.8	...	5.7	...	11.8	2
18	2.6	...	3.8	...	2.9	...	4.3	...	4.3	...	2.9	...	2.5	...	1.7	10.0	12	10	18	3.3	...	3.3	...	4.0	...	1.6	...	6.0	...	6.0	...	5.4	...	8.1	...	11.5	17		
19	4.3	...	1.8	...	5.8	...	1.2	...	6.5	...	1.3	...	5.5	...	2.3	...	...	12.1	12	10	19	1.8	...	1.8	...	5.5	...	1.1	...	4.3	...	...	3.9	...	...	...	6.6	24
20	6.1	...	1.2	...	7.4	...	1.5	...	6.1	...	2.5	...	4.5	...	1.9	13.7	10	40	20	6.5	1.3	10.0	2.0	7.1	...	1.4	...	4.2	...	0.8	...	10.2	12		
21	3.0	...	1.3	...	2.0	...	0.4	...	2.5	...	1.7	...	3.8	...	0.8	...	...	7.1	4	50	21	1.1	...	1.7	...	2.6	...	...	5.9	...	...	...	6.6	...	...	...	7.9	24
22	4.8	...	1.0	...	6.8	...	1.3	...	5.7	...	2.4	...	5.7	...	2.4	...	...	12.3	10	35	22	7.1	...	...	1.4	7.2	...	...	7.4	...	...	...	6.6	...	...	...	8.5	1, 11
23	6.9	...	2.9	...	7.4	...	1.5	...	4.8	...	1.0	...	3.2	...	0.6	...	...	13.7	1	10	23	...	6.9	...	...	...	10.5	...	...	6.9	2.9	...	1.3	1.9	...	...	10.5	9
24	...	5.5	...	13.3	...	5.5	...	13.3	...	7.3	...	10.9	...	7.5	...	11.1	...	20.5	9	50	24	...	3.8	2.6	...	...	3.9	...	...	4.8	...	1.0	...	3.0	2.0	...	5.6	16
25	...	5.8	...	8.7	...	4.9	...	7.4	...	8.7	...	5.8	...	6.4	...	2.6	...	15.4	11	50	25	...	Cal m	...	...	2.9	...	4.3	...	...	7.9	...	4.3	...	6.0	...	13.1	22
26	...	9.0	1.8	...	...	10.3	...	2.0	...	11.6	2.3	...	...	13.7	5.7	...	...	21.1	18	20	26	...	8.6	8.6	...	...	9.8	14.7	...	12.0	8.0	...	14.5	10.3	...	...	18.7	11
27	...	13.1	2.6	...	...	13.1	...	2.6	...	11.1	...	...	...	9.4	...	3.9	...	20.5	1	45	27	...	14.0	5.8	...	...	14.2	5.9	...	...	11.6	2.3	...	10.0	2.0	...	15.1	3
28	...	10.0	...	4.1	...	8.5	...	5.7	...	10.0	...	4.1	...	10.0	...	4.1	...	17.0	22	20	28	...	11.6	2.3	12.5	8.7	...	1.7	...	2.5	...	2.5	...	12.5	4		
29	...	10.1	...	6.7	...	11.8	...	4.9	...	11.7	...	7.8	...	9.8	...	9.8	...	19.8	17	30	29	...	4.0	...	1.6	...	2.5	...	2.5	...	2.3	...	2.3	...	4.2	...	4.2	...	6.6	22, 23	
30	...	9.0	...	9.0	...	4.3	...	10.3	...	4.9	6.6	...	6.6	...	17.5	3	35	30	...	3.4	...	5.2	...	2.9	...	4.3	...	3.7	...	3.7	...	4.5	...	1.9	...	6.9	2	
31	...	1.2	...	6.1	...	1.8	...	9.0	...	5.7	...	8.5	...	2.4	...	5.7	...	14.4	?	?	31	...	4.8	...	1.0	...	8.3	...	1.7	...	6.7	...	2.8	...	3.8	...	9.5	18			
																	S+N & W+E		153.0	93.9	183.0	95.4	178.6	112.0	161.8	102.0			S+N & W+E		61.4	73.5	85.0	84.8	87.7	81.0	69.4	71.0			
																	S-N & W-E		-51.8	59.7	-70.4	70.0	-67.6	71.4	-36.6	57.2			S-N & W-E		-47.0	39.1	-60.6	35.2	-69.3	13.8	-48.0	31.8			

ENGLAND S.W.:—SCILLY.

Height of Head above—Ground 9.8 m., M.S.L. 49.7 m.
Height of Cups above—Ground 5.8 m., M.S.L. 45.7 m.

ENGLAND E.:—SHOEBURYNESS.*

Height of Head above—Ground 27.4 m., M.S.L. 31.4 m.

Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.		
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.				m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.				
1	7.0	...	...	1.4	...	2.0	9.8	...	...	5.0	...	...	7.2	17.4	...	...	20.6	20	35	1	4.5	...	...	1.9	3.8	...	...	2.6	...	Cal m	...	1.5	...	3.7	...	10.4	22 15	
2	...	6.3	9.4	...	...	3.8	9.2	...	...	6.8	6.8	...	...	3.5	3.5	...	...	17.5	1	40	2	0.9	...	4.5	...	...	4.9	...	...	1.9	4.5	...	...	1.8	4.3	...	12.8	14 0
3	...	2.8	0.6	...	...	0.4	0.1	...	...	0.9	0.9	...	1.4	...	2.1	...	...	4.8	2	50	3	...	3.8	2.6	...	...	3.4	1.4	...	...	1.5	...	1.0	...	Cal m	...	7.9	1 15
4	1.2	...	1.2	...	1.8	...	1.2	...	2.1	...	0.4	...	1.7	...	0.3	2.6	12	35	4	...	2.7	2.1	0.4	1.6	...	4.0	1.8	...	0.4	...	7.3	11 55
5	0.4	...	...	0.7	...	...	0.3	...	...	1.6	...	2.4	...	2.7	...	1.8	...	5.4	20	30	5	...	1.7	...	1.7	...	Cal m	...	...	...	2.8	...	1.1	...	1.5	...	5.2	14 30
6	...	1.4	...	2.1	...	2.3	...	...	2.3	...	3.5	...	2.1	...	5.0	...	...	7.9	20	30	6	...	Cal m	...	...	Cal m	...	...	Cal m	...	Cal m	...	...	Cal m	...	...	4.3	0 40
7	...	...	...	7.1	1.9	...	...	9.4	...	...	...	10.0	...	...	...	...	...	15.8	11	50																		

9. SEISMOLOGICAL DIARY.

EARTHQUAKES:—ESKDALEMUIR.								MICROSEISMS OF N. COMPONENT:—ESKDALEMUIR.											
Day.	Phase.	Time, G.M.T.			Period.	Amplitudes.			Δ.	Remarks.	Day.	0 h.		6 h.		12 h.		18 h.	
		h	m	s		A _{N.}	A _{E.}	A _{Z.}				A _{N.}	T.	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.
3	e e S L M F	10	1	37	...	μ	μ	μ	km.		1	1.8	5.5	2.5	5.5	3.6	5	1.7	5.5
		10	8	27		2	1.1	5.5	1.1	4.5	1.2	4	1.0	5.5
		10	18	27		3	1.0	5	0.9	5	0.5	5	1.1	4.5
		10	36		4	0.9	6	1.3	5.5	1.1	6	1.6	6
		10	50	26		5	1.5	6.5	1.6	5.5	0.9	6	0.9	5
		12	15		6	0.7	5.5	0.5	4	0.5	4	0.3	4
4	L F	18	32	...	...	...	...	...		7	0.8	4	0.8	4	0.9	4	0.7	4
		19	...	...	...	...	...	...		8	0.2	4	...	...	0.3	4	0.4	5
8	P S L F	5	14	38	...	...	...	5800		9	1.1	4	1.0	4.5	...	...	...	...
		5	21	51	...	...	...	...		10	...	...	...	...	1.1	4	1.0	4
		5	30	28	...	...	...	...		11	0.8	4.5	0.4	4.5	0.3	4	0.3	4
		7	...	...	...	...	...	...		12	0.1	4	0.3	4.5	0.5	4	0.7	5
		...	...	...	...	...	...	...		13	1.0	6	1.0	5.5	0.9	5.5	0.9	5.5
		...	...	...	...	...	...	...		14	1.4	4	0.7	5	0.7	5	0.5	5
11	P L F	13	39	34	...	...	...	...	Slight disturbance.	15	0.7	5	0.6	4	0.5	4	0.9	4.5
		13	49	...	...	...	...	...		16	1.0	4	0.6	5.5	0.8	4	0.5	5
		14	40	...	...	...	...	...		17	0.7	4	0.6	4	0.6	4.5	0.7	4.5
		...	...	...	...	...	...	...		18	0.7	5.5	0.4	4.5	0.7	5.5	1.1	4
		...	...	...	...	...	...	...		19	0.9	5	1.0	5.5	0.7	6	0.7	5.5
		...	...	...	...	...	...	...		20	0.7	5.5	0.8	4	0.8	4	0.5	5.5
		...	...	...	...	...	...	...		21	0.9	6	1.0	4.5	0.8	5.5	0.8	6
		...	...	...	...	...	...	...		22	1.0	4	0.9	5.5	1.1	4	0.9	4
		...	...	...	...	...	...	...		23	1.1	4	0.9	4.5	0.9	4.5	0.7	5
		...	...	...	...	...	...	...		24	0.7	5	0.5	4	0.5	3.5	0.6	4
		...	...	...	...	...	...	...		25	0.6	4	0.2	4	0.3	4	0.3	5.5
12		22	8	to	...	...	...	...	Moderate disturbance; phases obscured by wind effects.	26	0.7	5	0.9	5.5	1.4	5.5	1.1	6
		23	30	...	...	...	...	...		27	1.4	5.5	1.4	4	1.6	5.5	1.8	5
21	L F	22	26	...	...	...	...		28	1.4	5	1.7	5.5	1.6	5	1.3	4.5	
		23	30	...	...	...	...		...	29	1.6	5	1.3	4.5	1.1	5	1.2	4
22	P S L F	6	10	1	...	...	...	2200	P and S doubtful.	30	1.4	4	0.8	5.5	0.9	4.5	0.9	4
		6	13	39	...	...	...	...		31	0.9	4	0.4	6	0.6	5.5	0.7	7
		6	15	14		Means for Month { A _N =0.9 μ. Normals, 1911-18 { A _N =1.3 μ. T=4.8 s. T=5.3 s.									
		7	...	...	...	...	...	...					
25	P S L F	17	15	50	3170	Slight disturbance.	EARTHQUAKES:—RICHMOND (KEW OBSERVATORY).									
		17	20	45	...	...	...	...		Day.	Times, G.M.T. of		Remarks.					
		17	23	49	...	...	...	...		Commence-ment.	Max. Phase.							
		18	30	...	...	...	...	3-6				h m	h m	Defective record.				
31	O P S L F	15	47	9	...	...	...	6700	8	...	5 59	Small.						
		15	57	20	...	...	...	...	10	...	1 49	Small.						
		16	5	33	...	...	...	...	11	...	14 8	Small.						
		16	16	25	...	...	...	...	12	...	22 59	Small.						
		18	...	...	...	...	...	...	21	...	22 47	Very small.						
		...	...	...	...	...	...	...	22	...	6 14	Very small.						
31	L M _N M _E F	19	44	30	...	...	...	...	25	...	17 19	{ Small. Succession of small waves to 17 h. 13 m.						
		19	51	23	...	...	...	...	31	15 45	16 33							
		19	51	22	...	...	...	...	31	19 49	19 57							

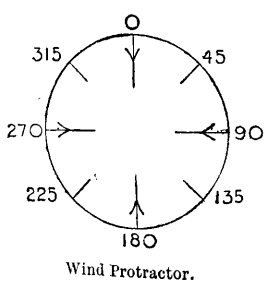
Note.—Time marking arrangements failed during passage of disturbance beginning soon after 1 h. on 10th October 1919.

10. SOUNDINGS WITH PILOT BALLOONS.

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.												Cloud Observations.								
		Geostrophic.		By Anemometer.		At Heights above M.S.L.								Time, G.M.T. h. m.	Type.	Deg. from N. mr/s.	Type.	Deg. from N. mr/s.				
		Deg. from N.	m/s.	Deg. from N.	m/s.	500 m.		1000 m.		2000 m.		3000 m.							4000 m.			
		Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.					
ABERDEEN.																						
3	17 0	230	17	200	4.5	225	17.0	235	10.0	235	12.0	...	...	...	...	13 0	...	...	Ci-Cu.	305	2.5
25	17 0	315	6	265	2.0	295	8.5	320	12.0	315	11.5	...	...	...	...	13 0	Fr-Cu.	330	10.0	...	...
ESKDALEMUIR.																						
3	7 10	300	7	calm		235	4.7	310	10.0	335	12.5	...	...	...	...	...	St.	...	Ci-St.	...	...
7	7 25	?	?	360	1.0	100	4.4	180	1.0	130	3.8	180	0.6	355	6.0	...	...	...	Ci.	270	2.0
7	11 45	?	?	150	0.5	135	2.1	275	3.0	200	4.3	185	5.0	350	3.6	...	...	...	Ci., Ci-St.	5	1.5
8	7 20	340	8	135	1.0	?	?	5	11.0	350	13.0	...	...	...	...	...	St-Cu.	...	A-Cu.	345	7.5
8	11 45	360	7	350	6.0	350	6.5	5	13.0	350	7.5	...	...	...	...	...	Cu.	...	Ci.	...	...
11	7 20	20	5	5	3.8	15	11.0	25	11.5	5	10.5	10	14.0	15	20.5	...	St-Cu.	40	...	Ci.	20	...
13	7 30	350	15	310	6.0	335	11.0	350	17.0	350	11.5	St-Cu.	360	...	Ci-St.	345	3.0
14	17 5	350	14	350	1.7	335	5.0	345	10.0	340	8.0	...	...	...	...	...	Cu., Fr-Cu.	...	...	...	...
15	7 30	315	11	310	8.5	325	9.0	335	10.5	325	16.0	...	...	...	...	...	St.	...	Ci-St.	320	4.0
16	7 25	350	17	325	6.5	345	7.5	355	13.5	340	12.5	345	26.5	...	...	...	...	...	cloud	less	...
16	11 40	350	8	280	5.0	330	9.5	335	12.0	345	5.5	...	...	...	...	...	St-Cu.	...	Ci-St.	...	...
21	11 40	210	8	195	4.0	210	4.8	215	9.0	200	8.5	195	5.5	200	4.8	...	...	...	Ci-St.	205	4.0
21	15 10	220	8	170	2.0	190	3.2	165	7.0	185	11.0	210	16.0	205	2.2	...	A-Cu.	...	Ci-St.	...	...
25	12 0	360	5	30	6.0	25	6.5	25	10.0	10	8.5	20	9.5	...	...	...	Cu.	...	Ci-St.	...	...
28	7 30	10	12	360	9.5	360	17.0	5	25.0	5	9.0	...	...	...	...	...	Fr-Cu.	...	...	...	...
28	11 50	10	21	360	11.0	355	10.5	10	22.5	25	17.5	...	...	...	...	...	Cu., Fr-Cu.	...	...	...	...
7	7 25			5000 m.	305	5.0	...	...	...	...	...	...	...	...	...	...	...	...	Ci.	270	2.0
7	11 45			(For observations at lower levels, see above.)	320	5.5	325	8.0	315	6.0	345	5.5	345	8.0	345	12.0	...	...	Ci., Ci-St.	5	1.5
11	7 20				15	27.0	St-Cu.	40	...	Ci.	20	...
21	11 40				270	3.7	217	5.0	360	2.0	305	6.0	320	11.0	320	16.5	...	...	Ci-St.	205	4.0
21	15 10				205	5.5	220	4.8	255	5.0	295	6.0	315	12.0	...	...	A-Cu.	...	Ci-St.	...	...
21	11 40																11,000 m.	Ci-St.	205	4.0
SOUTH FARNBOROUGH.																						
3	7 15	10	7	305	1.5	10	10.0	360	8.5	340	7.0	20	9.5	5	22.0	...	A-St.	...	...	...	...
4	7 45	?	?	calm		310	5.0	80	4.0	60	7.5	45	7.5	65	13.5	...	...	...	...	...
8	9 40	10	3	45	3.6	50	5.5	35	9.5	30	7.0	20	8.5	25	7.5	...	A-Cu.	...	...	...
8	12 25	10	7	20	2.7	12	1.5	30	13.5	20	8.5	...	...	...	...	...	A-St.	...	...	...
9	7 0	20	12	360	3.6	20	14.0	30	13.5	10	15.5	...	...	...	...	...	St-Cu.	...	...	...
10	7 15	360	7	360	6.5	355	13.5	355	12.5	350	16.0	...	...	...	...	...	...	...	Ci.	...	
10	7 40	360	7	315	1.8	355	13.0	355	12.0	355	15.0	...	...	...	...	...	...	...	Ci.	...	
10	15 30	330	10	345	5.5	335	7.5	330	9.5	360	12.0	...	...	...	...	...	St., St-Cu.	...	A-St.	...	
13	7 15	300	9	280	3.1	290	10.5	295	9.5	300	12.0	270	15.0	285	22.5	...	...	...	cloud	less	
14	7 20	280	12	260	5.0	285	11.5	290	11.0	285	13.5	...	...	...	...	...	A-Cu.	...	Ci.	...	
4	7 45			(For observations at lower levels, see above.)															5000 m.	6000 m.	...	
13	7 15																		60	18.0	...	
																			280	20.0	275	24.5

Height of Station above M.S.L. = H., Anemometer above ground = h.

Aberdeen H. h.
 Eskdalemuir 14 m. 32 m.
 S. Farnborough (Golf Course) 70 m. 31 m.
 Cahirciveen 9 m. 13 m.



Notes on Pressure Distribution.

October 1919.

1st, 7 h. Low centered off NW. of Ireland.
 3rd, 7 h., 18 h. } Deep depression centered near Iceland. SW.-NE. ridge across the British Isles.
 4th, 7 h. }
 7th, 7 h., 13 h. Anticyclone centered over the British Isles.
 8th, 7 h. Anticyclone over the British Isles, centered over Iceland; V over Scandinavia.
 8th, 13 h., 18 h. } Anticyclone centered S. of Iceland, Low over the Baltic.
 9th, 7 h.-11th, 7 h. }
 13th, 7 h. Deep depression centered over the North Sea.
 14th, 7 h., 18 h. " " " " Christiania. } Anticyclone from the Azores to Spitzbergen.
 15th, 7 h. " " " " the Gulf of Bothnia. }
 16th, 7 h., 13 h., 18 h. Anticyclone over the British Isles, centered S. of Ireland.
 17th, 7 h., 13 h., 18 h. " " " " over France.
 18th, 13 h.-22nd, 13 h. " " " " Central Europe.
 23rd, 7 h., 13 h. Shallow trough extending from Ireland to Scandinavia, SW.-NE. ridge over England.
 25th, 13 h., 18 h. Anticyclone centered near Iceland.
 27th, 7 h. " " " " ; shallow Low centered over the North Sea.
 27th, 18 h. }
 28th, 7 h., 13 h., 18 h. } Extensive shallow Low over Central Europe; }
 29th, 7 h., 13 h. Low centered over Holland; } Anticyclone from the Azores to Spitzbergen.
 30th, 7 h. " " " " the Channel; }
 30th, 13 h. " " " " France; }
 31st, 7 h., 13 h. Well established anticyclone centered over the Faeroe.

Notes on Ascents.

Aberdeen—
 3rd, 17 h. Ci-Cu. rapidly degraded and became fused into A-St. sheet during afternoon.
 25th, 17 h. Sky became rapidly cloudy with St-Cu. after 16 h.

Eskdalemuir—
 3rd, 7 h. 10 m. Sky became overcast with low clouds at 7 h. 30 m.
 7th, 7 h. 25 m. Ci. and Ci-St. degrading to A-Cu. very rapidly.
 8th, 7 h. 20 m. Rapid change of cloud form during ascent.
 15th, 7 h. 30 m. Brilliant parhelia during ascent.

South Farnborough—
 3rd, 7 h. 15 m. Surface mist.
 4th, 7 h. 45 m. " "
 15th, 7 h. 15 m. " "

Cahirciveen—
 7th, 9 h. 50 m. At about 4 km. a brief and vigorous downdraught of about 80 to 100 metres per minute was encountered, followed by a steady upward current of about 55 m/m. which continued over a vertical distance of about 1000 m. (Two-theodolite method.)
 13th, 7 h. 55 m. High velocities obtained above 3000 m. seem to indicate a leak in balloon.
 29th, 11 h. 20 m. At 3 km. an upward current of about 45 m/m. persisted over about 500 m. Traces of briefer vertical currents appeared at about 5.5 km. (Two-theodolite method.)
 30th, 11 h. 35 m. At 4.5 km. an upward current of about 40 m/m. prevailed over about 1000 m. Traces of briefer vertical currents at 6 km. (Two-theodolite method.)
 31st, 14 h. 50 m. At 2 km. a vigorous upward current of 80 m/m. continued over about 400 m., preceded by a brief downdraught of about 65 m/m. At 3 km. a downdraught of about 65 m/m. was found over about 100 m. Throughout the whole ascent up to 3.5 km. there was a great deal of convection. (Two-theodolite method.)

11. NEPHOSCOPE OBSERVATIONS.

ABERDEEN.

Day and Hour. G.M.T.	Type of Cloud.	Velocity-height-ratio.				Remarks.
		Degrees from N.	Milliradians per Second.	Components.		
				W.-E.	S.-N.	
		°	mr/s.	mr/s.	mr/s.	
2	{ False Ci. Cu-Nb.	130 295	2'0 10'0	-1'5 +9'1	+1'3 -4'2	False Ci., showing bright parhelia at times.
3	Ci-Cu.	305	2'4	+2'0	-1'4	Hazy, indefinite Ci-Cu.; fused to A-St. later.
4	St-Cu.	250	3'6	+3'4	+1'2	Fused St-Cu.
6	False Ci.	300	2'8	+2'4	-1'4	False Ci. became Ci-Cu. later.
8	Fr-Cu.	330	10'0	+5'0	-8'7	
9	Cu-Nb.	345	8'3	+2'1	-8'0	Apical part measured.
10	Cu. to Cu-Nb.	344	11'0	+3'0	-10'0	Central mass measured.
11	Cu. to Cu-Nb.	349	3'6	+0'7	-3'5	Apical part measured.
14	False Ci.	326	1'0	+0'4	-0'8	False Ci. formed from Cu-Nb. apex.
15	False Ci.	355	2'4	+0'2	-2'4	False Ci. from Cu-Nb. apex.
21	A-Cu.	313	5'0	+3'6	-3'4	Incipient high A-Cu.
22	St-Cu.	263	3'1	+3'1	+0'4	Fused lenticular St-Cu.
25	Fr-Cu.	330	10'0	+5'0	-8'7	
27	Cu-Nb.	3	17'0	-1'0	-17'0	Basal part measured.
28	Cu-Nb.	18	6'5	-2'0	-6'2	
29	Cu.	62	8'2	-7'2	-3'9	
30	{ A-Cu. Cu.	66 69	4'8 9'3	-4'4 -8'7	-1'9 -3'3	A-Cu. to high St-Cu. Cu. to small Cu-Nb.
31	St-Cu.	8	6'7	-0'9	-6'6	Slight Cu. below.

12. AURORA.

Day.	a.m. or p.m.	Moon.	Magnetic Character.		Aurora Observations.	
			Eskdalemuir.	Richmond.	Station.	Remarks.
1	P.	..	2, 2	2, 2	Eskdalemuir Glasgow (and other Scottish stations) Lisburn Armagh Bidston Dublin (city) Clongowes Wood Holyhead Birmingham Sparkhill Seskin (Carrick-on-Suir) Tenbury Waterford Valencia Observatory Ross-on-Wye Haverfordwest Roche's Point Rousdon Tavistock Sheepstor Newquay	23 h. 30 m. Brilliant, with curtains. 21 h. Bright. 19 h. 30 m. onwards. 21 h. Very fine. 20 h. 15 m.-24 h. From 21 h. 50 m. Pearly lustre, fairly bright, occasional rifts. From 23 h. 20 h.-23 h. 20 h.-24 h. Brilliant W. to N., reaching nearly to Polaris. 22 h., towards NNE. 21 h.-22 h. Fairly brilliant. From 20 h. Greenish arch in NW. and N.
2	a.	D	2, 2	2, 2	Aberdeen Southport Banff	23 h. 21 h.-23 h. Bright in North. 22 h.-22 h. 30 m. Greenish white bands, streamers much lighter. Bright. 24 h. Just showing behind dark, low cloud. Early morning till 3 h. Bright streamer curtains and corona.* 0 h.-3 h. Very brilliant display.
2	P.	..	2, 2	2, 2	Balmoral Eskdalemuir Donaghadee	21 h. Very faint. 20 h. Vivid. 20 h.-23 h. Glow, rather extensive, moderately bright.
4	P.	..	2, 2	2, 2	Aberdeen Edinburgh Skegness Deerness	19 h. 30 m.
5	P.	..	2, 2	2, 2	Banff Gordon Castle Inverness	
6	P.	..	2, 1	2, 1	Aberdeen Braemar	19 h.-23 h. Arch and streamer curtains, bright. 21 h. Faint glow.
8	P.	..	1, 1	1, 2	Gordon Castle	
9	..	○	..	..
12	P.	..	0, 0	0, 0	Glasgow Deerness Aberdeen Cheltenham	22 h. After 20 h. Glow type, faint. 21 h.
15	P.	..	1, 1	1, 2		
16	..	☾	..	..
16	P.	..	1, 1	2, 1	Eskdalemuir Deerness Aberdeen	20 h.-21 h. Glow.
17	P.	..	1, 1	1, 1	Meltham Bidston Tenbury Oxford	21 h.-23 h. Glow type, moderately bright. 19 h. 21 h. 20 h.-23 h. No streamers.
18	a.	..	1, 1	1, 1	Eskdalemuir	1 h. Faint glow.
19	P.	..	0, 0	0, 0	Deerness	
23	..	●	..	..
23	P.	..	2, 0	1, 0	Aberdeen Deerness	22 h. Glow.
25	a.	..	0, 0	0, 0	Eskdalemuir Deerness Inverness	Early a.m.
26	P.	..	0, 2	1, 1	Aberdeen Glasgow Meltham Valencia Observatory	From 18 h. Glow and arch, moderately faint. 19 h. 18 h. 30 m.-19 h. 15 m. Slight. 19 h. Glow.
27	P.	..	1, 1	1, 2	Deerness	
28	P.	..	1, 1	2, 1	Deerness	

Note.—The two magnetic "characters" entered in each case refer to the two periods of 24 hours ending and beginning at midnight of the night in question.

* Aberdeen, night of 1st was rainy and misty, hence aurora was not seen then.



METEOROLOGICAL OFFICE OBSERVATORIES—GEOPHYSICAL JOURNAL.

DAILY VALUES.—Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology.

Ninth Year.—No. 11. NOVEMBER 1919.]

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1. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.—Lat. 51° 30' N. Long. 0° 10' W.							RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.					ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.					CAHRCIVEEN.		
	Bright Sunshine.*		Radiation received on Horizontal Surface by Calendar Radiograph.					Bright Sunshine.*		Radiation at Noon by Ångström Pyrheliometer.			Bright Sunshine.*		Radiation by Ångström Pyrheliometer.			Bright Sunshine.*		
	Total.	Per cent. of Possible.	Daily Total.	Per cent. of Planetary.	Maximum.			Total.	Per cent. of Possible.	Intensity.	Vertical Component.	Sky.	Total.	Per cent. of Possible.	Time.	Sky.	p sec Z.	Intensity.	Total.	Per cent. of Possible.
					Amount.	h.	m.													
1	0'1	2	208	17	20	12	50	16	0'9	10	3'1	32	7'8	81
2	1'8	19	267	22	28	11	40	28	1'2	13	...	...	...	4'0	44	...	...	...	8'3	87
3	0'0	0	172	14	16	11	30	16	0'0	0	...	...	...	0'5	6	...	...	...	4'8	51
4	0'0	0	44?	4	4?	9	45?	2?	0'0	0	...	...	...	0'0	0	...	...	...	7'4	79
5	0'0	0	165?	14	21?	12	30?	21?	0'0	0	...	...	...	0'0	0	...	...	...	7'5	81
6	0'0	0	221	19	15	12	44	14	0'0	0	...	...	...	1'0	11	...	...	...	6'1	66
7	0'0	0	57	5	4	14	10	2	0'0	0	...	...	...	0'0	0	...	...	...	5'0	54
8	0'0	0	48	4	3	10	35	2	0'0	0	...	...	...	0'2	2	...	...	...	6'9	75
9	0'0	0	50	5	5	9	8	4	0'0	0	...	...	...	0'0	0	...	...	...	0'0	0
10	0'0	0	n 29	3	3	12	38	1	0'0	0	...	...	...	6'8	78	...	...	...	6'4	71
11	1'3	15	274	26	29	12	15	29	3'6	40	...	...	...	6'3	73	...	...	...	4'2	47
12	2'0	22	x 359	35	26	11	15	24	3'9	43	...	...	...	0'0	0	...	...	...	1'9	21
13	0'7	8	264	3	21	12	25	21	4'4	49	27	10	Thro' Cl.	3'3	39	...	...	...	7'5	84
14	0'0	0	230	23	20	11	25	20	0'1	1	...	...	...	4'6	55	...	...	...	7'6	87
15	0'0	0	201	21	16	13	40	10	0'1	1	...	...	...	x 7'0	84	...	...	...	4'0	45
16	2'1	24	296	31	27	12	30	27	4'6	52	...	...	...	0'0	0	...	...	...	0'0	0
17	0'0	0	83	9	7	9	37	6	0'0	0	...	...	...	0'0	0	...	...	...	0'0	0
18	1'2	14	292	32	19	10	30	18	2'5	29	13	4	Thro' Cl.	2'4	30	...	...	...	0'0	0
19	0'0	0	99	11	5	10	50	4	0'0	0	...	...	...	0'3	4	...	...	...	3'0	35
20	3'8	44	326	37	25	12	30	25	5'5	64	61	20	Clear	4'2	53	...	...	...	3'2	38
21	3'8	45	321	37	28	11	50	28	x 5'7	66	56	18	Clear	5'5	69	...	...	...	0'0	0
22	0'0	0	59	7	5	8	57	4	0'0	0	...	...	...	1'8	23	...	...	...	0'0	0
23	0'0	0	109	13	13	12	0	13	0'3	4	...	...	...	0'0	0	...	...	...	0'0	0
24	x 5'2	62	307	37	24	11	58	24	4'9	58	54	17	Clear	0'1	1	...	...	...	3'1	37
25	1'7	21	226	28	21	12	16	21	1'9	23	60	18	Clear	0'0	0	...	...	...	2'2	27
26	2'3	28	224	28	17	12	57	16	5'1	62	44	13	Hazy	2'4	31	...	...	...	1'2	15
27	0'0	0	41	5	5	14	8	3	0'0	0	...	...	...	4'9	64	...	...	...	5'7	70
28	0'0	0	41	5	6	13	8	4	0'0	0	...	...	...	2'1	28	...	...	...	2'5	31
29	1'1	14	131	7	24	11	38	24	0'5	6	...	...	...	0'4	5	...	...	...	4'8	60
30	0'0	0	172	22	14	11	0	12	0'0	0	...	...	...	0'0	0	...	...	...	0'0	0
Means	0'90	11	177	17	16	—	—	15	1'51	17	—	—	—	2'03	34	—	—	—	3'70	41
Normal	1'00	12	230	24	—	—	—	—	1'73	20	—	—	—	1'83	23	—	—	—	2'17	25

2. METEOROLOGY AND MAGNETISM:—CAHRCIVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W.

Heights above M. S. L.:—H=9.1 m. H_b=13.7 m. H_a=26.4 m. Above Ground: h_t=1.3 m. h_r=0.56 m. h_a=13.9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.		Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force, Declination West, and Inclination.	
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	9 h.	21 h.	9 h.	21 h.	9 h.	21 h.	9 h.	21 h.					
	mb.	mb.	a.	a.	a.	a.	millibar.	%	%	m/s.	m/s.	Tenths of Sky covered.	mm.	a.					
1	1031'4	1031'2	200+ 78'8	200+ 77'7	82	76	6'5	6'6	71	77	80	7	—	1	—	72	Fine and almost cloudless n. and day.		
2	1029'0	1023'3	78'4	77'7	81	77	6'0	6'9	67	81	90	5	—	1	—	73	Fine n. and day. Fine to o. evening.		
3	1016'6	1013'3	79'1	77'9	81	76	7'2	6'8	76	79	95	6	70	5	7	4	—	73	o. to c. n. Fair to fine day.
4	1008'5	1004'7	77'3	78'1	80	75	6'7	6'9	81	79	85	6	75	5	3	8	—	72	Fine n. and morning and —. Fine day.
5	1003'6	1001'6	76'5	77'2	79	76	6'0	6'4	77	78	90	2	85	5	000	000	—	73	Fine n. and morning. Fine and ∞ day.
6	1000'6	1001'5	76'0	76'4	80	74	6'5	6'5	86	84	55	3	—	1	300	000	—	73	Fine and — n. Fine and ∞ day.
7	1001'8	1000'9	72'2	76'3	80	71	5'8	6'8	100	89	60	2	—	1	100	—	1'4	70	Fine and — n. Fine a. Fine to ●° p.
8	1001'0	1002'9	74'5	73'1	79	71	6'2	5'2	91	85	—	1	—	1	4	2	—	71	Fine and — n. Fair to fine day. — p.
9	1002'1	1002'6	78'8	76'5	80	72	7'0	6'7	76	86	315	10	5	3	10	1	11'6	68	Fine and — n. o. p. h. day. < p.
10	1010'8	1015'9	76'2	75'7	79	75	6'4	5'8	84	80	30	4	7	4	6	7	—	72	Fine n. Fair to fine day.
11	1015'7	1015'4	71'0	71'4	78	69	3'7	3'6	70	67	—	1	8	2	5	0	—	n 66	Fine and — n. Fair to fine day.
12	1013'2	1013'0	72'0	73'4	78	n 69	4'2	5'7	74	91	80	3	—	1	6	3	2'8	n 66	Fine and — n. c. to o. a. o. to fine p.
13	1013'8	1012'6	72'7	73'0	77	72	4'5	4'6	76	75	65	3	75	2	4	0	—	68	Fine and — n. Fair to fine day. 12th—
14	1012'3	1014'9	73'6	73'7	n 76	72	5'1	4'5	80	70	100	5	45	3	0	0	—	68	Very fine n. and day.
15	1016'0	1024'6	71'5	73'5	78	71	4'3	4'9	78	78	80	2	—	1	6	0	—	68	Fair to fine day. < p.
16	1028'5	1027'5	74'2	82'9	83	71	5'1	10'8	77	89	355	3	270	7	10	10	6'6	68	Fine n. Fair to o. morning ●° day.
17	1024'4	1016'0	83'6	83'8	84	82	11'0	11'8	87	92	230	9	275	6	10	10	7'0	81	o. n. o. and ●° day.
18	1019'9	1015'4	81'8	83'0	84	81	9'5	10'7	84	88	250	5	225	6	10	10	2'5	79	o. and p. to b. c. n. o. to c. day. ● evening.
19	1008'5	1007'9	82'8	81'8	84	81	10'6	8'8	88	78	245	9	265	11	7	5	3'3	81	● to p. n. c. and p. day.
20	1009'2	1014'8	80'3	81'4	82	79	7'6	7'9	74	72	305	11	285	9	6	8	2'6	76	p. and q. n. ▲ and p. day. Fine evening.
21	1014'7	1011'6	82'4	83'5	84	82	10'9	12'4	93	98	280	6	190	2	10	10	5'4	78	d. n. p. morning. d. a. ● p. [ing.]
22	1015'5	1016'0	84'2	84'7	85	x 83	13'1	13'1	99	96	240	5	235	6	10	1	0'2	81	≡° and d. morning. o. day. o. d. p. even-
23	1010'9	1007'0	85'4	81'9	x 86	81	14'0	9'1	98	81	225	8	285	13	10	9	1'9	84	● to p. n. c. and p. day. p. and / p. 25th—
24	1006'3	999'1	81'9	79'5	83	79	8'9	6'9	79	72	230	9	280	10	7	6	6'7	79	Fine morning. Fair a. o. to p. and K. p.
25	998'3	1001'1	79'7	78'9	81	78	7'6	7'0	77	75	340	6	345	8	5	3	2'5	77	Fair and ▲° p. day. Fine evening.
26	1000'3	1003'4	78'5	78'2	80	77	7'1	6'6	79	75	360	12	30	7	9	3	5'8	74	p. ▲ n. and morning. p. a. Fair day.
27	1002'8	998'8	76'4	75'8	79	74	6'7	6'1	86	83	40	4	—	1	7	3	0'8	75	Fair and p. morning. Fine day and even-
28	996'5	999'1	74'0	74'5	78	74	5'6	5'6	85	83	60	2	70	6	6	1	—	72	Fair day. Fine evening. [ing.]
29	1004'3	1007'6	72'4	71'5	77	71	5'9	5'5	100	100	75	2	80	2	0	0	—	68	Fine and — n. and morning. Fine day. —

3. METEOROLOGY :—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m.

Heights above Ground :—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns: Day, Air Pressure at Station Level (9h, 21h), Air Temperature in Degrees Absolute (9h, 21h, Max, Min), Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second (9h, 21h), Cloud Amount and Weather (9h, 21h), Rain 0 h. to 24 h., Min. Temp. on Grass, and REMARKS. Includes monthly totals and normals.

4. METEOROLOGY :—ESKDALEMUIR, DUMFRIESHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m.

Heights above Ground :—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns: Day, Air Pressure at Station Level (9h, 21h), Air Temperature in Degrees Absolute (9h, 21h, Max, Min), Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second (9h, 21h), Cloud Amount and Weather (9h, 21h), Rain 0 h. to 24 h., Min. Temp. on Grass, and REMARKS. Includes monthly totals and normals.

Temperatures at or below the normal freezing point of water are printed in small type.

5. GEOPHYSICS :—RICHMOND (KEW OBSERVATORY).

Day.	Earth Temperature at 9 h.		Height above M. S. L. of Surface of Underground Water.		Magnetic Force.						Magnetic Character of Day.	Electric Character of Day.	Charge per cc. $\times 10^{20}$.		Air-Earth Current $\times 10^{16}$.	Potential Gradient, Volts per metre. Factor 2.20.			
	0.3 m.	1.2 m.	Daily Mean.	Extremes.	Horizontal Comp't.		Declination.		Inclination.				About 15 h.	About 15 h.	3 h.	9 h.	15 h.	21 h.	
					Mean Time.	γ	Mean Time.	West.	Mean Time.	North.									+
	a.	a.	cm.	cm.	h m	γ	h m	°	h m	°			Coulomb.	Amp/cm ² .	v/m.	v/m.	v/m.	v/m.	
1	200+	200+	202	...	...	...	...	...	...	...	0	1	...	...	270	455	580	500
2	78.6	82.6	201	...	...	...	...	...	...	...	1	1	...	...	255	295	150	375
3	78.5	82.5	199	...	...	...	...	...	...	...	0	2	0.29	0.35	...	270	685	580
4	78.2	82.4	198	...	...	...	...	...	...	...	2	0	...	...	110	580	550	500
5	78.0	82.2	196	...	...	...	...	...	...	...	0	1	...	...	455	430	175	325
6	78.4	82.1	195	...	11 21	18386	14 23	14 38'3	14 29	66 58'3	0	0	...	...	295	350	230	175
7	77.9	81.9	194	...	...	...	...	...	...	...	0	0	...	...	135	—	430	405
8	79.1	81.9	194	...	...	...	...	...	...	...	0	0	...	...	190	240	365	375
9	79.0	81.9	193	...	...	...	...	...	...	...	0	1	...	...	190	325	110	375
10	78.9	81.9	193	...	...	...	...	...	...	...	0	1	0.47	0.10	175	±+	590	540
11	77.6	81.8	195	...	...	...	...	...	...	...	1	0	0.04	0.37	215	375	480	540
12	76.7	81.8	200	...	...	...	...	...	...	...	1	1	0.14	0.12	375	590	590	255
13	76.0	81.6	204	...	11 10	18401	14 18	14 39'9	14 27	66 57'6	0	0	0.35	0.10	230	540	550	540	
14	76.0	81.4	207	...	...	...	...	...	...	...	0	1	0.39	0.08	295	—	620	805
15	76.0	81.3	208	208	...	...	...	...	...	...	0	1	...	...	325	415	675	±±
16	76.0	81.3	207	...	...	...	...	...	...	...	2	1	...	...	190	405	415	-510
17	75.8	80.9	206	...	...	...	...	...	...	...	1	1	...	...	310	645	365	-40
18	78.0	80.9	204	...	...	...	...	...	...	...	1	0	0.10	0.10	25	415	350	455
19	77.9	80.7	201	...	...	...	...	...	...	...	0	1	...	...	270	230	200	215
20	78.8	80.8	200	...	...	...	...	...	14 33	66 56'9	0	1	0.41	0.21	135	350	270	255
21	77.6	80.8	198	...	11 8	18411	14 23	14 39'8	...	...	1	0	0.08	0.23	200	375	325	580
22	76.7	80.7	197	...	...	...	...	...	...	...	1	1	...	...	375	415	430	390
23	78.3	80.7	196	...	...	...	...	...	...	...	1	1	...	...	95	215	135	200
24	79.8	80.7	196	...	...	...	...	...	...	...	0	0	0.21	0.18	80	500	415	485
25	79.4	80.6	195	...	...	...	...	...	...	...	0	1	0.37	0.10	160	510	120	430
26	78.0	80.8	194	...	...	...	...	...	...	...	1	1	0.18	0.33	270	540	325	-175
27	76.8	80.7	193	...	11 24	18411	...	...	14 23	66 57'9	0	1	0.55	0.41	550	270	565	480
28	76.2	80.6	193	...	...	...	...	...	...	...	0	1	0.49	0.70	725	550	700	820
29	76.2	80.6	192	...	...	...	12 15	14 38'6	...	...	0	2	...	...	±±	±±	240	590
30	76.0	80.5	191	191	...	...	...	...	...	...	0	0	...	...	390	455	860	455
M.	77.6	81.4	198	—	—	—	—	—	—	—	—	—	—	—	265†	419†	386†	333†	
	79.8	83.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

† Mean for 24 days.

6. GEOPHYSICS :—ESKDALEMUIR.

Day.	Magnetic Force.												Magnetic Character of Day.	Electric Character of Day.	Potential Gradient, Volts per metre. Factor 6.48.						
	North Component.			West Component.			Vertical Component.			3 h.	9 h.	15 h.			21 h.						
	Maximum. 15000 γ +	Minimum. 15000 γ +	Range.	Maximum. 4000 γ +	Minimum. 4000 γ +	Range.	Maximum. 44000 γ +	Minimum. 44000 γ +	Range.												
	h m	γ	γ	h m	γ	γ	h m	γ	γ	h m	γ	γ	h m	γ			v/m.	v/m.	v/m.	v/m.	
1	19 56	1004	961	11 50	43	13 51	877	840	to 1 10 20	37	16 40	1071	1059	2 3 15 0	12	0	1 b	135	115	215	350
2	18 37	1012	967	10 56	36	23 0	885	839	23 34	46	22 0	1074	1053	23 25	21	0	2 c	115	180	-515	0
3	18 37	1012	972	12 33	40	12 43	891	851	0 1 1	40	9 34	1070	1060	0 0	10	0	2 c	20	165	255	130
4	17 25	1082	913	17 49	169	16 35	1036	834	18 34	202	17 25	1350	1052	11 40	298	1	2 c	-15	105	35	235
5	19 7	985	962	10 38	23	11 54	875	835	2 41	40	11 43	1078	1050	0 40	28	0	1 a	120	280	175	225
6	21 57	994	962	12 0	32	12 18	871	839	9 42	32	9 15	1074	1067	11 38	7	0	2 c	25	-95	-40	230
7	19 35	1000	966	10 10	34	13 47	874	846	9 44	28	14 0	1071	1063	18 25	8	0	1 a	70	320	160	255
8	17 51	1013	985	10 45	28	13 10	893	853	8 47	40	1 0	1068	1057	11 20	11	0	1 b	140	320	235	195
9	18 30	1004	975	11 15	29	12 38	883	852	0 47	31	1 10	1068	1060	19 0	8	0	1 c	330	±±	130	345
10	19 23	990	975	10 30	15	13 37	883	851	3 56	32	15 30	1065	1059	10 47	6	0	1 c	120	190	70	990
11	7 10	1015	934	18 23	81	15 52	915	796	22 3	119	17 26	1124	1052	23 37	72	1	1 b	465	220	480	870
12	1 37	1029	942	15 11	87	6 5	902	784	2 7	118	15 40	1093	1016	1 3 31 30	77	1	1 c	170	±-	10	265
13	5 25	1003	962	11 31	41	12 40	881	853	0 10	28	16 10	1075	1059	10 20	16	0	1 b	420	355	645	1045
14	6 29	1007	984	12 35	23	12 54	878	858	0 11	20	20 20	1068	1061	11 10	7	0	0 a	495	425	245	660
15	20 50	1032	969	12 21	63	13 35	885	837	20 5	48	20 12	1070	1058	3 0	12	0	0 a	435	295	230	405
16	21 48	1070	937	22 12	133	16 42	932	761	22 17	171	21 36	1124	1051	10 40	73	1	1 b	140	305	805	105
17	20 46	1065	944	1 22	121	13 57	891	737	20 35	154	20 30	1086	1053	1 18	33	1	2 c	185	-115	±-	30
18	18 8	1029	942	17 35	87	14 9	892	753	17 59	139	18 0	1097	1061	0 1	36	1	2 c	90	255	-75	±±
19	18 18	999	966	11 36	33	12 11	876	845	9 9	31	14 40	1071	1062	10 15	9	0	2 c	-90	105	±±	±+
20	7 18	1004	979	12 0	25	12 19	880	846	9 57	34	14 55	1065	1058	11 0	7	0	1 c	±±	140	280	250
21	16 46	1010	961	21 40	49	13 35	884	767	21 4	117	21 20	1084	1057	11 0	27	1	0 a	155	170	230	380
22	2 55	1019	909	15 46	110	15 6	917	814	17 10	103	15 48	1141	1050	4 52	91	1	1 a	285	160	105	230
23	22 26	1028	965	11 5	63	12 37	892	814	18 52	78	18 54	1085	1064	22 40	21	1	2 c	95	105	90	±-
24	19 54	1017	953	15 46	64	12 32	884	845	0 2	39	16 1	1086	1059	10 40	27	1	2 c	135	105	250	200
25	5 0	1009	973	12 8	36	11 47	889	842	22 15	47	21 10	1071	1056	12 0	15	1	2 b	265	185	340	535
26	0 32	1022	969	11 55	53	4 30	885	840	2 48	45	20 0	1072	1045	5 0	27	0	2 c	320	235	385	±±
27	6 9	1005	985	12 20	20	12 23	881	859	0 25	22	17 0	1067	1060	13 25	7	0	1 b	295	160	250	505
28	5 33	1006	979	10 51	27	13 30	881	844	21 39	37	21 25	1071	1055	11 40	16	0	2 c	250	340	380	±±
29	5 20	1008	981	17 31	27	12 42	880	854	9 35	26	17 40										

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W.

Heights above M. S. L.:—H = 54 m. H_b = 55 m. Above Ground:—h_t = 1.48 m. h_r = 1.72 m. h_a = 8 m.

Table with columns: Day, Air Pressure at Station Level (9h, 14h, 21h, Mean of 3 Readings), Air Temperature in Degrees Absolute (9h, 14h, 21h, Max, Min, Mean of 5 Readings), Min. Temp. on Grass, Percentage of Humidity (9h, 14h, 21h, Mean), Rain 0h to 24h, REMARKS, Earth Current Character.

JERSEY (ST LOUIS OBSERVATORY).

Table with columns: Day, Wind Direction and Force (0-12 on the Beaufort Scale), Sunshine, Cloud Amount (tenths of Sky covered), Type of Cloud, and Direction whence coming, Mean Amount.

* For method of estimation, see Introduction.

† The first hour of observation was changed to 9 h. on Jan. 1st, 1919.

8. WIND COMPONENTS: Metres per second at fixed hours, together with the greatest mean hourly velocity, or the greatest velocity attained in a gust, and the time of its occurrence.

NORTH WALES:—HOLYHEAD.

Height of Head above—Roof 8.8 m., Ground 13.7 m., M.S.L. 19.2 m.
Height of Cups above—Roof 4.6 m., Ground 7.6 m., M.S.L. 15.2 m.

SCOTLAND N.:—DEERNESS.

Height of Cups above—Roof 1.5 m., Ground 4.9 m., M.S.L. 57.3 m.

Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	Day.	3 h.				9 h.				15 h.				21 h.				Vel. in Max. Hourly Run.	Time of Max.							
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.			S.	N.	W.	E.			
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.				m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.			m/s.	m/s.	m/s.	m/s.			
1	4.4	6.6	1.7	8.3	1.8	9.0	1.4	7.1	14.7	11	25	1	5.5	2.3	3.3	1.4	3.6	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	7.2	1										
2	6.1	7.6	5.1	6.3	6.3	6.3	2.8	6.7	12.7	9	45	2	5.6	6.1	2.5	3.0	3.0	1.0	2.4	7.2	10	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	6.8	4.1	10.0	4.0	9.7	3.3	7.9	15.0	13	20	3	1.8	0.8	1.8	0.6	2.9	2.1	2.1	4.6	24	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
4	6.1	5.2	4.8	1.5	7.7	1.5	7.4	12.4	17	55	4	3.5	3.5	1.3	6.8	2.2	10.9	9.8	11.5	17, 18, 22	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
5	4.9	5.9	1.0	4.8	1.0	4.8	5.2	10.6	17	55	5	2.3	2.3	3.3	8.3	7.4	4.9	8.3	1.7	9	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
6	2.9	2.1	2.1	Cal m	Cal m	Cal m	Cal m	6.4	6	25	6	7.9	5.3	9.0	6.0	8.6	8.6	9.0	9.0	23	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24						
7	0.3	1.6	Cal m	2.0	2.0	3.0	Cal m	10.7	14	0	7	12.0	12.0	14.4	14.4	5.4	8.1	4.4	6.0	9	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
8	0.9	2.7	1.8	2.9	2.9	6.0	1.3	6.5	18	35	8	7.5	11.1	2.4	11.5	11.5	6.9	13.4	3.5	3, 5	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24								
9	8.9	2.7	13.8	4.8	11.6	1.3	6.8	20.6	9	25	9	Cal m	Cal m	Cal m	5.9	5.3	5.3	8.2	20	10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24									
10	10.0	2.0	9.2	6.2	6.5	6.5	3.7	5.5	18	8	11	0.9	4.5	2.3	Cal m	Cal m	5.3	5.6	20	11	11	12	13	14	15	16	17	18	19	20	21	22	23	24										
11	0.3	1.6	1.5	7.4	7.8	7.8	9.7	4.0	18	0	12	3.6	7.1	1.4	5.7	2.4	6.1	2.5	5	12	12	13	14	15	16	17	18	19	20	21	22	23	24											
12	7.4	7.4	2.3	5.5	0.6	3.2	Cal m	14.6	1	45	13	0.6	1.5	0.4	2.3	1.9	1.3	0.8	13	13	13	14	15	16	17	18	19	20	21	22	23	24												
13	1.2	6.1	5.6	1.1	5.5	1.1	5.5	10.3	19	20	14	0.6	1.5	Cal m	Cal m	1.3	1.9	3.0	20	14	14	15	16	17	18	19	20	21	22	23	24													
14	0.8	4.2	4.2	5.9	5.8	5.8	4.7	15.9	15	50	15	3.3	1.4	1.7	1.1	4.2	0.8	2.1	17	15	15	16	17	18	19	20	21	22	23	24														
15	6.2	4.2	4.4	6.6	3.1	7.6	5.3	7.9	15	?	16	2.5	2.5	Cal m	Cal m	2.5	1.7	4.6	17	16	16	17	18	19	20	21	22	23	24															
16	3.3	7.9	10.5	4.9	7.4	3.9	9.4	?	18	50	17	7.4	1.5	12.9	2.6	10.2	9.2	13.1	9	17	17	18	19	20	21	22	23	24																
17	6.0	9.0	3.6	8.8	3.6	8.8	3.6	8.8	17	2	18	8.5	8.8	8.8	5.7	8.5	5.7	8.5	9	18	18	19	20	21	22	23	24																	
18	3.8	5.7	2.7	4.1	13.1	13.1	13.1	23.7	14	40	19	6.9	7.3	3.0	2.2	11.3	7.6	5.1	11	19	19	20	21	22	23	24																		
19	11.1	6.5	15.7	9.1	13.6	8.4	12.5	24.8	16	55	20	1.3	6.5	0.8	3.8	6.7	6.6	9.8	11	20	20	21	22	23	24																			
20	6.7	10.1	5.4	8.1	4.6	6.8	0.9	17.5	0	45	21	9.7	14.5	12.0	8.0	4.2	6.2	1.1	3	21	21	22	23	24																				
21	4.2	4.2	8.2	2.1	5.2	13.1	13.1	21.0	21	30	22	9.2	9.8	9.8	7.9	1.4	3.3	10.8	3	22	22	23	24																					
22	3.4	5.2	4.4	6.6	6.9	6.9	9.3	24.3	23	15	23	5.1	7.6	2.4	11.9	4.9	3.6	16.4	6	23	23	24																						
23	12.1	1.9	9.6	5.7	8.5	11.8	11.8	21.1	0	10	24	1.2	5.8	3.3	7.9	5.7	3.8	8.9	10	24	24	25																						
24	7.5	10.5	8.4	12.5	8.3	8.3	20.2	14	30	25	2.5	1.7	0.4	2.3	0.9	2.1	10.5	13.8	24	25	26																							
25	4.9	7.4	4.7	7.1	9.6	6.4	7.9	5.3	16	0	26	10.9	7.3	15.1	10.4	7.0	8.0	1.6	9	26	26																							
26	5.1	5.1	7.6	4.7	7.1	3.3	7.9	13.6	13	10	27	7.2	10.9	4.5	4.4	4.4	5.3	5.3	9	27	27																							
27	2.1	5.2	2.3	1.8	2.7	2.4	1.0	9.7	5	45	28	Cal m	4.6	1.4	2.2	0.9	1.3	0.6	4.6	2, 3	28	28																						
28	4.3	4.6	1.6	1.3	0.9	8.2	0.9	8.2	6	55	29	Cal m	Cal m	Cal m	1.8	2.7	Cal m	3.3	15	29	29																							
29	2.3	6.1	1.2	11.6	2.3	12.1	23.2	20	35	30	0.9	1.3	5.9	2.0	0.4	9.8	6.6	15.7	24	30	30																							
S+N & W+E	77.3	171.4	77.2	201.6	122.2	203.2	98.9	180.1			S+N & W+E	113.0	125.1	131.1	140.5	106.1	131.8	108.7	115.4																									
S-N & W-E	-45.9	6.0	-36.6	-7.0	-31.8	-6.8	-23.1	10.9			S-N & W-E	-26.0	8.9	-31.9	-10.9	-38.5	-15.2	-29.3	-15.4																									

ENGLAND S.W.:—SCILLY.

Height of Head above—Ground 9.8 m., M.S.L. 49.7 m.
Height of Cups above—Ground 5.8 m., M.S.L. 45.7 m.

ENGLAND E.:—SHOEBURYNNESS.*

Height of Head above—Ground 27.4 m., M.S.L. 31.4 m.

Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.	Day.	3 h.				9 h.				15 h.				21 h.				Max. in a Gust.	Time of Gust.							
	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.				S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.	S.	N.	W.	E.									
	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.				m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.									
1	1.1	5.3	4.6	No record	No record	No record	No record	No record	12.3?	18	45	1	3.4	3.0	3.0	7.3	4.2	10.2	17.1	7	35	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2	No record	6.3	10.4	3.8	3.8	2.6	0.5	2.5	9.2	0	35	2	5.7	1.1	6.0	1.2	8.1	9.5	18.6	21	0	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
3	0.3	0.7	1.9	4.6	1.1	5.7	7.9	10.4	19	35	3	Cal m	Cal m	0.8	3.9	2.9	4.3	8.5	23	25	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
4	3.6	3.6	8.3	3.0	3.0	7.3	2.1	5.0	13.6	4	5	2.2	5.4	10.4	3.0	7.3	4.2	6.3	15.2	7	10	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
5	2.1	9.2	1.9	4.6	1.1	2.7	2.1	3.2	6.0	0	30	6	4.8	2.0	4.0	4.2	0.8	2.2	0.9	9.4	5	50	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
6	0.2	0.8	2.9	4.5	0.9	1.7	0.3	6.6	13	50	7	1.7	0.7	1.8	0.4	2.7	Cal m	6.7	11	55	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
7	3.2	0.6	2.1	1.8	2.7	0.7	1.6	9.3	22	10	8	2.8	2.8	2.1	5.1	1.1	2.8	7.6	12	40	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24								
8	4.3	1.8	4.1	0.8	5.6	3.7	5.3	13.0	21	20	9	1.1	5.4	1.4	7.2	6.7	5.8	10.1	9	35	10	11																						

9. SEISMOLOGICAL DIARY.

EARTHQUAKES:—ESKDALEMUIR.

Day.	Phase.	Time, G.M.T.	Period.	Amplitudes.			Δ.	Remarks.
				A _{N.}	A _{E.}	A _{Z.}		
2	L	h m s	s	μ	μ	μ	km.	Slight disturbance.
	F	15 31	...	...	...	...	...
2	S	19 35 12	...	...	...	...	3900	P uncertain.
	L	19 39 26	...	...	...	...	...
	F	19 52	...	...	...	...	...
6	L	7 32	...	...	...	...	...
	F	8 15	...	...	...	...	...

Note.—The prevalence of large wind effects during the month may have led to the omission of several slight disturbances.

EARTHQUAKES:—RICHMOND (KEW OBSERVATORY).

Day.	Times, G.M.T. of		Remarks.
	Commence-ment.	Max. Phase.	
2	h m	h m	Very small.
2	...	15 38	
2	...	19 42	Small.
6	7 39	7 51	Very small.
18	22 3	22 11	Large disturbance. Amplitude on trace 3·7 mms. Succession of small waves to 22 h. 45 m.

MICROSEISMS OF N. COMPONENT:—ESKDALEMUIR.

Day.	0 h.		6 h.		12 h.		18 h.	
	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.
1	μ	s	μ	s	μ	s	μ	s
1	0·8	6	0·8	6	0·8	7	0·9	6
2	1·5	6	1·6	7	2·1	7	1·4	7
3	1·7	7	1·5	7	1·6	7·5	1·5	7
4	1·4	7	1·4	7·5	0·8	7·5	1·0	4·5
5	1·1	4	0·8	4	0·8	5	0·5	6
6	0·9	4	0·9	4	0·8	4	0·6	4·5
7	0·8	4	0·8	4	0·7	5·5	0·5	4
8	1·1	4	2·0	4	2·0	4·5	2·3	6
9	2·7	5	1·7	5·5	2·0	5·5	1·4	5
10	1·8	5	0·9	6	0·7	6	0·6	5·5
11	0·5	4·5	0·6	4·5	0·9	4·5	...	...
12	0·9	5	0·8	6	1·0	5	0·9	5
13	1·1	5	1·8	4·5	0·9	5	1·1	4
14	0·5	6	0·9	5	0·9	4·5	0·8	5·5
15	0·8	5·5	0·8	5	1·0	4·5	1·1	4
16	...	...	...	...	0·6	4	0·5	4·5
17	0·6	5	0·9	4	0·7	5·5	1·1	4
18	1·7	6	2·2	5·5	3·1	6·5	3·1	7
19	3·9	7	4·1	7	2·8	7	2·1	6
20	2·8	7	2·7	7	3·9	7	3·1	6
21	3·1	6	2·8	6	...	...	2·3	6
22	3·1	7	3·0	5·5	2·0	6·5	1·6	6
23	2·2	6	2·3	6	2·0	7	1·5	7
24	1·7	5	1·9	5	2·9	6	2·7	6
25	2·8	5	2·6	5·5	2·2	6·5	2·4	6
26	2·5	5·5	2·4	6	2·3	6	1·9	6
27	1·6	6	1·0	5	1·0	4·5	0·7	5·5
28	0·6	5·5	0·8	4·5	0·6	5	0·3	4
29	0·6	6	0·5	5	0·5	6	0·4	6
30	0·6	7	0·6	6	1·0	6	1·2	5·5

Means for Month { A_{N.} = 1·5. T = 5·5. Normals, 1911-18 { A_{N.} = 1·8. T = 5·6.

12. AURORA.

Day.	a. m. or p. m.	Moon.	Magnetic Character.		Aurora Observations.	
			Eskdalemuir.	Richmond.	Station.	Remarks.
1	...	☾	...	...	...
7	...	☉	...	...	...
14	...	☾	...	...	...
16	p.	...	1, 1	2, 1	Baltasound Deerness Wick Banff Aberdeen	18 h.-23 h. Arch moderately bright, elevation about 20°, very steady and persistent, colour greenish white.
17	p.	...	1, 1	1, 1	Deerness	
20	p.	...	0, 1	0, 1	Deerness	
21	p.	...	1, 1	1, 1	Deerness	
22	...	●	...	...	...
30	...	☾	...	...	...

Note.—The two magnetic "characters" entered in each case refer to the two periods of 24 hours ending and beginning at midnight of the night in question.

10. SOUNDINGS WITH PILOT BALLOONS.

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.										Cloud Observations.											
		Geostrophic.		By Anemometer.		At Heights above M.S.L.								Time, G.M.T. h. m.	Type.	Deg. from N. mr/s.	Type.	Deg. from N. mr/s.					
		Deg. from N.	m/s.	Deg. from N.	m/s.	500 m.		1000 m.		2000 m.		3000 m.							4000 m.				
ESKDALEMUIR.																							
10	12 30	45	7	25	7.5	55	10.5	60	16.0	60	19.5	...	...	...	...	...	Cu.	45	...	...	...	...
11	12 25	45	12	360	5.5	15	8.0	25	11.0	15	10.0	20	18.0	...	...	...	Cu.	...	...	...	...	...
13	8 10	60	8	360	4.0	25	8.5	50	11.5	45	6.0	...	...	...	...	...	St-Cu.	...	...	...	...	...
14	8 15	?	?	calm		50	4.0	105	3.2	125	2.3	...	...	...	...	...	St.	...	...	...	...	...
14	11 55	?	?	10	4.0	70	3.8	70	1.8	155	5.5	175	8.5	180	5.0	...	St-Cu., A-Cu.	...	...	Ci-St.	...	...
15	7 50	?	?	calm		35	5.5	80	5.0	95	4.9	85	2.0	...	...	...	...	...	Ci.	25	...	...
15	11 55	?	?	340	3.6	35	7.0	55	5.0	85	3.6	90	3.7	45	2.4	...	...	...	cloud	less	...	...
21	7 40	310	17	265	5.0	295	5.0	315	20.5	320	21.0	...	...	...	...	...	St-Cu.	320	...	...	...	...
26	12 15	20	14	360	7.5	10	13.0	25	11.0	15	8.0	...	...	...	...	...	Cu.	...	...	Ci-Cu., Ci-St.	10	0.5
27	7 55	?	?	20	11.5	30	18.0	45	21.5	50	6.0	...	...	...	...	...	St., St-Cu.	...	...	...	...	...
(For observations at lower levels, see above.)																							
14	11 55											5000 m.	...	...	...	...	...	...	...	...	...	...
15	11 55											235	2.9	St-Cu., A-Cu.	Ci-St.
SOUTH FARNBOROUGH.																							
11	14 50	360	9	360	3.1	355	4.8	15	9.0	360	8.0	...	...	...	...	...	Cu., Cu-Nb.	...	...	Fr-Cu., A-Cu.	...	...
12	7 45	?	?	290	2.0	360	11.5	20	10.0	10	8.0	...	...	...	...	...	...	...	cloud	less	...	...
12	8 8	?	?	290	0.9	5	10.5	25	8.5	5	9.0	10	19.0	...	...	...	...	...	A-Cu.	...	...	...
13	15 50	?	?	calm		15	5.5	45	6.0	30	5.5	355	6.5	...	...	...	...	...	cloud	less	...	...
18	8 5	310	10	245	2.2	310	14.5	320	16.0	310	14.5	305	29.0	305	28.5	...	St-Cu.	...	...	Ci-St.	180	...
21	7 45	300	18	245	6.5	295	18.0	320	17.0	315	11.5	315	22.5	315	23.5	...	St-Cu.	...	...	...	...	...
24	7 45	270	10	225	4.0	280	15.5	290	16.5	280	25.0	280	16.5	...	...	...	St.	135	...	...	...	...
25	9 15	270	10	225	1.8	290	7.0	290	8.0	285	8.5	275	8.5	240	20.0	...	...	...	Ci., Ci-St.	...	...	...
25	11 55	250	10	225	3.6	260	7.0	275	10.0	270	11.0	270	13.0	260	13.0	...	...	...	...	...	...	...
26	7 30	?	?	200	0.9	275	11.0	280	9.0	260	9.0	265	11.5	265	9.5	...	Cu., Nb.	...	...	St-Cu.	180	...
*26	10 35											5000 m.	6000 m.	...	...	...	...	...	...	...	...	...
(See below.)																							
18	8 5											310	35.0	St-Cu.	Ci-St.	180	...
21	7 45											315	32.0	St-Cu.
25	11 55											235	16.5	230	22.5
26	7 30											280	10.0	Cu.; Nb.	St-Cu.	180	...
*26	10 35	270	6	200	0.4	250	7.0	260	6.0	265	7.0	275	9.0	270	7.0	...	...	...	...	...	...	...
		5000 m.	6000 m.	7000 m.	8000 m.	9000 m.	10,000 m.	11,000 m.															
		265	8.0	265	6.5	245	15.0	245	12.0	280	7.5	285	8.0	225	6.5	...	...	...	...	...	...	...
		12,000 m.	13,000 m.	14,000 m.	15,000 m.	16,000 m.	17,000 m.	18,000 m.															
		265	6.0	255	11.0	280	6.5	205	7.0	300	3.5	300	11.0	290	7.0	...	...	...	...	...	...	...
		19,000 m.	20,000 m.	21,000 m.	22,000 m.	23,000 m.	24,000 m.	25,000 m.															
		250	14.0	260	11.0	255	15.5	265	22.5	245	26.0	230	16.5	285	14.5	...	...	...	...	...	...	...
CAHIRCIVEEN.																							
1	7 55	90	5	125	1.1	70	11.5	50	2.5	40	12.0	...	...	...	...	...	...	...	cloud	less	...	...
1	11 45	90	7	45	8.0	65	11.5	85	10.0	...	...	35	9.0	40	15.0	...	...	...	...	...	...	...
2	7 30	90	6	85	7.0	90	12.5	155	3.9	70	10.0	70	10.0	...	...	...	Cu., Fr-Cu.	110	...	...	...	...
3	7 55	80	7	85	7.5	75	7.5	95	3.1	80	9.0	...	...	...	...	...	St-Cu.	40	3.5	...	...	...
4	7 25	80	7	75	6.5	70	11.0	70	5.0	50	5.0	30	4.0	55	4.6	8 15	8 10	St.	65	...	Ci.	280	2.0
(For observations at lower levels, see above.)																							
1	7 55											5000 m.	6000 m.	cloud	less
1	11 45											20	16.0
(For observations at lower levels, see above.)																							
15 20.0 10 21.0																							

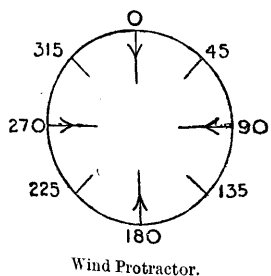
Notes on Pressure Distribution.

November 1919.
 1st, 7 h., 13 h. } Anticyclone over the British Isles, centred S. of Iceland.
 2nd, 7 h. Ridge from Iceland to Scandinavia, shallow Lows over the Azores region and Central Europe.
 3rd, 7 h. Ridge from Iceland to Scandinavia, extensive shallow Low centred W. of Spain.
 4th, 7 h., 13 h., 18 h. Ridge from Iceland to Scandinavia, extensive shallow Low centred W. of Spain.
 5th, 7 h., 13 h. Shallow Low centred W. of Spain, wedge over Scandinavia.
 6th, 7 h., 18 h. " from the Azores to Germany, wedge over Scandinavia.
 7th, 7 h., 18 h. " over Central Europe, wedge over Scandinavia.
 8th, 7 h., 13 h. " over the British Isles, " "
 11th, 7 h., 13 h. Anticyclone stretching from the Azores to Spitzbergen, shallow Low over the Continent.
 12th, 7 h., 18 h. } Irregular isobars over the British Isles, anticyclone over Icelandic region.
 13th, 7 h., 13 h., 18 h. }
 14th, 7 h., 13 h. Deep depression centred near Lisbon, anticyclone over Icelandic region.
 15th, 7 h., 13 h., 18 h. Deep depression centred over France.
 18th, 7 h. Westerly type.
 21st, 7 h. North-westerly type.
 24th, 7 h. Westerly type.
 25th, 7 h., 13 h. Deep depression covering the British Isles, centred N. of Scotland.
 26th, 7 h., 13 h. Extensive Low centred over the North Sea.
 27th, 7 h., 18 h. Low centred near Jersey.
 28th, 7 h., 18 h. Shallow Low covering the British Isles.
 29th, 7 h., 18 h. Low centred S. of Ireland, secondary near Portland Bill.

Notes on Ascents.

Eskdalemuir—
 11th, 12 h. 25 m. Snow lying.
 13th, 8 h. 10 m. Snow lying, barometer rising.
 14th, 8 h. 15 m. } Snow lying, barometer steady.
 11 h. 55 m. }
 15th, 7 h. 50 m. } " " "
 11 h. 55 m. } " " "
South Farnborough—
 11th, 14 h. 50 m. Mist above, Cu-Nb. coming up quickly.
 26th, 10 h. 35 m. See Met. Mag., May 1920, p. 73.
Cahiriveen—
 1st, 11 h. 55 m. Violent updraught of 150 m/m. at about 2 km. over 1000 m. (Two-theodolite.)
 4th, 17 h. 5 m. Vigorous updraught of about 100 m/m. at 2.5 km. over 500 m.
 5th, 11 h. 55 m. Fairly quiet after surface layers past, Ci. nearly stationary.
 6th, 15 h. 55 m. Conditions quiet after surface layers up to 4.5 km.
 14th, 11 h. 50 m. Well-marked undulations of long period in height-timegraph up to 6 km. Vertical currents up to 35 m/m. in some places.
 28th, 8h. 25 m. Shower at start. Balloon got wet but soon got clear of rain, so that error in vertical velocity probably not large.
 29th, 8 h. 20 m. Fine frosty morning.
 29th, 16 h. 55 m. Slight haze at surface.

Height of Station above M.S.L. = H.,
 Anemometer above ground = h.
 Aberdeen H. h.
 14 m. 32 m.
 Eskdalemuir 242 m. 15 m.
 South Farnborough 70 m. 31 m.
 Cahiriveen 9 m. 13 m.



Wind Protractor.

10. SOUNDINGS WITH PILOT BALLOONS—*continued.*

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.										Cloud Observations.											
		Geostrophic.		By Anemometer.		At Heights above M.S.L.								Time, G.M.T. h. m.	Type.	Deg. from N. mr/s	Type.	Deg. from N. mr/s					
		Deg. from N.	m/s.	Deg. from N.	m/s.	500 m.		1000 m.		2000 m.		3000 m.							4000 m.				
						Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.	Deg. from N.	m/s.						Deg. from N.	m/s.			
CAHIRCIVEEN— <i>continued.</i>																							
4	11 40	90	7	55	6.0	105	8.5	140	6.0	130	10.0	70	6.0	...	...	12 10	...	...	A-Cu.	120	2.5	
4	17 5	90	10	40	2.5	115	2.2	85	9.0	65	4.8	50	7.0	50	9.0	...	...	Cu.	65	...	...	...
5	8 5	90	4	90	3.0	65	10.0	80	14.0	70	11.5	50	6.5	...	...	...	...	...	cloud	less	...	...
5	11 55	90	10	50	7.5	60	10.5	70	13.0	45	5.5	50	4.2	5	1.5	...	...	...	Ci.	225	...	
6	7 50	50	6	55	2.5	45	8.0	70	8.0	20	7.0	...	...	...	...	8 15	St.	10	4.0	Ci., Ci-Cu.	230	3.0
6	15 55	45	5	75	3.0	50	7.5	50	6.0	30	7.0	350	2.7	255	7.5	17 10	...	...	A-Cu., A-St.	240	2.0	
7	7 50	50	4	55	1.5	340	4.2	350	5.5	330	7.5	...	...	...	...	16 40	Fr.-Cu.	360	...	Ci-Cu.	...	...
7	15 55	?	?	calm	?	270	0.5	305	4.1	290	4.1	280	10.5	275	12.0	16 40	St.-Cu.	290	...	Ci-St., Ci-Cu.	250	4.0	
8	7 40	?	?	50	2.1	350	6.5	350	7.0	320	7.0	310	8.0	285	12.5	8 25	St.-Cu.	360	...	A-Cu.	280	2.0	
8	12 30	?	?	75	3.5	20	4.7	345	6.5	345	7.0	305	5.5	285	7.5	...	Cu.	315	...	Ci-Cu.	250	...	
10	8 5	50	10	50	2.0	40	11.0	30	11.0	15	15.0	...	...	...	...	8 30	Cu.	20	...	A-Cu.	10	1.0
10	12 30	50	13	50	4.2	35	7.0	35	10.0	55	7.5	5	13.0	20	8.0	...	Cu.	45	...	...	...	...
11	8 10	360	5	calm	?	150	7.0	130	7.0	95	5.5	70	4.8	20	3.5	...	...	...	Ci-Cu., Ci-St.	315	...	
11	15 15	?	?	85	2.3	...	...	130	3.9	110	3.4	105	4.1	80	3.4	16 0	...	...	Ci-Cu., Ci-St.	315	...	
12	8 0	?	?	...	...	...	...	275	11.0	280	11.5	295	12.0	...	...	8 30	Cu.	...	...	Ci.	315	1.5
12	16 0	330	8	calm	?	35	4.1	20	7.0	350	8.0	...	...	...	...	...	Cu.	360	...	A-Cu.	315	...
13	7 55	360	10	50	3.8	55	11.5	40	6.0	45	8.5	360	6.0	...	...	...	St.-Cu.	360	...	...	...	...
13	11 40	?	?	50	3.4	60	13.5	55	6.0	45	7.5	...	...	...	...	12 10	...	...	Ci-Cu.	300	2.0	
14	8 0	80	4	80	4.3	65	13.5	70	9.0	65	12.5	55	8.0	...	...	...	...	...	cloud	less	...	...
14	11 50	60	6	80	7.5	65	12.5	60	8.0	55	10.5	25	11.0	30	9.0	...	...	...	cloud	less	...	...
15	16 25	360	6	75	1.5	35	6.5	20	7.5	15	12.0	5	15.0	355	14.0	...	...	...	cloud	less	...	...
25	8 45	300	15	5	5.0	330	11.5	330	15.5	330	18.0	...	...	...	...	9 10	Cu., St.-Cu.	315	...	...	...	...
27	16 10	20	8	15	5.5	25	9.0	20	5.0	20	6.5	20	6.0	345	4.1	...	...	...	Cu., Fr.-Cu.	20	...	
28	8 25	?	?	80	3.2	100	6.0	95	7.0	125	2.5	...	...	...	...	8 55	St.-Cu.	...	...	A-Cu.	210	1.5
28	16 25	?	?	95	4.0	40	2.1	40	4.9	80	6.5	360	2.3	300	3.5	...	St.-Cu.	70	...	False Ci.	...	...
29	8 20	360	8	70	1.5	10	4.8	30	2.0	340	6.0	330	7.5	305	12.0	...	St.-Cu.	315	...	...	...	...
29	15 55	280	3	calm	?	100	0.5	310	1.4	290	3.5	290	6.0	300	11.5	...	...	...	A-Cu.	305	4.0	
		5000 m.		6000 m.		7000 m.		8000 m.		9000 m.		10,000 m.		11,000 m.									
5	11 55	255	14.0	...	...	270	19.5	265	27.5	...	...	...	...	...	...	...	...	...	...	Ci.	225	...
6	15 55	240	11.5	225	13.5	220	18.5	215	18.5	205	18.0	230	12.5	...	...	17 10	...	...	A-Cu., A-St.	240	2.0	
8	12 30	270	12.5	265	12.0	...	...	...	...	...	...	...	...	...	...	...	...	...	Cu.	315	...	
10	12 30	25	9.0	20	3.1	20	2.6	25	4.6	...	...	...	...	...	...	...	...	...	Cu.	45	...	
11	8 10	320	2.6	340	13.0	330	13.0	310	15.5	320	23.5	...	...	...	...	...	...	...	...	Ci-Cu., Ci-St.	315	...
11	15 15	...	...	5	9.0	...	...	...	...	...	...	...	...	...	...	16 0	...	...	...	Ci-Cu., Ci-St.	315	...
14	11 50	350	4.0	290	5.5	315	11.0	280	13.5	285	9.0	265	12.5	270	16.5	...	...	...	cloud	less	...	...
15	16 25	360	16.5	cloud	less

(For observations at lower levels, see above.)

11. NEPHOSCOPE OBSERVATIONS.

ABERDEEN.

Day and Hour, G.M.T.	Type of Cloud.	Velocity-height-ratio.				Remarks.
		Degrees from N.	Milliradians per Second.	Components.		
				W.-E.	S.-N.	
7 11	A-Cu.	268	1.8	+	0.0	High A-Cu. High fused A-Cu. Cu. to St-Cu. transitional type. High type St-Cu.
7 13	A-Cu.	268	2.0	+	0.0	
11 13	Cu.	45	6.9	-	4.9	
19 13	St.-Cu.	240	6.5	-	3.3	
22 13	Fr.-St.	299	16.0	+	8.0	
25 13	A-Cu.	320	1.0	+	0.7	A-Cu. of low type. Central mass measured. "Anvil" of false Ci measured. Ci. changing to Ci-St.
26 13	Cu-Nb.	8	9.2	-	9.1	
27 13	False Ci.	50	1.8	-	1.2	
28 13	Cu.	120	6.6	-	5.7	
29 13	Ci.	95	2.1	-	2.1	

Note.—Large amount of Nb. and diffuse cloud all month.

METEOROLOGICAL OFFICE OBSERVATORIES—GEOPHYSICAL JOURNAL.

DAILY VALUES.—*Solar Radiation, Meteorology, Atmospheric Electricity, Terrestrial Magnetism, and Seismology.*
 Ninth Year.—No. 12. DECEMBER 1919. Units based on the C.G.S. System. [Price 1s.]

I. SUNSHINE AND SOLAR RADIATION.

Day.	WESTMINSTER.							SOUTH KENSINGTON.—Lat. 51° 30' N. Long. 0° 10' W.					RICHMOND.—Lat. 51° 28' N. Long. 0° 19' W.					ESKDALEMUIR.—Lat. 55° 19' N. Long. 3° 12' W.					CAHIREVEEN.	
	Bright Sunshine.*		Radiation received on Horizontal Surface by Callendar Radiograph.					Bright Sunshine.*		Radiation at Noon by Ångström Pyrheliometer.			Bright Sunshine.*		Radiation by Ångström Pyrheliometer.			Bright Sunshine.*						
	Total.	Per cent. of Possible.	Daily Total.	Per cent. of Planetary.	Maximum.			Total.	Per cent. of Possible.	Intensity.	Vertical Component.	Sky.	Total.	Per cent. of Possible.	Time.	Sky.	p sec Z.	Intensity.	Total.	Per cent. of Possible.				
					Amount.	Time.	11.30 h. to 12.30 h.																	
1	0'0	0	34	5	4	11 30	4	0'0	0	...	...	0'0	0	...	...	...	...	0'3	3
2	3'2	40	187	25	19	12 15	19	3'9	48	60	17	0'6	7	...	...	...	...	0'0	0	
3	0'0	0	70	10	8	13 15	7	0'0	0	...	...	1'4	18	...	...	...	...	0'1	1
4	2'7	34	143	20	19	11 50	19	2'5	31	...	...	0'0	0	...	...	...	...	2'1	26
5	0'0	0	14	2	3	12 5	3	0'0	0	...	...	0'0	0	...	...	...	...	0'0	0
6	0'4	5	108	15	18	10 50	8	0'9	11	...	...	0'3	4	...	...	...	...	3'7	47
7	3'1	39	212	30	16	11 55	16	4'4	55	...	...	6'2	79	12 3	Clear	4'65	69	3'9	50			
8	0'0	0	136	19	16	11 35	16	3'7	47	...	...	6'0	77	12 4	Clear	4'76	62	1'1	15			
9	0'0	0	120	17	8	12 10	8	7'0	89	...	...	0'2	3	...	...	...	...	1'7	22
10	2'2	28	224	33	18	12 45	15	2'3	29	...	...	0'0	0	...	...	...	...	0'0	0
11	0'0	0	47	7	5	11 50	5	0'0	0	...	...	0'0	0	...	...	...	...	1'9	24
12	0'0	0	59	9	3	14 5	2	0'0	0	...	...	0'0	0	...	...	...	...	2'4	31
13	0'0	0	48	7	3	13 0	2	0'0	0	...	...	0'0	0	...	...	...	...	0'1	1
14	0'0	0	68	10	10	12 14	10	0'0	0	...	...	3'2	42	...	...	...	...	0'0	0
15	0'0	0	68	10	4	12 10	4	0'0	0	...	...	0'0	0	...	...	...	...	2'6	34
16	0'0	0	93	14	10	13 40	3	0'0	0	...	...	0'0	0	...	...	...	...	1'2	16
17	0'4	5	183	28	14	13 5	12	0'1	1	...	...	0'0	0	...	...	...	...	0'0	0
18	0'0	0	99	15	12	11 5	6	0'2	2	...	...	0'0	0	...	...	...	...	0'2	2
19	0'8	11	167	26	13	12 10	13	0'9	12	...	...	3'2	42	...	...	...	...	0'0	0
20	0'0	0	100	15	14	12 30	14	0'0	0	...	...	0'0	0	...	...	...	...	0'0	0
21	0'0	0	43	7	15	12 40	8	0'4	5	...	...	0'6	8	...	...	...	...	2'1	28
22	0'3	4	106	16	8	10 5	7	0'6	8	...	...	0'0	0	...	...	...	...	0'0	0
23	0'0	0	99	15	10	13 55	7	0'0	0	...	...	0'0	0	...	...	...	...	1'0	13
24	2'1	27	217	33	15	12 20	15	3'1	40	33	9	1'1	14	...	...	...	...	1'8	23	
25	0'5	7	147	23	23	12 7	23	0'6	8	55	14	4'0	52	...	...	...	...	3'5	46	
26	0'1	2	67	10	11	11 50	11	0'0	0	...	...	0'0	0	...	...	...	...	0'0	0
27	1'1	15	154	23	18	11 30	18	0'6	8	...	...	0'3	4	...	...	...	...	2'1	27
28	0'0	0	142	22	9	12 15	9	0'0	0	...	...	0'0	0	...	...	...	...	0'0	0
29	0'0	0	174	26	12	12 50	11	0'0	0	...	...	0'1	1	...	...	...	...	0'0	0
30	0'0	0	68	10	10	11 15	7	0'0	0	...	...	0'0	0	...	...	...	...	0'0	0
31	0'1	1	77	12	7	13 25	4	0'2	2	...	...	0'6	8	...	...	...	...	0'0	0
Means	0'55	7	112	16	11	—	10	0'82	13	—	—	0'90	12	—	—	—	—	1'03	13					
Normal	0'52	7	131	19	—	—	—	1'19	16	—	—	0'68	10	—	—	—	—	1'32	17					

2. METEOROLOGY AND MAGNETISM :—CAHIREVEEN (VALENCIA OBSERVATORY).—Lat. 51° 56' N. Long. 10° 15' W. Heights above M. S. L.:—H=9.1 m. H_b=13.7 m. H_a=26.4 m. Above Ground: h₁=1.3 m. h_r=0.56 m. h₂=13.9 m.

Day.	Air Pressure at Station Level.		Air Temperature in Degrees Absolute.				Humidity.				Wind—Veer from North in degrees and Speed in metres per second.				Cloud Amount (0-10) and Weather.		Rain 0 h. to 24 h.	Min. Temp. on Grass.	REMARKS.	Magnetism. Horizontal Force, Declination West, and Inclination.
	9 h.	21 h.	9 h.	21 h.	Max.	Min.	Vapour Pressure.		Percentage.		m/s.		9 h.	21 h.	9 h.	21 h.				
	mb.	mb.	a.	a.	a.	a.	millibar.	%	%	m/s.	m/s.	Tenths of Sky covered.	mm.	a.						
1	1005.1	998.5	79.5	78.7	82	78	8.5	8.0	87	87	185	5	235	10	8	8	7.3	76	Fine n. o. to c. and p. day.	—
2	1004.1	1007.3	78.4	84.1	85	78	7.8	13.0	88	99	220	2	225	5	9	10	1.3	76	Fine morning. o. to d. day.	
3	1010.1	1013.2	84.1	83.1	85	83	11.8	10.1	90	82	240	6	240	11	9	2	1.5	82	o. and p. day. Fair to fine evening.	
4	1018.2	1026.4	82.9	82.1	84	82	9.9	9.0	82	78	235	13	260	7	3	4	1.0	80	Fine n. Fine to fair day.	
5	1016.9	1016.2	84.4	82.6	85	82	12.7	9.3	95	78	225	11	250	9	10	10	1.4	80	o. to d. day.	
6	1010.0	1008.8	80.7	82.2	83	80	8.3	8.5	79	74	280	16	300	16	9	7	1.9	79	o. p. and dry a. Fine p.	
7	1021.0	1023.9	81.4	80.0	83	78	8.3	7.1	76	71	335	9	340	11	6	7	2.5	78	Fair and p. day. p. and q. evening.	
8	1026.3	1022.4	78.3	79.1	80	78	7.1	7.5	80	80	15	2	140	5	7	10	1.3	76	Fair a. o. and p. evening.	17871 γ 19° 23'4" 68° 3'2"
9	1016.2	1009.2	80.0	79.5	82	79	9.6	9.1	96	94	—	1	—	1	10	10	1.8	77	d. n. and a. Fair to fine p.	
10	995.0	990.1	83.8	79.9	84	78	12.4	9.3	97	94	195	5	—	1	10	4	18.7	76	morning. o. to p. day.	
11	991.5	997.7	79.3	78.2	81	78	8.1	7.6	85	86	230	8	175	5	8	5	8.1	75	p. n. and morning. Fair day. p. evening.	
12	1004.4	1002.3	80.6	82.4	83	79	8.9	9.7	85	83	220	4	175	11	2	10	16.2	75	Fair n. Fine day. o. evening.	
13	1000.4	1006.6	82.4	79.3	84	79	11.1	7.8	95	82	180	5	200	4	6	2	7.7	80	n. p. day. Fine and evening.	
14	1000.4	991.9	83.2	80.5	84	80	11.4	8.4	92	81	175	9	220	8	10	4	7.7	78	o. n. p. a. p. to o. p.	
15	994.2	999.4	79.5	79.9	82	76	8.2	7.6	85	76	170	4	280	2	7	1	2.7	75	Fair n. and day. Fine and evening.	
16	1005.3	1005.6	77.2	81.2	83	75	7.5	10.5	92	97	140	3	175	8	4	10	10.1	73	Fine n. and morning. p. day. evening.	
17	1014.4	1021.7	81.1	82.0	83	81	10.0	10.0	93	88	270	2	225	2	10	7	—	79	Overcast and dull day.	
18	1019.2	1030.1	83.4	81.8	84	82	11.9	7.0	95	62	185	6	290	11	10	4	0.7	79	Fair morning. o. and d. day.	68° 5'1"
19	1033.3	1029.9	80.3	83.7	84	80	9.4	12.3	92	96	205	2	250	5	8	10	0.6	77	Fair morning. o. and d. day.	
20	1027.9	1019.1	83.6	83.9	84	83	12.1	12.4	95	96	220	4	230	9	10	10	1.4	82	d. morning and day. [evening.]	
21	1016.5	1019.4	81.2	81.0	84	80	9.0	7.7	84	72	285	13	285	14	9	4	9.5	79	morning. o. to c. day. q.	
22	1015.0	1007.4	82.3	83.6	84	81	10.1	12.1	87	95	235	11	245	13	10	10	1.1	78	Fair morning. o. and d. day.	
23	1003.3	1000.5	82.0	80.7	85	80	9.1	8.8	80	84	255	9	250	9	5	8	2.7	80	o. and d. morning. c. to o. and p. day.	17852 γ 19° 24'7" 68° 7'7"
24	1000.5	997.4	79.3	80.7	81	79	8.1	8.1	85	77	235	10	255	13	8	4	4.5	76	Fair, q. p. h. day.	
25	1003.8	1012.8	80.6	79.3	82	78	7.8	8.1	75	85	285	12	—	1	4	2	1.3	77	Fair day. Fine evening.	
26	998.5	998.5	82.3	83.0	85	80	11.1	9.9	96	81	170	11	240	9	10	9	21.1	76	to morning. o. day. [evening.]	
27	998.5	999.1	80.4	79.9	83	79	7.8	8.2	76	83	250	10	270	6	7	7	2.1	78	o. to c. morning. Fair day. o. to c.	
28	996.3	987.7	80.8	84.3	85	78	8.4	11.9	80	90	145	7	230	11	10	5	8.6	76	Fair morning. a. o. day. Fair evening.	
29	992.6	996.6	81.0	79.7	84	78	10.1	9.3	95	95	—	1	—	1	9	3	11.3	80	n. o. to o. day. p. evening. [evening.]	
30	986.9	985.4	81.9	79.0	83	78														

3. METEOROLOGY :—RICHMOND, SURREY (KEW OBSERVATORY).—Lat. 51° 28' N. Long. 0° 19' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 5.5 m. Barometer, H_b = 10.4 m. Cups of Anemometer, H_a = 25 m.

Heights above Ground :—Thermometers, h_t = 3.0 m. Rain-gauge, h_r = 0.53 m. Cups of Anemometer, h_a = 20 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly totals and normals.

45 YEARS

30 YEARS

35 YEARS

4. METEOROLOGY :—ESKDALEMUIR, DUMFRIESSHIRE.—Lat. 55° 19' N. Long. 3° 12' W.

Heights above Mean Sea Level :—Rain-gauge Site, H = 242 m. Barometer, H_b = 237.3 m. Vane of Anemometer, H_a = 250 m.

Heights above Ground :—Thermometers, h_t = 0.9 m. Rain-gauge, h_r = 0.38 m. Vane of Anemometer, h_a = 15 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Humidity (Vapour Pressure, Percentage), Wind—Veer from North in degrees and Speed in metres per second, Cloud Amount and Weather, Rain 0 h. to 24 h., Min. Temp. on Grass, REMARKS. Includes monthly totals and normals.

Temperatures at or below the normal freezing point of water are printed in small type.

α denotes the maximum and n the minimum value in the column.

5. GEOPHYSICS:—RICHMOND (KEW OBSERVATORY).

Day.	Earth Temperature at 9 h.		Height above M.S.L. of Surface of Underground Water.		Magnetic Force.						Magnetic Character of Day.	Electric Character of Day.	Charge per cc. $\times 10^{20}$.		Air-Earth Current. $\times 10^{16}$.	Potential Gradient, Volts per metre. Factor 2.29.								
	0.3 m.	1.2 m.	Daily Mean.	Extremes.	Horizontal Comp't.		Declination.		Inclination.				+	-		About 15 h.	About 15 h.	3 h.	9 h.	15 h.	21 h.			
					Mean Time.	γ	Mean Time.	West.	Mean Time.	North.					h							m	h	m
	a.	a.	cm.	cm.	h	m	γ	h	m	°	'	h	m	°	'	coulomb.	amp/cm ² .	v/m.	v/m.	v/m.	v/m.			
1	200+	200+	191	...	...	...	...	...	...	...	...	0	2	...	...	...	85	-365	-880	810
2	76.4	80.3	190	190	...	...	...	...	...	...	...	0	2	0.23	0.04	0.90	55	-600	420	715
3	77.7	80.0	190	190	...	...	...	...	...	...	...	1	2	0.43	0.45	0.70	250	-140	295	-85
4	79.0	80.1	192	...	11	16	18405	14	23	14	40'2	14	23	66	58'1	...	170	40	±	280				
5	78.6	80.1	195	...	...	...	...	...	...	...	...	1	2	...	...	...	210	420	30	180
6	78.5	80.2	198	...	...	...	...	...	...	...	...	0	1	...	...	...	265	310	450	530
7	78.0	80.2	202	...	...	...	...	...	...	...	...	0	1	...	...	...	110	195	310	530
8	77.0	80.2	206	...	...	...	...	...	...	...	...	1	0	0.14	0.14	...	225	365	320	520
9	76.1	80.2	210	...	...	...	...	...	...	...	...	0	0	0.45	0.33	...	475	630	770	475
10	75.4	80.3	213	...	...	...	...	...	...	...	...	1	0	0.23	0.21	...	755	615	—	—
11	75.2	79.9	215	...	11	16	18425	14	21	14	40'2	...	...	...	...	...	—	—	350	310
12	76.3	79.8	213	...	...	...	...	...	...	...	...	1	0	0.27	0.45	1.05	225	265	435	350
13	77.1	79.7	212	...	...	...	...	...	...	...	...	1	0	...	...	...	170	310	320	110
14	77.9	79.7	211	...	...	...	...	...	...	...	...	2	1	...	...	...	140	195	265	240
15	78.4	79.7	210	...	...	...	...	...	...	...	...	2	1	0.31	0.43	0.70	225	225	335	-265
16	78.7	79.6	209	...	...	...	...	...	...	...	...	0	1	0.51	0.23	0.25	125	-100	490	490
17	78.0	79.6	207	...	...	...	...	...	...	...	...	0	0	0.45	0.14	0.30	730	730	660	250
18	78.0	79.8	208	...	11	7	18410	...	...	...	...	1	1	0.23	0.21	0.40	180	70	505	195
19	77.8	79.8	209	...	...	...	...	14	25	14	38'7	...	...	...	...	...	140	335	240	545
20	77.0	79.8	211	...	...	...	...	...	...	...	...	1	0	...	...	...	475	475	210	110
21	78.5	79.7	212	...	...	...	...	...	...	...	...	1	1	...	...	...	40	70	55	225
22	78.0	79.9	211	...	...	...	...	...	...	...	...	2	1	...	...	...	140	450	310	250
23	78.7	79.8	211	...	...	...	...	...	...	...	...	1	1	0.21	0.21	0.50	170	15	265	335
24	79.0	79.9	211	...	11	9	18398	14	22	14	40'6	14	17	66	58'1	2	1	0.57	0.08	...	110	335	280	475
25	78.3	79.9	212	...	...	...	...	...	...	...	...	1	1	...	...	...	140	335	365	490
26	77.4	79.9	213	...	...	...	...	...	...	...	...	0	2	...	...	...	335	505	280	85
27	77.9	79.9	214	...	...	...	...	...	...	...	...	0	1	...	...	...	125	180	265	350
28	77.8	79.9	215	...	...	...	...	...	...	...	...	0	1	...	...	...	265	520	630	-125
29	78.5	79.9	216	...	...	...	...	...	...	...	...	0	0	0.23	0.21	0.85	125	365	390	265
30	79.4	79.7	218	...	...	...	...	...	...	...	...	0	1	...	...	...	125	350	225	70
31	79.8	79.8	220	221	...	...	...	...	...	...	...	0	1	0.21	0.18	0.60	100	-210	210	575
M.	77.8	79.9	208	—	—	—	—	—	—	—	—	—	—	—	—	—	206†	223†	302†	311†				
	78.4	80.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				

† Mean for 28 days only.

6. GEOPHYSICS:—ESKDALEMUIR.

Day.	Magnetic Force.															Magnetic Character of Day.	Electric Character of Day.	Potential Gradient, Volts per metre. Factor 6.08.			
	North Component.					West Component.					Vertical Component.							3 h.	9 h.	15 h.	21 h.
	Maximum. 15000 γ +	Minimum. 15000 γ +	Range.	Maximum. 4000 γ +	Minimum. 4000 γ +	Range.	Maximum. 44000 γ +	Minimum. 44000 γ +	Range.	Maximum. 44000 γ +	Minimum. 44000 γ +	Range.	h	m	γ						
1	22 22	1013	983	20 9	30	13 3	892	840	0 23	52	20 30	1076	1061	8 45	15	0	1 b	175	330	360	675
2	18 30	1007	980	21 29	27	12 41	878	837	22 0	41	21 40	1079	1061	11 0	18	0	2 c	z-	z-	80	510
3	21 13	1022	957	21 35	65	21 14	892	817	22 23	75	22 14	1107	1057	11 23	50	1	2 b	185	295	225	260
4	0 28	1040	976	21 46	64	17 18	902	803	1 10	99	21 49	1088	1058	7 20	30	1	2 c	65	115	±	160
5	23 16	1021	961	11 42	60	12 59	895	808	1 44	87	23 3	1076	1057	2 26	19	1	2 c	110	-1060	55	160
6	4 56	1017	972	12 5	45	11 48	887	843	23 50	44	23 58	1073	1058	6 0	15	0	2 c	100	z+	z-	185
7	22 43	1015	984	13 21	31	13 42	878	846	0 1	32	0 1	1073	1058	10 20	15	0	1 b	200	470	695	375
8	21 1	1027	955	21 52	72	21 40	912	807	20 54	105	20 55	1082	1057	9 25	25	1	0 a	155	185	355	495
9	22 5	1024	975	0 31	49	17 5	881	835	18 52	46	18 50	1078	1062	22 15	16	0	0 a	175	255	315	365
10	7 53	1009	945	14 35	64	14 14	888	845	21 29	43	15 12	1082	1057	11 0	25	0	2 c	255	280	z-	-790
11	10 58	1009	960	15 49	49	12 24	886	834	23 45	52	15 50	1076	1056	9 55	20	0	2 c	-1180	-340	400	290
12	23 2	1032	963	12 55	69	13 15	897	822	23 19	75	16 30	1078	1061	7 7	17	1	2 c	z-	340	20	410
13	5 57	1027	972	16 18	55	13 12	900	808	0 29	92	19 17	1081	1044	6 47	37	1	2 c	125	z-	z-	180
14	17 49	1017	905	15 17	112	16 4	948	818	15 16	130	15 31	1129	1042	7 31	87	1	0 a	135	340	425	315
15	20 53	1022	729	9 27	293	11 33	928	750	21 6	178	17 37	1174	1036	8 4	138	2	2 c	265	-275	440	±
16	21 46	987	939	9 43	48	11 12	874	835	2 45	39	13 53	1087	1059	0 50	28	1	2 b	105	380	505	500
17	16 6	994	973	10 0	21	13 28	871	850	8 51	21	10 0	1082	1075	18 30	7	0	1 b	320	585	355	145
18	22 50	1051	970	21 31	81	13 25	880	776	23 40	104	21 30	1092	1067	24 0	25	1	2 b	315	360	-150	±
19	8 44	1002	954	0 21	48	2 23	899	793	0 1	106	16 0	1081	1036	2 46	45	1	1 b	95	110	245	210
20	0 20	1065	944	18 6	121	13 54	888	808	0 51	80	18 33	1095	1051	0 35	44	1	1 b	250	175	150	95
21	18 37	1024	938	10 5	86	0 1	883	765	18 26	118	18 29	1090	1028	3 48	62	1	2 c	-210	80	z-	355
22	22 18	1029	932	16 43	97	17 19	889	771	23 11	118	17 56	1110	1038	22 57	72	1	1 b	435	215	430	755
23	20 52	1011	951	9 23	60	14 16	881	803	23 7	78	17 1	1090	1043	0 1	47	1	2 c	240	-180	135	-135
24	21 51	1040	942	15 44	98	7 18	905	775	21 38	130	18 0	1099	1020	4 0	79	1	2 b	-45	380	220	330
25	5 18	1000	965	14 40	35	8 32	873	818	0 20	55	15 10	1080	1053	1 10	27	1	0 a	215	75	845	650
26	21 51	993	975	10 22	18	13 49	873	846	0 0	27	15 52	1078	1068	11 33	10	0	2 b	250	290	290	z-
27	7																				

7. JERSEY (ST LOUIS OBSERVATORY).—Lat. 49° 12' N. Long. 2° 6' W.

Heights above M.S.L.:—H = 54 m. H_b = 55 m. Above Ground:—h_t = 1.48 m. h_r = 1.72 m. h_a = 8 m.

Table with columns: Day, Air Pressure at Station Level, Air Temperature in Degrees Absolute, Min. Temp. on Grass, Percentage of Humidity, Rain, REMARKS, Earth Current Character. Rows 1-31 and Means/Normal.

JERSEY (ST LOUIS OBSERVATORY).

Table with columns: Day, Wind Direction and Force, Sunshine, Cloud Amount, Upper/Lower cloud types, Direction, Mean Amount. Rows 1-31 and Means/Normal.

* For method of estimation, see Introduction.

† The first hour of observation was changed to 9 h. on Jan. 1st, 1919.

9. SEISMOLOGICAL DIARY.

EARTHQUAKES:—ESKDALEMUIR.									MICROSEISMS OF N. COMPONENT:—ESKDALEMUIR.								
Day.	Phase.	Time, G.M.T.	Period.	Amplitudes.			Δ.	Remarks.	Day.	0 h.		6 h.		12 h.		18 h.	
				A _{N.}	A _{E.}	A _{Z.}				A _{N.}	T.	A _{N.}	T.	A _{N.}	T.	A _{N.}	T.
		h m s	s	μ	μ	μ	km.		μ	s	μ	s	μ	s	μ	s	
9	L F	21 7 21 18	...	...	...	...	...		1	1.6	6	1.8	8.5	2.5	8	1.8	6.5
			...	...	...	...	...		2	1.8	6.5	1.8	6.5	1.7	6	1.2	6
									3	1.4	6	1.3	5	1.6	6	2.1	5.5
									4	1.9	8	2.3	6.5	3.3	6.5	3.7	7.5
									5	3.1	7	3.1	7	...	...	...	...
									6	3.5	7	3.5	8	4.7	8.5	...	...
									7	3.9	7	3.1	6	2.1	7	1.8	6
									8	2.1	4.5	2.3	4	1.6	4	1.4	7.5
									9	3.0	8	1.7	7	1.3	5.5	1.1	5
									10	1.3	7	1.4	6.5	1.8	5	1.8	5
									11	2.1	5.5	2.3	6	2.6	5	2.3	6
									12	2.6	6.5	2.5	6	2.2	6.5	2.2	6.5
12		0 28 to 0 40	...	...	...	...	...	Slight disturbance; no recognisable phases.	13	2.5	7	2.3	6	2.3	7	2.3	6.5
			...	...	...	...	...		14	2.6	8	4.4	8.5	3.9	8	4.3	9
									15	3.0	9	3.2	8	2.9	7	2.7	6
									16	3.7	5	3.2	6	2.9	6.5	2.3	6
									17	3.2	6	3.2	6.5	3.1	6	3.4	5.5
									18	3.5	7.5	4.5	7	3.5	8.5	6.2	8
									19	9.9	7.5	7.8	7.5	4.1	8.5	4.9	7.5
									20	3.3	8	3.2	8	3.9	7.5	3.7	8
									21	3.7	8	3.9	8	3.2	8	4.2	8
									22	5.1	8	3.9	8	3.5	7	3.3	6.5
14		2 30	...	...	...	...	...	Moderate disturbance, but unreadable, owing to wind effects and large microseisms.	23	...	...	2.5	7	2.1	8	2.4	6.5
									24	1.9	8	2.5	8.5	3.4	7	2.6	6.5
									25	3.6	6.5	3.9	6	2.9	5	2.0	6
									26	2.3	6	1.7	5.5	1.9	5.5	1.6	6
									27	3.3	6	5.0	5	5.7	6.5	6.6	7
									28	6.6	7	8.2	6.5	6.6	6	4.1	6
									29	3.8	6	4.5	5.5	2.8	6	2.8	5.5
									30	2.2	6.5	1.9	6	2.6	5.5	1.6	6
									31	1.7	5.5	1.6	5.5	1.5	5	1.0	6.5
16		12 30 to 12 44	...	...	...	...	...	Slight disturbance, obscured by microseisms.	Means for Month { A _{N.} =3.0 μ. T=6.6 s. Normals, 1911-18 { A _{N.} =2.1 μ. T=5.8 s.								
EARTHQUAKES:—RICHMOND (KEW OBSERVATORY).																	
Day.	Times, G.M.T. of		Remarks.														
	Commence-ment.	Max. Phase.															
9	h m ...	h m 19 28	Small.														
14	...	2 44	Very small.														
16	...	12 40	Very small.														
20	20 18	20 29	{ Amplitude on trace 1.1 mm. Succession of very small waves to 21 h. 18 m.														
20	21 18	21 32	{ Large disturbance. Amplitude on trace 3.9 mms. Succession of small waves to 22 h. 46 m.														
22	...	23 53	Small.														

10. SOUNDINGS WITH PILOT BALLOONS.

Day.	Time of Start, G.M.T. h. m.	Horizontal Velocity of Wind.										Cloud Observations.								
		Geostrophic.		By Anemometer.		At Heights above M.S.L.						Time, G.M.T. h. m.	Type.	Deg. from N. mr/s.	Type.	Deg. from N. mr/s.				
		Deg. from N.	m/s.	Deg. from N.	nr/s.	500 m.		1000 m.		2000 m.							3000 m.		4000 m.	
ESKDALEMUIR.																				
8	8 10	360	15	360	10'0	355	15'0	10	20'5	10	16'0	...	...	...	...	...	...
8	12 0	10	9	360	9'0	10	14'0	25	15'0	20	9'5	...	...	...	...	...	...
9	8 10	?	?	calm		235	0'7	240	2'7	230	4'4	330	6'0	335	20'5	...	...	
9	12 0	?	?	calm		200	2'7	205	5'5	240	6'5	...	...	...	...	...	...
14	12 15	190	15	170	5'5	190	8'5	200	14'0	190	19'0	...	...	...	...	...	...
(For observations at lower levels, see above.)																				
9	8 10											5000 m.								
												330	20'0	...	A-Cu.	360	...	Ci-St.	350	2'5
SOUTH FARNBOROUGH.																				
2	10 50	280	15	270	11'5	305	22'5	295	23'5	280	26'5	...	...	...	...	...	...
2	12 15	280	15	270	6'5	275	12'5	285	19'0	280	22'0	...	...	...	...	...	...
6	8 0	280	20	225	6'5	270	17'5	285	26'5	285	20'0	...	...	...	...	...	...
8	7 45	360	20	335	6'5	345	19'0	360	18'5	360	20'0	355	21'5	360	21'5	...	...	
9	8 0	340	4	calm		10	7'0	15	6'0	355	8'0	335	10'5	360	15'0	...	...	
9	12 45	?	?	calm		10	1'8	345	3'3	350	3'5	355	5'5	...	...	...	...
10	7 55	210	24	155	3'0	180	15'5	190	12'5	185	4'8	300	7'0	...	...	...	...
17	9 20	?	?	200	0'5	255	8'5	265	8'0	255	7'5	305	10'5	290	8'5	...	...	
18	7 50	260	7	calm		230	2'4	250	6'5	310	2'0	260	8'5	285	12'5	...	...	
22	7 55	300	20	245	7'5	295	15'0	305	24'5	310	25'5	...	...	...	...	...	...
22	8 30	300	20	245	6'0	290	17'0	310	26'0	320	24'5	...	...	...	...	...	...
23	14 40	290	15	220	6'5	285	16'0	285	22'5	275	26'5	...	...	...	...	...	...
24	7 50	280	16	245	6'5	280	18'0	290	24'0	295	16'5	295	26'5	...	...	...	...
24	8 45	280	16	245	7'5	280	16'0	295	23'0	295	22'5	295	24'5	...	...	...	...
29	11 25	240	12	200	7'0	220	12'0	255	15'5	245	21'5	245	28'5	...	...	...	...
29	12 25	240	12	200	7'5	250	12'5	245	15'0	245	19'0	245	24'0	...	...	...	...
(For observations at lower levels, see above.)																				
17	9 20											5000 m.								
												330	11'0	...	A-Cu.	...	Ci; Ci-Cu.	...		
CAHIRCIVEEN.																				
2	8 30	290	13	245	1'6	270	9'0	270	12'0	275	18'5	285	18'5	...	...	...	...
8	12 0	?	?	165	1'8	360	3'2	355	4'5	350	5'0	330	17'0	330	19'0	12 45	...			
9	9 5	220	12	calm		335	6'0	320	8'5	220	11'0	...	...	...	...	...	...
11	15 45	220	21	170	4'7	225	8'5	225	9'0	220	14'0	225	13'0	225	18'0	...	...	
12	15 35	230	24	190	8'5	205	12'0	200	22'0	230	14'5	235	14'0	...	...	16 0	...	
16	8 30	?	?	calm		205	8'5	210	9'5	220	11'5	...	...	...	...	...	...
31	8 45	320	18	295	5'5	300	8'0	300	10'0	310	13'5	300	12'0	...	...	...	...

Notes on Pressure Distribution.

December 1919.

During the whole month there was a permanent anticyclone over the Azores region.

2nd, 7 h., 13 h. Low centered S. of Iceland.
 6th, 7 h. Extensive Low, having centres over the Shetlands and Cattedag.
 8th, 7 h., 13 h. Northerly type.
 9th, 7 h., 13 h. Wedge over the British Isles, centered over the Azores.
 10th, 7 h. } Low centered S. of Iceland, wedge over Scandinavia centered over the
 11th, 18 h. } Azores.
 12th, 18 h. Low centered S.W. of Iceland, }
 14th, 13 h. Southerly type. } Anticyclone centered over the Azores
 16th, 7 h. } Low centered W. of Iceland, } and the Baltic.
 17th, 7 h. }
 18th, 7 h. Low centered N. of Iceland, ridge from the Azores to Central Europe.
 22nd, 7 h. Well-established anticyclone entered S. of Ireland, Low centered over the Skager Rak.
 23rd, 13 h. } Trough across the British Isles.
 24th, 7 h. }
 29th, 13 h. Low centered N. of Scotland, High over the Baltic.
 31st, 7 h. Deep depression centered over the British Isles and the Baltic.

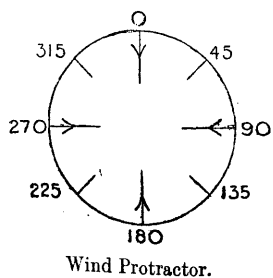
Notes on Ascents.

Eskdalemuir—
 8th, 8 h. 10 m. Snow lying above 450 m.
 8th, 12 h. 0 m. Very clear to the North.
 9th, Lunar halo at 7 h.
 9th, 12 h. 0 m. Sky clouded up gradually during morning from the S.W. A-Cu. degrading into St-Cu.
 14th, 12 h. 15 m. Height of St-Cu. 2165 m.

South Farnborough—
 18th, 7 h. 50 m. Ci-Cu. and A-Cu. clearing and revealing some Ci.
 22nd, 8 h. 30 m. Strong wave marking.

Height of Station above M.S.L. = H.
 Anemometer above ground = h.

	H.	h.
Aberdeen	14 m.	32 m.
Eskdalemuir	242 m.	15 m.
S. Farnborough	70 m.	31 m.
Cahiriveen	9 m.	13 m.



11. NEPHOSCOPE OBSERVATIONS.

ABERDEEN.

Day and Hour. G.M.T.	Type of Cloud.	Velocity-height-ratio.				Remarks.
		Degrees from N.	Milliradians per Second.	Components.		
				W.-E.	S.-N.	
4 13	False Ci.	273	2'5	+2'5	-0'1	Coarse false Ci. to thin A-Cu. Low type of cloud—apex measured. A-Cu. of low type. Diffuse St-Cu.
6 13	St-Cu.	315	2'7	+1'9	-1'9	
8 13	Cu-Nb.	3	7'4	-7'4	-0'4	
12 13	A-Cu.	220	4'2	+2'7	+3'2	
19 13	St-Cu.	315	10'0	+7'1	-7'1	
22 13	False Ci.	300	9'4	+8'1	-4'7	Heavy masses of false Ci. Heavy sheets mixed with fine threads. Fine sheets of Ci. to partial Ci-Cu. Really St-Cuf.—low altitude. Lenticular St-Cu. sheets.
23 13	"	282	5'4	+5'3	-1'1	
24 12	Ci-Cu.	287	3'0	+2'9	-0'9	
26 13	Cu.	180	6'9	0'0	+6'9	
29 13	St-Cu.	245	3'0	+2'7	+1'3	

Note.—Large amount of Nb. cloud all month.

12. AURORA.

Day.	a.m. or p.m.	Moon.	Magnetic Character.		Aurora Observations.	
			Eskdalemuir.	Richmond.	Station.	Remarks.
7	...	○	...	...	...
7	p.	...	0, 1	0, 1	Gordon Castle Paisley Deerness	
12	...	...	...	...	...
14	...	☾	...	...	...
14	p.	...	1, 2	2, 2	Deerness	
15	p.	...	1, 0	2, 0	Seskin (Carrick-on-Suir) Valencia Observatory	Faint. 20 h.-21 h.; rather faint.
18	p.	...	1, 1	1, 1	Baltasound Deerness	
19	p.	...	1, 1	1, 1	Eskdalemuir	Slight glow.
21	p.	...	1, 1	1, 2	Baltasound Deerness	
22	...	●	...	...	...
22	p.	...	1, 1	2, 1	Baltasound Deerness	
23	p.	...	1, 1	1, 2	Deerness	
25	p.	...	1, 0	1, 0	Deerness	
30	...	☾	...	...	...
30	a.	...	0, 0	0, 0	Oxford	0 h. 30 m.-1 h.

Note.—The two magnetic "characters" given in each case refer to the two periods of 24 hours ending and beginning at midnight of the night in question.

BRITISH METEOROLOGICAL AND MAGNETIC
YEAR BOOK, 1919.

GEOPHYSICAL JOURNAL, 1919.

ANNUAL SUPPLEMENT.

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Upper Air Temperatures.

(a) *Soundings with Registering Balloons.*

There are seven soundings to be recorded for the year 1919. These ascents were made from Benson, Oxfordshire. The station is close to the River Thames and at the foot of the Chiltern Hills.

(b) *Aeroplane Ascents.*

Temperatures recorded at South Farnborough.—The observations utilised in preparing the Tables on pp. 106 and 107 were made in aeroplanes by the Experimental Pilots of the Royal Aircraft Establishment and reported to the Branch Meteorological Office at South Farnborough.

Temperature is measured with an open scale "spiral bulb" spirit thermometer, mounted on wood, with a bright brass screen shielding the front of the bulb from direct radiation. The thermometer, which is mounted so as to ensure good ventilation, is supported on a wing strut about 6 ft. from the body of the machine. Temperature observations are made when the aeroplane is climbing or flying level to minimise the error due to temperature-lag, which would be serious in a rapid descent.

The data supplied to the Meteorological Office are actual temperatures in degrees Centigrade and corresponding altimeter readings in feet. Surface temperature at the time of ascent is usually noted by the observer, but in a few instances screen thermometer readings have been utilised.

The altimeters used are provided with what has been called the Trade Scale,* *i.e.* they are designed to be accurate in an atmosphere with the uniform temperature 283 a. Corrections are applied to the altimeter readings on account of the divergence of air temperatures aloft from 283 a. It may be noted here that in the altimeters which were in use in previous years the zero of the scale was fixed so that a definite isobaric surface corresponded with a definite nominal height, the index pointing to zero of the scale when the pressure was equal to 29.90 in. of mercury. It was therefore necessary to correct altimeter readings both for zero-setting and air-temperature. The practice was changed at the beginning of 1919, and in the ascents here tabulated the altimeter was set with ground level as zero. Corrections have been applied for temperature deviations and for the height of the starting point above sea-level.

The heights of the levels at which readings have been reported are corrected and the temperatures are plotted against these corrected heights. Temperatures corresponding with steps of half a kilometre are then obtained by interpolation from a smooth curve through the plotted points. All temperatures are given to the nearest half degree.

The monthly averages for the various heights have been set out in a separate table. It should be noted, however, that owing to the insufficient number of observations the averages are not as satisfactory as the corresponding data for the year 1918. The yearly averages which are the means of the values tabulated for the several months have been quoted at the bottom of the table. The total number of observations at any level throughout the whole year is also given. The mean surface temperature at South Farnborough for each month, as published in *The Monthly Weather Report*, is quoted in the table for comparison with the mean of the surface temperatures at the times of ascent. As might be expected, the aeroplane ascents being in the day time, the temperature at the time of ascent was generally above the mean for the day at ground level.

A new feature of the temperature table is the additional information regarding surface pressure and geostrophic wind velocity estimated from *The Daily Weather Report* for the hour which is nearest to the time of ascent.

It may be useful to students of the tables to know that maps showing the distribution of wind at certain levels are printed in *The Daily Weather Report*, Section B.

* See M.O., 228, "The Estimation of Height from Readings of an Altimeter."

Upper Air Temperatures.

SOUNDINGS WITH REGISTERING BALLOONS, 1919.

BENSON.—Lat. 51° 37' N. Long. 1° 7' W.

Height above Mean Sea Level:—57 m.

T=Temperature in Degrees Absolute above 200 a. P=Pressure in millibars. H=Height in kilometres above M.S.L.

No.	340.	343.	344.	345.	346.	347.	348.	No.	340.	343.	344.	345.	346.	347.	348.							
Day.	Jan. 6.	Mar. 20.	Apr. 3.	Apr. 22.	May 5.	July 3.	July 8.	Day.	Jan. 6.	Mar. 20.	Apr. 3.	Apr. 22.	May 5.	July 3.	July 8.							
Start G.M.T.	12 h. 38 m.	16 h. 12 m.	17 h. 18 m.	9 h. 46 m.	18 h. 0 m.	18 h. 13 m.	15 h. 45 m.	HEIGHTS AND TEMPERATURES CORRESPONDING WITH ISOBARIC SURFACES.														
H ₁ =Greatest Height.	8.0 km.	9.2 km.	10.7 km.	10.3 km.	14.0 km.	18.5 km.	11.4 km.															
T ₁ =Corresponding Temp.	228 a.	221 a.	224 a.	227 a.	216 a.	229 a.	222 a.	PRESSURE.														
P ₁ =Corresponding Pressure	327 mb.	280 mb.	236 mb.	265 mb.	144 mb.	75 mb.	220 mb.	Millibars.	H.	T.	H.	T.	H.	T.	H.	T.						
Place of Fall	Dagnall, Berk-hampsted	Cirencester, Glos.	Portsmouth Dockyard	Sparsholt, Winchester	Banbury	Benfleet, Essex	Reading	100	km.	a.	km.	a.	km.	a.	km.	a.						
								200	—	—	—	—	—	—	—	—	—	—	—			
								300	—	—	8.76	23	9.09	27	9.38	32	9.31	31	9.17	30	9.33	30
								400	6.65	30	6.83	35	7.12	40	7.37	47	7.30	46	7.18	42	7.32	46
								500	5.12	40	5.25	40	5.54	50	5.73	53	5.65	57	5.57	53	5.69	56
								600	3.81	50	3.92	54	4.16	59	4.36	62	4.24	66	4.20	61	4.30	65
								700	2.66	60	2.75	62	2.98	64	3.16	69	3.03	70	3.00	68	3.08	73
								800	1.63	65	1.72	67	1.94	66	2.10	72	1.96	77	1.94	76	1.99	79
								900	0.71	70	0.78	71	1.12	74	1.15	77	1.00	84	0.98	82	1.03	81
								1000	—	—	—	—	0.16	82	0.29	80	0.12	89	0.10	86	0.15	86
Distance	46 km.	62 km.	90 km.	64 km.	52 km.	151 km.	21 km.	PRESSURES AND TEMPERATURES AT GIVEN HEIGHTS.														
Bearing	60°	280°	180°	210°	340°	100°	160°	HEIGHTS.	P.	T.	P.	T.	P.	T.	P.	T.						
Geostrophic Wind—Time G.M.T.	13 h.	18 h.	18 h.	7 h.	18 h.	18 h.	18 h.	Kilometres.	mb.	a.	mb.	a.	mb.	a.	mb.	a.						
Speed	13 m/s.	?	?	?	8 m/s.	11 m/s.	6 m/s.	18.0	—	—	—	—	—	—	—	—						
Deg. from N.	230°	?	?	?	150°	270°	360°	17.0	—	—	—	—	—	—	—	—						
Wind (Anemometer)—Speed	4.0 m/s.	3.0 m/s.	1.0 m/s.	Calm	5.5 m/s.	3.0 m/s.	3.0 m/s.	16.0	—	—	—	—	—	—	—	—						
Deg. from North	225°	150°	350°	...	100°	300°	45°	15.0	—	—	—	—	—	—	—	—						
Tropopause Type*	...	...	I.	...	I.	I.	I.	14.0	—	—	—	—	—	—	—	—				
H _c =Height	...	...	10.5 km.	...	12.6 km.	10.0 km.	11.0 km.	13.0	—	—	—	—	—	—	—	—				
P _c =Pressure	...	...	224 mb.	...	181 mb.	266 mb.	230 mb.	12.0	—	—	—	—	—	—	—	—				
T _c =Temp.	...	...	224 a.	...	210 a.	227 a.	220 a.	11.0	—	—	—	—	—	—	—	—				
(P ₉) Pressure at 9 km.	...	288 mb.	303 mb.	317 mb.	314 mb.	308 mb.	315 mb.	10.0	—	—	—	—	—	—	—	—						
(P ₁) Pressure at M.S.L.	983 mb.	993 mb.	1019 mb.	1035 mb.	1014 mb.	1011 mb.	1018 mb.	9.0	—	—	289	22	304	28	317	35						
(T _m) Mean Temp. 1 to 9 km.	...	247 a.	252 a.	258 a.	260 a.	256 a.	260 a.	8.0	327	28	336	29	352	34	366	43						
								7.0	380	29	389	34	407	41	421	49						
								6.0	440	34	450	42	468	48	482	53						
								5.0	509	41	517	47	536	54	551	59						
								4.0	585	49	592	54	612	60	628	64						
								3.0	669	57	677	60	697	64	714	69						
								2.5	715	61	724	63	744	62	760	71						
								2.0	793	64	771	66	794	65	809	73						
								1.5	814	65	822	68	846	70	862	75						
								1.0	868	69	876	70	901	75	917	77						
								0.5	924	73	933	72	958	79	975	80						
								G.L. 0.06	976	76	986	74	1011	82	1028	82						

NOTES.

- 340. Isothermal at 264 a. from 1.7 to 2.0 km. Wind S.S.W., irregular up to 1 km. Barometer very low for two preceding days. Screen temperature 277 a. Pressure Distribution. (13 h.) Depression over the North Sea and over Valencia.
- 343. Snow and rain in the morning, rain all day on the 19th. Light E. wind. Balloon lost in cloud in two minutes. Screen temperature 274 a. Pressure Distribution. (18 h.) Shallow "low" centered near Brest.
- 344. Inversion 261 a. to 264 a. of 3 a. at 2.6 km. on one trace and 2.7 on the other. Light N. wind, overcast after clear, sunny day, clouds at 2.2 km. Balloon last seen 11th min. S.E. by S. Screen temperature 282 a. Pressure Distribution. (18 h.) The Azores anticyclone covering the British Isles.
- 345. Inversion 252 a. at 5.9 km. to 254 a. at 6.2 km. Calm. N.E. wind backed to N.W. at 3.5 km. Low cloud in places. Overcast with high cloud. Barometer high, but falling. Screen temperature 282 a. Pressure Distribution. (7 h.) Anticyclone over the British Isles, centered over England.
- 346. Isothermal at 270 a. 3.1 to 3.5 km. Wind E.S.E. Clear afternoon, sudden development of Cu. at 17 h. 30 m., turning to St. at 18 h. 0 m. Screen temperature 288.5 a. Pressure Distribution. (18 h.) "Low" centered W. of Ireland. Extensive anticyclone centered over Finland.
- 347. Overcast, with Cu. shower at 18 h. Balloon lost in seven minutes going E.S.E. Wind irregular. Humidity 80 per cent. Screen temperature 286 a. Pressure Distribution. (18 h.) Shallow "low" centered over England.
- 348. Inversion 280 a. to 283 a. from 0.9 to 1.2 km. Clear after cloudy day. Light N. wind. Humidity 75 per cent. Screen temperature 289.5 a. Pressure Distribution. (18 h.) Extensive Atlantic anticyclone covering the British Isles.

LAPSE RATE OF TEMPERATURE BETWEEN GIVEN HEIGHTS.

Degrees Absolute per kilometre.

Kilometres.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17 to 18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16 to 17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15 to 16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14 to 15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13 to 14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12 to 13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11 to 12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10 to 11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9 to 10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8 to 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7 to 8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6 to 7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5 to 6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4 to 5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3 to 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2.5 to 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2 to 2.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.5 to 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1 to 1.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
.5 to 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
.06 to .5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* For the definition of the Types of Tropopause, see Annual Supplement, 1913, p. 92; or "The Characteristics of the Free Atmosphere," M.O. 220 c. Geophysical Memoirs, No. 13, p. 59.

Notes on Seismological Work at Eskdalemuir Observatory during 1919.

Equipment.—The instrumental equipment consists of three Galitzin pendulums, arranged to record displacements in the north, east, and vertical directions. There are also Omori and Weichert pendulums, but they are not in operation.

The constants of the two horizontal Galitzin instruments underwent no appreciable change during the year. The tables for magnification and lag, published in the *Supplement* for 1915, still hold good.

Earthquakes.—The number of disturbances recorded during the year, excluding those in which the displacement was exceedingly small, was 121—a smaller number than usual. The epicentral distance was determined in 19 cases. The greatest epicentral distances so found were 11,700, 10,400, and 9000 kilometres. In about a dozen other cases the epicentral distance might have been determined but for the disturbing influence of wind on the building. The record on such occasions is difficult to read. The azimuth of the epicentre was determined in two cases. It is only in the absence of wind and microseismal effects that this is possible.

Microseisms.—The amplitude and period of microseisms in the N-S direction at 0 h., 6 h., 12 h., and 18 h. were determined as usual, and have been published in the *Geophysical Journal*. The mean values for the different months of 1919, compared with the average from 1911 to 1918, are given below. The unit for amplitude is the micron ($10^{-6}\text{m} = \cdot 001 \text{ mm.} = \mu$), for the period, 1 second.

		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1919.	Amplitude (μ) .	1·8	1·5	2·1	1·2	0·7	0·7	0·3	0·6	1·1	0·9	1·5	3·0
	Period (sec.) .	5·5	5·0	5·1	4·5	4·0	4·2	3·0	4·2	4·7	4·8	5·5	6·6
1911-1918.	Amplitude (μ) .	2·5	2·6	1·7	1·2	0·7	0·5	0·3	0·4	0·8	1·3	1·8	2·1
	Period (sec.) .	6·1	6·4	5·7	5·4	4·8	4·5	4·4	4·4	4·9	5·3	5·8	5·8

The yearly means of amplitude and period since 1911 are as follows :—

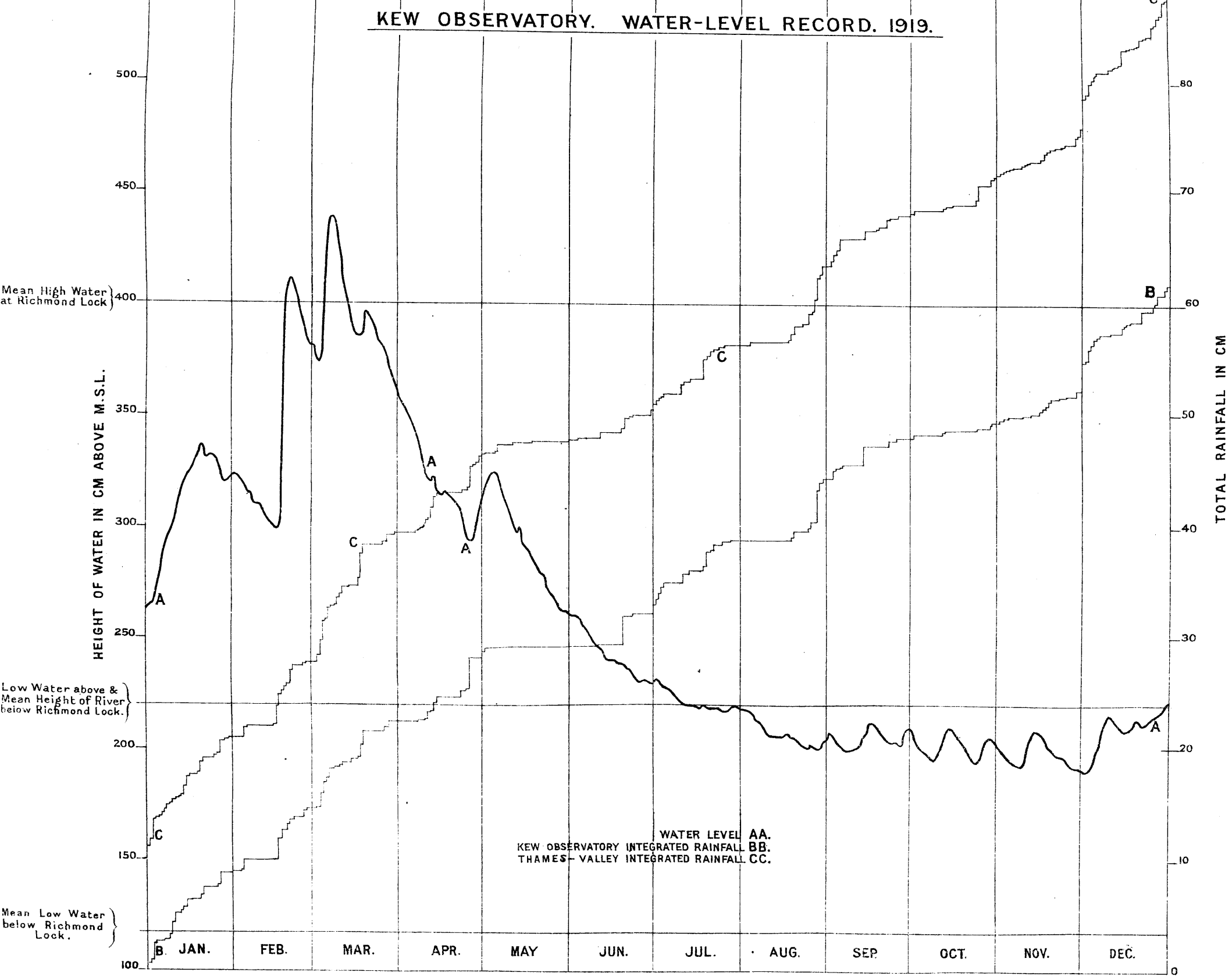
	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.
Amplitude (μ) .	1·1	1·1	1·6	1·6	1·3	1·1	1·1	1·5	1·3
Period (sec.) .	5·2	5·0	5·5	5·4	5·2	5·3	5·2	5·4	4·8

The amplitude of the microseismal displacement increases with the period. The relation is not a linear one—at least for periods above 4·5 seconds. There is no evidence of regular diurnal variation in either amplitude or period.

The Water-Level Recorder at Kew Observatory, Richmond.

A description of the apparatus will be found in the *Annual Supplement* for 1914. Regular observations commenced in July 1914. The values of the mid-height for each day have appeared in the monthly numbers of the *Journal*, along with the extreme values recorded during the month and the dates on which these presented themselves. The general nature of the variation will be readily derived from the diagram, in which the graph A A shows the fluctuations in water level. The integrated

KEW OBSERVATORY. WATER-LEVEL RECORD. 1919.





rainfall (*i.e.* the total fall up to any assigned date) at Kew Observatory is represented by the graph B B, whilst the general rainfall in the Thames Valley* (obtained from twenty-four stations above Teddington) is integrated in the graph C C. The rainfall scale is five times that for the height of the water in the well. In reading the graph C C, 10 cm. is to be *subtracted* from the amount indicated by the scale on the right of the diagram.

The correlation between the Thames Valley and Kew rainfalls is very close, the ratio between the two being about 5 : 4. The rainfall during the first four months was about 50 per cent. of the total for the year, and so the water was maintained at a high level during this period, the summit of 438 cm. being reached on 8th March.

The drought during May and June quickly brought the water down to its summer level. The scanty rainfall during the latter half of the year hardly affected the level of the water in the well, which was below the Richmond Lock low water-mark from the middle of July to the end of December.

The response of the well to variations in the height of the barometer and to the tide in the neighbouring river has been discussed† by E. G. Bilham. The effect of the alternation of spring and neap tides can be easily recognised in the diagram, especially in the autumn months.

A comparison of the graphs for the several years 1914–1919 shows the predominant features of high water-mark in winter and low water-mark in summer. The larger variations of level are mainly governed by the amount of rainfall. It is possible, therefore, to form an approximate idea of the fluctuations of underground water-level from the annual distribution of rainfall, but it is the rainfall of a large area which counts. Even very heavy falls, if quite local, do not affect the water-level appreciably.

The observatory is situated in the Old Deer Park, which lies within a bend of the River Thames, and is not far from Richmond Lock. This lock is half-tidal, *i.e.* at high water there is no obstruction to the flow of the river, at half-tide the sluices come into operation, so that the water above the lock does not fall below the half-tide level, whereas below lock at low tide there is very little water—at any rate in a dry season.

As will be seen from the diagram, the “drought level” of the underground water at the Observatory is very close to that at which the level is maintained above the lock, when the sluices are in use, as they are perhaps for three-quarters of the day. At spring tide the average level of the river throughout the 24 hours is higher than at neap tide, and the underground water rises about 10 cm.

The water may stay at the drought level until well into the winter. For example, there was little rain in the latter months of 1917, and it was not until 15th January 1918 that a rise began. Then there were five wet days (January 15–19), with an aggregate fall of 6 cm. at the Observatory, and the water level rose 160 cm. to the maximum of the year, which was reached on the 20th. The highest level recorded since the installation of the apparatus was 469 cm. above M.S.L. on 23rd March 1916, when parts of the Old Deer Park were flooded.

The downward trend of the water in summer is often arrested by a general rainfall over a wide stretch of the country. Two instances of a remarkable rise in summer are worthy of note. The first occurred in May 1915. The rainfall over the Thames Valley was heavy, 7·9 cm. being recorded at the Observatory in the middle of the

* A chart showing the rainfall of the Thames Valley is published monthly in *Symons's Met. Mag.*

† *Roy. Soc. Proc.*, A94, 1918, p. 165; and *Q. J. R. Met. Soc.*, vol. xlv., 1918, p. 171.

month (May 12th–19th). The corresponding response was 31 cm., and the summit was reached on 24th May, the lag indicating the comparatively slow drainage down the Thames Valley. Similarly in 1917 a total rainfall of 9.1 cm. (July 29th–Aug. 1st) at Kew was attended with a rise of 55 cm. in the water, the lag in this case being 9 days.

The contrast between the immediate response to heavy rainfall in winter and lag in summer is explained by the fact that the soil being saturated in winter, additional rain runs off and into the river channel at once, whilst, in summer, the water has to saturate the subsoil before it begins to run away either over the surface or by underground channels. As a general rule, the greater part of the summer rainfall evaporates before it can make its way to the river. Moreover, the damming up of the water at the lock is probably responsible for the elimination of fluctuations in level due to such part of this summer rain as does contribute to the river flow.

Table of Monthly Means of Magnetic Data for Eskdalemuir, 1919.

The following table gives the mean monthly values of daily maximum and minimum and of the corresponding daily range of the magnetic elements at Eskdalemuir Observatory. The corresponding data published for Kew Observatory in previous years are no longer available. It should be mentioned, however, that the magneto-grams for "international quiet days" have been tabulated at that Observatory, and that a summary of the results will be printed in *Hourly Values*.

Month.	North Component.			West Component.			Vertical Component.		
	Max. 15000 γ +	Min. 15000 γ +	Range.	Max. 4000 γ +	Min. 4000 γ +	Range.	Max. 44000 γ +	Min. 44000 γ +	Range.
January . . .	γ 1013	γ 917	γ 96	γ 934	γ 834	γ 100	γ 1131	γ 1070	γ 61
February . . .	1022	926	96	936	835	101	1112	1052	60
March . . .	1030	908	122	940	823	117	1093	1008 -	85 +
April . . .	1032	926	106	932	835	97	1092	1022 -	70 +
May . . .	1056	924	132	939	830	109	1119	1029 -	90 +
June . . .	1050	960	90	934	838	96	1118	1074	44
July . . .	1051	957	94	935	843	92	1137	1093	44
August . . .	1049	932 -	117 +	931	824 -	107 +	1146 +	1078 -	68 +
September . . .	1047	924	123	921	804	117	1132	1032	100
October . . .	1048	908 -	140 +	927	797	130	1121 +	1030	91 +
November . . .	1016	961	55	893	827	66	1090	1056	34
December . . .	1017	953	64	889	819	70	1088	1055	33
Year . . .	1036	933 -	103 +	926	826 -	100 +	1115 +	1050 -	65 +

The traces passed the limits of registration on eight days; the value accepted for the maximum or minimum in such a case represents the upper or lower edge of the photographic sheet. Such values have been excluded in the calculation of the monthly means published in the *Geophysical Journal*, Table 6, but are used in obtaining the figures entered in the table above. The mean values of the daily range for the months affected are still underestimated, but the differences from the true values are probably small.

The extreme values for the year and the corresponding annual ranges were as follows:—

North Component . . .	Maximum.	Minimum.	Range.
West . . .	16336 γ	< 15627 γ	> 709 γ
Vertical . . .	5173 γ	4591 γ	582 γ
	> 45415 γ	< 44830 γ	> 585 γ

**Table of Monthly Means of Electrical Data for Kew Observatory,
Richmond, 1919.**

The following table gives mean values of positive and negative charges obtained with the Ebert apparatus. The observations are made only on certain days, and so the figures do not necessarily represent true means for the months. The number of days utilised for computing the respective means are given in the table.

Charge per c.c. at about 15 h. at Kew Observatory, Richmond. Unit 1×10^{-10} Coulomb.

Year.	Sign of Charge.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Year.
1919	+	0·48	0·49	0·47	0·37	0·61	0·90	0·37	0·48	0·45	0·50	0·42	0·40	0·50
	-	0·27	0·33	0·39	0·28	0·51	0·56	0·20	0·50	0·32	0·25	0·30	0·28	0·35
No. of days utilised	+	7	6	7	6	10	6	7	2	3	10	6	7	77
	-	7	5	7	8	9	8	8	10	7	9	8	8	94

For a reason fully explained in the accompanying note use has been made only of the earlier part of the observation taken on each day. The later part of the observation was undoubtedly affected by an instrumental source of error. It is not impossible that even the earlier part of the observation suffered from the error in question, but at all events it suffered much less than the later part.

A popular account of the method of measurement of positive and negative charges will be found in a paper* by Mr. C. D. Stewart. For a comparison of the units used here and in corresponding tables elsewhere reference may be made to the Introduction. Mean values of potential gradient at Kew Observatory will be printed in *Hourly Values*.

In the means for the year equal weight has been assigned to each individual observation independently of the month it occurs in, as the number of days available was unduly low for some of the months. Owing to the exclusion of the latter part of the daily observation the mean time is some 15 minutes earlier than in previous years. This may have some slight influence on the results.

**A Discussion of the Effects of Deterioration of the Ebert Apparatus
in use at Kew Observatory, Richmond.**

The Ebert apparatus is used to determine the amounts of free positive and negative charges carried by the more mobile ions of the atmosphere. By means of a turbine a measured volume of air is pulled through a hollow cylinder, in the axis of which is a charged rod. The cylinder is earthed, and the co-axial rod is charged negative or positive according as the ionic charge under investigation is positive or negative. The rod is connected to an electrometer, and the observation consists essentially in determining the reduction in voltage accompanying the passage of a given volume of air. The free charge carried by the more mobile ions of sign opposite to that on the rod is given up to the rod, so that, allowance being made for any leak due to imperfect insulation, the reduction in voltage measures the quantity desired.

It has been known for a considerable time that a measurement of the negative ionic charge may be prejudiced if it immediately follows a measurement of the positive ionic charge without any interval elapsing after the second charging of the rod, but

* *Q. J. R. Met. Soc.*, vol. xliii., 1917, p. 409.

it has been supposed that this source of error is negligible if a minute or two be allowed to elapse.

For some years the practice at Kew Observatory had been to have two Ebert instruments in simultaneous operation, one measuring the positive, the other the negative charge. This gave the same mean time for the results obtained for the two signs.

In 1916, however, one of the instruments broke down and repairs could not be executed at the time. It thus became necessary, if observations on both signs of charge were to be made on the same day, to take the two observations successively with a single instrument. To make things as nearly as possible alike for the two charges, the sign of the charge first given to the rod was different on successive days; also, a short interval was allowed after the second charging of the rod before a reading was taken. This procedure continued until January 1920.

The electrometer employed is of the Wulf pattern, having two parallel fibres, the distance between which increases with the voltage. A deterioration of the surface of the fibres, which had presumably set in very gradually, was noticed some years ago. As viewed by the reading microscope, the outline of the fibres appeared furry, as if a coating were peeling off, instead of being sharp, as it was originally. This may not be the cause of the trouble presently to be described, but the chances are that it is.

It had always been customary, after first charging the rod, to leave the instrument in the open for some minutes before observing, but apparent changes of reading during this interval had never been recorded. In 1919 the interval was increased.

The procedure followed was to pull 1200 litres of air through, this occupying about 15 minutes, readings of the electrometer being taken after the passage of each 400 litres. Only the total fall entered into the calculations. The turbine was cut out only after the 1200 litres had passed, and the intermediate readings answering to the passage of the 400 and 800 litres could not claim the same accuracy as the final one. They served merely as a rough check, which occasionally proved useful when—as sometimes happened in damp weather—the insulation deteriorated during the observation. Changes in the electric contents of the atmosphere are at times very considerable in the course of 15 minutes. Thus a good deal of irregularity in the apparent rate of fall of the voltage was accepted as inevitable, even before the deterioration of the fibres. This deterioration diminished the accuracy of reading, which again naturally added to the apparent irregularities. This will explain why the defect was not detected earlier.

It was only gradually that a vague suspicion dawned on the observer that the changes of voltage during the second part of the observation, after the second charging of the rod, tended to be unduly small. In view of this it became customary to pull at least 100, sometimes 500, litres of air through before commencing the second part of the observation. In the beginning of 1920 direct experiment showed that the apparent voltage, when no air was being pulled through, almost invariably *rose* for some minutes after charging, irrespective of the recent history of the instrument. The length of time for which this rise was appreciable might be 5, 10, or even 15 minutes. The instrument behaved as if with a constant charge it had a gradually diminishing capacity. Thus during an ionic charge observation, taken without a prolonged interval after charging, the natural decrease in voltage was opposed by a rise of instrumental origin. The instrumental rise would naturally depend on the charge given to the rod, which was but little variable. Thus the error might be expected to

be relatively greatest when the ionic charges are least, *i.e.* in the winter months, and for the negative charges. As will be seen presently, that is exactly what happened.

To investigate the matter the observations of the years 1917 to 1919 were divided into two categories: (A) Those in which the observation for positive ionic charges (*i.e.* those in which the Ebert rod was charged negative) came first; (B) those in which the observation for positive charges came second. Suppose that during a certain month or season there are n days in category (A) and n' in category (B), and suppose the sums of the observed daily changes of voltage during this period (each answering to 1200 litres of air and corrected for ordinary leakage) to be A_+ , A_- , B_- , and B_+ . If there were no instrumental defect prejudicing A_- and B_+ , as compared with B_- and A_+ , and if the diurnal variation during the interval—some 25 minutes—between the mean times of the two daily observations were negligible, then, supposing a sufficiently large number of days included to cut out accidents, we should expect to find

$$(A_+/n) \div (B_+/n') = 1, (B_-/n') \div (A_-/n) = 1.$$

At first, the days of each month were considered separately, but the ratios obtained were obviously largely influenced by accident. The results for each year were accordingly recalculated, for the year as a whole, and for two 6-month periods, summer including April to September, and winter the remaining 6 months. The following results were obtained:—

Year.	n .	n' .	Values of $(A_+/n) \div (B_+/n')$.			Values of $(B_-/n') \div (A_-/n)$.		
			Summer.	Year.	Winter.	Summer.	Year.	Winter.
1917	79	83	1.11	1.14	1.15	1.06	1.22	1.63
1918	85	81	1.37	1.39	1.46	1.43	1.51	1.63
1919	78	93	1.24	1.39	1.71	1.38	1.52	1.62

A similar calculation was made for 1916, but a much smaller number of observations was available, as the practice of using two apparatus was in operation for part of the year. The means from all the observations were 1.24 for the positive and 1.33 for the negative ions. The fact that these values are larger than the means for 1917 does not possess much significance owing to the paucity of observations in most of the summer months of 1916. The single month November contributed almost a quarter of the observations.

In the years 1917 to 1919 the numbers of summer and winter observations were nearly equal, and for these years purely accidental causes, though not wholly eliminated, should have no great influence on the seasonal results. It will be seen that 1918 and 1919 show a marked rise in the ratio as compared with 1917, except in the case of the winter value of $(B_-/n') \div (A_-/n)$. The last three months of 1917 when treated alone gave for this ratio the value 1.93, which suggests that deterioration had certainly commenced by that time. The fact that 1919 shows no progressive rise as compared with 1918 may not unreasonably be ascribed to the increased precautions introduced in the later year.

If we confine ourselves to results obtained from the first daily observation, the values obtained from the seasonal groups are as follows:—

Charge per c.c. Unit 1×10^{-16} Coulomb.

Year.	Positive Charge.			Negative Charge.		
	Summer.	Winter.	Year.	Summer.	Winter.	Year.
1917	0.737	0.481	0.610	0.535	0.377	0.451
1918	0.694	0.488	0.597	0.492	0.318	0.413
1919	0.551	0.462	0.502	0.401	0.300	0.353

These figures are not wholly re-assuring as regards even the first observation of the day in 1919.

The differences between the values of the ratio for the summer and winter seasons, and the positive and negative charges, are on the whole less than might have been anticipated, but are in the expected direction.

The possibility that the difference might be due in whole or in part to the regular diurnal variation naturally suggests itself. It is obvious, however, that only a very rapid change of the electrical conditions could fully account for so large a difference, and the only period of the day when there seems any reasonable chance of a very rapid systematic change is near sunset or sunrise. Thus it is only in winter that such an explanation would seem at all probable *a priori*. The conclusion that the difference was almost entirely of instrumental origin seems unavoidable in view of the subsequent experience during 1920. For the first eleven months of that year the practice was to confine the observations of each day to a single sign, the sign being different on alternate days. On each day observations were taken for two 15-minute periods in succession, the loss due to defective insulation being observed, as has been the practice since 1916, at the end of the first 15-minute period. The instrument was charged a long time before the observation, and 100 litres of air were run through before the regular observations began. During the eleven months there were eighty days when the positive ions were collected and seventy-five when the negative ions were collected. The totals of the charges observed during the first 15-minute and the second 15-minute observations being separately summed, the ratio between these charges was calculated. For positive ions the ratio was 1.02, for negative ions it was 1.06. The winter and summer months being separately dealt with, the values of the ratio were :

1.01 for summer and 1.03 for winter for positive ions.

1.04 for summer and 1.08 for winter for negative ions.

It would thus appear that while a small part of the observed deficiency in the second half of the daily observations from 1917 to 1919 may be of natural origin—at least in the case of negative ions in winter—much the greater part was of instrumental origin. As the values obtained from the complete observation were thus unduly depressed, particulars of the results obtainable from the first half of the daily observations appear desirable for 1917 and 1918 as well as for 1919. The results for 1917 and 1918 are accordingly given in the following table. The remarks already made with reference to the table for 1919 apply also to it.

Charge per c.c. at about 15 h. at Kew Observatory, Richmond. Unit 1×10^{-16} Coulomb.

Year.	Sign of Charge.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Year.
1917	{ +	0.53	0.43	0.75	0.60	0.63	0.82	0.67	0.96	0.66	0.53	0.34	0.43	0.61
	{ -	0.38	0.40	0.40	0.54	0.47	0.65	0.49	0.59	0.52	0.47	0.25	0.39	0.45
1918	{ +	0.42	...	0.55	0.51	0.75	0.55	0.81	0.64	0.91	0.48	0.58	0.39	0.60
	{ -	0.25	...	0.38	0.28	0.49	0.53	0.59	0.45	0.63	0.39	0.27	0.31	0.41

ERRATA.

Page 3,	Table 6.	North Component, Mean Range,	<i>insert</i> 96.
" 3,	" 6.	West " " "	" 100.
" 3,	" 6.	Vertical " " "	" 61.
" 11,	" 6.	North " " "	<i>for</i> 92 <i>read</i> 96.
" 11,	" 6.	West " " "	96 " 101.
" 11,	" 6.	Vertical " " Maximum,	" 1105 " 1112.
" 11,	" 6.	" " Range,	" 54 " 60.
" 19,	" 6.	" " Minimum,	" 1008 " 1011.
" 19,	" 6.	" " Range,	" 85 " 83.
" 27,	" 6.	" " Maximum,	" 1092 " 1093.
" 35,	" 6.	North " " Range,	<i>insert</i> 132.
" 35,	" 6.	West " " "	" 109.
" 35,	" 6.	Vertical " " "	" 84.
" 45, etc.	" 5.	Heading <i>for</i> charge per c.c. $\times 10^{20}$	<i>read</i> charge per c.c. $\times 10^{16}$.
" 51,	" 2.	Magnetism, 30th, Declination West,	<i>for</i> 23'1" <i>read</i> 19' 23'1".
" 51,	" 2.	" " 30th, Inclination,	" 6'1" " 68° 6'1".
" 51,	" 2.	" " 31st, Declination West,	" 24'4" " 19° 24'4".
" 53,	" 6.	North Component, Mean Maximum,	" 1052 " 1051.
" 53,	" 6.	" " " Range,	" 95 " 94.
" 53,	" 6.	Potential Gradient, Volts per metre, Factor,	<i>for</i> 7.24 <i>read</i> 5.92 to 13 h. on 10th.
			and " 9.63 " 6.29.
" 61,	" 6.	" " " " " Factor,	" 3.77 " 5.99.
" 67,	" 2.	Mean Pressure, 9h.,	<i>for</i> 1016.7 <i>read</i> 1015.0.
" 67,	" 2.	" " 21h.,	" 1016.4 " 1014.7.
" 68,	" 3.	" " 9h.,	" 1017.5 " 1016.2.
" 68,	" 3.	" " 21h.,	" 1016.9 " 1015.9.
" 68,	" 4.	" " 9h.,	" 1013.6 " 985.1.
" 68,	" 4.	" " 21h.,	" 1013.5 " 985.3.
" 77,	" 2.	" " 9h.,	" 1024.4 " 1022.7.
" 77,	" 2.	" " 21h.,	" 1025.3 " 1023.6.
" 78,	" 3.	" " 9h.,	" 1022.0 " 1020.7.
" 78,	" 3.	" " 21h.,	" 1022.1 " 1020.8.
" 88,	" 3.	" " 9h.,	" 1008.9 " 1007.6.
" 88,	" 3.	" " 21h.,	" 1009.1 " 1007.8.
" 88,	" 4.	" " 9h.,	" 1009.1 " 979.7.
" 88,	" 4.	" " 21h.,	" 1008.3 " 978.9.
" 89,	" 6.	West Component, Mean Maximum,	<i>for</i> 894 <i>read</i> 893.
" 89,	" 6.	" " " Range,	" 67 " 66.