

Air Ministry
METEOROLOGICAL OFFICE

THE
OBSERVATORIES' YEAR BOOK
1933

Comprising the meteorological and geophysical results obtained from autographic records and eye observations at the observatories at Lerwick, Aberdeen, Eskdalemuir, Cahirciveen (Valentia Observatory), and Richmond (Kew Observatory), and the results of soundings of the upper atmosphere by means of registering balloons.

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*There also exists a
 Geophysical Memoir no 80 1949
 "Aurora ranges of the magnetic
 elements, during the polar
 year 1932-3, at the Observatories
 of Lerwick and Eskdalemuir
 (Letter M 21463 61 of 15/3/65)*

PREFACE.

From 1908 to 1921, the serial statistical publications of the Meteorological Office were grouped together as though they were parts of one comprehensive book. This book, which was entitled "The British Meteorological and Magnetic Year Book," consisted of:—

| | | | | | |
|---------------------|----|----|----|----|---|
| Part I | .. | .. | .. | .. | The Weekly Weather Report. |
| Part II | .. | .. | .. | .. | The Monthly Weather Report. |
| Part III, Section I | .. | .. | .. | .. | Daily Readings at Meteorological stations of the First and Second Orders. |
| Section II | .. | .. | .. | .. | Geophysical Journal, Daily Values of Meteorological and Geophysical Elements. |
| Part IV, Section I | .. | .. | .. | .. | Hourly Values from Autographic Records, Meteorological Section. |
| Section II | .. | .. | .. | .. | Hourly Values from Autographic Records, Geophysical Section. |
| Part V | .. | .. | .. | .. | Réseau Mondial. |

The data for the year 1922 and subsequent years are found in the following publications:—

| New Publication from 1922. | | | | Corresponding parts of the British Meteorological and Magnetic Year Book until the end of 1921. | |
|------------------------------|----|----|----|---|-----------------------|
| The Weekly Weather Report | .. | .. | .. | Part I. | |
| The Monthly Weather Report | .. | .. | .. | Part II. | |
| The Observatories' Year Book | .. | .. | .. | } | |
| | | | | | Part III, Section II. |
| | | | | | Part IV, Section I.* |
| The Réseau Mondial | .. | .. | .. | Part IV, Section II. | |
| | | | | Part V. | |

It will be noticed that Part III, Section I, of the old publication is not included in the new issues. This part contained "Daily Readings at Meteorological Stations of the First and Second Orders," and it has been decided that as the Observatories' Year Book contains daily values of the meteorological elements for the principal first order stations and the Daily Weather Report contains daily values for these and about 40 other stations, it is not necessary to revive the issue of this section, which ceased with the data for 1921.

The present volume is the twelfth issue of the Observatories' Year Book. It contains geophysical data for Lerwick, Eskdalemuir, Cahirciveen and Richmond, meteorological data for Aberdeen, Eskdalemuir, Cahirciveen and Richmond, and in addition an aerological section giving the results of soundings of the upper atmosphere by means of registering balloons.

The table of mean annual values of magnetic data for observatories of the globe has been contributed by the Astronomer Royal. It will be found at the end of the Eskdalemuir section.

*Part IV, Section I, Hourly Values from Autographic Records, Meteorological Section, was discontinued after the data for 1913 had been published. The hourly values for the years 1914 to 1921 are, however, available in manuscript.

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ERRATA IN PREVIOUS VOLUMES.

Hourly Values, 1918.

P. 27. Table XXIII.—Heading. *For North read Vertical.* *1009 25/1/15*

Hourly Values, 1919.

P. 17. (Magnetic Section). Table III.—January 21st. V component at 8h. *For 1983 read 1083.*

P. 26. (Magnetic Section). Table XXII.—June 1st. W. component at 8 h. *For 951 read 851.* *1009 25/1/15*

Year Book, 1922.

P. 159. Table 207.—March 27th. V component at 10h. *For 1071 read 1017.* *1009 25/1/15*

Year Book, 1930.

P. 347. Table A. March a_2 . *For 33 read 147.*
 April a_2 . *For 34 read 146.*
 Year c_2 . *For .258 read .360.*
 Year a_2 . *For 136 read 151.*
 Equinox c_2 . *For .178 read .412.*
 Equinox a_2 . *For 94 read 155.* *1009 25/1/15*

Year Book, 1932.

P. 40. Table II.—Minimum Value Vertical Force. *For 25756y read 45756y.*

LERWICK DECLINATION SEE ERRATA 1962 O.Y.B.

LIST OF OBSERVATORIES.

| | Latitude. | Longitude. | G.M.T. of Local Mean Noon. | Height above M.S.L. |
|--|-----------|------------|----------------------------------|---------------------------|
| Lerwick, Shetland Isles | 60 8 N. | 1 11 W. | h m 12 5 | metres 81·7 |
| Aberdeen | 57 10 N. | 2 6 W. | 12 8 | { 11·4† 24·1 |
| Eskdalemuir, Dumfries-shire | 55 19 N. | 3 12 W. | 12 13 | 242·0 |
| Valentia Observatory, Cahirciveen, Co. Kerry. | 51 56 N. | 10 15 W. | 12 41 | 9·1 |
| Kew Observatory, Richmond, Surrey .. | 51 28 N. | 0 19 W. | 12 1 | 5·5 |

Note.—The height given is that of the site of the rain-gauge. The heights of other meteorological instruments are shown in the appropriate Tables.

† The site of the rain-gauge was altered on 1st June 1928 to a height of 11·4 metres and on 1st April 1933 to a height of 24·1 metres.

NORMAL VALUES AND MONTHLY SUMMARIES.

Monthly and annual normals of pressure, dry bulb temperature, and rainfall for each hour of the day and for the period of 45 years, 1871–1915, are published for the observatories, Aberdeen, Cahirciveen, Richmond and Falmouth in *Hourly Values from Autographic Records, 1917* (Part IV of the British Meteorological and Magnetic Year Book, 1917), and in previous volumes of that series. Corresponding normals of wind-speed and sunshine* are published there for the same observatories and for the period of 35 years, 1881–1915, while corresponding normals of relative humidity are also published there for the period of 30 years, 1886–1915. For Eskdalemuir the same publication gives hourly averages for the months and for the year, referred to the period 1911–1915.

It should be noted, however, that the normal hourly values in the case of wind, rainfall and sunshine refer to periods of 60 minutes centred at exact hours G.M.T., and are therefore not directly comparable with the values printed in this volume which refer to periods of 60 minutes ended at exact hours G.M.T.

Summaries giving additional mean values and frequencies of occurrence of various meteorological phenomena will be found for all the observatories in *The Monthly Weather Report* and its Annual Summary. The latter also contains special summaries of the tabulations of the anemographs.

Monthly normal values of maximum, minimum and mean temperature, rainfall and sunshine for the period 1881–1915 are published in the *Book of Normals, Section I*, for Aberdeen, Cahirciveen, Richmond and Falmouth. *Section IV* of the same publication gives information regarding the range of variation of temperature and rainfall at the same observatories, and monthly frequencies of the normal numbers of days of hail, thunder, snow, snow-lying and ground frost. *Section VI* of the *Book of Normals* gives tables and isopleth diagrams showing the normal diurnal and seasonal variation of relative humidity at all the observatories for which data of relative humidity are included in this volume.

Monthly average values of maximum, minimum and mean temperature for 1901–1930 in the cases of Aberdeen, Cahirciveen and Richmond, and for the period 1910–1930 in the case of Eskdalemuir are published in *Averages of Temperature for the British Isles*.

Averages of total monthly duration and daily mean duration of bright sunshine for similar periods are published in *Averages of Bright Sunshine for the British Isles*.

*The normals of hourly values of sunshine for Aberdeen for all months except February are incorrect, owing to an error in computation. The published values except February, should be increased by one-third.

GENERAL INTRODUCTION TO THE METEOROLOGICAL TABLES.

The elements dealt with in the following meteorological tables for the Observatories at Aberdeen, Eskdalemuir, Cahirciveen and Richmond are :—barometric pressure, air temperature, humidity, rainfall, sunshine, wind speed and direction, minimum night temperature on the grass, temperature in the ground, cloud, visibility and weather, and in some cases solar radiation and level of underground water.

The positions of the Observatories and the heights of the sites are given on p. 8.

NOTES ON THE INSTRUMENTS AND TABULATION OF THE RECORDS.

A detailed description of the barograph, thermograph, and Beckley rain-gauge used for obtaining the records of pressure, temperature, humidity, and rainfall is given in the *Reports* of the Meteorological Office for the years 1867 and 1869; for a description of other instruments in use reference may be made to the *Meteorological Observer's Handbook* and to the article on Meteorological Instruments in the *Dictionary of Applied Physics*, Vol. III. The following notes are supplementary and are given partly for reference and partly as containing information necessary for the interpretation of the tables.

Barometer.—The record of barometric pressure is obtained photographically from a mercurial barometer.

By means of a source of light, a condenser and an objective arranged as in the ordinary optical lantern, an image of the space above the mercury in the tube, reduced to very small width by means of a diaphragm, is projected upside down upon a sheet of photographic (" bromide ") paper carried upon a cylinder which is rotated by means of clockwork and makes one revolution about its vertical axis in rather more than 48 hours. The image is in the form of a vertical line of light, the upper edge of which is defined by the position of the mercury in the barometer tube, while the lower edge is defined by a plate actuated by a zinc rod. The purpose of the zinc rod is to provide an automatic compensation for temperature changes, the arrangement being such that any shortening of the line of light due to a rise of temperature and consequent expansion of mercury in the tube is balanced by an equal lengthening due to movement of the plate carried on the zinc rod.

The barogram is, therefore, a continuous photograph of a narrow illuminated vertical line and appears as a horizontal ribbon, the depth of which is constantly varying with the rise or fall of the mercury in the tube of the barometer.

A time-scale is recorded upon the barogram by means of a shutter actuated by the clock. This shutter cuts off the light for the space of four minutes every two hours, thus producing interruptions which appear on the record as narrow white spaces corresponding with intervals of four minutes centred at the half hours 1h 30m, 3h 30m, etc. Until 1918 these time-breaks occurred at the even hours, 2h, 4h, 6h, etc., but it was found that when the edge of the record was not critically sharp owing to various causes, a systematic error was introduced when measuring the records, whereby the values at the even hours were slightly in excess of those at the odd hours where no time-break existed. From 1918 onwards the clock was so arranged that the time-breaks should occur half an hour before the even hours; by this means both even and odd hour-values are measured at points on the trace which are unaffected by any systematic difference.

Control readings of a standard barometer are taken three times a day by different observers. The control readings are first corrected for index error, temperature and gravity, and then compared with the corresponding readings of the barogram. The differences between the control readings and the corresponding tabulated values

are then found and a correction derived therefrom is applied to all the tabulated values. This correction, known as the "residual correction," is so applied as to run smoothly throughout the whole length of each record—a period of 48 hours—and alterations in the amount of the correction occur, where necessary, in steps not exceeding 0.1 millibar.*

The scale value of the barograms is found from a comparison of a series of such standard and curve readings. The indications of a curve are converted into numerical values by measuring the ordinates with a tabulating instrument, graduated according to the ascertained scale value.

Thermometers.—The air temperature and humidity data at each Observatory are derived from records obtained photographically from two mercurial thermometers. One thermometer is used as a dry bulb and the other as a wet bulb thermometer.

Each thermometer has a large cylindrical bulb four inches long and a very long stem. The latter is bent twice at right angles to enable the bulb to be exposed outside the building in a louvred screen attached to the north wall of the Observatory.† The column of mercury in the vertical portion of the stem inside the building is broken at a convenient point by a small air space which moves up or down the stem with rise or fall of temperature. The record is obtained by passing a reflected beam of light through the air space and photographing its image upon a moving sheet of "bromide" paper in the same manner as described in the case of the barometer. A base line is traced on the paper by a pencil of light passing through a small aperture in the brass frame carrying the recording thermometer. The time-scale is automatically recorded upon the curves, a time-break occurring half an hour before each even hour.

Two large standard thermometers with very open scales graduated in degrees absolute and having bulbs similar to those of the thermograph are mounted in the screen side by side and close to the thermograph bulbs. One of the thermometers is arranged as a dry bulb, the other as a wet bulb. Control readings of these thermometers are made three times a day for comparison with the corresponding readings obtained from the thermograms.

The scale-value of the curves is found by a comparison of the readings of the standard thermometers, corrected for any errors they may have, with the corresponding measurements of the curves. The curves are measured by means of a plate of glass ruled with lines corresponding with the ascertained scale-value of the record, both for temperature and for time. The scale is graduated so as to read degrees vertically and hours horizontally.

Two alternative methods of reading the curves have been adopted.

- (a) At Richmond the scale is set by the base-line and after hourly readings have been obtained for the whole record comparisons are made with the control readings. The residual correction so determined (normally the same for the whole record of 48 hours) is applied to the tabulations.
- (b) At Aberdeen, Eskdalemuir and Cahirciveen, the practice is to adjust the glass scale so that the readings at the control hours on the trace are made to show general agreement with the corresponding eye-readings of the standard thermometers. The temperature equivalent of any part of the curve can then be read off. The base-line photographed on the record serves as a useful check.

* At Cahirciveen and Richmond the rule is to apply the same correction for the whole chart.

† At Eskdalemuir the screen stands in the open.

Rainfall.—This element is recorded by a Beckley self-registering rain-gauge, in which the rain as it falls is collected in a receiver supported on a float in a vessel of mercury. As the rain passes into the receiver, the float gradually sinks, carrying with it a pen which records its position upon a chart wrapped round a clock-driven cylinder. The displacement of the mercury by the float is arranged so as to give a uniform scale throughout. When five millimetres (two-tenths of an inch) of rain have entered the receiver a siphon comes into action, and, by discharging its contents, causes the float to rise till the pen is brought back to the zero line, from which the record begins again.

The collecting funnel of the Beckley rain-gauge has an area of approximately 100 square inches. Each gauge stands on level ground and its distance from every other object is greater than twice the height of the object. The height of the rim of the Beckley rain-gauge above the surface of the surrounding ground varies from 0.4 m. to 0.6 m. at the different observatories. Details are given at the head of the tables of hourly values. A check gauge with funnel 8 inches in diameter is installed near by.

The records obtained from the Beckley self-registering rain-gauge are, if necessary, subjected to a proportional correction whereby they are brought into agreement with the amount of rainfall as recorded by the check rain-gauge which is read twice daily at, 7h. and 18h.

Sunshine.—The record of sunshine is obtained from a Campbell-Stokes recorder in which instrument the sun's rays are focussed through a 4-inch spherical lens of crown glass upon a strip of blue card, which is scorched, or burned right through, according to the intensity of the sun's rays. Three different patterns of card are used at different seasons of the year. The cards are exposed in a metal bowl, and the focussed image of the sun leaves its mark behind it as it travels along the surface of the card with the apparent motion of the sun through the heavens. The intensity of the burn is not measured, but the record is regarded as that of "bright" sunshine whenever the card has been distinctly scorched. When measuring the duration of sunshine which is represented by intermittent burns, an allowance is made for the extension of the trace by the charring of the card.

Wind - Speed and Direction.—The hourly values of wind-speed and direction for Eskdalemuir, Richmond and Cahirciveen which appear in this volume are derived from the records of Dines tube anemographs, a description of which will be found in the *Meteorological Observer's Handbook*. In the case of Aberdeen, where building operations have seriously impaired the exposure of the tube anemograph, data from the Robinson cup anemograph, adjusted as explained in the sectional introduction, have again been printed for 1933. Instantaneous velocities for Aberdeen refer, however, to tube anemographs; for the first three months of the year the tube anemograph used was that with impaired exposure, for the rest of the year a tube anemograph at a new site has been utilised. At Eskdalemuir records of tube anemographs have always been used, but at the older observatories the data printed in volumes previous to that of 1926 were obtained from Robinson cup anemographs. At Richmond a new Dines tube anemograph, erected on the dome in the position formerly occupied by the Robinson cup anemograph, but with its vane 3 metres higher than the original height of the cups, has been brought into use from January 1st, 1931. At Cahirciveen (Valentia Observatory) a new Dines tube anemograph, with 1-inch connecting pipes, was brought into use as from January 1st, 1932. The new instrument was erected alongside the old instrument, and a comparison extending over the period May, 1931, to January, 1932, showed that the new instrument recorded higher velocities than the old. In hourly mean values the difference was nearly uniform and equal to .4 m/s or 1 mi/hr.

In gust velocities the increase was approximately 12 per cent. of the velocity recorded by the old instrument. At Eskdalemuir a new Dines tube anemograph with 1 inch connecting pipes was brought into use as from 11th August 1933. The diameter of the connecting pipes of the old instrument was $\frac{1}{2}$ inch. Particulars of the exposure of the instruments at each Observatory will be found in the sectional introductions.

The relation between the values of wind speed recorded by the cup and tube anemographs at the several observatories was briefly discussed in the General Introduction to the volume for 1926. The following table gives, for the various wind directions, the mean values of wind speed recorded by the tube anemographs, expressed as percentages of the corresponding values recorded by the cup anemographs:—

*Average values of the quantity $100 \times \frac{\text{Speed by tube anemograph}}{\text{Speed by cup anemograph}}$
at the three observatories, arranged according to the direction of the wind.*

North = 360°, East = 90°, South = 180°, West = 270°.

| Wind Direction in degrees from North. | Aber- deen. (to 1929) | Cahir- civeen. (to 1931) | Richmond. | | Wind Direction in degrees from North. | Aber- deen. (to 1929) | Cahir- civeen. (to 1931) | Richmond. | |
|---|-----------------------------|--------------------------------|-----------|------|---|-----------------------------|--------------------------------|-----------|------|
| | | | 1926-30 | 1931 | | | | 1926-30 | 1931 |
| 10 | 131 | 103 | 99 | 114 | 190 | 138 | 137 | 96 | 107 |
| 20 | 132 | 103 | 100 | 113 | 200 | 132 | 134 | 99 | 107 |
| 30 | 130 | 104 | 103 | 114 | 210 | 124 | 128 | 99 | 104 |
| 40 | 117 | 103 | 103 | 110 | 220 | 115 | 115 | 100 | 104 |
| 50 | 115 | 104 | 104 | 109 | 230 | 108 | 102 | 100 | 104 |
| 60 | 115 | 105 | 99 | 103 | 240 | 110 | 90 | 100 | 103 |
| 70 | 119 | 105 | 99 | 102 | 250 | 112 | 88 | 101 | 106 |
| 80 | 113 | 104 | 97 | 99 | 260 | 114 | 85 | 101 | 107 |
| 90 | 110 | 102 | 101 | 103 | 270 | 128 | 82 | 101 | 108 |
| 100 | 126 | 98 | 104 | 106 | 280 | 124 | 81 | 103 | 111 |
| 110 | 121 | 97 | 102 | 103 | 290 | 110 | 83 | 101 | 111 |
| 120 | 118 | 98 | 100 | 102 | 300 | 99 | 88 | 96 | 108 |
| 130 | 118 | 100 | 104 | 105 | 310 | 100 | 92 | 93 | 103 |
| 140 | 125 | 103 | 102 | 105 | 320 | 108 | 95 | 96 | 107 |
| 150 | 128 | 107 | 98 | 102 | 330 | 111 | 97 | 99 | 115 |
| 160 | 137 | 114 | 92 | 99 | 340 | 120 | 98 | 98 | 116 |
| 170 | 133 | 123 | 92 | 103 | 350 | 138 | 99 | 103 | 119 |
| 180 | 135 | 134 | 95 | 106 | 360 | 135 | 102 | 104 | 122 |

Details in regard to the comparison of the new and old tube anemographs at Richmond will be found in the sectional introduction for the year 1931.

Minimum Night Temperature on the Grass.—This is the temperature determined by a minimum thermometer exposed freely over the surface of the grass. The stem of the thermometer is enclosed in an outer glass jacket, but the spirit bulb is freely exposed to the air. The thermometer is supported on two small Y-shaped pieces of wood so that it lies horizontally, with its bulb about one or two inches above the ground, which is covered with short grass. When snow has fallen the thermometer is supported so as to lie just above the surface of the fallen snow, but not touching it.

The thermometer is laid out at 18h. each day, having been kept in an upright position, bulb downwards, inside the Stevenson Screen during the daytime, so that any spirit that may have condensed in the upper part of the stem may be able to run down and join the main spirit column.

Earth Temperature.—At each observatory the earth temperature is read daily at 9h at depths of 30 cm. and 122 cm. below the surface. For this purpose use is made of

Symons' earth thermometers, in which the bulb is embedded in paraffin wax for the purpose of introducing sufficient "lag" to ensure that the reading will not change appreciably during the process of drawing up the thermometer in order to take the reading. The thermometers are supported at the correct depth in steel tubes sunk into the ground. At Aberdeen discontinuities have occurred on several occasions in recent years owing to changes of site. (See sectional introduction).

NOTES ON THE TABLES.

General.—Interpolated values are printed within brackets, (). Maximum and minimum values are underlined.

Standard of Time.—The observations are referred to *Greenwich Mean Time* except as regards sunshine, for which element *local apparent time* is used.

Units.—In accordance with the practice introduced in 1911, as a consequence of certain resolutions of the Gassiot Committee of the Royal Society, the values in the tables are expressed throughout in units based upon the C.G.S. System: tables for conversion to other units are given in the *British Meteorological and Magnetic Year Book (Part IV)* for 1913 and are also to be found in the *Computer's Handbook*.

Daily Mean Values.—The daily means of pressure, temperature, and relative humidity are obtained by adding half the sum of the values for the initial and final midnights to the sum of the 23 intermediate hourly values and dividing by 24.

For wind speed the tabulated hourly values are means for periods of 60 minutes between the exact hours 0h and 1h, 1h and 2h, etc.* The daily mean is therefore obtained by dividing the sum of the 24 hourly values by 24.

In the preparation of the tables of diurnal inequalities for individual months and for the year, it is assumed that the difference of value between the means for the initial and final midnights, which may be termed, so far as the hourly variations are concerned, the non-cyclic variation, is equally distributed over the whole 24-hour period.

A note on the computation of the correction for non-cyclic change will be found at the end of this Introduction.

Annual Values.—The mean values or totals for the whole year (given either in separate tables or at the end of the corresponding monthly tables), are computed as the means or sums of 365, in leap year 366, daily values.† The annual values of pressure at sea level are computed from the annual means at station level and the annual means of air temperature; the annual values of vapour pressure are derived from the annual means of air temperature and relative humidity.

Atmospheric Pressure.—All pressures recorded in this volume are expressed in *millibars*, one millibar being equal to 1000 dynes per square centimetre. The following are the values of physical constants used in evaluating the data:—

Density of Mercury = 13.5955 grams per cc. at 0°C.

Intensity of Gravity at Sea Level (Lat. 45°) = 980.617 centimetres per second per second.

1 inch = 25.4000 millimetres.

Hence a pressure of 1000 millibars corresponds with a reading of 750.076 millimetres on a mercury barometer at temperature 0°C. in Lat. 45° and is equivalent to 29.5306 inches under standard conditions of temperature (mercury at freezing point, scale at 62° F.) in Lat. 45°.

The true pressure in millibars can only be obtained from the reading of a barometer after the latter has been suitably corrected for (a) index error, (b) temperature, and (c) gravity.

* See Note, p. 17.

† At Eskdalemuir the annual values for the years 1922 to 1926 were computed as the means or sums of 12 monthly values.

These corrections have been applied to the barometer readings in obtaining the pressure values published in this volume. The corrections for index error (including those for capillarity) are given in the certificates issued by the Kew Observatory or the National Physical Laboratory in respect of the standard barometers at each observatory. The corrections for temperature are equivalent to those published in the *International Meteorological Tables* (Gauthier-Villars, Paris, 1890). The correction for the variation of gravity from its standard value at sea level in latitude 45° , quoted above, is in accordance with the formula adopted in the *International Tables*, viz. :—

$$g_{z,\lambda}/g_{0,45^\circ} = (1 - 0.00259 \cos 2\lambda) (1 - 5z/4E)$$

where z = height of the station above M.S.L.
 E = earth's radius, both expressed in the same units,
and λ = latitude of station.

Except at Eskdalemuir, the correction for the variation of gravity with height, contained in the second factor of the above equation, is insignificant.

Unless otherwise stated, all pressure values refer to the level of the observatory, as given in the headings of the tables. The reduction to sea level, wherever made, is effected by tables drawn up for each observatory in accordance with the following scheme :—

If p is pressure at station level, and P is pressure at sea level, the correction required to reduce p to sea level is $P - p$ where

$$\log_e (P/p) = \bar{g}z (1 - 3\bar{w}/8p) / K\bar{T}.$$

z = height of station in centimetres.

e = base of Napierian logarithms.

K = gas constant for dry air = $10^9/348.4$ C.G.S. units.*

\bar{T} = mean absolute temperature of the air column between station level and mean sea level.

\bar{w} = mean value of water vapour pressure in the column.

\bar{g} = mean value of the acceleration of gravity in the air column. Even at Eskdalemuir, the highest station, the effect on the correction of the variation of gravity with height is, in this case, negligible, so that

$$g = 980.617 (1 - 0.00259 \cos 2\lambda).$$

The factor $(1 - 3\bar{w}/8p)$ in the above formula is practically unity except at Eskdalemuir. Its value for that observatory was discussed in the Introduction to the Eskdalemuir section for the year 1928.

In the same way, the value of \bar{T} at each observatory differs inappreciably from the value of air temperature at the observatory, except in the case of Eskdalemuir (see Introduction to Eskdalemuir section for details).

Hence at all observatories except Eskdalemuir, no corrections are applied for the effects of water vapour, or of change of air temperature in the column of air between the station and sea level.

The scheme for correcting barometer readings outlined above was introduced for Eskdalemuir at the beginning of 1927. For the other observatories, it has come into effect as from 1st January, 1928. The effects of the introduction of the scheme on the tabulated values are briefly referred to in the several introductions to the individual sections. Only at Eskdalemuir are they at all appreciable.

The tables contain values of pressure at exact hours obtained from the photographic barograms in the manner described on p. 9; also daily, monthly and annual means of hourly values, together with the monthly and annual means of diurnal inequalities. Monthly and annual means of the hourly values after reduction to mean sea level are also given.

* This value depends on a coefficient of expansion of dry air of $1/273$ and on the density of dry air at pressure 1013.23 mb. and temperature 273°A , viz., 1293.052 g/m^3 .

There is also a table showing the daily extremes of pressure, *i.e.*, the maximum and minimum values recorded during each day.

Temperature.—The scale on which temperatures are recorded is such that the freezing point of water under atmospheric pressure is 273°A precisely. Other temperatures differ by $273\cdot0$ from readings on the Centigrade scale.

The scale approximates to the absolute scale defined by Lord Kelvin, on which the temperature of the freezing point is $273\cdot1$ to the nearest tenth of a degree.* Accordingly, to convert temperatures published in this volume to the Kelvin scale, a correction $+0\cdot1$ is to be added to each reading.

As an alternative to the application of this correction modified values may be used for the constants which enter certain formulæ. For example:—At temperature t on the scale adopted in the Year Book, the radiation according to Stefan's Law† is

$$5\cdot709 \times 10^{-5} (t + 0\cdot1)^4 \text{erg}/(\text{cm.}^2 \text{sec.}) ; \text{ or } 5\cdot717 \times 10^{-5} t^4 \text{erg}/(\text{cm.}^2 \text{sec.})$$

In using the modified formulæ we are virtually adopting a scale of temperature with the degrees greater than those of the Centigrade scale, in the ratio of $273\cdot1$ to 273 . This is the practice of the *Computer's Handbook* of the Meteorological Office.

The tables give the values of temperature at exact hours obtained from the photographic thermograms; also daily, monthly and annual means of hourly values, together with the monthly and annual means of diurnal inequalities. There is also a table showing the daily extremes of temperature.

Humidity.—When the temperature of the wet bulb is above 273°A , values of relative humidity at exact hours are deduced from the corresponding values of dry and wet bulb temperatures obtained from tabulations of the photographic thermographs, complete saturation being taken as 100. Until the end of the year 1925 the reduction was effected from tables based on Glaisher's hygrometric factors,‡ but from 1st January, 1926, tables have been employed which proceed from Regnault's formula

$$x = f - Ap (t - t'),$$

where x = vapour pressure under the conditions of observation.

f = saturation vapour pressure at the temperature (t') of the wet bulb.

p = pressure of the air.

t = temperature of the dry bulb in absolute (Centigrade) degrees.

t' = temperature of the wet bulb in the same units.

A = a constant.

The tables used in this volume for determining the hourly values of relative humidity when the wet bulb is above the freezing point are *Jelineks Psychrometer-Tafeln* (6th edition, Leipzig, 1911).§

No allowance for variation of pressure p is made and the standard value used in Jelinek's tables, *i.e.*, 755 mm. of mercury (1006·57 mb.), is adhered to. Similarly no allowance is made in the adopted value of the constant "A" for the speed of the air flowing past the wet bulb, though it is well known that "A" is not independent of the ventilation. "A" is regarded as fixed and equal to 0·008. In view of the well-marked diurnal variation of wind-speed, the diurnal variation of humidity, derived in this manner, is subject to slight modification.

* A. L. Day and R. B. Sosman, *Dictionary of Applied Physics*. Macmillan, London, 1922. Vol. I, p. 840.

† The constant 5·709 is the value which has been adopted by the International Research Council for publication in the "*International Critical Tables*."

‡ Glaisher's *Hygrometrical Tables*, 7th edition, London, 1885.

§ These tables give values which are in almost exact agreement with those given by *Hygrometric Tables* published by the Meteorological Office in 1924 (M.O. 265) for general use at second and third order stations. The latter tables are not suited to the purposes of this Year Book, because in them temperature is expressed in Fahrenheit degrees, whereas the absolute Centigrade scale of temperature is used at the observatories.

When the wet bulb reading does not exceed 273°A , the above method of reduction is not followed, but values of relative humidity are derived from the record of the hair hygograph. To these values are applied appropriate corrections based on a comparison between the readings of the record of that instrument and the corresponding values of humidity computed from dry and wet bulb readings during neighbouring periods when the wet bulb readings exceeded 273°A .

The mean values of vapour pressure are computed by slide rule from a table* of saturation vapour pressure over water, and the corresponding mean values of relative humidity and air temperature.

The normal hourly values of relative humidity for the period 1886-1915, published for certain Observatories in "Hourly Values from Autographic Records, 1917," were derived from tables based on Glaisher's factors. The application of the new tables to the normal hourly values of dry and wet-bulb temperature gives results for normal relative humidity which are only slightly different from those which have been published. At Kew Observatory in winter the difference is negligible; in July it does not exceed 1 per cent. at any hour, in October it does not exceed 2 per cent. at any hour. The effect is greatest in April, when the published normal values of average relative humidity are reduced by 3 per cent. at noon and at 16h. and by smaller amounts at other hours.

Of greater importance is the effect on the values of absolute minimum humidity. Under the old system, entries of relative humidity less than 30 per cent. seldom occurred; under the new system, such entries may occur not infrequently.

Tables are printed giving the values of relative humidity at exact hours together with daily, monthly and annual means of hourly values. Monthly and annual means of vapour pressure computed from the corresponding mean values of temperature and relative humidity, together with monthly and annual means of diurnal inequalities of relative humidity, are also given.

Rainfall.—Tables are given showing for the 60-minute intervals between exact hours† the amount of precipitation, expressed in millimetres, derived from the record of the Beckley gauge (see p. 11). Totals of amount are given for each day, and for each month; the latter totals referring both to the complete days of the month, and to each of the hours of the day. When zero rainfall is assigned to a particular hour, the entry appears as "...". Corresponding totals of durations of rainfall are also given, the duration being regarded as the number of hours during which rain falls at a rate of not less than 0.1 millimetre per hour. If slight precipitation, due to rain, snow, fog or dew, extends over some hours, and if the amounts collected in some or all of the hours are less than .1 mm., the fact is indicated by a succession of entries, each of which is enclosed within brackets, covering the period over which precipitation is known or believed to have occurred. In such cases entries of (.1) are allocated evenly among the hours concerned in such a way that their sum is equal to the aggregate fall during the period, and the remaining entries are (...), (*), (≡) or (⊖) according as the precipitation took the form of rain, snow, fog or dew. Slight precipitation which takes other forms such as hail, sleet, hoar frost, glazed frost and rime is dealt with similarly. When it is impossible to determine the hourly amounts of precipitation, e.g., during snowfall or on occasions when the record has failed, the normal procedure is to consider each case

* The saturation vapour pressures used are those employed in the preparation of *Hygrometric Tables*. They are equivalent to those published by Scheel and Heuse in *Annalen der Physik*, 1910.

† For the years 1904 to 1920 it was the practice to tabulate rainfall for the periods of 60 minutes centred at the exact hours; the reversion to the method in use before 1904 occurred on 1st January, 1921.

on its merits, and to assign hourly values derived from estimates made by the observers as soon as possible after the event. Such values are also enclosed in brackets.

Annual totals of hourly amounts and duration and notes on special features of the rainfall of the year are also given.

Sunshine.—Tables are given showing for each of the 60-minute intervals between exact hours* according to *local apparent time*, from sunrise to sunset, the duration of bright sunshine recorded by the Campbell-Stokes instrument. The sums and means of hourly amounts are also given. For each day is shown the total duration of bright sunshine, and also the percentage this represents of the "possible" duration for the day. The "possible" for each day is computed as the period of time beginning and ending at the instants when the centre of the sun is apparently on the horizon, due allowance being made for atmospheric refraction. Even on a clear day the sun, when at an altitude less than $2\frac{1}{2}^{\circ}$ to 3° above the horizon, fails to make a scorch on the card of the Campbell-Stokes recorder.

A distinction is made in the tables between (a) sunshine not possible, and (b) sunshine possible but none recorded. If, in any hour, sunshine is not possible, the symbol "—" is used; if more than 3 minutes of "possible" sunshine falls in the 60-minute interval between exact hours according to local apparent time, and if no sunshine was recorded, the symbol "... " is printed.

The values for the months and for the year of percentage of possible duration of sunshine are obtained by comparing the total recorded sunshine for the period with the total "possible" sunshine for the period.

Wind.—Tables are printed giving the hourly values of wind speed and direction, together with the mean speed for each day, each hour, and for the month and year. Values of speed are expressed in metres per second (1 metre per second = 2.2369 miles per hour): those of direction are given in degrees from true north. The values of direction and speed† are averages for periods of sixty minutes, between the exact hours of Greenwich Mean Time. They are obtained by estimation from the records with the aid of a transparent scale, with engraved graduations corresponding with the velocity, direction and time scales of the record.

When the record shows that the vane is sticking and is not responding to the variations of the wind the readings of both direction and velocity are regarded as untrustworthy and are not tabulated, the symbol "... " being entered instead. In such cases the velocity is usually less than 1 m/s and the symbol "... " is regarded as equivalent to 0.5 m/s for the purpose of evaluating the daily mean velocity. In other cases of lost record, estimated values are entered within brackets wherever possible.

The daily values of the speed and time of occurrence of the maximum gust and the monthly distribution of wind are shown in other tables.

Minimum Night Temperature on the Grass.—Values are given for each day of the year together with monthly and annual mean values. The interval to which the reading refers is from 18h the previous day to 7h on the day to which it is entered.

Diary of Cloud, Visibility and Weather.—In these tables are given particulars of the cloud forms observed daily at 7h, 13h, and 18h, the total cloud amount observed at

* Before 1st January, 1921, sunshine was tabulated for the periods of 60 minutes centred at exact hours.

† Before 1st May, 1915, it was the practice to take the direction at the exact hour whilst wind speed referred to 60 minute intervals centred at exact hours. Thereafter until 1st January, 1932, both wind speed and direction were tabulated for periods of 60 minutes centred at the exact hours. At a meeting on 17th December, 1931, the Gassiot Committee resolved that hourly values of terrestrial magnetism, potential gradient and wind velocity and direction should be brought into accordance with the practice decided upon for Polar Year stations by the International Commission for the Polar Year 1932-1933, *viz.*, that hourly mean values should refer to periods of 60 minutes between exact hours of standard time. (See also Introduction to *Hourly Values from Autographic Records*, 1913, p. xv.)

7h, 9h, 13h, 15h, 18h, and 21h, the range of visibility at each of these six hours and the kind of precipitation when any was falling at those hours. There is also a column devoted to remarks on the weather of the day.

Cloud Form.—The observations of cloud form are made in accordance with the International classification, and the following abbreviations are used in the tables:—

| | |
|--|-------|
| Cirrus | Ci. |
| Cirrocumulus | Cicu. |
| Cirrostratus | Cist. |
| Alto cumulus | Acu. |
| Altostratus | Ast. |
| Stratocumulus | Stcu. |
| Stratus | St. |
| Nimbostratus | Nbst. |
| Cumulus | Cu. |
| Cumulonimbus | Cunb. |
| Fracto (prefix as in fractostratus) | Fr. |
| Cumuliformis (as in stratus cumuliformis) | Cuf. |
| Lenticularis (as in altocumulus lenticularis) | Lent. |
| Mammatus (as in cumulus mammatus) | Mam. |
| Castellatus (as in altocumulus castellatus) | Cast. |

All the cloud forms noted by the observer at the time of observation are printed where space permits. When the number of forms is too great to allow of this, the predominating forms selected at the time of observation to give the best representation of the cloud canopy are printed. If high or medium cloud can be seen, one of the selected types is normally a high or medium cloud.

Cloud Amount.—The figure given for the amount of cloud denotes the proportion of the sky covered by cloud, the numerical scale running from 0, cloudless, to 10, completely overcast. The figure denotes the total cloudiness irrespective of form. In the case of fog through which it is impossible to discern the sun or stars the cloud amount is entered as 10, but if cloud can be seen through the fog, the form and amount of that cloud are entered in the usual way. If the sun or stars are visible through fog and if there is no evidence of cloud above the fog the amount is entered as 0.

Visibility.—Observations of the range of horizontal visibility made every day at 7h, 9h, 13h, 15h, 18h, and 21h, are printed in the diaries of cloud and weather.

As described in detail in the *Meteorological Observer's Handbook*, a series of selected objects, A, B, C . . . , as nearly as possible at the standard distances given in the table which follows, is used for this observation. The objects are selected so as to be readily seen and identified from specified observing points in daylight, when the air is clear. A variation up to 10 per cent. from the standard distances is considered admissible. Particulars of the objects in use at each observatory, together with a statement of their actual distances and bearings from the point of observation and notes on local peculiarities which affect the observations, will be found in the Introductions to the sections for the individual observatories.

The method of observing consists in determining which is the most distant of the selected objects that can be identified and entering the corresponding letter. In cases of uncertainty when the observer, though recognising the presence of an object, would be unable to identify its nature from the observations he is able to make *at the time*, the letter corresponding with the next nearer object is entered. If object A, the nearest of the selected objects cannot be identified, an entry X is made. At night the letters are used to denote as nearly as possible corresponding degrees of atmospheric obscurity.

SCHEME FOR OBSERVATIONS OF RANGE OF VISIBILITY AND OF FOG,
MIST AND HAZE.

| Indication Letter of Object. | Standard Distance of Object. | Verbal Description. | BEAUFORT LETTERS. | |
|---------------------------------|---------------------------------|---------------------------------------|------------------------------------|----------------------------------|
| | | | Detailed Scale.* | Contracted Scale. |
| (X) | Metres. — | Dense fog | 8 f | } F |
| A | 25 | | 7 f | |
| B | 50 | Thick fog | 6 f | |
| C | 100 | | 5 f | |
| D | 200 | Fog | 4 f | } f |
| E | 500 | Moderate fog | 3 f | |
| F | 1,000 | Mist, haze or very poor visibility | m or z | m or z. |
| G | 2,000 | Poor visibility | } m _o or z _o | m _o or z _o |
| H | 4,000 | Moderate visibility | | |
| I | 7,000 | | | |
| J | 10,000 | Good visibility | | |
| K | 20,000 | Very good visibility | | |
| L | 30,000 | | | |
| M | 50,000 | | Excellent visibility | |

NOTE.—The grouping of the letters by the horizontal lines indicates the limits of the several figures of the International Telegraph Code for visibility, from 0 to 9, which grouping is also adopted in the tables of frequencies published in the *Monthly Weather Report*.

Small letters are used to indicate interpolations or extrapolations made in cases where it has not been possible to find suitable objects within 10 per cent. of the standard distances. In such cases the observer may use objects at other than the standard distances to guide his judgment. Particulars of such auxiliary objects will be found in the sectional introductions.

At Cahirciveen, visibility is recorded in both landward and seaward directions. The observations of visibility landwards are printed in the main tables. Particulars of occasions when visibility seawards differed from visibility landwards are set out in the Introduction to the Cahirciveen Section.

Fog, Mist and Haze.—The table of standard distances of visibility objects also summarizes the descriptions used in connection with the phenomena of fog, mist and haze, and relates them to the scale of visibility. It also contains the Beaufort letters used for these phenomena in the Remarks column of the diary. In this Year Book as in other publications of the Meteorological Office, statistics of fog, mist and haze are based solely on visibility observations. The term *fog* is restricted to occasions when the visibility is less than 1 kilometre (*i.e.*, object F not visible); the terms *mist* and *haze* to occasions when the visibility is greater than 1 kilometre,

* Not used in this Year Book.

but less than 2 kilometres (*i.e.*, object "F" visible, but "G" not visible). The distinction between mist (m) and haze (z) is determined by the depression of the wet bulb. When the visibility is between the limits specified for mist or haze, haze is recorded when the depression of the wet bulb is more than 1°F; if the depression of the wet bulb does not exceed this limit, the term *mist* is used.

In volumes previous to 1926, occasions of haze, mist and fog were indicated by the International symbols for these phenomena, viz., ∞, ≡ and ≡ respectively, but the relation of these terms to the visibility scale was less rigorous. In order to indicate that a change in procedure has occurred in this matter, the three International symbols for haze, mist and fog are no longer used.

Precipitation.—Whenever precipitation is falling at one of the six hours of observation there is printed in the Diary of Cloud and Weather under the heading "Precipitation" the International weather symbol which indicates the kind of precipitation, in accordance with the list below.

Remarks.—For the purposes of the column headed "Remarks on the Weather of the Day," it is usual to consider the day as divided into three portions, viz., morning, afternoon and night, denoted by *a*, *p*, *n*, respectively, but it should be noted that no arrangements are made for regular eye observation of weather changes in the period 21h 30m to 6h 30m.

The entries in the remarks column consist very largely of international weather symbols and the letters of the Beaufort scale. These symbols and letters are as follows:—

Beaufort Notation and International Weather Symbols.

| | | | |
|----|--|-----|---|
| b | blue sky, whether with clear or hazy atmosphere. | r | ● rain. |
| c | cloudy, <i>i.e.</i> , detached opening clouds. | ← | ice crystals in the air. |
| o | overcast, <i>i.e.</i> , the whole sky covered with one impervious cloud. | s | * snow. |
| g | gloomy. | rs | * sleet. |
| u | ugly, threatening. | + | drift snow. |
| v | visibility, abnormal transparency of atmosphere. | ⊠ | snow lying. (More than half the surrounding country covered with snow.) |
| z | haze.* | h | ▲ hail. |
| m | mist, light fog.* | △ | soft hail. |
| f | fog.* | t | T thunder. |
| fe | wet fog, <i>i.e.</i> , fog which deposits water copiously on exposed surfaces. | l | < lightning. |
| w | dew. | tlr | ⚡ thunderstorm. |
| x | hoar frost. | ≡ | gale. |
| | rime. | q | squalls. |
| | glazed frost. | ⊙ | ☉ solar corona. |
| e | water deposited copiously on exposed surfaces, without rain falling. | ⊕ | ☉ solar halo. |
| y | dry air. (Relative humidity less than 60 per cent.) | ☾ | ☾ lunar corona. |
| p | passing showers. | ☾ | ☾ lunar halo. |
| d | drizzling rain. | (| ☾ rainbow. |
| | | ☾ | ☾ aurora. |
| | | ☾ | ☾ zodiacal light. |
| | | ☾ | ☾ mirage. |

The letter *i* preceding a letter or symbol which denotes some form of precipitation indicates that the precipitation is of an "intermittent" or "occasional" character.

The letter *j* preceding a letter or symbol which denotes some form of precipitation indicates that the precipitation is within sight, though not actually falling at the station.

* To indicate varying intensities of haze, mist and fog the notation shown in the last two columns of the table on p. 19 is used.

The figure 0 written after and above a symbol indicates slight, whilst the figure 2 indicates strong or heavy; thus \bullet^0 slight rain, \bullet^2 heavy rain. The figures 0 and 2 written after and below the letters of the Beaufort notation are also used with a similar significance, thus d_0 stands for slight drizzle.

The letters b, c, o, g and u, are used to describe the general appearance of the sky. The use of the letters g and u is sufficiently clear from the definitions given above. o is used whenever the sky is completely overcast with a uniform layer of thick or heavy cloud; c is used to denote that there is some cloud present, but o is not appropriate; b denotes that there is some blue sky.*

In order to meet difficulties which occur when there are only small quantities of cloud or blue sky present, c is not used unless the sky is more than a quarter covered, and b unless there is more than a quarter of the sky free from cloud. If there is more than a quarter of the sky covered with cloud and more than a quarter of the sky free from cloud b and c are both recorded.

Up to 1931 the gale symbol ⚡ was used in this publication to indicate that the wind as recorded by the anemograph averaged at least 17.2 m/s for one or more "centred" hours. At Richmond (Kew Observatory) the symbol has been used with the word gust in brackets to indicate the occurrence of gusts reaching 17.2 m/s.

The symbol is now used to indicate occasions when the mean velocity reached or exceeded the lower limit corresponding to Beaufort Force 8 at any time in the 24 hours of the civil day. The lower limit of velocity is dependent upon the "effective height" of the anemometer (see *Meteorological Magazine* 67, 1933, p. 278). The allotted values at the several observatories are:—

| | | | |
|----------|-------------|----------|-----------|
| Aberdeen | Eskdalemuir | Valentia | Kew |
| 17.2 | 17.2 | 17.2 | 18.8 m/s. |

Note on the Computation of the Correction for Non-cyclic change.

The non-cyclic change is the average increase from one midnight to the next. If, as in the case of barometric pressure, curves are read at each hour G.M.T. and tabulated under the headings 0h, 1h...23h, 24h, and the means for each of the hours in a calendar month are taken out, the mean for 0h, will not in general be the same as the mean for 24h. Let x_n be the mean value corresponding to hour n ; then the non-cyclic change is represented by $x_{24} - x_0$. Let \bar{x} be the mean value for the whole 24 hours. In the case under consideration the value of \bar{x} is

$$\frac{1}{24} [\frac{1}{2} (x_0 + x_{24}) + x_1 + x_2 + \dots + x_{23}]$$

$x_n - \bar{x}$ is the "diurnal inequality" at hour n . To apply a correction for non-cyclic change we assume that the non-cyclic change arises from a steady rise or fall, entering as a linear term. The correction applicable at hour n is therefore proportional to the time reckoned from 12h and takes the form:—

$$\frac{12 - n}{24} (x_{24} - x_0)$$

the corrected diurnal inequality having the value

$$x_n - \bar{x} + (12 - n) (x_{24} - x_0) / 24.$$

In the present volume the hourly values refer either to readings at the exact hour or to means for periods of 60 minutes between exact hours *i.e.*, centering at the half hours. In the latter class of tabulations, the first hour of the day runs from 0h to 1h and the n^{th} hour from $(n - 1)$ h to nh . For the calculation of non-cyclic change we assume that the value of the variable at midnight is represented to a close enough approximation by the mean of the values tabulated for the hours preceding and following midnight, thus

* The present usage with regard to b, c and o dates from 1st Jan., 1926.

the mean value for the first midnight is $\frac{1}{2} (x_0 + x_1)$ and for the second midnight $\frac{1}{2} (x_{24} + x_{25})$, where x_0 represents the value for the hour preceding the first midnight and x_{25} represents the value for the hour following the second midnight. The value of the non-cyclic change is therefore $(x_{24} + x_{25} - x_0 - x_1)/2$. Remembering that the interval from noon to the middle of a tabular hour is, in this class of tabulation, an odd number of half hours, we get as the expression for the diurnal inequality at the n^{th} hour, corrected for non-cyclic change

$$d_n = x_n - \bar{x} + (25 - 2n) (x_{24} + x_{25} - x_0 - x_1)/96.$$

A correction in this form has been applied to the diurnal inequalities of terrestrial magnetism and atmospheric electricity printed in this volume.

It will be seen that the computation of the non-cyclic change (when derived from "all days"), requires a knowledge of the value for the first tabular hour in the following year. The values of wind velocity and terrestrial magnetism for the hour 0-1h on January 1st, 1934, have accordingly been appended to the appropriate tables.

M.O.370
(Lerwick)

Air Ministry
METEOROLOGICAL OFFICE

THE
OBSERVATORIES' YEAR BOOK
1933

Comprising the meteorological and geophysical results obtained from autographic records and eye observations at the observatories at Lerwick, Aberdeen, Eskdalemuir, Cahirciveen (Valentia Observatory), and Richmond (Kew Observatory), and the results of soundings of the upper atmosphere by means of registering balloons.

LERWICK

Published by the authority of the
METEOROLOGICAL COMMITTEE



LONDON
HIS MAJESTY'S STATIONERY OFFICE
1935

LERWICK OBSERVATORY.

| | | | | | | | | |
|--------------------------------|----|----|----|----|----|------------------|-----|----------------|
| Latitude.. | .. | .. | .. | .. | .. | 30° | 8' | N. |
| Longitude | .. | .. | .. | .. | .. | 1° | 11' | W. |
| G.M.T. of Local Mean Noon | .. | .. | .. | .. | .. | 12h. | 5m. | |
| Height of Site above Sea-level | .. | .. | .. | .. | .. | From 80.5 metres | | |
| | | | | | | | | to 90.0 metres |

INTRODUCTION.

GENERAL REMARKS.

In 1919 the establishment of an observatory in the Shetlands was included in the programme of the Meteorological Office. A wireless station, built in 1913 by the Admiralty and transferred after the war to the Post Office, but used by that Department only in case of emergency, offered suitable accommodation in the way of offices and living quarters. It proved possible to make an arrangement under which the Air Ministry has the use of the station as an observatory.

The Observatory was opened on the 7th June, 1921, when the first instalment of the instrumental equipment arrived. Later on in the same year the construction of a magnetograph house and of huts for absolute magnetic and auroral observations was commenced. The magnetograph house is a heavy concrete structure with walls 2 feet 6 inches (76 cm.) thick, of internal dimensions 16 feet by 10 feet (4.9 m. x 3 m.), and after construction several months had to elapse before the thick concrete walls and roof could be thoroughly dried and the recording instruments placed in position. These instruments, which are described below, consist of magnetographs recording magnetic declination and horizontal and vertical force. More recently subsidiary magnetographs recording the same elements have been installed in one of the adjacent non-magnetic huts; the records obtained therefrom are used to cover lacunæ in the standard traces or for special investigations.

Other instruments installed at the Observatory included barometers, barograph, hygrograph, psychrometers, nephoscope, rain-gauges (ordinary and self-recording), sunshine recorder and Dines tube anemograph and, later, an electrograph; and in 1928 a Krogness auroral camera. But meteorological observations have been restricted, and the time of the somewhat limited staff available has been devoted chiefly to magnetic work, to some work in atmospheric electricity and latterly to auroral photography.

The site and the work in Atmospheric Electricity and Terrestrial Magnetism will now be described.

SITE.

The Observatory is situated on a ridge of high ground about a mile and a half (2.4 km.) to the south-west of Lerwick and adjoins the main road between Lerwick and Scalloway. The site slopes upward from west-north-west to east-south-east, the average height above M.S.L. being about 280 feet (85 metres). The ground to the east and south-east rises slightly for about $\frac{1}{4}$ mile (.4 km.) then slopes sharply down to the sea. In other directions there is a downward slope for about $\frac{1}{4}$ mile extending to the Loch of Trebister on the south-west, Sandy Loch to north-west, and to the Burn of Sound to north-north-west; beyond these and distant about $\frac{3}{4}$ mile (1.2 km.) from the Observatory are small hills - Munger Hill to the south is about 320 feet (97 metres) above M.S.L., Shurton Hill to west-north-west rises to 576 feet (176 metres), and Stony Hill to the north to about 400 feet (122 metres). In clear weather it is possible to see the Outer Skerries, 25 $\frac{1}{2}$ miles (41 km.) north-east by north, and Sumburgh Head, 20 miles (32 km.) south by west; the horizon in other directions is limited to a few miles.

The average depth of soil in the vicinity is about a foot, and outcrops of sandstone occur in many places. The surrounding country is barren and desolate, the only vegetation being coarse grass, stunted heather, and moss, with occasional patches of bare black peat. The Observatory ground is of a very uneven nature, and, owing to lack of proper drainage, is frequently water-logged. Views of the station are shown and the arrangement of buildings and situation of instruments are set out on a site plan in "The Observatories' Year Book," 1928.

ATMOSPHERIC ELECTRICITY.

Notes on the Instruments.- The records of potential gradient are obtained from a Benndorf electrograph (No. 108, by L. Castagna, Vienna) which since 1926 has been installed in the north-west corner of the Office Block. The site is divergent from the ideal for two reasons:-

(1) There is distortion of the equipotential surfaces by adjacent houses, wireless plant, etc.,

(2) It is a comparatively large distance (236 metres) away from the ground where absolute determinations are made.

Consideration of the variations of mean monthly values of the reduction factor shows that these disadvantages are less serious than might be anticipated.

The collector rod passes through a window in the north wall, and is situated 190 cm. from the corner of the building. The collector is 476 cm. above the ground and projects 123 cm. from the window. The collectors are of polonium deposited on a copper rod, about 4 cms. long by 0.5 cm diameter; these are recoated periodically by arrangement with the Government Chemist, and a fresh collector is brought into use on the first day of each quarter. The collector is screwed into the smaller end of a tapered German silver tube, 76 cm. long, and of triangular cross section, which, in turn, is attached to a "Duralumin" tube, 89 cm. long and 1.3 cm. in diameter. The latter tube passes through a hole, 3.8 cm. diameter, in one end of a wooden box (dimensions 38 x 25 x 10 cm.), where it is supported horizontally between the ends

of two metal rods embedded in sulphur. A number of small 2-volt electric bulbs are kept burning inside the box in order to improve the insulation of the supports for the collector rod during wet weather, and a similar bulb is placed inside the case of the electrometer. The rod is connected to the base of the acid pot of the Benndorf electrometer by a fine wire. A detailed description of this instrument is to be found in "Phys. Zeit" 7 (1906), p. 98, whilst the general principle is described in Mathias' "Traité d'Electricité Atmosphérique et Tellurique," p. 54, and in Chauveau's "Electricité Atmosphérique," pp. 61-64.

The record consists of a series of dots made once a minute on a longroll of paper as it is unwound from a drum by clockwork, exact hours being indicated by dots near the edge of the sheet. Timing is taken from electric clock No. 1,031, governed by the Observatory standard, Shelton No.35. The needle of the electrometer is earthed at least once daily, and a zero line is obtained by connecting up these earth marks; owing to the constancy of the perpendicular distance between the zero line and the line through the hour marks, further intermediate positions of the zero are easily obtained. The scale value has been about 25 volts per millimetre, which permits a range from + 1600 to - 1600 volts per metre in the open to be recorded.

Combined tests of the insulation of the system and scale value of the record are made daily, the procedure being to remove the collector and to charge the needle, which is connected to a Wulf electrometer. The rate of leak is obtained for a period of 4 minutes with a positive charge and for the same interval with a negative charge. Considering the climatic difficulties the behaviour of the instrument in the matter of insulation has been very satisfactory. The rate of leak has been in general small, the average during 1933 being such that the instrument would lose half its potential in 41 minutes. It has been found that the scale value remains reasonably steady and may, for all practical purposes, be taken as constant across the full width of the sheet. The factor by which the recorded potential must be multiplied for conversion into potential gradient in the open is obtained from absolute measurements above a levelled piece of ground near the old site of the electrograph (see site plan in "The Observatories' Year Book," 1928). An insulated wire, stretched horizontally between two stout wooden posts 121 cm. in height and 9.48 m. apart, carries at its centre a burning fuse exactly 1 metre above the ground. A Wulf electrometer, usually No.5225 (Günther & Tegetmeyer, Brunswick), is connected to one end of the wire and twenty to thirty readings are obtained from the electrometer at half-minute intervals. The reduction factor is deduced from the mean of these values and the corresponding mean potential at the collector as recorded by the Benndorf electrograph. Smoothed monthly means of the factors so obtained are employed in reduction of the records. The calibration of the Wulf electrometers is checked periodically, using a Gambrell potentiometer and standard cells. There was no change in any essential part of the apparatus or in the observational technique throughout the year 1933.

Monthly scale values and exposure factors, together with data relating to rate of leak, are shown in the following table:-

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Year |
|---|------|------|------|------|------|------|------|------|-------|------|------|------|------|
| Mean value of - $\frac{d}{dt} \log_e V$ | .017 | .017 | .017 | .017 | .015 | .017 | .015 | .015 | .014 | .017 | .019 | .018 | .017 |
| No. of days used in mean | 20 | 18 | 19 | 19 | 22 | 22 | 22 | 22 | 20 | 21 | 21 | 21 | 247 |
| Highest - $\frac{d}{dt} \log_e V$... | .021 | .021 | .023 | .022 | .019 | .023 | .021 | .019 | .022 | .025 | .028 | .022 | - |
| Lowest - $\frac{d}{dt} \log_e V$... | .012 | .013 | .013 | .012 | .011 | .011 | .012 | .011 | .009 | .012 | .012 | .009 | - |
| Scale value (v/mm) ... | 25.6 | 25.6 | 25.1 | 24.3 | 24.3 | 24.2 | 24.1 | 24.4 | 23.9 | 24.5 | 24.6 | 24.6 | 24.6 |
| Mean Exposure Factor | 1.24 | 1.32 | 1.25 | 1.26 | 1.24 | 1.13 | 1.23 | 1.28 | 1.25 | 1.32 | 1.30 | 1.27 | 1.26 |
| Applied Exposure Factor | 1.26 | 1.28 | 1.27 | 1.25 | 1.22 | 1.18 | 1.22 | 1.26 | 1.27 | 1.30 | 1.30 | 1.27 | 1.26 |
| No. of Determinations of Exposure Factor ... | 7 | 5 | 8 | 8 | 10 | 8 | 11 | 9 | 9 | 6 | 9 | 8 | 98 |

Tests of the rate of rise of potential of the Berndorf recorder with a polonium collector were made in September, 1930, and it was found that the potential rose from zero to half the final value in about 4 seconds. Sometimes when there is no wind the rate of rise of potential is very much slower and apparently nearly linear. If the instrument rises through a potential V and has a capacity C^* a quantity of electricity CV has to be given to the air in the neighbourhood of the collector, and in the absence of wind and the presence of fog this may hang about in the form of a heavily charged cloud for a considerable time before being dispersed. Fortunately these conditions are rare at Lerwick except in early summer.

If we assume the leaking and the charging to be exponential, i.e., -

$$\text{If } \frac{dV}{dt} = - K_1 V$$

$$\text{and } \frac{d(V_0 - V)}{dt} = K_c (V_0 - V)$$

where K_1 measures the rate of leak,
 K_c " " charging,
and V_0 is the potential of the air near the collector,

then the potential finally acquired by the instrument is $V_0 K_c / (K_1 + K_c)$.

The ratio K_1/K_c is only about 1/600 so that there is no appreciable error in the readings from this cause.

In the mean for the years 1927-33 the exposure factor shows a maximum of 1.33 in June and a minimum of 1.25 in January with secondary maximum of 1.32 in September and secondary minimum of 1.28 in August. In individual years

* The capacity was measured in October, 1930, and found to be approximately 75 cms

however the variations are somewhat irregular. The vegetation in the vicinity of the site for the absolute observations changes very slightly throughout the year and the grass on the site itself is kept short. A larger contribution to the variations of the factor is probably made by a combination of effects due to peculiarities of the electrograph site and wind direction. In this connection the following table shows the mean values of the exposure factor for 1927-33 summarized according to wind direction:-

| | Calm | N | NE | E | SE | S | SW | W | NW | 1927-33 |
|-------------|------|------|------|------|------|------|------|------|------|---------|
| Mean Factor | 1.32 | 1.31 | 1.31 | 1.26 | 1.26 | 1.33 | 1.31 | 1.30 | 1.27 | 1.30 |

Relatively high values of the factor are on the average associated with winds from north and north-east, south and south-west and with calms. The courtyard is open at the north-east and south-west sides and the electrograph is situated near the open south-west side. The exposure in other directions is obstructed by buildings, and the depression of the factor, resulting from the higher potential of the collector when shielded from the wind, would be in agreement with R.A. Watson's conclusion that potential gradient is inversely dependent upon wind speed. (Geophysical Memoir No. 38).

On 28th June, 4th July, and 12th September, 1928, measurements were made of potential gradient above fairly smooth ground near sea level. The determinations on the two earlier dates were taken at the Point of Trebister, $2\frac{1}{4}$ km. south-south-east of the Observatory, those on the third near the Sands of Sound, 1 km. to the east. In all, ten series of observations were obtained. The mean electrograph exposure factor computed therefrom works out at 1.36, a value in close agreement with the standard determinations.

IDENTIFICATION NUMBERS OF INSTRUMENTS USED IN 1933.

| | |
|---|------|
| Benndorf electrograph (L. Castagna, Vienna) | 108 |
| Wulf bifilar electrometer (Günther & Tegetmeyer, Brunswick) | 5225 |
| " " " " " " | 2965 |

Review of Results.- Days when there was a complete trace have been classified as follows by means of an electric character figure:-

- 0, denotes a day during which, from midnight to midnight, no negative potential was recorded.
- 1, denotes a day with excursions to the negative not amounting in the aggregate to more than three hours.
- 2, denotes a day with negative potential amounting in the aggregate to more than three hours.

- a, denotes that the range of potential gradient in the open did not exceed 1,000 volts in any of 24 hourly periods of the day.
- b, denotes that this range was exceeded in at least one, but in fewer than six, of these periods.
- c, denotes that this range was exceeded in six or more of the hourly periods.

The character figures so assigned are given in Table 4.

In the Observatories Year Book for 1928, for the first time, this table contained also details of the duration of negative potential for each day for which an estimate could reasonably be made. If the record failed when no precipitation fell it was assumed that the potential gradient remained positive; if, however, precipitation fell when part of the record was lacking no estimate was made except when the part of missing record was small enough and the conditions of precipitation sufficiently continuous to permit the interpolation of the gradient conditions from those obtaining before and after the break.

In the year 1933 there were 59.4 hours less negative potential gradient than in 1932, and thirteen more days on which negative gradients occurred. The daily mean duration of negative gradient was thus 1.32 hours, against 1.53 hours for 1932, 1.52 for 1931, 1.55 for 1930, 1.55 for 1929 and 1.63 for 1928. In each year the month-to-month variations of mean duration of negative gradient and of mean electric character figure show a close relationship to the variations in rainfall.

Curves are read by use of a mean value glass scale graduated in millimetres, the tabulated values being 60 minute means between exact hours G.M.T. The ordinates are converted into volts per metre in the open by multiplying by the product of the appropriate scale value and reduction factor. Values are assigned for the hours ending at 3h, 9h, 15h, and 21h, on all days, and for each hour on "a" days.

An indication of the characteristics of indeterminate potentials may be obtained from the tabulations, in which:-

1. Values prefixed by the symbols $>$, $<$, indicate that for one or more periods during the hour potential passed beyond the range recorded by the electrograph.
2. z is marked against hours when the potential passed beyond the recorded range in both directions.

The values for the hours ending at 3h, 9h, 15h, and 21h are given in Table 1; estimated values, enclosed within brackets, are given in cases where the record was in some manner defective; a dash is entered against hours for which no value can be given with any degree of assurance. Two sets of mean values are given:- (a) The means of all positive values; hours when the trace passed off the top of the sheet are included in obtaining these means, the upper limit of registration being taken as the value for the period not recorded. (b) The means for all days on which all four hours were completely recorded or could be estimated.

In all months the general (a) mean from the four selected hours exceeds the (b) mean, the difference over the year as a whole amounting to 18 v/m. In six months the means from the Oa days are greater than the (a) means; over the year as a whole the Oa day mean is 2 v/m less than the (a) mean. The annual mean daily values derived in these three ways for the seven years 1927-1933 during which the electrograph has been in the same position are :-

| | Oa | (a) | (b) |
|------------|---------|---------|---------|
| 1927 | 213 v/m | 179 v/m | 160 v/m |
| 1928 | 166 v/m | 156 v/m | 134 v/m |
| 1929 | 162 v/m | 161 v/m | 133 v/m |
| 1930 | 181 v/m | 175 v/m | 158 v/m |
| 1931 | 161 v/m | 163 v/m | 147 v/m |
| 1932 | 159 v/m | 159 v/m | 141 v/m |
| 1933 | 168 v/m | 170 v/m | 152 v/m |

It is a defect of the Benndorf recorder that even with such a high scale value as 25 v/mm the width of the sheet is frequently exceeded during oscillatory movements. In 1933 there were 64 days on which the electrometer needle went beyond the limits of registration on the positive side and 101 on the negative side; these occasions were mainly when precipitation was falling on the collector. The greatest number of extreme positive excursions were associated with snow or sleet showers and were almost invariably only momentary.

The following are the occasions of potential gradients (positive and negative) exceeding 1000 v/m persistent over periods of at least one hour, a specified hour defining the 60 minute interval ended at the exact hour G.M.T.:-

Positive. March 20d 8h. Aug. 21d 11h-12h. Aug. 23d 11h-12h. Aug. 27d 22h-24h.

Negative. Jan. 5d 4-6h. Jan. 12d 21h. Jan. 25d 21h. Jan. 26d 0-5h.
Jan. 31d 18-20h. Mar. 6d 8h, 15d 5h. Mar. 16d 7-10h. April 9d 7h, April 10d 3h, April 14d 19-22h. Dec. 30d 14h.

Occasions when the potential gradient was negative for prolonged periods with perhaps only a few temporary changes to positive were noted as follows:-

- (I) January 25d 19h 35m to 26d 6h 35m. Potential negative for all but about 9 minutes of this period. Mean gradient <-1187 v/m. Moderate rain throughout.
- (II) January 31d 17h 23m to 23h 18m. Potential negative for all but 3 minutes of this period. Mean gradient <-1128 v/m. Moderate rain throughout.
- (III) March 16d 3h 54m to 9h 53m. Potential negative for all but 6 minutes of this period. Mean gradient <-1085 v/m. Moderate or heavy rain throughout.
- (IV) April 14d 18h 53m to 23h 34m. Potential negative for all but one minute of this period. Mean gradient <-1043 v/m. Moderate rain throughout.
- (V) June 16d 2h 18m to 5h 53m. Potential negative for whole period. Mean gradient <-529 v/m. Moderate rain throughout.

Notable spells of high potential were:-

- (I) March 22d 9h. to 22h. Mean gradient 599 v/m.
- (II) May 6d 17h to 7d 2h. Mean gradient 632 v/m. Thick fog.
- (III) July 11d 16h to 24h. Mean gradient 606 v/m. Mist.
- (IV) August 26d 17h to 22h. Mean gradient 814 v/m. Fog.
- (V) August 27d 17h to 28d 1h. Mean gradient > 896 v/m. Fog.

There were 43 days on which there occurred apparent changes of potential gradient from the limit of the sheet on the positive side to the limit on the negative side, at least once within an interval of 60 minutes. If these changes were real and not due to charges given to the collector rod by precipitation, they connote a range exceeding 3200 v/m within an hour. Assuming that in Shetland the charge associated with rain may occasionally attain 10 E.S.U. per cc., it has been found that the gradient recorded may contain a contribution of not less than 50 volts arising from the charge given by the rain. In some of the hours the extreme reversal occurred at least twice within the period.

The diurnal inequalities for 0a days for the months, seasons, and year, are given in Table 2, together with mean values of the potential gradient and particulars of the non-cyclic change and the number of days used; the inequalities and other entries for the seasons and year are the means of the corresponding entries for the appropriate months. Similar data for the 1a and 2a days together are given in Table 3.

The annual mean diurnal variation for 0a days during 1933 has a well marked minimum at about 3h and a conspicuous maximum at 21h; secondary maxima and minima occur at about 8h and 11h respectively. This secondary oscillation however is a small one, the year resembling, in this respect, 1929 and 1932 rather than 1927, 1928, 1930 or 1931, in all of which the secondary oscillation was pronounced. In the separate mean variations for the seasons, the evening maximum occurs at 19h. in winter, 20h in equinoctial months and 21h. in summer; while the minimum occurs at 2h in winter, 3h in summer and 4h in equinoctial months. The secondary minimum is at 11h in all seasons. It is inconspicuous save in summer, when it is almost as deep as the 3h minimum. The inequalities for all 1a and 2a days, i.e. days on which no hour has a range exceeding 1000 v/m but on which negative potential gradients occurred, are naturally more irregular than the 0a day ones. The general form however is approximately the same, except that the secondary oscillation is relatively much greater. The winter months show the largest ranges, both for 0a and for 1a and 2a day inequalities. In previous years the equinoctial ranges have generally been the greatest.

TERRESTRIAL MAGNETISM.

Notes on the Instruments.

The standard records of declination and horizontal force are obtained from the Munro magnetographs which were in use at Falmouth until 1912. The instruments had been stored for several years, but were afterwards reconditioned and tested at Kew before being installed at Lerwick in November, 1922.

A new vertical force instrument of the Watson quartz fibre type and supplied by the Cambridge Instrument Company was installed in the standard recording house at the end of November 1929, and became the standard vertical force instrument from 1st January, 1930. A description of this type of instrument is given in "Terrestrial Magnetism", Vol. IX (1904), pp. 62-68.

The declination magnet has a unifilar suspension, and the torsion correction is negligible. The scale value is constant for all positions of the light dot on the sheet; throughout the year it was 1 mm. of ordinate to 1.93 minutes of arc. In the horizontal force instrument the magnet is maintained in a position approximately perpendicular to the magnetic meridian by torsion of the bifilar suspension. Copper damping plates are fitted to each instrument and the recording mechanism is similar to that used at Eskdalemuir. The arrangement of the instruments in the magnetograph house is shown in "The Observatories' Year Book," 1928.

A complete auxiliary magnetograph is maintained, the constituents being a Krogness H magnetograph, and locally constructed declination and vertical force instruments. The last mentioned has a quartz fibre suspension and generally resembles the Watson instrument. It was brought into use, in place of the Munro recorder previously used, in March 1932.

The auxiliary recorders arranged to function at a low sensitivity have proved their usefulness in supplying record during highly disturbed hours.

The chief instrumental difficulties encountered during the year were:-

- (a) A slight irregular drift in the case of the horizontal and vertical force instruments.
- (b) Irregular changes in declination base line values.

Monthly scale values have been assigned to the records by taking overlapping means, except when discontinuities occurred and special measures were required. The determinations in the case of H are made by Broun's method, and deflecting magnet being placed in the "broadside on" position and at a distance of 55.9 cm. from the recording magnets. A larger deflection distance would render the error due to inequality of the distribution coefficients for the H and D magnets less appreciable, but cannot be used owing to the restricted size of the magnetograph house. For standardisation of the vertical force magnetograph, the field is varied by passing known currents (± 60 , ± 120 milliamps) through Helmholtz Gaugain coils fitted to the instrument. The scale value of H was maintained at approximately 6 γ /mm. and that of V at about 9 γ /mm.

The records of declination, horizontal force and vertical force have been tabulated hour by hour. The values are read off by means of graduated glass scales, a value being the mean reading for 60 minutes between exact hours G.M.T.

Base values for the records are obtained from the results of absolute observations, the determinations of horizontal force being taken at least twice weekly, those of dip and declination five or six times in each week. Horizontal force and declination are determined with the unifilar magnetometer on the centre pillar (No. 2) of the absolute hut, the azimuth of the fixed mark being taken as $8^{\circ} 43' 2''$ east of south. Inclination is measured with the dip circle placed on the East pillar (No. 3), using $3\frac{1}{2}$ inch needles. In the deflection experiment three distances, 25, 30 and 35 cm., are used for obtaining the distribution coefficients, the horizontal force being computed from the deflection at 25 cm. only.

Mean annual values of the P and Q correction have been derived from observations during the period March 1923 to the end of 1933. An accident caused some change to the magnet in March 1923, and values for earlier months have been discarded.

The values during these years are as follows:-

| Year | P. | Q. | $\log_{10}(1 + P/25^2 + Q/25^4)$. |
|-----------------------|--------|---------|------------------------------------|
| 1923 (March-December) | -2.398 | -14.36 | $\bar{1}.99831$ |
| 1924 | -1.236 | -464.6 | $\bar{1}.99862$ |
| 1925 | -1.165 | -875.9 | $\bar{1}.99821$ |
| 1926 | +1.225 | -1711.2 | $\bar{1}.99895$ |
| 1927 | +2.229 | -2183.8 | $\bar{1}.99912$ |
| 1928 | +0.223 | -1395.6 | $\bar{1}.99860$ |
| 1929 | -0.539 | -968.5 | $\bar{1}.99855$ |
| 1930 | -1.210 | -837.1 | $\bar{1}.99823$ |
| 1931 | -1.041 | -895.3 | $\bar{1}.99828$ |
| 1932 | +1.367 | -1849.9 | $\bar{1}.99889$ |
| 1933 | -0.121 | -1081.9 | $\bar{1}.99871$ |

The mean value of $\log_{10}(1 + P/25^2 + Q/25^4)$ employed in the reduction of all observations for 1933 was the mean of the values derived up to the end of 1932, namely, $\bar{1}.99858$. If the 1933 value is added, the mean for the total available period becomes $\bar{1}.99859$. The adoption of this latter value would raise all the hourly values, monthly means, etc., as given in the tables by 0.2γ in the case of H and 0.5γ in the case of V.

In October 1932 a Schuster-Smith portable magnetometer (No. L45434, by the Cambridge Instrument Co.) was installed on the West (No. 1) pillar of the absolute observation hut. The principle of this instrument is explained in the Dictionary of Applied Physics, Vol. 11, pp. 528-532.

The potentiometer, variable resistances, galvanometer, and a milliammeter used for rough current adjustments are all enclosed in a single box approximately 32 cm. by 30 cm. by 15 cm. The permanent magnets of the galvanometer and milliammeter are arranged so that their common external field is as small as possible; but it is still appreciable. For this reason the potentiometer is set up at the extreme Eastern end of the hut, about 240 cm. from the Dip circle, 380 cm. from the unifilar magnetometer and 520 cm. from the coils of the Schuster-Smith magnetometer. The field exerted by the permanent magnets at the dip circle is less than 0.5γ .

Four observations are taken weekly. Each observation occupies less than ten minutes, and casual errors are considerably smaller than with the unifilar magnetometer. Base values for the horizontal force magnetograph as de-

duced from observations with this instrument, differ from those obtained with the unifilar magnetometer. It is not yet known to which instrument the error should be ascribed, but at present the unifilar is retained as standard. The base value curve obtained from the results of the Schuster-Smith magnetometer is, nevertheless, of great value for purposes of comparison with that obtained from the standard unifilar instrument.

As stated in the general remarks, the walls of the magnetograph chamber are of concrete, 2 feet 6 inches in thickness. The diurnal variation of temperature within the chamber is, for most days of the year, negligibly small and no corrections for this diurnal variation have been applied to the diurnal inequalities or other data published in this volume. From the magnetograph house temperatures for each day given in the Tables, however, it will be noted that the day-to-day change of temperature is sometimes considerable. The average change day-to-day in degrees absolute over each of the twelve months of 1933 and for the year as a whole was as follows:-

| Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Year |
|------|------|------|------|------|------|------|------|-------|------|------|------|------|
| 0.32 | 0.38 | 0.41 | 0.39 | 0.25 | 0.32 | 0.21 | 0.24 | 0.31 | 0.48 | 0.33 | 0.31 | 0.33 |

There were 6 occasions on which the change reached or exceeded 1°A . These rapid fluctuations of temperature obviously add considerably to the problem of satisfactorily determining base line values in the cases of the horizontal and vertical force magnetographs. The temperature coefficients are known with fair accuracy, being taken to be 6.1γ per 1°A ., in the case of the horizontal force magnetograph and -5γ per 1°A . in the case of the vertical force magnetograph.

As mentioned above, no attempt has been made to correct the diurnal inequalities for the very small and rather uncertain diurnal variation of temperature to which the chamber may be subject.

The results of the absolute determinations of D, I and H are summarized in the subjoined table, and the values of m, the moment of collimator magnet 3951A are also given. Considerations of space make it necessary to limit the observations printed to about two per week, but, as indicated above, absolute observations of some of the elements are made more frequently. For each set of absolute observations are shown the deduced base line values of H, D and V, and, in brackets, the adopted base line values. Thus, the entry 195 (200) under H signifies: deduced base line value 14,195, adopted base line value 14,200. The adopted values were obtained as described in the foregoing, and therefore the base line values corresponding to dates between those given in the table may be obtained by interpolation.

ABSOLUTE DETERMINATIONS OF D, I AND H, AND BASE LINE VALUES OF H, D AND V.

Lerwick

1933.

| Date. | Declination. | | | Inclination | | Horizontal Force. | | | Base line values (deduced and adopted) | | |
|---------|--------------|----|-------|-------------|---------|-------------------|-------|--------|---|----------------|-----------|
| | Mean Time. | D. | | Mean Time. | I. | Mean Time. | H. | m. | H. | D. | V. |
| | h. m. | ° | ' | h. m. | ° | h. m. | γ | | 14,000γ+ | ° | 46,000γ+ |
| Jan. 3 | 11 42 | 13 | 41 30 | 12 11 | 72 45.2 | 12 24 | 14493 | 1048.8 | 478 (477) | 12 58.7 (57.8) | 607 (546) |
| 6 | 11 56 | | 45 31 | 12 31 | 46.0 | 11 15 | 462 | 8.5 | 474 (480) | 56.9 (58.0) | 565 (547) |
| 10 | 11 50 | | 39 39 | 12 18 | 45.4 | 14 42 | 491 | 8.9 | 484 (484) | 58.0 (58.1) | 569 (549) |
| 13 | 10 25 | | 41 27 | 14 34 | 44.8 | 11 00 | 498 | 8.3 | 346 (346) | 58.7 (58.3) | 602 (550) |
| 18 | 11 53 | | 39 40 | 11 09 | 46.6 | 12 24 | 475 | 8.9 | 342 (351) | 57.4 (58.4) | 638 (551) |
| 21 | 11 18 | | 41 34 | 10 30 | 44.9 | 11 48 | 485 | 8.6 | 347 (353) | 58.8 (58.4) | 591 (552) |
| 24 | 11 35 | | 43 24 | 13 01 | 46.0 | 12 06 | 465 | 8.7 | 360 (356) | 59.2 (58.5) | 567 (553) |
| 27 | 11 28 | | 39 39 | 13 01 | 45.9 | 12 09 | 471 | 8.7 | 356 (358) | 58.8 (58.5) | 578 (554) |
| 30 | 09 54 | | 37 58 | 11 14 | 45.5 | 10 25 | 473 | 8.7 | 365 (360) | 58.4 (58.5) | 636 (555) |
| Feb. 3 | 09 55 | 13 | 38 50 | 11 47 | 72 45.6 | 10 34 | 14498 | 1047.5 | 380 (364) | 12 58.1 (58.5) | 585 (556) |
| 7 | 11 22 | | 42 8 | 13 05 | 45.0 | 12 00 | 491 | 8.9 | 364 (366) | 57.9 (58.5) | 604 (558) |
| 10 | 12 19 | | 41 2 | 11 55 | 45.6 | 12 44 | 493 | 8.3 | 379 (368) | 58.2 (58.5) | 599 (560) |
| 14 | 11 59 | | 43 15 | 11 32 | 45.2 | 12 31 | 480 | 7.9 | 365 (370) | 59.3 (58.6) | 596 (568) |
| 17 | 11 57 | | 40 45 | 11 37 | 45.5 | 12 29 | 481 | 8.3 | 372 (372) | 58.3 (58.5) | 593 (576) |
| 21 | 12 09 | | 44 11 | 11 40 | 45.6 | 12 34 | 478 | 8.5 | 370 (374) | 58.6 (58.5) | 572 (587) |
| 24 | 14 21 | | 46 17 | 15 36 | 45.5 | 14 50 | 486 | 8.7 | 372 (376) | 58.4 (58.5) | 610 (594) |
| 28 | 11 23 | | 40 55 | 12 35 | 46.2 | 15 18 | 479 | 8.1 | 369 (379) | 59.8 (58.5) | 644 (603) |
| Mar. 3 | 10 25 | 13 | 38 43 | 12 01 | 72 45.5 | 11 01 | 14483 | 1048.1 | 375 381 | 12 58.8 (58.6) | 629 (606) |
| 7 | 09 47 | | 36 53 | 09 27 | 44.9 | 10 34 | 479 | 8.1 | 389 384 | 58.5 (58.6) | - (607) |
| 10 | 11 53 | | 41 55 | 11 29 | 45.3 | 12 31 | 491 | 7.6 | 408 387 | 57.7 (58.6) | 596 607 |
| 14 | 12 09 | | 41 35 | 11 41 | 45.7 | 12 37 | 461 | 8.3 | 390 390 | 58.7 (58.6) | 602 605 |
| 17 | 12 12 | | 43 29 | 11 47 | 45.4 | 12 38 | 483 | 8.2 | 403 392 | 59.1 (58.6) | 595 604 |
| 21 | 11 15 | | 42 55 | 12 23 | 46.2 | 11 43 | 454 | 7.1 | 398 395 | 57.9 (58.7) | 545 605 |
| 24 | 09 57 | | 39 9 | 09 26 | 45.6 | 10 27 | 461 | 8.0 | 409 397 | 58.8 (58.7) | 575 607 |
| 28 | 12 09 | | 40 27 | 11 43 | 45.7 | 12 36 | 472 | 7.7 | 415 401 | 58.6 (58.7) | 584 610 |
| 31 | 11 57 | | 43 17 | 11 41 | 46.6 | 12 29 | 471 | 8.0 | 415 403 | 58.5 (58.7) | 608 612 |
| April 4 | 11 57 | 13 | 40 21 | 12 37 | 72 45.8 | 12 32 | 14467 | 1048.5 | 411 (406) | 12 58.7 (58.7) | 595 (602) |
| 8 | 11 49 | | 41 42 | 11 29 | 46.1 | 12 24 | 461 | 8.6 | 411 (409) | 59.1 (58.6) | (604) |
| 11 | 10 22 | | 37 9 | 11 31 | 45.3 | 10 51 | 457 | 8.5 | 413 (412) | 59.5 (58.6) | 590 (609) |
| 14 | 10 33 | | 37 13 | 11 50 | 45.6 | 11 07 | 463 | 8.8 | 416 (414) | 59.2 (58.6) | 577 (606) |
| 18 | 10 28 | | 36 29 | 11 33 | 45.2 | 10 55 | 456 | 8.3 | 416 (418) | 58.1 (58.5) | 592 (593) |
| 21 | 10 25 | | 34 32 | 11 25 | 46.0 | 10 52 | 450 | 8.9 | 415 (420) | 58.3 (58.5) | 567 (590) |
| 25 | 10 57 | | 39 22 | 11 53 | 46.3 | 11 23 | 454 | 8.0 | 420 (424) | 58.7 (58.5) | 630 (595) |
| 28 | 10 19 | | 35 31 | 11 28 | 45.2 | 10 44 | 455 | 8.2 | 423 (426) | 58.9 (58.5) | 579 (599) |
| May 2 | 10 29 | 13 | 33 33 | 11 46 | 72 45.6 | 10 59 | 14468 | 1048.5 | 433 (429) | 58.4 (58.5) | 585 (596) |
| 5 | 10 41 | | 36 12 | 11 43 | 45.4 | 11 07 | 449 | 8.2 | 427 (432) | 58.6 (58.5) | 598 (594) |
| 10 | 10 53 | | 38 29 | 13 31 | 44.9 | 11 25 | 464 | 8.3 | 431 (436) | 58.9 (58.5) | 628 (592) |
| 13 | 10 45 | | 39 14 | 08 28 | 44.7 | 11 18 | 462 | 8.7 | 437 (438) | 58.3 (58.5) | 599 (593) |
| 16 | 08 33 | | 31 57 | 10 42 | 46.1 | 08 59 | 459 | 8.4 | 439 (441) | 58.4 (58.5) | 615 (595) |
| 19 | 10 47 | | 36 3 | 11 49 | 45.5 | 11 13 | 451 | 8.6 | 434 (444) | 58.8 (58.5) | 633 (600) |
| 25 | 09 09 | | 34 29 | 08 49 | 45.8 | 11 09 | 469 | 8.3 | 450 (447) | 58.2 (58.5) | 610 (609) |
| 26 | 08 47 | | 31 2 | 08 32 | 45.3 | 10 46 | 459 | 8.4 | 447 (451) | 58.2 (58.5) | 624 (609) |
| 30 | 08 21 | | 31 35 | 10 49 | 45.7 | 08 50 | 435 | 8.9 | 450 (456) | 58.6 (58.5) | 598 (604) |
| June 2 | 10 30 | 13 | 36 15 | - | 72 - | 11 03 | 14449 | 1048.7 | 451 (460) | 12 58.8 (58.6) | - (606) |
| 6 | 08 51 | | 30 25 | 08 31 | 45.0 | 10 36 | 467 | 8.1 | 464 (464) | 58.4 (58.6) | 609 (615) |
| 10 | 08 49 | | 30 33 | 08 31 | 45.5 | 10 47 | 457 | 8.5 | 475 (470) | 58.9 (58.6) | 619 (619) |
| 13 | 10 23 | | 33 42 | 11 31 | 45.5 | 10 51 | 452 | 8.6 | 470 (474) | 59.5 (58.6) | 614 (613) |
| 16 | 08 25 | | 26 59 | 11 07 | 45.6 | 08 53 | 467 | 8.2 | 484 (480) | 58.0 (58.6) | 607 (615) |
| 20 | 08 21 | | 29 49 | 11 33 | 45.5 | 08 49 | 464 | 8.5 | 486 486 | 58.0 (58.6) | 668 (620) |
| 23 | 08 31 | | 28 57 | 10 53 | 45.0 | 08 58 | 451 | 8.1 | 485 492 | 58.3 (58.6) | 617 (628) |
| 27 | 08 19 | | 29 52 | 10 53 | 45.6 | 08 46 | 453 | 8.6 | 495 500 | 58.6 (58.6) | 605 (635) |
| 30 | 08 28 | | 27 11 | 10 23 | 45.2 | 08 59 | 455 | 8.5 | 505 506 | 58.4 (58.6) | 616 (627) |

LERWICK OBSERVATORY.

ABSOLUTE DETERMINATIONS- (Continued).

| Date | Declination | | | Inclination | | | Horizontal Force. | | | Base line values (deduced and adopted) | | | |
|---------|-------------|----|-------|-------------|----|------|-------------------|-------|--------|---|---------|--------|-----------|
| | Mean Time | D. | | Mean Time. | I. | | Mean Time | H. | m. | H. | D. | V. | |
| | h. m. | ° | ' | h. m. | ° | ' | h. m. | γ | | 14,000 γ+ | ° | ' | 46,000 γ+ |
| July 4 | 10 46 | 13 | 32 54 | 09 01 | 72 | 45.0 | 11 23 | 14466 | 1048.6 | 505 (516) | 12 58.0 | (58.6) | 674 (637) |
| 7 | 10 29 | | 34 5 | 11 35 | | 45.4 | 11 01 | 457 | 8.5 | 549 (546) | 59.0 | (58.6) | 630 (642) |
| 11 | 08 21 | | 28 27 | 10 20 | | 46.1 | 08 52 | 453 | 8.7 | 550 (555) | 59.1 | (58.6) | 635 (646) |
| 14 | 08 37 | | 28 9 | 10 59 | | 45.8 | 08 59 | 468 | 8.7 | 272 (272) | 58.4 | (58.6) | 656 (652) |
| 18 | 08 25 | | 27 52 | 10 47 | | 45.1 | 08 52 | 465 | 8.8 | 287 (288) | 57.8 | (58.7) | 659 (656) |
| 21 | 08 16 | | 27 22 | 10 47 | | 45.9 | 08 42 | 463 | 8.3 | 301 (299) | 58.0 | (58.7) | 637 (658) |
| 25 | 08 19 | | 28 50 | 13 59 | | 44.8 | 08 43 | 456 | 8.4 | 314 (316) | 58.4 | (58.8) | 687 (655) |
| 28 | 08 38 | | 28 57 | 11 23 | | 45.3 | 09 03 | 449 | 8.9 | 327 (328) | 58.8 | (58.9) | 613 (654) |
| Aug. 1 | 08 16 | 13 | 26 57 | 11 31 | 72 | 46.0 | 08 46 | 14469 | 1048.0 | 353 (344) | 12 58.6 | (59.0) | 659 (662) |
| 4 | 08 45 | | 29 36 | 08 25 | | 45.0 | 11 02 | 456 | 8.6 | 364 (360) | 58.7 | (59.1) | 655 (665) |
| 8 | 10 37 | | 35 3 | 11 36 | | 46.0 | 11 04 | 435 | 8.13 | 384 (380) | 60.1 | (59.5) | 624 (654) |
| 11 | 08 43 | | 26 12 | 08 26 | | 45.3 | 11 17 | 433 | 9.0 | 389 (395) | 59.9 | (59.8) | 655 (654) |
| 15 | 11 57 | | 41 3 | 08 40 | | 45.9 | 11 31 | 433 | 8.1 | 407 (419) | 60.7 | (60.0) | 615 (661) |
| 18 | 10 35 | | 33 41 | 11 37 | | 45.5 | 11 00 | 459 | 8.5 | 431 (436) | 59.7 | (60.0) | 705 (668) |
| 22 | 10 27 | | 35 12 | 11 27 | | 45.6 | 10 49 | 453 | 8.2 | 460 (461) | 60.5 | (60.0) | 669 (665) |
| 25 | 11 49 | | 37 17 | 08 23 | | 46.0 | 11 27 | 436 | 8.1 | 486 (484) | 60.4 | (60.0) | 631 (663) |
| 30 | 13 35 | | 34 46 | 11 23 | | 44.8 | 10 37 | 466 | 8.4 | 477 (471) | 57.5 | (59.6) | 675 (670) |
| Sept. 2 | 08 08 | 13 | 28 42 | 07 53 | 72 | 46.7 | 10 35 | 14464 | 1048.1 | 501 (499) | 12 59.6 | (59.1) | 746 (676) |
| 5 | 09 27 | | 31 55 | 09 50 | | 45.8 | 11 33 | 453 | 8.4 | 510 (513) | 58.9 | (58.8) | 648 (676) |
| 7 | 09 09 | | 33 44 | 13 27 | | 44.7 | 08 41 | 450 | 8.1 | 521 (519) | - | - | 712 (673) |
| 11 | 09 47 | | 33 11 | 09 15 | | 46.2 | 11 08 | 434 | 8.4 | 309 (307) | 60.0 | (59.6) | 605 (658) |
| 14 | 10 49 | | 35 13 | 13 53 | | 45.9 | 11 17 | 439 | 8.2 | 315 (313) | 59.5 | (59.5) | 688 (648) |
| 16 | 09 27 | | 32 40 | 09 09 | | 46.1 | 10 33 | 430 | 8.5 | 313 (317) | 60.3 | (59.4) | 627 (646) |
| 19 | 09 27 | | 30 27 | 09 09 | | 46.2 | 10 56 | 457 | 8.2 | 323 (322) | 59.0 | (59.2) | 683 (649) |
| 22 | 10 39 | | 36 47 | 11 45 | | 46.4 | 11 06 | 433 | 8.3 | 324 (328) | 59.5 | (59.1) | 652 (656) |
| 26 | 07 43 | | 28 25 | 13 48 | | 45.8 | 08 05 | 459 | 8.2 | 345 (335) | - | - | 682 (663) |
| 29 | 09 29 | | 29 5 | 09 13 | | 46.0 | 10 47 | 454 | 8.6 | 341 (339) | 58.8 | (0.3) | 679 (669) |
| Oct. 3 | 10 29 | 13 | 29 30 | 13 27 | 72 | 45.8 | 11 02 | 14451 | 1048.2 | 344 (343) | 13 0.4 | (0.4) | 707 (672) |
| 6 | 09 08 | | 31 52 | 08 51 | | 46.9 | 10 44 | 445 | 7.9 | 347 (348) | 0.0 | (0.4) | 662 (673) |
| 10 | 10 41 | | 33 59 | 10 18 | | 47.6 | 12 23 | 462 | 8.5 | 360 (354) | 0.8 | (0.4) | 596 (674) |
| 13 | 10 51 | | 34 51 | 10 29 | | 46.7 | 12 31 | 455 | 8.5 | 361 (359) | 0.9 | (0.4) | 673 (675) |
| 17 | 10 57 | | 32 7 | 10 36 | | 46.4 | 12 03 | 457 | 8.6 | 365 (365) | 0.9 | (0.4) | 697 (677) |
| 20 | 10 55 | | 32 52 | 10 39 | | 46.0 | 11 57 | 456 | 8.6 | 371 (370) | 1.2 | (0.4) | 690 (679) |
| 24 | 10 38 | | 31 21 | 10 21 | | 45.8 | 12 02 | 463 | 8.4 | 374 (376) | 0.5 | (0.4) | 685 (684) |
| 27 | 12 12 | | 33 4 | 11 43 | | 46.0 | 12 39 | 468 | 8.3 | 383 (380) | 0.7 | (0.4) | 707 (690) |
| 31 | 11 31 | | 33 53 | 12 39 | | 45.1 | 11 59 | 474 | 8.5 | 383 (385) | 0.7 | (0.4) | 766 (696) |
| Nov. 3 | 10 08 | 13 | 30 36 | 09 48 | 72 | 46.1 | 11 30 | 14480 | 1048.3 | 391 (390) | 12 59.5 | (0.4) | 740 (693) |
| 7 | 10 56 | | 31 55 | 12 21 | | 46.4 | 11 44 | 440 | 8.1 | 391 (391) | 13 0.5 | (0.4) | 683 (693) |
| 10 | 12 13 | | 31 41 | 11 46 | | 46.8 | 12 44 | 448 | 8.4 | 391 (391) | 0.0 | (0.4) | 693 (696) |
| 14 | 11 39 | | 30 48 | 12 43 | | 46.1 | 12 06 | 465 | 8.2 | 387 (391) | 0.3 | (0.4) | 764 (703) |
| 17 | 11 25 | | 31 28 | 12 39 | | 45.6 | 11 56 | 477 | 8.5 | 391 (391) | 0.6 | (0.4) | 754 (708) |
| 21 | 12 15 | | 32 39 | 11 41 | | 46.0 | 12 41 | 467 | 8.1 | 391 (391) | 1.2 | (0.4) | 753 (714) |
| 24 | 11 51 | | 31 30 | 12 49 | | 45.0 | 12 20 | 469 | 8.3 | 394 (392) | 0.6 | (0.4) | 704 (715) |
| 28 | 11 01 | | 34 51 | 10 35 | | 46.2 | 12 01 | 465 | 8.1 | 402 (395) | 0.3 | (0.4) | 716 (716) |
| Dec. 1 | 10 47 | 13 | 30 53 | 10 25 | 72 | 45.1 | 12 10 | 14462 | 1048.2 | 396 (397) | 13 0.0 | (0.4) | 706 (715) |
| 5 | 10 49 | | 32 17 | 10 31 | | 46.6 | 12 27 | 453 | 8.3 | 404 (401) | 12 59.9 | (0.4) | 711 (709) |
| 8 | 10 57 | | 29 54 | 10 39 | | 45.9 | 12 01 | 464 | 8.3 | 405 (404) | 13 0.6 | (0.4) | 716 (700) |
| 12 | 10 33 | | 29 33 | 10 15 | | 45.8 | 11 58 | 469 | 8.2 | 408 (408) | 0.2 | (0.4) | 711 (696) |
| 15 | 10 57 | | 29 49 | 10 39 | | 45.4 | 12 04 | 469 | 8.1 | 408 (411) | 12 59.9 | (0.4) | 739 (702) |
| 19 | 10 47 | | 29 41 | 10 19 | | 45.3 | 11 43 | 462 | 8.2 | 414 (414) | 59.8 | (0.4) | 722 (705) |
| 22 | 12 15 | | 30 51 | 11 46 | | 45.4 | 12 43 | 472 | 8.1 | 420 (417) | - | - | 711 (705) |
| 26 | 11 35 | | 30 36 | 12 35 | | 45.1 | 12 02 | 471 | 8.2 | 423 (421) | - | - | 709 (704) |
| 28 | 11 38 | | 29 43 | 12 39 | | 45.5 | 12 02 | 471 | 8.3 | 425 (423) | - | - | 723 (703) |

AURORA.

From about September to April a watch for aurora is maintained, normally until about 23h G.M.T. each evening, and observations - as a rule at intervals of 15 to 20 minutes - are made of the northern horizon and of general meteorological conditions. The records form what is called the auroral log, a brief summary of which is given in Table 67. When any auroral display is observed, a second observer is called and detailed observations are maintained until the display subsides. These detailed observations have consisted in noting and making descriptions of the phenomena seen during the display, and have been supplemented whenever possible by photographs taken with the Krogness camera. The descriptive notes are entered in a second log reserved for records of actual auroral displays. Extracts from this latter log may be obtained by anyone requiring the detailed information.

During the period of the International Polar Year, August 1932 to August 1933 an observer at Urafirth, situated approximately 26 miles NNW of the Observatory, has been supplied with a second Krogness camera. On suitable occasions communication between the two stations has been established by telephone and simultaneous photographs of aurora have been taken with the two cameras.

A general auroral table for Scotland (Table 68) is also included. This table has been compiled from the records of all stations at which climatological observations or weather logs are maintained. The observers at these stations, whilst noting occasions of aurora which they may happen to observe, do not in general maintain a special watch.

Notes on the Tables.

The hourly values of H, D and V, obtained as described above, appear in three of the four monthly tables. The variations in D, being expressed in minutes, may be readily converted to units of force (γ) of the component perpendicular to the magnetic meridian by multiplying by a factor which for 1932 is approximately 4.22. The mean value for the day is computed as the mean of the twenty-four hourly values.

The letters "Q" and "D", prefixed to dates, denote the five quiet and the five disturbed days as selected at De Bilt.

In the fourth table for each month are given:-

- (a) The values and times of the daily maximum and minimum and the values of the absolute daily range for each of the elements H, D and V.
- (b) The value of $HR_H + VR_V$ for each day where R_H and R_V denote the absolute ranges in force for a calendar day of the horizontal and vertical components.
- (c) The daily magnetic character figures, assigned according to the international scheme wherein "0", "1", "2", respectively, denote quiet, moderately disturbed, and highly disturbed conditions.
- (d) The daily values of temperature in the magnetic chamber.

Mean diurnal inequalities of H, D and V on all days and on international quiet and disturbed days are given, for the months, seasons and year, in Tables 53 to 61.

In calculating diurnal inequalities the non-cyclic change has been eliminated on the assumption that its time rate is linear. The values of the range of the mean diurnal inequalities of the several elements in the three categories of days are brought together in Table 62, and the values of the non-cyclic change are given in Table 64. The "Average Departures," or mean values of the inequality taken irrespectively of sign, throughout the 24 hours, are given in Table 63.

The mean values of $HR_H + VR_V$ are summarized in Table 65.

In Table 66 appear for the months and year the mean values of N, W, V, D, I, H and Total Force T. The means of N, W, I and T are derived from the corresponding mean values of H, D and V, which are the means of hourly values on all days in the month or year.

Finally, in Tables 67 and 68 are given summaries of auroral observations obtained as already described.

Review of Results.

Mean and Extreme Values of the Magnetic Elements, 1933. - The mean values of the magnetic elements for the years 1932 and 1933 are given in Table 1. The values of H, D and V has been computed from the hourly values derived from the autographic records of all days, standardized by means of the absolute observations; those of N, W, I and T have been deduced from the values of H, D and V.

TABLE 1.

| Year | H. | D. (West) | I. | N. | W. | V. | T. |
|----------|-------|--------------|---------|-------|------|-------|-------|
| | γ | ° ' " | ° ' " | γ | γ | γ | γ |
| 1932 ... | 14495 | 13 46.1 | 72 43.5 | 14078 | 3450 | 46608 | 48809 |
| 1933 ... | 14477 | 13 34.0 | 72 44.6 | 14073 | 3396 | 46605 | 48802 |

The decrease in westerly declination from 1932 to 1933 (12'.1) was less than in the previous year (13'.6). The rates for the eight earlier years were 13'.8 for 1923-24, 13'.0 for 1924-25, 14'.9 for 1925-26, 12'.9 for 1926-27, 12'.8 for 1927-28, 13'.7 for 1928-29, 12'.4 for 1929-30 and 11'.6 for 1930-31.

Mean values derived from (a) international quiet days and (b) international disturbed days are as follows:- (a) H, 14480γ; D, 13°34'.1; V, 46608γ; (b) H, 14473γ; D, 13°33'.7; V, 46603γ.

The extreme values of H, D and V recorded during 1933 are given in Table II.

TABLE II

| Element. | Maximum. | | Minimum | | Absolute Annual Range. |
|------------------|----------------|-------------------------|----------------|-------------------------|------------------------|
| | Value. | Date, 1933. | Value. | Date, 1933. | |
| Horizontal Force | 15324 γ | d. h. m. May 1 16 15 | 13513 γ | d. h. m. May 1 21 33 | 1811 γ |
| Declination | 15° 23'·6 | May 1 16 32 | 12° 33'·3 | Sept. 13 19 45 | 2° 50'·3 |
| Vertical Force | 47012 γ | May 1 21 25 | 46332 γ | June 13 3 36 | 680 γ |

The range of 2° 50'·3 in declination is equivalent to a range of 717 γ in the component of force perpendicular to the magnetic meridian. In the year 1932 larger ranges were recorded in D and V.

Magnetic character of the year.- The following table shows the mean sunspot numbers for recent years, together with the mean absolute daily range of declination, as a rough measure of magnetic activity:-

| Year. | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 |
|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Mean Sunspot No. | 5·8 | 16·7 | 44·3 | 63·9 | 69·0 | 76·8 | 64·2 | 38·9 | 20·9 | 11·2 | 5·5 |
| Mean absolute daily range of D. | 14'·9 | 15'·4 | 18'·1 | 25'·0 | 20'·0 | 21'·4 | 24'·3 | 28'·5 | 19'·2 | 21'·3 | 19'·6 |

During these eleven years the sunspot numbers show a fairly regular rise and fall, with maximum in 1928; but the D ranges show maxima in 1926 and 1930, the latter the larger, although the sunspot number was comparatively small.

In the next table the magnetic conditions for individual months of the year 1933 are set out, together with the provisional sunspot numbers.

| | Jan. | Feb. | Mar. | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|------------------------------------|------|------|------|-------|------|------|------|------|-------|------|------|------|
| Provisional sunspot number | 11·3 | 20·4 | 10·0 | 2·9 | 3·7 | 5·0 | 2·8 | 0·2 | 5·1 | 3·4 | 0·7 | 0·3 |
| Mean absolute daily range of D ... | 17·2 | 21·1 | 19·8 | 23·2 | 24·0 | 17·9 | 15·9 | 20·6 | 22·0 | 18·5 | 18·4 | 16·1 |
| Mean $\frac{HRH + VRV}{10,000}$ | 464 | 585 | 635 | 709 | 861 | 536 | 456 | 526 | 659 | 554 | 412 | 358 |

The values of mean absolute daily range for the months and seasons of the year 1933 are given in Table IV, the ranges of declination in angle having, for convenience of comparison, been converted to units of force of the component perpendicular to the magnetic meridian. If comparison be made with the corresponding table in the Eskdalemuir Section it will be seen that in 1933 the ratios of the annual mean ranges of H, D and V at Lerwick to those at Eskdalemuir are 1.5, 1.2 and 2.7. The ratios of the mean daily ranges for the six years 1926-31 of Lerwick H to Eskdalemuir N, Lerwick D to Eskdalemuir W, and Lerwick V to Eskdalemuir V, are 1.4, 1.1 and 1.9; the greatest variation from year to year appears in the case of the vertical component; scarcely any variation appears in the ratio of the W or D component and a slight variation in the case of the H or N component.

TABLE III.

| Month. | Magnetic Character Figures. | | | Mean Character Figures. | | Mean Value of $\frac{HR_H + VR_V}{10,000}$ | | |
|------------|-----------------------------|-----------|-----------|-------------------------|-----------------|--|---------|---------|
| | "0" days. | "1" days. | "2" days. | Lerwick. | Inter-national. | All days. | Q days. | D days. |
| 1933. | | | | | | | | |
| January | 12 | 18 | 1 | .65 | .65 | 464 | 86 | 987 |
| February | 14 | 9 | 5 | .68 | .65 | 585 | 89 | 1769 |
| March | 8 | 17 | 6 | .94 | .71 | 635 | 136 | 1714 |
| April | 4 | 22 | 4 | 1.00 | .76 | 709 | 262 | 1371 |
| May | 11 | 17 | 3 | .74 | .62 | 861 | 189 | 2025 |
| June | 16 | 12 | 2 | .53 | .55 | 536 | 186 | 1402 |
| July | 18 | 11 | 2 | .48 | .54 | 456 | 218 | 1020 |
| August | 17 | 11 | 3 | .55 | .60 | 526 | 218 | 1422 |
| September | 9 | 17 | 4 | .83 | .77 | 659 | 260 | 1809 |
| October | 14 | 13 | 4 | .68 | .65 | 554 | 129 | 1229 |
| November | 14 | 13 | 3 | .63 | .63 | 412 | 130 | 1039 |
| December | 20 | 9 | 2 | .42 | .53 | 358 | 87 | 1172 |
| Year, 1933 | 157 | 169 | 39 | .59 | .64 | 563 | 166 | 1413 |
| Year, 1932 | 97 | 230 | 39 | .84 | .71 | 644 | 182 | 1602 |
| Year, 1931 | 121 | 212 | 32 | .75 | .66 | 589 | 196 | 1394 |
| Year, 1930 | 64 | 235 | 66 | 1.01 | .83 | 1063 | 250 | 2515 |
| Year, 1929 | 113 | 214 | 38 | .80 | .67 | | | |
| Year, 1928 | 126 | 211 | 29 | .74 | .63 | | | |
| Year, 1927 | 137 | 206 | 22 | .68 | .63 | | | |
| Year, 1926 | 208 | 134 | 23 | .50 | .65 | | | |
| Year, 1925 | 207 | 130 | 28 | .51 | .56 | | | |
| Year, 1924 | 229 | 114 | 23 | .44 | .55 | | | |

TABLE IV.- ABSOLUTE DAILY RANGE. MEAN MONTHLY VALUES.

| Month. | Mean Absolute Daily Range 1933. | | | Mean Daily Range expressed as Percentage of Yearly Mean- 1933. | | |
|----------------|------------------------------------|-----|-----|--|-----|-----|
| | H. | D. | V. | H. | D. | V. |
| | Y | Y | Y | % | % | % |
| January .. | 67 | 72 | 79 | 74 | 88 | 85 |
| February .. | 84 | 89 | 99 | 92 | 109 | 106 |
| March | 114 | 83 | 101 | 125 | 101 | 109 |
| April | 109 | 98 | 118 | 120 | 120 | 127 |
| May | 175 | 102 | 130 | 192 | 125 | 140 |
| June | 94 | 75 | 86 | 103 | 91 | 93 |
| July | 82 | 67 | 73 | 90 | 82 | 78 |
| August | 98 | 87 | 83 | 108 | 106 | 89 |
| September .. | 94 | 93 | 112 | 103 | 113 | 121 |
| October | 76 | 78 | 95 | 84 | 95 | 102 |
| November | 49 | 77 | 73 | 54 | 94 | 78 |
| December | 47 | 68 | 62 | 52 | 83 | 67 |
| Winter | 62 | 77 | 78 | 68 | 94 | 84 |
| Equinox | 98 | 88 | 107 | 108 | 107 | 115 |
| Summer | 112 | 83 | 93 | 123 | 101 | 100 |
| Year | 91 | 82 | 93 | - | - | - |

The frequency distribution of absolute daily ranges recorded in 1933 is shown in Table V. A comparison with the corresponding figures for Eskdalemuir (Table V. on page 180) indicates that ranges in excess of 200Y are again much more frequent at Lerwick than at Eskdalemuir, even in the case of D ranges, of which the frequency distributions at the two places usually show less divergence. Apart from this it is notable that the ranges of maximum frequency at Lerwick fall in the intervals 50-59Y for H and D, and 20-29Y for V, that is, at much the same points as at Eskdalemuir, though V has many more ranges in excess of 200Y than have H and D.

TABLE V.- FREQUENCY DISTRIBUTION OF ABSOLUTE DAILY RANGE.

| Range | Number of Cases, 1933. | | | Percentage Distribution. | | |
|-----------------|------------------------|----|----|--------------------------|------|------|
| | H. | D. | V. | H. | D. | V. |
| 0- 9 .. | 0 | 0 | 1 | 0.0 | 0.0 | 0.3 |
| 10- 19 .. | 15 | 3 | 37 | 4.1 | 0.8 | 10.1 |
| 20- 29 .. | 37 | 16 | 57 | 10.1 | 4.4 | 15.6 |
| 30- 39 .. | 35 | 32 | 38 | 9.6 | 8.8 | 10.4 |
| 40- 49 .. | 27 | 49 | 29 | 7.4 | 13.4 | 7.9 |
| 50- 59 .. | 55 | 49 | 24 | 15.1 | 13.4 | 6.6 |
| 60- 69 .. | 43 | 46 | 18 | 11.8 | 12.6 | 4.9 |
| 70- 79 .. | 36 | 24 | 16 | 9.9 | 6.6 | 4.4 |
| 80- 89 .. | 19 | 28 | 11 | 5.2 | 7.7 | 3.0 |
| 90- 99 .. | 16 | 21 | 13 | 4.4 | 5.8 | 3.6 |
| 100- 109 .. | 10 | 17 | 7 | 2.7 | 4.7 | 1.9 |
| 110- 119 .. | 10 | 14 | 17 | 2.7 | 3.8 | 4.7 |
| 120- 129 .. | 6 | 7 | 8 | 1.6 | 1.9 | 2.2 |
| 130- 139 .. | 6 | 16 | 7 | 1.6 | 4.4 | 1.9 |
| 140- 149 .. | 4 | 10 | 9 | 1.1 | 2.7 | 2.5 |
| 150- 159 .. | 3 | 5 | 4 | 0.8 | 1.4 | 1.1 |
| 160- 169 .. | 5 | 7 | 11 | 1.4 | 1.9 | 3.0 |
| 170- 179 .. | 2 | 7 | 6 | 0.5 | 1.9 | 1.6 |
| 180- 189 .. | 1 | 3 | 2 | 0.3 | 0.8 | 0.5 |
| 190- 199 .. | 4 | 1 | 4 | 1.1 | 0.3 | 1.1 |
| 200+ | 31 | 10 | 46 | 8.5 | 2.7 | 12.6 |
| Days omitted .. | 0 | 0 | 0 | - | - | - |

TABLE VI.- PRINCIPAL MAGNETIC DISTURBANCES RECORDED AT LERWICK, 1933.

Where the beginning of a disturbance has been marked by a "sudden commencement", the serial number is followed by an asterisk (*), and the time entered in the second column is that of the sudden commencement, estimated to the nearest minute. In other cases, the exact hour nearest the time at which disturbance may be regarded as having begun is entered in the second column. To the tabulated values of maximum and minimum, the following have to be added:- H, 14,000γ; D, 13°; V, 46,000γ.

| No. | From | To | Horizontal Force. | | | | | Declination. | | | | | Vertical Force. | | | | |
|-----|---------------|-------------|-------------------|----------|------|----------|-------|--------------|----------|-------|----------|--------|-----------------|----------|------|----------|--------|
| | | | Max. | Time. | Min. | Time. | Range | Max. | Time | Min. | Time. | Range. | Max. | Time. | Min. | Time. | Range. |
| | d. h. m. | d. h. | γ | d. h. m. | γ | d. h. m. | γ | | d. h. m. | | d. h. m. | | γ | d. h. m. | γ | d. h. m. | γ |
| 1 | Jan. 19 4 | Jan. 20 10 | 589 | 19 15 55 | 427 | 20 4 49 | 162 | 51.1 | 20 4 50 | 21.9 | 19 15 57 | 29.2 | 803 | 19 15 54 | 498 | 20 5 18 | 305 |
| 2 | Jan. 22 3 | Jan. 30 24 | 682 | 22 19 8 | 319 | 24 0 58 | 363 | 60.6 | 27 21 20 | 16.9 | 22 19 9 | 43.7 | 816 | 22 19 6 | 478 | 24 1 41 | 338 |
| 3 | Feb. 18 14 | Feb. 28 4 | 773 | 21 16 6 | 255 | 20 1 34 | 548 | 57.8 | 19 14 45 | -1.1 | 23 19 36 | 58.9 | 914 | 21 16 7 | 397 | 19 23 40 | 517 |
| 4 | Mar. 18 2 | Mar. 25 24 | 577 | 24 17 25 | 93 | 18 23 18 | 484 | 57.8 | 20 1 43 | -11.0 | 19 21 15 | 68.6 | 737 | 19 18 46 | 392 | 18 23 20 | 345 |
| 5 | Mar. 27 5 | Mar. 30 6 | 542 | 27 16 57 | 428 | 29 10 42 | 114 | 53.7 | 27 13 58 | 27.3 | 28 17 33 | 26.4 | 707 | 27 17 26 | 545 | 29 22 53 | 162 |
| 6 | Apr. 2 8 | Apr. 9 24 | 524 | 7 17 48 | 407 | 4 1 41 | 117 | 49.1 | 4 2 20 | 14.8 | 7 20 25 | 34.3 | 704 | 7 16 21 | 502 | 4 2 43 | 202 |
| 7 | Apr. 15 12 | Apr. 26 24 | 613 | 15 20 37 | 194 | 15 21 29 | 419 | 52.9 | 17 12 56 | 6.0 | 16 19 24 | 46.9 | 772 | 15 20 30 | 427 | 19 23 15 | 345 |
| 8* | Apr. 30 16 28 | May 7 16 | 1324 | 1 16 15 | -487 | 1 21 33 | 1811 | 143.6 | 1 16 32 | 7.0 | 4 19 14 | 136.6 | 1012 | 1 21 25 | 335 | 1 16 13 | 677 |
| 9 | May 13 4 | May 19 22 | 567 | 19 18 58 | 363 | 18 4 54 | 204 | 46.6 | 14 16 14 | 17.8 | 18 0 59 | 28.8 | 687 | 14 19 24 | 479 | 18 5 21 | 208 |
| 10 | May 27 12 | May 28 4 | 557 | 27 18 7 | 413 | 28 1 36 | 144 | 43.5 | 27 22 5 | 17.8 | 28 2 55 | 25.7 | 649 | 27 19 4 | 454 | 28 1 42 | 195 |
| 11* | May 29 6 25 | June 1 22 | 575 | 30 17 14 | 356 | 30 1 56 | 219 | 52.4 | 1 3 13 | 14.3 | 29 20 42 | 38.1 | 697 | 30 17 34 | 422 | 30 2 57 | 275 |
| 12 | June 8 4 | June 9 22 | 544 | 8 18 33 | 378 | 9 0 11 | 166 | 45.5 | 8 11 40 | 24.3 | 8 4 54 | 21.2 | 642 | 9 16 54 | 477 | 9 1 35 | 165 |
| 13 | June 12 20 | June 16 4 | 571 | 13 15 32 | 287 | 14 0 16 | 284 | 48.6 | 13 22 36 | 7.9 | 13 23 14 | 40.7 | 692 | 13 16 9 | 332 | 13 3 36 | 360 |
| 14 | June 19 8 | June 22 4 | 543 | 20 16 37 | 427 | 20 2 29 | 116 | 46.3 | 20 15 2 | 12.9 | 20 2 22 | 33.4 | 636 | 20 15 54 | 476 | 20 1 35 | 160 |
| 15 | June 27 6 | July 3 4 | 578 | 28 16 14 | 436 | 27 9 56 | 142 | 50.1 | 27 14 40 | 23.7 | 29 0 15 | 26.4 | 684 | 28 16 57 | 501 | 28 0 58 | 183 |
| 16 | July 23 10 | July 24 17 | 569 | 24 16 1 | 296 | 24 3 36 | 273 | 44.3 | 23 13 55 | 8.6 | 23 22 19 | 35.7 | 704 | 24 15 39 | 407 | 24 3 40 | 297 |
| 17 | July 27 22 | July 27 24 | 484 | 27 23 55 | 327 | 27 22 39 | 157 | 44.2 | 27 22 37 | 24.9 | 27 22 47 | 19.3 | 594 | 27 22 0 | 396 | 27 22 55 | 198 |
| 18 | Aug. 5 4 | Aug. 6 21 | 889 | 5 18 20 | 317 | 6 2 46 | 572 | 106.9 | 5 18 25 | 12.1 | 5 18 24 | 94.8 | 761 | 5 18 26 | 473 | 6 3 0 | 288 |
| 19 | Aug. 13 8 | Aug. 14 24 | 549 | 13 14 40 | 387 | 13 22 47 | 162 | 44.5 | 13 11 53 | 4.5 | 13 19 36 | 40.0 | 664 | 13 19 28 | 378 | 13 22 53 | 286 |
| 20 | Aug. 17 8 | Aug. 25 9 | 620 | 21 16 25 | 385 | 18 23 59 | 235 | 45.4 | 18 17 5 | 8.7 | 18 19 56 | 36.7 | 712 | 21 16 25 | 440 | 18 23 59 | 272 |
| 21 | Sept. 9 4 | Sept. 11 2 | 502 | 9 3 28 | 238 | 9 6 42 | 264 | 64.3 | 9 5 16 | 21.6 | 9 0 6 | 42.7 | 715 | 9 14 41 | 355 | 9 5 48 | 360 |
| 22 | Sept. 13 12 | Sept. 18 12 | 643 | 13 16 6 | 199 | 15 4 6 | 444 | 49.3 | 13 17 34 | -26.7 | 13 19 45 | 76.0 | 790 | 13 16 8 | 379 | 13 20 27 | 411 |
| 23 | Oct. 3 23 | Oct. 11 4 | 542 | 7 17 27 | 262 | 5 1 5 | 280 | 42.5 | 7 7 33 | 1.6 | 7 17 32 | 40.9 | 748 | 7 17 26 | 380 | 5 1 5 | 368 |
| 24 | Oct. 11 22 | Oct. 12 14 | 490 | 12 4 55 | 258 | 12 0 35 | 232 | 44.0 | 12 6 7 | 6.4 | 11 23 45 | 37.6 | 623 | 12 12 50 | 367 | 12 1 26 | 256 |
| 25 | Oct. 13 9 | Oct. 14 24 | 514 | 13 23 53 | 408 | 14 0 37 | 106 | 45.2 | 13 14 16 | 1.9 | 14 18 4 | 43.3 | 735 | 13 14 54 | 447 | 14 0 16 | 288 |
| 26 | Nov. 5 17 | Nov. 12 4 | 517 | 9 20 33 | 388 | 7 0 43 | 129 | 48.1 | 6 15 57 | -5.4 | 7 20 31 | 53.5 | 765 | 6 17 45 | 459 | 8 1 35 | 306 |
| 27 | Dec. 3 10 | Dec. 6 4 | 490 | 5 5 40 | 398 | 4 11 55 | 92 | 46.3 | 4 7 5 | 4.6 | 3 19 32 | 41.7 | 718 | 5 17 33 | 549 | 6 0 54 | 169 |
| 28 | Dec. 9 13 | Dec. 10 24 | 583 | 9 18 34 | 281 | 9 21 39 | 302 | 43.4 | 10 22 22 | -5.4 | 9 22 16 | 48.8 | 840 | 9 16 28 | 448 | 9 22 28 | 392 |

"Diurnal Inequalities."- The mean diurnal inequalities for all days, international quiet and disturbed days, for the months, seasons and the year, are given in Tables 53-61, and the corresponding inequality ranges in Table 62. The inequalities of H, D and V for international quiet and disturbed days are shown graphically in Plate I, whilst in Plate II are given vector diagrams illustrating the diurnal variation of magnetic force in the horizontal, the prime vertical and the meridian planes respectively.

All days. The ranges of the annual mean inequalities of H and D like those of 1932 are smaller than in any of the six previous years; that of V is less than in 1926 and 1930-32 but greater than in 1927-29.

Quiet days. The H and D ranges for the year are equal to or smaller than any since 1923. That of V is greater than in 1927-29 and 1932, but less than in 1926, 1930 and 1931.

In V, 1927, 1928 and 1929 had the smallest Q-day ranges, in the seasons as well as the years, 1930 considerably the largest; but in H and D the relation between the years is not so clear, 1927, 1928, and 1929 tending to have the largest ranges, 1931-33 the smallest, with the disturbed years 1926 and 1930 intermediate.

Disturbed days. The range of the annual inequality of H is less than in any of the previous years since 1924. The most outstanding month was May which had a range not reached since the three disturbed months of April, May and June 1930.

In D four of the last 10 years had slightly smaller ranges.

In V the range is less than in any year since 1928.

The disturbed day ranges in all three elements are, as usual, greatest in the Equinox season.

A comparison of the records of Eskdalemuir and Lerwick shows that in general the declination inequalities at the two places for all, quiet and disturbed days are very similar in general appearance, although minor irregularities on the one set of values are not always reproduced on the other, or, if so, only with diminished amplitude. Differences are more obvious on the horizontal force curves even on quiet days; and become conspicuous in the disturbed day inequalities in H in some months. In the case of vertical force these differences are even more marked. The table below shows the ratios of the ranges of the inequalities in the various months.

Ratio of the Range of the Inequality at Lerwick to that at Eskdalemuir. (1933)

| Type of Day. | Element. | Jan. | Feb. | Mar. | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|--------------|----------|------|------|------|-------|------|------|------|------|-------|------|------|------|
| q | D | 1.08 | .95 | .99 | .99 | .98 | 1.09 | 1.07 | 1.11 | 1.01 | .82 | 1.09 | 1.07 |
| d | D | 1.22 | 1.23 | 1.19 | 1.13 | 1.52 | 1.14 | 1.13 | 1.05 | 1.07 | 1.13 | 1.18 | 1.15 |
| q | H | .83 | .75 | 1.05 | 1.03 | 1.11 | 1.30 | 1.13 | 1.06 | .98 | .97 | .95 | .88 |
| d | H | 1.04 | 1.75 | 1.65 | 1.08 | 2.74 | 1.41 | 1.12 | 1.74 | 1.73 | .79 | 1.04 | 1.07 |
| q | V | 1.31 | 1.29 | .77 | 1.33 | .81 | .81 | .83 | .86 | 1.20 | .84 | 1.24 | 1.31 |
| d | V | 2.36 | 2.29 | 2.18 | 2.95 | .97 | 2.27 | 2.24 | 1.84 | 1.86 | 2.38 | 2.34 | 2.87 |

DIURNAL VARIATION OF THE MAGNETIC ELEMENTS

LERWICK 1933

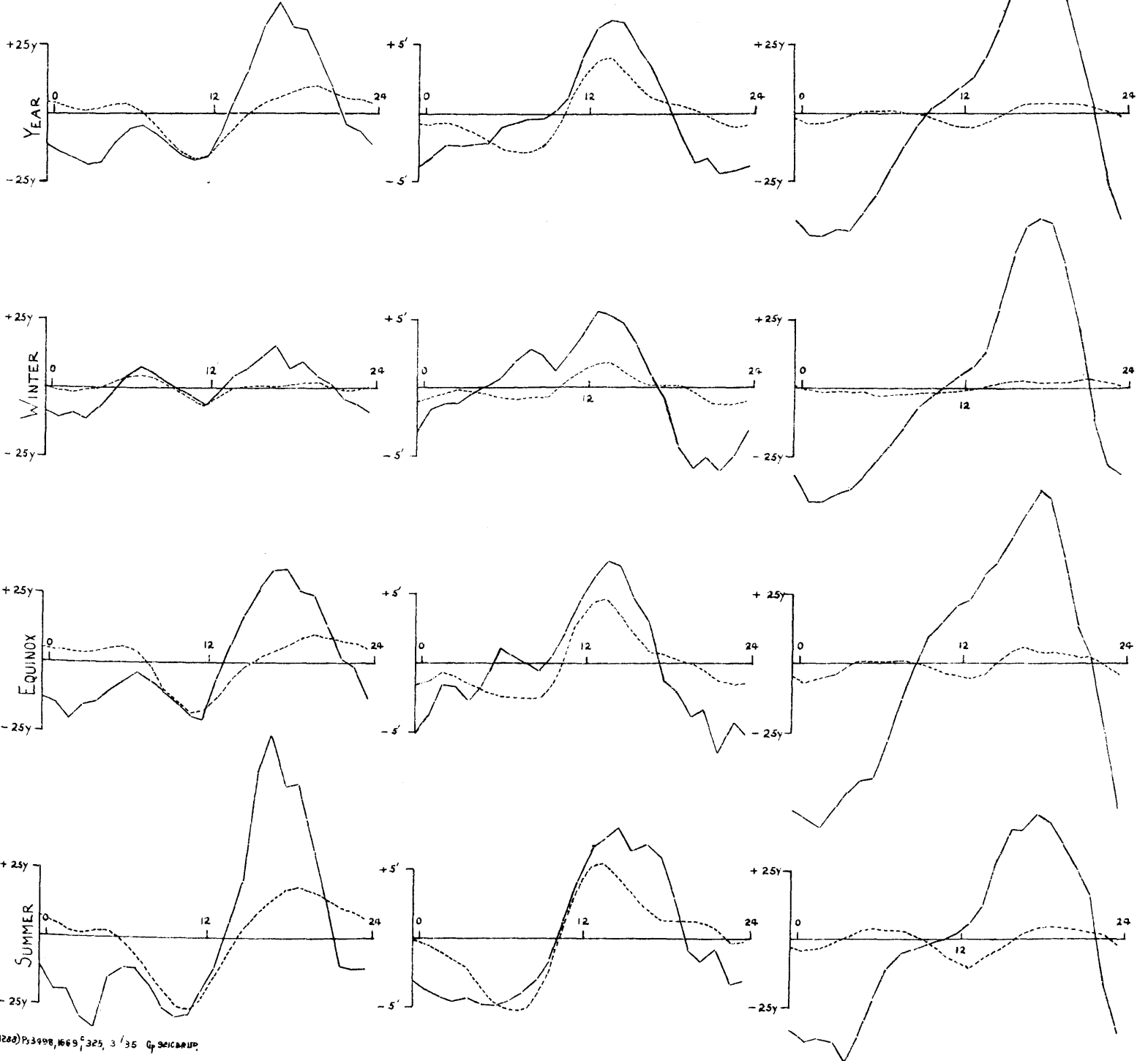
Horizontal Force

Declination

Vertical Force

Quiet days -----

Disturbed days ———



(1202) P33998, 1669°, 325, 3 / 35 Gp 20100000

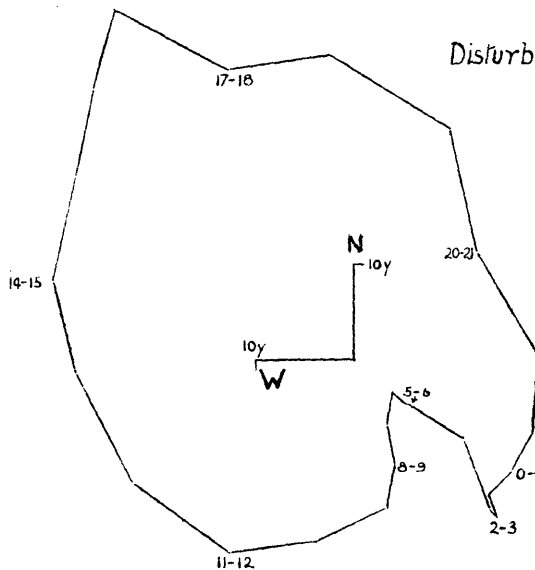
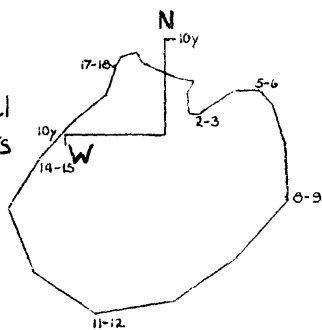
VECTOR DIAGRAMS ILLUSTRATING DIURNAL VARIATION OF MAGNETIC FORCE

LERWICK 1933

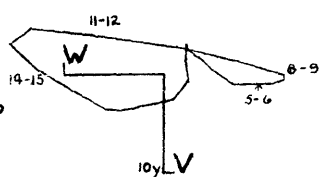
Quiet days

Disturbed days.

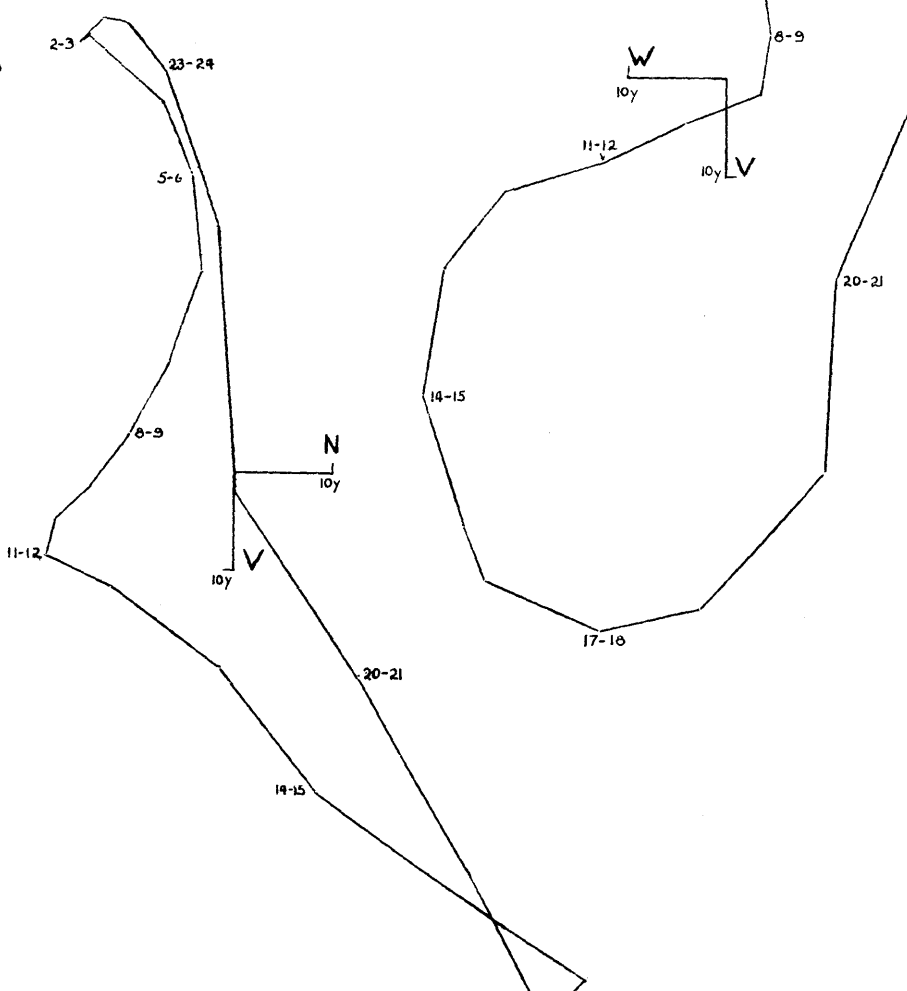
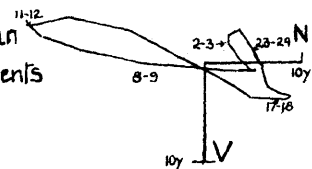
Horizontal
Components



Prime
Vertical
Components



Meridian
Components



"Magnetic Disturbances." - Particulars of the principal magnetic disturbances recorded at Lerwick during the year are given in Table VI. In the Eskdalemuir Section will be found a similar list which deals with the same disturbances as recorded at that Observatory. Within the limits of accuracy of measurement and registration, "sudden commencements" appear to occur simultaneously at the two Observatories.

Remarks on the Autographic Records, 1933.

JANUARY.- (Average Character Figure 0.61).

Disturbances were neither frequent nor very large. There was a hump in H 75 γ high at about 1d 20h accompanied by a 27' bay in D and a fall of about 65 γ in V. At 6d 0h 34m a small movement of the "sudden commencement" type occurred, marking the beginning of only slight disturbance. Again, on 15d there were some slow waves in all elements between the somewhat unusual times of 5h and 9h. The ranges in this period were:- H, 92 γ ; D, 19'; V, 78 γ . Otherwise the first half of the month was quiet.

H and V had peaks respectively 110 γ and 140 γ high at about 19d 16h; followed, after a long quiet interval, by bays between 20d 4h and 20d 6h. The V bay was 90 γ , the H bay 70 γ deep. A D bay 27' deep accompanied the peak, and a small D hump the bay in the other records.

On 22d - the only "2" day in the month - disturbance was confined to the evening. In H there were several peaks, the largest and sharpest, at 19h 8m. This feature also appeared in V and (inverted) in D. On all records the return greatly exceeded the outward swing, the movements being:- in H, +190 γ , -290 γ ; in V, +115 γ , -250 γ ; in D, -17', +42'. There was scarcely a sign of the deep bay which, in H and V, usually follows such an evening; but on the following night (ca 24d 1h) there were good bays in both - 180 γ deep in H, 160 γ in V. Records continued to be somewhat lively until the end of the month. In particular, there was at 27d 21h - 21h 40m a fall of 150 γ in V; and at the same time a 35' peak occurred in D, and an H bay 130 γ deep.

Aurora was seen from one or more places in Scotland on the evenings of January 1, 8, 15, 19, 22, 23 and 27-30. Apart from a short period of moderate activity, 22h 15m to 22h 21m on the 1st, as seen from Lerwick all were very weak displays.

FEBRUARY.- (Average Character Figure 0.64).

There was a period of not very violent disturbance from the 19th to 26th: otherwise, a particularly quiet month.

There were a number of periods of moderate disturbance during the afternoon and evening of the 19th, including a D bay 31' deep with a minimum at 18h 43m. H. showed two well-defined night bays respectively 210 γ and 250 γ deep with minima at 23h 25m and 20d 1h 34m. V fell 230 γ between 22h 20m and 23h 25m, remained very low but steady until 1h 30m, and then recovered rapidly. Two fairly large D bays were recorded in this period, but their minima, at 0h 6m and 1h 1m, did not coincide with those of H: indeed a small D hump was associated with the first H bay.

The rest of the 20th was fairly quiet; and the H and V bays of the night of 20-21st, though well-defined, were not large. H and V show fine, sharp peaks, 250 γ and 190 γ high, with the maxima at about 21d 16h 6m, and at the same time there was a bay 41' deep in D. A second H peak (of 80 γ) at 22h 9m was accompanied by a deep D bay and by a fall of 130 γ in V. V remained low until 22d 7h, reaching a minimum of 46434 γ at 0h 56m. H was also somewhat low during this period, although there were no very considerable bays.

Smaller outbreaks of disturbance were common until the 26th. A bay in D 39' deep occurred at 22d 18h 20m: and there were bays in H and V at about 23d 0h, respectively 150 γ and 130 γ deep. On the afternoon and evening of 23d there were several small humps in H. The one at 19h 33m, 80 γ high, was accompanied by a sharp peak in V 60 γ high and by a 40' bay in D. Fairly deep night bays in V and H were recorded at 26d 2h: and another in V but not, curiously enough, in H, at 26d 21h 53m. There was also a 29' bay in D at 26h 20h 45m.

Aurora, in all cases feeble, was seen from one or more places in Scotland on the evenings of February 1, 14, and 19-25.

MARCH.- (Average Character Figure 0.90).

Really quiet days were somewhat rare. On the other hand, there was only one period of really disturbed conditions (18th to 25th).

Bays in V, respectively 120 γ and 130 γ deep were recorded on the 11th (0-4h) and the 18th (2-8h). Each of these was accompanied by a "wave" in the D record, with a range of 18' on the 11th and of 24' on the 18th.

The main disturbance of the month began at 18d 22h 18m with a peak 80 γ high in H. This was followed by a swift fall of 410 γ to a minimum at 23h 18m, but the recovery was also rapid and after 19d 2h the curve was quiet. D and V both show fairly deep bays commencing with rapid falls at about 22h 25m, each of which was divided into two by a peak at 23h 40m (26' high in D, 100 γ in V).

This disturbance continued until the 25th. In no case was there very large H movement by day, but there were many quite deep night bays:- at 19d 20h 58m, 370 γ deep: at 20d 1h 34m, 240 γ deep: at 21d 23h 59m, 210 γ deep: at 22d 2h 50m, 180 γ deep: and at 24d 2h 59m, 160 γ deep. V readings were as usual very low for long periods during each night. On the night of 19th to 20th there were separate bays, respectively 160 γ and 190 γ deep, corresponding with the two H bays; but on the night of 21-22nd a single bay 200 γ deep covered the period occupied by both H bays. D showed a bay 42' deep at 19d 18h 57m accompanying a hump of 90 γ in H and a sharp fall in V, and a second one 46' deep at 21h 15m - not quite coincident with the main H bay. As often happens, the second H bay on this night was accompanied by a hump in D 33' high. The liveliest part of the D record was from 23d 15h 30m to 21h 30m; when the trace showed continual and fairly rapid movement, although the range was only 31'.

Aurora was seen from one or more places in Scotland on the evenings of March 17-25, 28 and 29. As seen from Lerwick only the display of the 19th was at all active. On this night, from about 20h 40m to 20h 50m the whole Northern half of the sky was covered with rays converging from the horizon

on a point almost overhead. Across the rays lay many bands, often with ray structure and at times brilliantly coloured in green and pink, which constantly altered their form. After 20h 47m the variations in the pattern became slower, but the whole began to pulsate rapidly. The display quickly decayed after about 21h 15m and by 21h 40m only a faint glow remained.

APRIL.- (Average Magnetic Character Figure 1.00).

Quiet days were few but on the other hand there were no really large disturbances.

There was a short period of fairly vigorous movement on the 15th between 20h and midnight. The first H movement was a sharp rise of 68γ at 20h 27m., followed by a bay 419γ deep. The movements immediately preceding and following the minimum were very rapid, the fall of 200γ and rise of 310γ occupying together only 15 minutes. V movements were similar, though the range, 231γ , was only about half that of H; while changes in D were roughly the reverse of those in H, with a range of $32'$.

This disturbance continued to affect the records until April 26th, chiefly in the form of night bays of moderate depth in H and V. There were also some fairly large changes in D, of which the most conspicuous were a bay $30'$ deep at 16d 19h 24m and a curious double wave with a range of $25'$ between 22h and 24h on the 21st.

At 30d 16h 28m H showed a beautiful "sudden commencement" (movements $-24\gamma, +91\gamma$) which however, though visible, was represented by only very small movements on the other records. Disturbance on this evening was not particularly great; H and V showed humps at about 20h 50m, followed by bays with minima a little before midnight, while the main feature in D was the bay accompanying the H and V humps. The ranges for the evening were all moderate - 229γ in H, 212γ in V, $35.7'$ in D.

Aurora was seen from one or more places in Scotland on the evenings of April 2, 12, 13, 16-18, 21, 23 and 30. All were very weak displays.

MAY.- (Average Character Figure 0.74).

A somewhat quiet month after the first two days.

The storm of 1d-2d was the greatest for several years, but the main changes were comparatively simple in form. H remained almost quiet until just before 1d 14h; then there was a single huge peak with a maximum at 16h 15m, followed by two bays at 21h 33m and 2d 0h 40m. These latter were separated by a swing of about 700γ towards normal values, and the total range of H on this day was 1811γ . V rose steadily, about 240γ , between 12h 40m and 15h 20m, and then fell 500γ very suddenly; rose again, irregularly, some 680γ before 21h 25m, when it again fell sharply, about 630γ . Once more V began to climb, but at 0h 26m, after rising 420γ , it fell sharply for the third time (460γ). After this it rose rapidly and was quite quiet after 2d 3h.

In D there was a period of high mean values and very large and swift swings between 1d 15h 20m and 18h 0m. Eight swings exceeded one degree, and the largest was $90'$. The two night bays in H were accompanied by D peaks respectively $70'$ and $60'$ high.

By 2d 3h all records were quiet, and there was little in the rest of the month that calls for comment. D showed a bay 30' deep at 4d 19h 14m, accompanied by a 90γ hump in V; and there were fairly deep night bays in both H and V at about 6d 2h 25m and 7d 0h 50m. A further mild disturbance was recorded on May 14 and 15. From 17d 22h to 18d 8h values of H and V were somewhat low, but there were no large or sudden movements. A small "sudden commencement" at 29d 6h 25m ushered in a further period of slight disturbance. H and V showed bays of fair depth (150γ in H, 170γ in V) centred about 30d 2h, accompanied by two peaks in D respectively 21' and 25' high.

Aurora was seen from some places in the north and west of Scotland on the evenings of May 1 and 2, the former a brilliant display.

JUNE.- (Average Character Figure 0.53).

A quiet month, without any large disturbance.

There were bays in H and V respectively 125γ and 170γ deep at 1d 3h-4h, accompanied by a hump in D 20' high. A very quiet week followed, but on the early morning of the 9th there were again bays of moderate depth in H and V.

The largest disturbance of the month began on the 13th. Values of H were a little high during the afternoon and early evening, but the main feature was a double bay with minima at 22h 49m and 14d 0h 16m. The second, and deeper bay was 200γ in depth. V movements were generally similar to those in H and the second bay, 250γ deep, was again the larger. There were also some movements in D, with a range for the evening of 40.7', but they seemed to bear no simple relation to the changes in the other elements. Further bays, 125γ deep in H, 170γ in V, accompanied by a D wave with a range of 28.6', occurred at 15d 2h.

The month contained two more periods of small disturbance (19th-20th and 25th to 29th) but nothing of interest was recorded on either occasion

JULY.- (Average Character Figure 0.48).

A quiet month: the 24th and 27th were the only "2" days, and both were only mild cases.

The first appreciable disturbance of the month began at about noon on the 23rd. During most of the afternoon and evening H and V values were a little high, but there was a bay in H 100γ deep with a minimum at 14h 48m. The D record was little affected until 22h, when there was a fall of about 26'. The usual night bays in H and V followed, with minima at about 24d 3h 30m. On the afternoon of the 24th there was an H hump 75γ high with a maximum at 16h 1m, accompanied (or rather slightly preceded) by a 100γ hump in V and a D bay 16' deep.

A series of quite quiet records was broken by a period of moderate disturbance between 27d 22h and 27d 24h. This appeared as a single V-shaped bay in both H and V (154γ deep in H and 190γ in V) while in D there were only a few irregular swings, on both sides of the normal, with a total range of only 19'.

AUGUST.- (Average Character Figure 0.55).

This again was a quiet month. It contained three "2" days, of which only the 5th showed any vigorous disturbance.

The chief feature on the 5th was a fine H peak, 420γ high at 18h 20m. Between 5d 18h and 19h V and D showed numerous rapid swings, the final result of which was a fall in both elements - 90γ in V, 50' in D. The largest swings in both occurred at about 18h 25m. The one in V, which occupied only about one minute, amounted to 271γ; the one in D to 70'. All three elements showed comparatively small bays at approximately 6d 3h.

The next period of disturbance came late on the 13th. The H record was the least affected of the three, for its largest feature was a night bay 90γ deep at 22h 47m. The corresponding V bay was 200γ in depth, and at the same time there was a 20' bay in D. A larger D bay (33' deep) was centred at 19h 36m, roughly corresponding with the maxima of H and V.

A third period of disturbance began on the afternoon of the 18th. None of the movements were very remarkable. A small peak, 100γ high, occurred in H at 17h 1m, and at midnight there was a bay 70γ deep. Although the V range was 267γ all its movements were quite slow. In D there were several bays during the evening, but the greatest, at 19h 56m, was only 25' deep.

On the 21st, at 16h 25m, there was a hump in H 86γ high, accompanied by a somewhat smaller one in V and a Day bay 20' deep. A second D bay, also about 20' deep, followed at 19h 53m. The records of the 23rd and 24th also show small disturbances, but, after that, the remainder of the month was quiet.

Aurora was seen from Baltasound on the evening of August 20.

SEPTEMBER.- (Average Character Figure 0.83).

There were no violent disturbances, but activity generally was greater than in recent months.

The first disturbance, which occurred on the 9th, was of an unusual type. In V there was a bay 240γ deep lasting from a little after 4h till 9h while H in the same period showed two bays, both about 260γ deep, separated by a great peak with a maximum at 5h 36m. In D there was a hump 42' high with a maximum at 5h 16m. After 10h the movements on this day were small, but there were bays of moderate depth in H and V with minima a little after 10d 2h.

The next outbreak began on the afternoon of the 13th. H and V began to rise at 14h, but at 18h both fell sharply back - H, 124γ, V, 90γ. A further fall in V, of 320γ began at 19h 20m; thereafter V remained low until 14d 3h though this long bay was divided by a low hump centred at 22h. H showed a bay of short duration, 105γ deep, at 20h 31m but the record generally was a type commoner in V - high afternoon values and a long low period at night, but no well-defined peaks or bays. D showed only one large departure from the normal - a bay 58' deep at 19h 45m.

Two D bays 23' and 27' deep at 19h 41m and 22h 0m, and a small H bay 120γ deep, at 22h 19m were the main features of the 14th. A much larger H bay was the one at 15d 4h 6m, 270γ deep, which was accompanied by a V bay of 177γ and a small D hump. The remainder of the month was tolerably quiet. There was an H bay 100γ deep at 19d 23h 16m, and V bays of moderate depth were recorded on the nights of 17-18th, 19-20th and 28-29th. D records during the second half of the month were rather livelier than those of H and V, but the movements were not large; the most striking feature was a small wave, forming two bays and an intervening hump with a range of 24·5', at 16d 20h 42m to 22h 18m.

Aurora was seen from one or more places in Scotland on the evenings of September 9-11, 13, 16-21, and 24-26. The displays of the 13th and 25th as seen from Lerwick were at times active and brilliant, though in no way unusual.

OCTOBER.- (Average Character Figure 0·68).

There were no very large disturbances but moderate ones were frequent during the first half of the month.

The first four days were quiet. Then at 5d 1h 5m, there occurred bays in H and V respectively 200γ and 150γ deep. A fairly quiet day followed, but at 5d 21h 16m there was a peak in H 60γ high, accompanied by shallow bays in V and D.

Small bays appeared on all records in the early morning of both the 6th and 7th while at 7d 17h 27m the H and V records showed peaks, respectively 85γ and 130γ high, accompanied by a 32' day in D. The records of the 8th, 9th and 10th all showed a certain liveliness, the main feature being a bay, 100γ deep in H and 130γ in V, at about 10d 1h 30m.

A much larger bay occurred at 12d 0h-2h. This was 200 γ deep in H and 215γ in V, and was accompanied by a D hump 31' high. On the 13th, V was the most strikingly disturbed element showing a well-defined peak at 14h 54m and a bay with a minimum at 14d 0h 16m. The other elements showed a few irregular movements at about these same hours. The main feature of the 14th were two bays in D, respectively 29' and 26' deep with minima at 18h 4m and 20h 19m. The first of these was accompanied by a shallow H bay, the second by an irregular wave in H having a range of 83γ.

The second half of the month was much quieter. The only features which call for mention were two small H peaks at 18d 20h 20m and 26d 21h 24m, respectively 55γ and 57γ high, each of which was accompanied by a small but sharply defined D bay.

Aurora was seen from one or more places in Scotland on the evenings of October, 1, 10-13, 15, 17, 20, 23-25 and 29. They were all weak or moderate displays. The most active as seen from Lerwick was that of the 24th - when, curiously enough, there was very little magnetic activity.

NOVEMBER.- (Average Character Figure 0·63).

This again was a month of small disturbances, of which the great majority were in the first fortnight.

The beginning of the month was quiet, but disturbance gradually grew greater during the first week. The main features of this period were two bays in D, at 3d 18h 42m and 4d 20h 45m, respectively 28' and 31' in depth. Throughout the 6th 7th and 8th, the H record was lively, but showed no large changes. In the late evening of each day there was a small hump, that of the 7th, 70γ high, being the largest; while a small night bay (80γ deep) appeared at 7d 0h 43m, and a still smaller one at 8d 1h 29m. In V the disturbed day pattern was well shown and the ranges were large, but all changes were slow. Disturbance in D also was of the usual type; the largest bays were the ones at 7d 16h 33m and 7d 20h 31m, respectively 29' and 33' deep.

After the 9th, this disturbance gradually decreased in intensity and from the 12th onwards the month was remarkably quiet. At 21d 15h 34m a D bay, 20' deep, appeared, and on the 27th there was a double peak in H, 95γ high, with maxima at 20h 26m and 20h 43m. V showed a 90γ hump with a maximum at 20h 26m, followed by two bays, each some 50γ deep, at 20h 40m and 21h 43m; while in D there were two bays, each about 30' deep, at 20h 40m and 21h 16m.

Aurora mostly feeble, was seen from one or more places in Scotland on the evenings of November 8-12, 17 and 22.

DECEMBER.- (Average Character Figure 0.42).

Disturbance was frequent during the first ten days, but the rest of the month was quiet.

Most of the records during the period 2nd-7th showed some activity, but the movements were generally small. In D, however, there were bays at 3d 19h 32m, 5d 15h 4m, 5d 17h 32m and 7d 19h 24m, all between 20' and 30' deep.

The 9th produced the greatest disturbance of the month. H was somewhat below normal during the early afternoon, but rose sharply just after 16h. The main features of this record were two peaks at 16h 30m and 18h 34m with maxima of 14562γ and 14583γ; and a single night bay with a minimum of 14281γ at 21h 39m. V was steady until 14h 30m, and then rose swiftly to a maximum of 46840γ at 16h 28m. Thereafter V showed a remarkably steady fall which continued (except for a 50γ hump at 21h 15m) until the minimum, 46448γ, was reached at 22h 28m. D changes were more irregular, but this element, also, decreased gradually from 16h onwards, and reached its minimum (12° 54.6') at 22h 16m. All elements returned to normal soon after midnight, but disturbance reappeared between 10d 15h and 10d 24h. In H and V the movements, though smaller, resembled those of the previous day; but the largest feature in D was a hump, 25' high, at 22h 22m.

At 18d 19h 16m and 18d 22h 24m, two bays appeared in D, the former 20', the latter 25' deep; and at 28d 23h 23m and 29d 2h 35m there were humps in H respectively 50γ and 45γ high, accompanied by shallow bays in V and D.

Aurora was seen from one or more places in Scotland on the evenings of December 4, 7, 9-11, 15, 16 and 18. The displays of 9th and 10th were seen fairly widely from the north and west of the country.

POTENTIAL GRADIENT (reduced to level surface): VOLTS PER METRE.
 Mean values for periods of sixty minutes, ending at exact hours, Greenwich Mean Time.

1933.

1. LERWICK.

| Day | January. Factor 1.26 | | | | February. Factor 1.28 | | | | March. Factor 1.27 | | | | | | | |
|------|----------------------|----------|------------|------------|-----------------------|----------|------------|------------|--------------------|----------|------------|------------|---------|--|--|--|
| | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | | | | |
| 1 | v/m. -452 | v/m. 107 | v/m. 84 | v/m. 126 | v/m. 66 | v/m. 95 | v/m. Z± | v/m. > 961 | v/m. 93 | v/m. 163 | v/m. 255 | v/m. 297 | | | | |
| 2 | 97 | 81 | 97 | 136 | Z± | 321 | 141 | Z± | 214 | 182 | 201 | 889 | | | | |
| 3 | 97 | 184 | 94 | 178 | 49 | 118 | Z± | 141 | 61 | 41 | 144 | 118 | | | | |
| 4 | 145 | 171 | 252 | 359 | -1000 | 82 | -194 | 148 | 134 | -13 | 121 | -131 | | | | |
| 5 | 129 | 0 | 145 | 191 | 79 | 36 | 115 | 154 | 28 | 57 | -102 | 322 | | | | |
| 6 | 200 | <-81 | 478 | 149 | 95 | 131 | 112 | <-968 | 191 | <-431 | 399 | 434 | | | | |
| 7 | 74 | 90 | 100 | 129 | 295 | 210 | 187 | 148 | 265 | 341 | 249 | -239 | | | | |
| 8 | 123 | 233 | 136 | (142) | 318 | 144 | 374 | 148 | 118 | 163 | 214 | <-638 | | | | |
| 9 | (97) | (97) | 107 | 149 | 79 | 85 | 115 | 102 | 226 | 195 | 93 | 239 | | | | |
| 10 | 65 | 29 | 139 | 16 | 62 | 92 | 134 | 102 | 329 | 309 | 392 | 775 | | | | |
| 11 | 65 | 81 | 139 | 142 | 79 | 98 | 161 | 108 | 450 | 542 | 609 | 376 | | | | |
| 12 | 58 | 113 | 161 | <-1017 | 128 | 125 | 194 | Z± | 322 | 348 | 593 | 367 | | | | |
| 13 | 100 | 233 | 145 | -65 | Z± | <-82 | 230 | 131 | 195 | 265 | 287 | 140 | | | | |
| 14 | 90 | 200 | 229 | 149 | 108 | 85 | 141 | 167 | 77 | 153 | 147 | 217 | | | | |
| 15 | -275 | 142 | 168 | 181 | 102 | 118 | 180 | 194 | 128 | 128 | 128 | 278 | | | | |
| 16 | 84 | 258 | 81 | -178 | 98 | 52 | 98 | 262 | -32 | <-1435 | 169 | 86 | | | | |
| 17 | 61 | 155 | Z - | > 226 | 69 | 72 | 148 | 180 | 118 | 93 | -501 | 163 | | | | |
| 18 | > 323 | 129 | 203 | Z± | 108 | 79 | <-46 | Z± | 112 | 144 | 159 | 274 | | | | |
| 19 | > -42 | > 543 | 197 | -23 | Z± | 377 | 118 | 134 | 159 | 163 | 191 | 182 | | | | |
| 20 | > 937 | 113 | 110 | 161 | 59 | 92 | 226 | 213 | 112 | 195 | > 447 | 89 | | | | |
| 21 | 68 | 187 | 252 | 304 | 348 | 239 | 85 | Z± | 93 | 354 | 153 | 159 | | | | |
| 22 | -158 | 158 | 191 | 236 | 331 | Z± | <-20 | 374 | 201 | 545 | 587 | 603 | | | | |
| 23 | 161 | 203 | 220 | 391 | > 889 | 190 | 249 | > 426 | 345 | 357 | 367 | 230 | | | | |
| 24 | 223 | 333 | 233 | 278 | 79 | 92 | > 436 | 131 | 195 | 239 | 309 | 252 | | | | |
| 25 | 174 | 200 | 155 | <-1227 | 66 | 154 | 187 | 184 | 207 | 239 | 338 | 408 | | | | |
| 26 | <-1612 | -65 | 187 | 245 | 141 | 171 | 148 | 75 | 319 | 303 | 306 | 268 | | | | |
| 27 | 116 | 362 | 203 | 74 | 194 | 171 | 161 | 151 | 140 | 121 | 51 | 214 | | | | |
| 28 | 61 | 81 | 126 | -81 | 82 | -82 | 167 | 102 | 281 | 166 | 128 | 163 | | | | |
| 29 | 19 | 165 | 78 | 171 | --- | --- | --- | --- | 77 | 169 | 236 | 159 | | | | |
| 30 | 87 | -74 | <-371 | > 539 | --- | --- | --- | --- | 226 | 134 | 93 | > 415 | | | | |
| 31 | Z± | > 517 | 149 | <-937 | --- | --- | --- | --- | Z± | > 287 | 134 | 144 | | | | |
| (a) | 145 | 184 | 168 | 203 | 163 | 137 | 178 | 205 | 187 | 228 | 258 | 266 | | | | |
| (b) | 44 | 162 | 153 | 144 | 122 | 100 | 168 | 152 | 191 | 224 | 218 | 237 | | | | |
| Mean | (a) 175 | | | | (b) 126 | | | | (a) 235 | | | | (b) 217 | | | |
| Day | April Factor 1.25 | | | | May Factor 1.22 | | | | June Factor 1.18 | | | | | | | |
| | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | | | | |
| 1 | v/m. Z± | v/m. 76 | v/m. 109 | v/m. 255 | v/m. 92 | v/m. 86 | v/m. 71 | v/m. 104 | v/m. 117 | v/m. 71 | v/m. 117 | v/m. 140 | | | | |
| 2 | 67 | -179 | -137 | 155 | 65 | 110 | 118 | 118 | 120 | 263 | 163 | 229 | | | | |
| 3 | 46 | 143 | 140 | 131 | 53 | 181 | 157 | 160 | Z± | 326 | 240 | 415 | | | | |
| 4 | 97 | 137 | 149 | 271 | 92 | 104 | 89 | 110 | 272 | 243 | 212 | 275 | | | | |
| 5 | 94 | 128 | 170 | 228 | 95 | 86 | 210 | 127 | 160 | 317 | 315 | 317 | | | | |
| 6 | 119 | 82 | 149 | 134 | 482 | 491 | 400 | 660 | 163 | 240 | 277 | 352 | | | | |
| 7 | <-148 | 185 | 237 | 444 | 545 | 302 | 148 | 167 | 432 | 380 | 272 | 289 | | | | |
| 8 | 271 | 207 | 365 | 395 | 98 | 127 | 172 | 124 | 143 | 86 | 149 | 149 | | | | |
| 9 | 593 | 140 | 164 | 170 | 124 | 101 | -9 | 104 | 106 | 109 | 100 | 163 | | | | |
| 10 | <-1110 | 119 | 204 | 213 | 86 | 127 | 112 | 148 | 100 | 97 | 94 | 149 | | | | |
| 11 | -638 | 192 | 109 | 167 | 92 | 148 | 53 | 107 | 109 | 209 | 146 | 186 | | | | |
| 12 | <-350 | Z± | 243 | 179 | 110 | 56 | 124 | 148 | 74 | 186 | 229 | 649 | | | | |
| 13 | 116 | 112 | 143 | 143 | 107 | 118 | 161 | <-548 | 418 | 317 | 123 | 109 | | | | |
| 14 | 119 | 187 | 119 | <-1408 | 148 | 166 | 110 | 121 | 197 | 220 | 203 | 632 | | | | |
| 15 | 52 | 143 | 185 | 161 | 133 | -30 | 92 | < 0 | 400 | 323 | 203 | 486 | | | | |
| 16 | 85 | 134 | 91 | 119 | 112 | 145 | 148 | 172 | -246 | 129 | 160 | -80 | | | | |
| 17 | 85 | 119 | 131 | 152 | 133 | 77 | 50 | 71 | 129 | 160 | 189 | 192 | | | | |
| 18 | 91 | > 377 | <-222 | 106 | 86 | 121 | 148 | -27 | 220 | 146 | 140 | 189 | | | | |
| 19 | 116 | 106 | 119 | 140 | <-932 | 406 | 429 | 459 | 215 | 154 | 152 | 134 | | | | |
| 20 | 73 | 128 | 109 | 167 | 403 | 281 | 542 | 568 | 109 | 143 | 140 | 166 | | | | |
| 21 | 55 | 109 | -261 | 103 | 343 | 408 | 311 | 539 | 166 | 252 | 263 | 117 | | | | |
| 22 | 179 | 88 | 134 | 164 | 225 | 337 | 195 | 290 | 192 | 312 | 292 | 186 | | | | |
| 23 | 82 | 143 | 140 | 195 | 222 | 86 | 104 | 663 | -186 | 160 | 140 | 200 | | | | |
| 24 | 116 | 116 | 143 | 109 | 249 | 204 | 228 | 201 | 177 | 163 | 143 | 400 | | | | |
| 25 | 70 | 161 | 219 | 85 | 252 | 281 | 175 | 249 | 255 | 160 | 154 | 132 | | | | |
| 26 | 274 | 593 | 407 | 514 | 118 | 118 | 95 | 104 | 92 | 57 | 140 | 63 | | | | |
| 27 | 243 | 243 | 313 | (365) | 74 | 107 | 89 | 89 | 106 | 89 | 143 | 186 | | | | |
| 28 | (243) | (334) | 268 | 40 | 59 | 74 | 80 | 133 | 149 | 112 | 149 | 146 | | | | |
| 29 | 198 | 210 | 192 | 58 | 133 | 167 | 184 | 189 | 103 | 92 | 132 | 123 | | | | |
| 30 | 43 | 164 | 106 | 128 | 148 | 160 | 47 | 133 | 94 | 114 | 129 | 149 | | | | |
| 31 | --- | --- | --- | --- | 104 | 133 | 77 | 118 | --- | --- | --- | --- | | | | |
| (a) | 141 | 172 | 180 | 189 | 166 | 177 | 164 | 213 | 178 | 188 | 177 | 239 | | | | |
| (b) | 112 | 166 | 148 | 179 | 169 | 171 | 151 | 203 | 151 | 183 | 175 | 222 | | | | |
| Mean | (a) 171 | | | | (b) 149 | | | | (a) 195 | | | | (b) 183 | | | |

Note:- The Potential Gradient is reckoned as positive if the potential increases upwards. For indeterminate potential gradient the notation Z is used.
 (a) Mean of all positive readings.
 (b) Mean from all complete days using both positive and negative readings.

1. LERWICK.

| Day | July Factor 1-22 | | | | August Factor 1-26 | | | | September Factor 1-27 | | | | | | |
|------|---------------------|-------------|-------------|---------------|----------------------|-------------|-------------|-----------------|-----------------------|-------------|-------------|-----------------|--|--|--|
| | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | | | |
| 1 | v/m. 173 | v/m. 92 | v/m. 271 | v/m. 450 | v/m. 95 | v/m. 98 | v/m. 111 | v/m. 138 | v/m. 94 | v/m. 106 | v/m. 82 | v/m. 158 | | | |
| 2 | 191 | 167 | 143 | 161 | 132 | 126 | 85 | 298 | 30 | 52 | 27 | 207 | | | |
| 3 | 226 | 271 | 191 | 319 | 200 | 378 | 107 | 130 | 395 | 435 | 85 | 88 | | | |
| 4 | 194 | 298 | 170 | 370 | 117 | 111 | 120 | 298 | 79 | 201 | 112 | 213 | | | |
| 5 | 244 | 167 | 414 | 438 | 98 | 184 | 286 | 139 | 125 | 274 | 295 | 240 | | | |
| 6 | 66 | 122 | 221 | 447 | > 184 | 95 | 83 | 120 | 198 | 170 | 76 | -36 | | | |
| 7 | 131 | 632 | 432 | 298 | 95 | 161 | 83 | 212 | 119 | 168 | 137 | 195 | | | |
| 8 | 263 | 173 | 286 | 396 | 95 | 83 | 89 | 153 | 131 | 140 | 119 | 137 | | | |
| 9 | 575 | 429 | 507 | 393 | 111 | 163 | < -230 | > 706 | 106 | 116 | 119 | 134 | | | |
| 10 | 450 | 161 | 444 | 316 | 144 | 111 | 80 | 111 | 85 | 122 | 186 | 283 | | | |
| 11 | 161 | 146 | 343 | 546 | 92 | 111 | 77 | 129 | 155 | 109 | 94 | 216 | | | |
| 12 | 134 | 116 | 131 | 128 | 86 | 104 | 117 | 166 | 179 | 73 | 116 | 94 | | | |
| 13 | 83 | 131 | 280 | 152 | 187 | 183 | 187 | 104 | 73 | 27 | 109 | -21 | | | |
| 14 | 203 | 173 | 221 | 149 | 107 | 77 | 129 | 298 | 91 | 109 | 94 | 43 | | | |
| 15 | 164 | 143 | 33 | 131 | 138 | 212 | 461 | 264 | -532 | 0 | 112 | 179 | | | |
| 16 | 75 | 113 | 89 | 149 | 80 | 77 | 80 | 147 | 97 | 94 | 179 | 407 | | | |
| 17 | 95 | 126 | 72 | 122 | 74 | 147 | 117 | 255 | 392 | 496 | 389 | 657 | | | |
| 18 | 131 | 104 | 107 | 98 | 92 | 52 | 49 | 95 | 246 | 225 | 119 | 246 | | | |
| 19 | 247 | 536 | 194 | 435 | < -18 | 58 | 92 | 184 | 347 | 271 | 88 | 46 | | | |
| 20 | 131 | 137 | -30 | 438 | 80 | 123 | 101 | 384 | 64 | 97 | 168 | 192 | | | |
| 21 | 229 | 361 | 530 | 292 | 187 | > 952 | 92 | 141 | 85 | 143 | 182 | 210 | | | |
| 22 | 182 | 194 | 119 | 119 | 101 | 510 | 126 | 190 | 112 | 149 | 162 | 198 | | | |
| 23 | 122 | 167 | 131 | 209 | < -200 | -614 | 120 | 123 | 79 | 112 | -213 | 158 | | | |
| 24 | 122 | 104 | 89 | 137 | 98 | 203 | 138 | 193 | 125 | 289 | 155 | 261 | | | |
| 25 | 89 | 125 | 92 | 116 | 153 | 246 | 378 | (307) | 103 | 137 | 155 | 225 | | | |
| 26 | 116 | 143 | 72 | 325 | 353 | 353 | 350 | 847 | 112 | 243 | 185 | 158 | | | |
| 27 | 98 | 107 | 60 | 89 | 537 | 583 | < -507 | 706 | (61) | (91) | 222 | 213 | | | |
| 28 | 72 | 77 | 119 | 134 | 418 | 362 | 144 | 215 | 146 | 234 | 310 | 116 | | | |
| 29 | 113 | 122 | 89 | 119 | 157 | 221 | 239 | 399 | 103 | 246 | 192 | 188 | | | |
| 30 | 104 | 125 | 95 | 110 | 132 | 359 | 129 | 169 | 112 | 152 | 137 | 146 | | | |
| 31 | 83 | 92 | 116 | 134 | 89 | 46 | 92 | 126 | --- | --- | --- | --- | | | |
| (a) | 170 | 189 | 202 | 249 | 152 | 213 | 144 | 249 | 139 | 169 | 151 | 200 | | | |
| (b) | 170 | 189 | 195 | 249 | 137 | 182 | 152 | 230 | 117 | 169 | 139 | 185 | | | |
| Mean | (a) 203 (b) 201 | | | | (a) 189 (b) 175 | | | | (a) 165 (b) 163 | | | | | | |
| Day | October Factor 1-30 | | | | November Factor 1-30 | | | | December Factor 1-27 | | | | | | |
| | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | 2 - 3 h. | 8 - 9 h. | 14 - 15 h. | 20 - 21 h. | | | |
| 1 | v/m. 93 | v/m. 112 | v/m. 182 | v/m. 230 | v/m. -38 | v/m. 122 | v/m. 170 | v/m. 362 | v/m. 119 | v/m. 162 | v/m. 153 | v/m. 140 | | | |
| 2 | 159 | 131 | 102 | 255 | -32 | > 288 | 125 | 134 | 93 | 156 | 156 | 150 | | | |
| 3 | 96 | 121 | 134 | 112 | 70 | 109 | 128 | 115 | 87 | 66 | 122 | 47 | | | |
| 4 | 77 | 140 | 189 | 118 | 93 | 61 | 77 | 147 | 87 | 119 | 109 | 147 | | | |
| 5 | 102 | 118 | 217 | 26 | 102 | 77 | 138 | 93 | 84 | 100 | 197 | 56 | | | |
| 6 | 83 | 32 | 67 | 131 | 115 | 163 | 122 | 96 | 103 | 140 | 125 | 140 | | | |
| 7 | 61 | 105 | 137 | 364 | 122 | 118 | 102 | 96 | 84 | 125 | 156 | 25 | | | |
| 8 | 89 | 96 | 64 | -73 | 96 | 80 | 96 | 141 | 78 | 62 | 109 | 125 | | | |
| 9 | 112 | 239 | -29 | -364 | 64 | 106 | -83 | 160 | 59 | 97 | 87 | 94 | | | |
| 10 | 112 | 150 | 156 | 134 | 118 | 93 | 144 | 118 | 34 | 62 | 131 | 125 | | | |
| 11 | 41 | 115 | 112 | 131 | 58 | 115 | -464 | -141 | 75 | 81 | 125 | 162 | | | |
| 12 | 102 | 99 | 112 | 77 | 70 | < -736 | 134 | 99 | 94 | 150 | 78 | 168 | | | |
| 13 | 67 | 80 | 166 | 156 | 400 | 118 | 192 | -458 | 128 | 125 | 100 | -6 | | | |
| 14 | 121 | 124 | 144 | 105 | 180 | 86 | 176 | -48 | 100 | 100 | 109 | 122 | | | |
| 15 | 77 | 99 | 153 | 6 | 70 | 122 | 182 | 125 | 78 | 97 | 125 | 87 | | | |
| 16 | < -287 | 121 | 112 | -99 | 96 | 80 | 166 | 0 | 69 | 94 | 90 | 103 | | | |
| 17 | 73 | 96 | 118 | 128 | 96 | 144 | 176 | 368 | 90 | 59 | 59 | 78 | | | |
| 18 | 70 | 108 | 300 | 169 | 112 | 90 | 170 | 80 | 78 | 34 | (94) | 90 | | | |
| 19 | 112 | 112 | 169 | 207 | 61 | 86 | 179 | 112 | 28 | 100 | 125 | 69 | | | |
| 20 | 131 | 172 | 175 | 144 | 77 | -42 | 16 | 64 | 81 | 103 | 125 | 144 | | | |
| 21 | 112 | 163 | 191 | 236 | 109 | 93 | 90 | 109 | 66 | 115 | 175 | 168 | | | |
| 22 | 38 | 89 | 163 | 182 | -64 | 102 | 150 | 93 | 81 | 56 | 66 | 90 | | | |
| 23 | 86 | -150 | 115 | 118 | 54 | 93 | 118 | 125 | 84 | 90 | 94 | 94 | | | |
| 24 | 57 | 102 | 121 | 182 | 74 | 99 | 186 | 317 | 119 | 59 | 47 | 106 | | | |
| 25 | 105 | 83 | < -159 | 217 | 61 | 99 | 102 | 115 | 234 | 178 | 172 | 209 | | | |
| 26 | 96 | 89 | 118 | -96 | 99 | 96 | 147 | 131 | 140 | 12 | 122 | 187 | | | |
| 27 | 83 | 86 | -89 | -188 | 125 | 115 | 160 | 170 | 41 | 103 | 128 | 109 | | | |
| 28 | 32 | 105 | 89 | -255 | 131 | 61 | 160 | 10 | 140 | 112 | 150 | 134 | | | |
| 29 | 86 | 105 | 140 | 156 | 144 | 128 | 144 | 115 | 69 | 106 | 115 | 75 | | | |
| 30 | 93 | 128 | 115 | 108 | 109 | 144 | 189 | 138 | -6 | 47 | 343 | 278 | | | |
| 31 | -213 | 96 | 124 | 80 | --- | --- | --- | --- | 137 | 268 | 190 | 181 | | | |
| (a) | 88 | 114 | 141 | 151 | 107 | 110 | 140 | 135 | 92 | 103 | 128 | 123 | | | |
| (b) | 78 | 106 | 128 | 89 | 97 | 99 | 112 | 98 | 89 | 103 | 128 | 119 | | | |
| Mean | (a) 123 (b) 100 | | | | (a) 123 (b) 101 | | | | (a) 111 (b) 110 | | | | | | |
| | | | | Annual Means. | | | | (a) 144 (b) 123 | | | | (a) 165 (b) 156 | | | |
| | | | | | | | | | | | | (a) 170 (b) 152 | | | |

The Potential Gradient is reckoned as positive if the potential increases upwards. For indeterminate potential gradient the notation Z is used.
 (a) Mean of all positive readings. (b) Mean from all complete days using both positive and negative readings.

POTENTIAL GRADIENT (reduced to level surface): DIURNAL INEQUALITIES (in volts per metre).

The departures from the mean of the day are adjusted for non-cyclic change.†
*On DAYS ONLY.

2. LERWICK.

1933.

| Month and Season | Hour 0-1 | G.M.T. 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 | † Non-cyclic Change | No. of Days Used | Mean Values |
|------------------|----------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------|----------|----------|---------------------|------------------|-------------|
| Jan. | v/m. -54 | v/m. -62 | v/m. -59 | v/m. -52 | v/m. -44 | v/m. -34 | v/m. +14 | v/m. +25 | v/m. +23 | v/m. +29 | v/m. - 9 | v/m. -13 | v/m. - 5 | v/m. -16 | v/m. + 6 | v/m. +29 | v/m. +27 | v/m. +62 | v/m. +76 | v/m. +67 | v/m. +36 | v/m. 0 | v/m. -21 | v/m. -26 | v/m. +44 | 6 | 206 |
| Feb. | -18 | -35 | -47 | -46 | -50 | -60 | -56 | -36 | -29 | -27 | -21 | +15 | +21 | +30 | +35 | +22 | +26 | +71 | +99 | +79 | +50 | 0 | -15 | - 9 | - 7 | 1 | 146 |
| Mar. | -44 | -32 | -39 | -47 | -23 | -22 | -13 | - 9 | 0 | +27 | +20 | +24 | +41 | +37 | +45 | +60 | +43 | +40 | +16 | + 3 | - 6 | -28 | -39 | -54 | + 1 | 12 | 282 |
| Apr. | -32 | -32 | -34 | -33 | -27 | -14 | - 6 | -17 | -24 | -30 | -28 | + 3 | +15 | +14 | +20 | +19 | +12 | +13 | +20 | +71 | +53 | +38 | +13 | -14 | -34 | 3 | 131 |
| May | -13 | -22 | -10 | + 7 | - 9 | +34 | + 5 | -17 | -13 | -20 | -20 | -33 | -19 | + 1 | -19 | -20 | - 7 | - 5 | + 4 | +22 | +54 | +53 | +41 | + 8 | -34 | 14 | 171 |
| June | + 5 | -16 | -18 | - 4 | + 5 | - 3 | - 3 | - 7 | -17 | -21 | -29 | -12 | + 2 | -21 | -19 | - 6 | - 2 | - 3 | - 1 | +19 | +53 | +34 | +46 | +17 | -43 | 18 | 196 |
| July | 0 | -31 | -73 | -51 | -39 | -15 | + 7 | + 3 | -28 | -39 | -47 | -39 | -16 | -26 | +10 | +28 | +49 | +41 | +46 | +31 | +57 | +62 | +47 | +21 | -27 | 18 | 214 |
| Aug. | -18 | 0 | -17 | -31 | -30 | -19 | - 7 | + 4 | +27 | -29 | - 3 | - 8 | -15 | -23 | - 6 | +36 | +30 | +13 | - 1 | - 1 | +15 | + 6 | + 9 | + 5 | + 9 | 8 | 141 |
| Sept. | -26 | -22 | -34 | -38 | -38 | -27 | + 7 | +19 | +13 | - 6 | -14 | -15 | - 6 | + 4 | + 5 | - 3 | + 3 | +22 | +39 | +49 | +55 | +31 | - 2 | -15 | +21 | 16 | 170 |
| Oct. | -34 | -45 | -42 | -39 | -44 | -46 | -38 | -20 | - 8 | - 8 | -12 | - 4 | +10 | +21 | +45 | +39 | +38 | +46 | +53 | +44 | +39 | +18 | - 1 | -13 | +13 | 8 | 137 |
| Nov. | - 2 | -18 | -23 | -21 | -24 | -14 | -23 | -19 | -12 | - 5 | -13 | - 6 | + 5 | +11 | +15 | +12 | +13 | +21 | +22 | +27 | +25 | +21 | +15 | - 6 | + 4 | 9 | 116 |
| Dec. | -16 | -25 | + 5 | + 3 | + 2 | + 4 | - 5 | + 5 | + 1 | - 9 | - 8 | - 1 | 0 | - 6 | + 1 | + 9 | + 9 | +15 | +18 | +21 | +18 | - 7 | -20 | -15 | + 9 | 7 | 111 |
| Year | -21 | -28 | -33 | -29 | -27 | -18 | -10 | - 6 | - 6 | - 7 | -15 | - 7 | + 3 | + 2 | +11 | +19 | +20 | +28 | +33 | +36 | +37 | +19 | + 6 | - 8 | - 4 | 120 | 168 |
| Winter | -23 | -35 | -31 | -29 | -29 | -26 | -17 | - 6 | - 4 | - 3 | -13 | - 1 | + 5 | + 5 | +14 | +18 | +19 | +42 | +54 | +49 | +32 | + 3 | -10 | -14 | +13 | 23 | 145 |
| Eqnx. | -34 | -33 | -37 | -39 | -33 | -27 | -13 | - 7 | - 5 | - 4 | - 9 | + 2 | +15 | +19 | +29 | +29 | +24 | +30 | +32 | +42 | +35 | +15 | - 7 | -24 | 0 | 39 | 180 |
| Summer | - 7 | -17 | -29 | -20 | -18 | - 1 | + 1 | - 4 | - 8 | -13 | -25 | -23 | -12 | -17 | - 9 | + 9 | +17 | +11 | +12 | +18 | +45 | +39 | +36 | +13 | -24 | 58 | 181 |

* 1a AND 2a DAYS ONLY.

3. LERWICK.

1933.

| Month and Season | Hour 0-1 | G.M.T. 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 | † Non-cyclic Change | No. of Days Used | Mean Values |
|------------------|----------|------------|-----------|-----------|-----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|----------|----------|----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|---------------------|------------------|-------------|
| Jan. | v/m. +32 | v/m. + 1 | v/m. -303 | v/m. -515 | v/m. -128 | v/m. +51 | v/m. +34 | v/m. + 3 | v/m. +35 | v/m. +10 | v/m. -226 | v/m. -122 | v/m. -106 | v/m. +18 | v/m. +70 | v/m. +83 | v/m. +109 | v/m. +87 | v/m. +113 | v/m. +140 | v/m. +127 | v/m. +192 | v/m. +199 | v/m. +106 | v/m. -47 | 1 | 127 |
| Feb. | - 8 | +31 | + 1 | - 9 | -30 | -18 | - 6 | - 4 | -27 | -24 | + 4 | - 5 | + 9 | +14 | +36 | +25 | + 2 | -11 | -18 | - 1 | +11 | +19 | + 9 | - 1 | - 5 | 6 | 106 |
| Mar. | -20 | -28 | -33 | -37 | -48 | -51 | -21 | +30 | +33 | -36 | -63 | -23 | + 2 | + 2 | +17 | +31 | +44 | +53 | +32 | +69 | +77 | +19 | -20 | -19 | -12 | 5 | 145 |
| Apr. | -32 | -28 | -65 | -68 | -55 | -22 | -11 | + 9 | +33 | +18 | -22 | -21 | + 2 | +19 | +19 | +25 | +36 | +45 | +40 | +53 | +29 | +27 | - 3 | -27 | + 9 | 8 | 166 |
| May | -34 | -12 | - 5 | -27 | -11 | - 1 | +26 | +15 | + 6 | -30 | -17 | -25 | -53 | -23 | -37 | - 8 | + 8 | +15 | +30 | +56 | +32 | +53 | +39 | + 3 | +12 | 11 | 189 |
| June | + 9 | -10 | +15 | +21 | +18 | +15 | -33 | + 2 | +25 | +29 | -14 | - 9 | -10 | -14 | + 6 | - 4 | + 8 | - 2 | +11 | +26 | -11 | -18 | - 8 | -21 | +75 | 7 | 160 |
| July | -17 | -91 | + 1 | -29 | -21 | +30 | +37 | +33 | +60 | +42 | +10 | -57 | -55 | -46 | -55 | -16 | - 5 | +33 | +53 | +19 | +58 | +21 | + 2 | - 9 | +49 | 5 | 164 |
| Aug. | -16 | -61 | -49 | -51 | -37 | -15 | + 5 | - 8 | - 2 | - 7 | + 4 | -46 | -51 | -54 | -36 | -29 | -26 | + 2 | +40 | +85 | +103 | +107 | +135 | + 8 | -86 | 9 | 160 |
| Sept. | +41 | +24 | +43 | +18 | -84 | -29 | -54 | -18 | +68 | +32 | -45 | -21 | -26 | -23 | - 7 | -31 | -38 | -11 | +31 | +42 | +15 | +41 | +17 | +28 | -53 | 4 | 131 |
| Oct. | -21 | -17 | -16 | -23 | -32 | -44 | -36 | -31 | -24 | -25 | -20 | 0 | + 7 | +22 | +25 | +24 | +21 | 0 | +46 | +50 | +40 | +28 | +23 | + 3 | - 6 | 12 | 107 |
| Nov. | -43 | -19 | -31 | -14 | -16 | -15 | -37 | -20 | - 5 | -25 | -19 | -24 | - 5 | + 4 | +17 | +38 | +57 | +12 | +37 | +47 | +71 | +15 | - 1 | -25 | - 3 | 8 | 116 |
| Dec. | -12 | -36 | -20 | -22 | -23 | -20 | -23 | - 8 | - 2 | + 3 | - 9 | + 3 | +10 | +27 | +22 | +22 | +28 | +46 | +21 | +17 | +12 | - 8 | -19 | - 6 | + 3 | 17 | 103 |
| Year | -10 | -21 | -39 | -63 | -39 | -12 | -10 | 0 | +15 | - 1 | -35 | -29 | -23 | - 5 | + 6 | +13 | +20 | +22 | +36 | +49 | +47 | +41 | +31 | + 3 | - 5 | 93 | 139 |
| Winter | - 8 | - 6 | -88 | -140 | -49 | - 1 | - 8 | - 7 | - 2 | - 9 | -63 | -37 | -23 | +16 | +36 | +42 | +49 | +33 | +38 | +51 | +55 | +55 | +47 | +19 | -13 | 32 | 113 |
| Eqnx. | - 8 | -12 | -18 | -27 | -65 | -37 | -31 | - 3 | +25 | - 3 | -37 | -16 | - 4 | + 5 | +13 | +12 | +16 | +22 | +37 | +51 | +40 | +29 | + 4 | - 4 | -15 | 29 | 137 |
| Summer | -15 | -43 | - 9 | -21 | -13 | 0 | + 9 | +11 | +22 | + 9 | - 4 | -34 | -42 | -34 | -31 | -14 | - 4 | +12 | +33 | +47 | +45 | +41 | +42 | - 5 | +13 | 32 | 166 |

† See page 21

* Note for explanation of Qa, 1a, and 2a Days, see page 55.

ELECTRICAL CHARACTER OF EACH DAY, AND APPROXIMATE DURATION OF NEGATIVE POTENTIAL GRADIENT.

4. LERWICK.

1933.

| Day. | January. | | February. | | March. | | April. | | May. | | June. | | July. | | August. | | September. | | October. | | November. | | December. | |
|-------------------|-------------|-----------------------------------|-------------|-----------------------------------|-------------|-----------------------------------|-------------|-----------------------------------|-------------|-----------------------------------|-------------|-----------------------------------|-------------|-----------------------------------|-------------|-----------------------------------|-------------|-----------------------------------|-------------|-----------------------------------|-------------|-----------------------------------|-------------|-----------------------------------|
| | Char-acter. | Dura-tion of nega-tive pot. grad. | Char-acter. | Dura-tion of nega-tive pot. grad. | Char-acter. | Dura-tion of nega-tive pot. grad. | Char-acter. | Dura-tion of nega-tive pot. grad. | Char-acter. | Dura-tion of nega-tive pot. grad. | Char-acter. | Dura-tion of nega-tive pot. grad. | Char-acter. | Dura-tion of nega-tive pot. grad. | Char-acter. | Dura-tion of nega-tive pot. grad. | Char-acter. | Dura-tion of nega-tive pot. grad. | Char-acter. | Dura-tion of nega-tive pot. grad. | Char-acter. | Dura-tion of nega-tive pot. grad. | Char-acter. | Dura-tion of nega-tive pot. grad. |
| | hrs. | | hrs. | | hrs. | | hrs. | hrs. | | hrs. | | hrs. | hrs. | | hrs. | | hrs. | hrs. | | hrs. | hrs. | | hrs. | hrs. |
| 1 | 2b | 4.1 | 1c | 1.4 | 1a | 0.1 | 1b | 0.3 | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 1a | 0.3 | 2a | 3.7 | 0a | --- |
| 2 | 1b | 2.9 | 2c | 3.6 | 0a | --- | 2c | 10.1 | 0a | --- | 1a | 0.1 | 1a | 0.1 | 1a | 0.1 | 1b | 3.1 | 1a | 0.8 | 2b | 5.1 | 1d | 0.7 |
| 3 | 1b | 1.8 | 1b | 1.3 | 1a | 1.0 | 1a | 1.1 | 1a | 0.6 | 1b | 0.8 | 0a | --- | 0a | --- | 1a | 1.4 | 1a | 1.3 | 1b | 2.3 | 1a | 1.2 |
| 4 | 0a | --- | 2b | 4.8 | 2b | 5.7 | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 0a | --- |
| 5 | 2c | 5.3 | 1a | 1.4 | 2b | 7.0 | 1a | 0.6 | 1b | 3.0 | 1b | 0.1 | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 0a | --- |
| 6 | 1c | 1.5 | 2b | 4.9 | 2c | 6.3 | 0a | --- | 1a | 0.3 | 0a | --- | 0a | --- | 1b | 1.4 | 1b | 2.3 | 1a | 0.1 | 0a | --- | 0a | --- |
| 7 | 2b | 4.9 | 1b | 1.6 | 1b | 1.0 | 1b | 1.8 | 0a | --- | 0a | --- | 0a | --- | 1a | 0.1 | 0a | --- | 0a | --- | (1a) | (0.3) | 1b | 1.0 |
| 8 | (1b) | (0.1) | 2b | 5.1 | 1b | 1.3 | 1b | 0.7 | 0a | --- | 0a | --- | 0a | --- | 1a | 0.3 | 0a | --- | 2b | 3.9 | 0a | --- | 0a | --- |
| 9 | (1b) | (0.3) | 1a | 0.6 | 1a | 0.2 | 2b | 3.7 | 1a | 2.1 | 0a | --- | 1b | 1.4 | 1c | 1.3 | 0a | --- | 2b | 5.3 | 1a | 1.7 | 1a | 0.5 |
| 10 | 1b | 2.8 | 1b | 0.2 | 1b | 0.5 | 1b | 2.7 | 0a | --- | 1a | 0.2 | 1b | 2.6 | 1b | 1.0 | 0a | --- | 1a | 1.2 | 1a | 0.2 | 1a | 1.7 |
| 11 | 0a | --- | 1a | 0.1 | 0a | --- | 1b | 1.9 | 1a | 1.0 | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 1b | 0.9 | 2b | 5.4 | 1a | 0.1 |
| 12 | 2b | 4.8 | 1c | 1.5 | 0a | --- | 2c | 3.2 | 1a | 1.2 | 0a | --- | 0a | --- | 0a | --- | 1a | 0.2 | 1a | 0.6 | 2c | 6.7 | 1b | 1.0 |
| 13 | 1b | 1.1 | 1c | 2.8 | 1b | 1.1 | 1b | 0.5 | 1b | 2.8 | 0a | --- | 0a | --- | 0a | --- | 1a | 2.3 | 1a | 1.8 | 2b | 4.7 | 1b | 2.5 |
| 14 | 1b | 2.1 | 1b | 0.8 | 1b | 1.0 | 2b | 5.5 | 1b | 2.8 | 0a | --- | 1b | 1.5 | 1a | 0.3 | 2b | 4.5 | 1a | 0.2 | 1b | 1.9 | 1a | 0.4 |
| 15 | 2b | 4.1 | 0a | --- | 1b | 2.7 | 1a | 0.3 | 1b | 1.0 | 0a | --- | 1b | 2.5 | 1b | 0.7 | 2b | 6.9 | 2b | 3.7 | 2b | 4.1 | 1a | 1.2 |
| 16 | 2b | 6.9 | 2c | 4.0 | 2c | 7.5 | 1b | 1.0 | 1a | 0.2 | 2c | 9.0 | 1a | 0.1 | 1b | 1.3 | 0a | --- | 1b | 3.0 | 1b | 2.6 | 1a | 0.1 |
| 17 | 2c | 3.2 | 1b | 1.0 | 2c | 4.0 | 1b | 0.1 | 1a | 2.9 | 1a | 0.6 | 1a | 0.3 | 1a | 0.1 | 0a | --- | 1a | 0.4 | 1a | 0.1 | 0a | --- |
| 18 | 1c | 2.9 | 1c | 1.9 | 1a | 0.1 | 1c | 1.1 | 1b | 2.7 | 1a | 0.4 | 0a | --- | 1a | 1.5 | 1a | 0.1 | 0a | --- | 1a | 1.1 | (1a) | (0.1) |
| 19 | 2c | 3.9 | 1b | 1.2 | 0a | --- | 1a | 0.2 | 2b | 4.4 | 0a | --- | 1a | 1.4 | 1b | 2.1 | 1b | 0.8 | 0a | --- | 1a | 1.3 | 1a | 2.2 |
| 20 | 1b | 1.2 | 2b | 5.1 | 1c | 1.4 | 1b | 2.5 | 0a | --- | 0a | --- | 1b | 1.6 | 1b | 1.3 | 1a | 0.3 | 0a | --- | 1b | 2.3 | 1a | 0.1 |
| 21 | 0a | --- | 1b | 0.5 | 1a | 1.0 | 2b | 3.3 | 1a | 0.1 | 0a | --- | 0a | --- | 1c | 1.2 | 0a | --- | 0a | --- | 0a | --- | 1a | 0.1 |
| 22 | 2a | 3.7 | 1c | 2.4 | 0a | --- | 1b | 1.4 | 0a | --- | 1a | 0.1 | 0a | --- | 1c | 0.7 | 0a | --- | 2a | 4.2 | 1b | 2.2 | 0a | --- |
| 23 | 0a | --- | 1c | 1.8 | 0a | --- | 1a | 0.2 | 0a | --- | 2b | 3.1 | 0a | --- | 2c | 6.0 | 1b | 1.5 | 1a | 2.3 | 0a | --- | 1a | 0.2 |
| 24 | 0a | --- | 1c | 2.2 | 0a | --- | 0a | --- | 1a | 0.1 | 0a | --- | 1b | 0.5 | 0a | --- | 1b | 1.6 | 0a | --- | 0a | --- | 1a | 0.6 |
| 25 | 2b | 5.0 | 2c | 3.3 | 0a | --- | 1a | 0.1 | 0a | --- | 0a | --- | 1b | 0.5 | (0a) | --- | 0a | --- | 2b | 4.2 | 0a | --- | 0a | --- |
| 26 | 2b | 8.3 | 1a | 1.7 | 0a | --- | 1a | 0.1 | 0a | --- | 1a | 0.1 | 1a | 0.1 | (0a) | --- | 0a | --- | 2b | 3.8 | 0a | --- | 1a | 1.7 |
| 27 | 0a | --- | 1a | 0.1 | 0a | --- | 1b | 1.5 | 0a | --- | 0a | --- | 0a | --- | 1b | 1.5 | 0a | --- | 2b | 5.5 | 1a | 1.4 | 2b | 4.1 |
| 28 | 2b | 4.1 | 1a | 1.6 | 0a | --- | 1b | 2.5 | 0a | --- | 0a | --- | 1b | 0.7 | 1a | 0.3 | 0a | --- | 1c | 2.7 | 1b | 2.9 | 1b | 2.1 |
| 29 | 2b | 3.5 | 0a | --- | 0a | --- | 1b | 0.5 | 1a | 0.1 | 0a | --- | 0a | --- | 1a | 0.5 | 0a | --- | 2b | 5.1 | 1a | 0.6 | 1a | 0.1 |
| 30 | 2c | 7.0 | 1b | 1.6 | 1a | 0.9 | 1a | 0.9 | 1a | 0.6 | 1a | 0.1 | 0a | --- | 1a | 0.1 | 0a | --- | 1a | 0.5 | 0a | --- | 2c | 7.3 |
| 31 | 2c | 8.7 | 1c | 1.0 | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 0a | --- | 1b | 1.2 | 0a | --- | 2b | 4.3 | 0a | --- | 1a | 0.5 |
| Total | 40 | 94.2 | 34 | 56.7 | 24 | 44.5 | 32 | 47.8 | 18 | 25.4 | 13 | 14.6 | 13 | 13.3 | 22 | 23.0 | 14 | 25.0 | 32 | 56.1 | 26 | 50.0 | 26 | 29.6 |
| No. of days used. | 31 | 31 | 28 | 28 | 31 | 31 | 30 | 30 | 31 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 30 | 30 | 31 | 31 | 30 | 30 | 31 | 31 |
| Mean | 1.29 | 3.0 | 1.21 | 2.0 | 0.77 | 1.4 | 1.07 | 1.6 | 0.58 | 0.8 | 0.43 | 0.5 | 0.42 | 0.4 | 0.71 | 0.7 | 0.47 | 0.8 | 1.03 | 1.8 | 0.87 | 1.7 | 0.84 | 1.0 |

Annual Values :- Character Frequency 0 1 2
 126 184 55
 Mean Character Figure .081 (365 days)
 Duration of negative pot. grad: Total 480.2 hrs.
 No. of days 365
 Mean 1.32

Explanatory Note:- The electrical 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. The explanation of these symbols is as follows:-

- 0. denotes a day during which from midnight to midnight no negative potential was recorded.
- 1. denotes a day with excursions to the negative not amounting in the aggregate to more than three hours.
- 2. denotes negative potential extending in the aggregate over three hours or more.
- a, denotes that within the 24 periods of 60 minutes for which an estimate of the mean potential gradient has to be made in the process of tabulation, there was in no case a range of potential gradient in the open exceeding 1000 volts.
- b, denotes that a range of potential gradient in the open exceeding 1,000 volts was reached in at least one but in fewer than six of the 24 hourly periods referred to above.
- c, denotes that a range of 1,000 volts or more occurred in at least six of the 24 hourly periods.

LE 5/1933/012/01/35 140

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

14,000 γ (•14 C.G.S. unit) +

JANUARY, 1933.

5. LERWICK. (H.)

19
27

Table with columns: Hour G. M. T., Day, 0-1 to 23-24, Mean. Rows include days 1-31 and a Mean row. Values range from 472 to 500.

LE 1933/012/01/35 140

MAGNETIC DECLINATION (WEST).

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

13° +

JANUARY, 1933.

6. LERWICK. (D.)

Table with columns: Hour G. M. T., Day, 0-1 to 23-24, Mean. Rows include days 1-31 and a Mean row. Values range from 34.9 to 41.1.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

9. LERWICK. (H.)

14,000 γ ($\cdot 14$ C.G.S. unit) +

FEBRUARY, 1933.

Table with 25 columns (0-1 to 23-24) and 25 rows (Day 1 to Mean). Data represents magnetic force values for Lerwick (H.) in February 1933.

MAGNETIC DECLINATION (WEST)
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

10. LERWICK. (D.)

13° +

FEBRUARY, 1933.

Table with 25 columns (0-1 to 23-24) and 25 rows (Day 1 to Mean). Data represents magnetic declination values for Lerwick (D.) in February 1933.

TERRESTRIAL MAGNETIC FORCE: VERTICAL COMPONENT. Mean values for periods of sixty minutes ending at the Hours of Greenwich Mean Time.

11. LERWICK. (V.)

46,000 γ (+46 C.G.S.unit) +

FEBRUARY, 1933.

Table with 25 columns (Hour G. M. T., 0-1 to 23-24, Mean) and 28 rows (Day 1 to 28). Data represents vertical magnetic force components.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS: MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

12. LERWICK.

FEBRUARY, 1933.

Table with 15 columns (Day, Horizontal Force, Declination, Vertical Force, HRH+VR, Magnetic Character, Temperature) and 28 rows (Day 1 to 28). Data represents daily extremes of magnetic elements and temperature.

For explanation see p. 38.

Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 56-61.

13. LERWICK. (H.)

14,000 γ (·14 C.G.S.unit) +

Table with 24 columns (0-1 to 23-24) and 25 rows (Day 1 to Mean). Values range from 462 to 530.

MAGNETIC DECLINATION (WEST).

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

14. LERWICK (D.)

13° +

Table with 24 columns (0-1 to 23-24) and 32 rows (Day 1 to Mean). Values range from 34.0 to 39.9.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT. Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

17. Lerwick. (H.)

14,000 Y (.14 C.G.S. unit) +

April, 1932.

Table with 24 columns (0-1 to 23-24) and 30 rows (Day 1 to 30 Q). Includes a 'Mean' row at the bottom. Values range from 463 to 509.

LE 13/1932 out of base

MAGNETIC DECLINATION (WEST).

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

18. Lerwick. (D.)

15° +

April, 1932.

Table with 24 columns (0-1 to 23-24) and 30 rows (Day 1 to 30 Q). Includes a 'Mean' row at the bottom. Values range from 46.0 to 52.7.

Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 56-61.

062

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

25. LERWICK. (H.)

14,000γ (.46 C.G.S.unit) +

JUNE, 1933.

Table with 23 columns (Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, Mean) and 30 rows (Day 1 D, 2, 3, 4, 5 Q, 6 Q, 7, 8, 9, 10, 11, 12, 13 D, 14 D, 15, 16 Q, 17, 18 Q, 19, 20 D, 21, 22, 23, 24 Q, 25, 26, 27, 28 D, 29, 30, Mean). Each cell contains a numerical value representing magnetic force.

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MAGNETIC DECLINATION (WEST)
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

26. LERWICK. (D.)

13° +

JUNE, 1933.

Table with 23 columns (Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, Mean) and 30 rows (Day 1 D, 2, 3, 4, 5 Q, 6 Q, 7, 8, 9, 10, 11, 12, 13 D, 14 D, 15, 16 Q, 17, 18 Q, 19, 20 D, 21, 22, 23, 24 Q, 25, 26, 27, 28 D, 29, 30, Mean). Each cell contains a numerical value representing magnetic declination.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

29. LERWICK. (H.)

14,000γ (-14 C.G.S.unit) +

JULY, 1933.

Table with 24 columns (0-1 to 23-24) and 25 rows (Day 1 to Mean). Contains magnetic force data for Lerwick (H.) in July 1933.

MAGNETIC DECLINATION (WEST).
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

30. LERWICK. (D.)

13° +

JULY, 1933.

Table with 24 columns (0-1 to 23-24) and 25 rows (Day 1 to Mean). Contains magnetic declination data for Lerwick (D.) in July 1933.

Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 56-61

TERRESTRIAL MAGNETIC FORCE: VERTICAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

31. LERWICK. (V.)

46,000γ (.46 C.G.S.unit) +

JULY, 1933.

Table with 24 columns (Hour G. M. T., 0-1 to 23-24, Mean) and 31 rows (Day 1 to 31). Contains magnetic force data for Lerwick.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS:
MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

32. LERWICK.

JULY, 1933.

Table with 14 columns (Day, Horizontal Force, Declination, Vertical Force, HRH+VRV, Magnetic Character, Temperature) and 31 rows (Day 1 to 31). Contains magnetic character and temperature data for Lerwick.

§ For explanation see page 38. Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of tables 56-61.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

33. LERWICK. (H.)

14,000 γ (·14 C.G.S.unit) +

AUGUST, 1933.

Table with 24 columns (0-1 to 23-24) and 25 rows (Day 1 Q to Mean). Values range from 468 to 508.

34. LERWICK. (D.)

13° +

AUGUST, 1933.

MAGNETIC DECLINATION (WEST). Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

Table with 24 columns (0-1 to 23-24) and 25 rows (Day 1 Q to Mean). Values range from 26.4 to 35.5.

Q denotes an "International Quiet Day", While D denotes a disturbed day used for the computation of Tables 56-61.

092

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT. Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

37. LERWICK. (H.)

14,000 γ (-14 C.G.S. unit) +

SEPTEMBER, 1933.

Table with 24 columns (0-1 to 23-24) and 30 rows (Day 1 to 30). Includes a 'Mean' row at the bottom. Values range from approximately 390 to 499.

091

MAGNETIC DECLINATION (WEST). Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

38. LERWICK. (D.)

13° +

SEPTEMBER, 1933.

Table with 24 columns (0-1 to 23-24) and 30 rows (Day 1 to 30). Includes a 'Mean' row at the bottom. Values range from approximately 27.2 to 37.7.

Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 56-61.

TERRESTRIAL MAGNETIC FORCE: VERTICAL COMPONENT. Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

39. LERWICK. (V.)

46,000 γ (·46 C.G.S. unit) +

SEPTEMBER, 1935.

Table with 25 columns (0-1 to 23-24) and 25 rows (Day 1 to 30). Each cell contains a numerical value representing magnetic force. Includes a 'Mean' row at the bottom.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS: MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE

40. LERWICK.

SEPTEMBER, 1935.

Table with 12 columns: Day, Horizontal Force (Maximum, Minimum, Range), Declination (Maximum, Minimum, Range), Vertical Force (Maximum, Minimum, Range), HRh+VRv, Magnetic Character of Day, Temperature in Magnet House. Includes a 'Mean' row and a 'No. of Days Used' row.

§ For explanation see page 38. Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 56-61.

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TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

41. LERWICK. (H.)

14,000γ (·14 C.G.S.unit) +

OCTOBER, 1933.

Table with 23 columns (Hour G. M. T., 0-1 to 23-24, Mean) and 32 rows (Day 1 to 31). Data values range from 431 to 488.

101

MAGNETIC DECLINATION (WEST).
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

42. LERWICK. (D.)

13° +

OCTOBER, 1933.

Table with 23 columns (Hour G. M. T., 0-1 to 23-24, Mean) and 32 rows (Day 1 to 31). Data values range from 27.0 to 35.5.

Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 56-61.

TERRESTRIAL MAGNETIC FORCE: VERTICAL COMPONENT. Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

43. LERWICK. (V.)

46,000 γ (.46 C.G.S. unit) +

OCTOBER, 1933.

Table with 24 columns (Hour G. M. T., 0-1 to 23-24, Mean) and 31 rows (Day 1 Q to 31). Data represents vertical magnetic force components.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS: MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

44. LERWICK

OCTOBER, 1933.

Table with 13 columns (Day, Horizontal Force, Declination, Vertical Force, HRh+VRv, Magnetic Character, Temperature) and 31 rows (Day 1 Q to 31). Data includes magnetic extremes and temperature.

§ For explanation see page 38. Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 56-61.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

NOVEMBER, 1933.

45. LERWICK. (H.)

14,000 γ ($\cdot 14$ C.G.S. unit) +

Table with 24 columns (0-1 to 23-24) and 25 rows (Day 1 to Mean). Each cell contains a numerical value representing magnetic force.

MAGNETIC DECLINATION (WEST).

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

46. LERWICK. (D.)

13° +

NOVEMBER, 1933.

Table with 24 columns (0-1 to 23-24) and 31 rows (Day 1 to Mean). Each cell contains a numerical value representing magnetic declination.

Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 56-61.

TERRESTRIAL MAGNETIC FORCE: VERTICAL COMPONENT. Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

47. LERWICK. (V.)

46,000 γ (.46 C.G.S. unit) +

NOVEMBER, 1933.

Table with 24 columns (0-1 to 23-24) and 30 rows (Day 1 to 30). Includes a 'Mean' row at the bottom. Values range from 589 to 609.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS: MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

48. LERWICK.

NOVEMBER, 1933.

Table with 13 columns: Horizontal Force, Declination, Vertical Force, HRh+VRv, Magnetic Character, Temperature. Rows for Day 1 to 30 and a 'Mean' row. Includes sub-headers for Maximum, Minimum, and Range.

§ For explanation see page 38. Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 56-61.

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TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

49. LERWICK. (H.)

14,000 γ (.14 C.G.S. unit) +

DECEMBER, 1933.

Table with 24 columns (0-1 to 23-24) and 25 rows (Day 1 Q to Mean). Values range from 463 to 488.

473 at 0-lh. Jan. 1st. 1934.

MAGNETIC DECLINATION (WEST).
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

50. LERWICK. (D.)

13° +

DECEMBER, 1933.

Table with 24 columns (0-1 to 23-24) and 32 rows (Day 1 Q to Mean). Values range from 27.6 to 31.3.

28.1 at 0-lh. Jan. 1st. 1934.

Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 56-61.

Departures from mean of the day adjusted for non-cyclic change.†

Table 53: LERWICK. HORIZONTAL FORCE. (ALL DAYS). 1933. Columns include Month and Season, Hour (0-1 to 23-24), and monthly data for 1933.

Table 54: LERWICK. DECLINATION. (ALL DAYS). 1933. Columns include Month and Season, Hour (0-1 to 23-24), and monthly data for 1933.

Table 55: LERWICK. VERTICAL FORCE. (ALL DAYS). 1933. Columns include Month and Season, Hour (0-1 to 23-24), and monthly data for 1933.

Departures from mean of the day adjusted for non-cyclic change.†

Table 56: LERWICK. HORIZONTAL FORCE (QUIET DAYS). 1933. Columns: Hour 0-1, G.M.T. 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24. Rows: MONTH and SEASON, Jan., Feb., Mar., Apr., May, June, July, Aug., Sept., Oct., Nov., Dec., Year, Winter, Equinox, Summer.

Table 57: LERWICK. DECLINATION (QUIET DAYS). 1933. Columns: Hour 0-1, G.M.T. 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24. Rows: MONTH and SEASON, Jan., Feb., Mar., Apl., May, June, July, Aug., Sept., Oct., Nov., Dec., Year, Winter, Equinox, Summer.

Table 58: LERWICK. VERTICAL FORCE (QUIET DAYS). 1933. Columns: Hour 0-1, G.M.T. 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24. Rows: MONTH and SEASON, Jan., Feb., Mar., Apl., May, June, July, Aug., Sept., Oct., Nov., Dec., Year, Winter, Equinox, Summer.

† See page 21.

RANGE OF MEAN DIURNAL INEQUALITIES FOR THE MONTHS, YEAR AND SEASONS OF 1933.

NOTE.- The ranges are those shown in Tables 53 to 61 in the preparation of which the non-cyclic change has been eliminated.

AVERAGE DEPARTURE.

62. LERWICK.

1933.

63. LERWICK.

1933.

| | All Days. | | | Quiet Days. | | | Disturbed Days. | | | All Days. | | | Quiet Days. | | | Disturbed Days. | | |
|-----------|-----------|-------|------|-------------|-------|------|-----------------|-------|-------|-----------|------|------|-------------|------|-----|-----------------|------|------|
| | H. | D. | V. | H. | D. | V. | H. | D. | V. | H. | D. | V. | H. | D. | V. | H. | D. | V. |
| January | 15.7 | 7.25 | 34.3 | 10.4 | 4.12 | 6.3 | 19.5 | 10.60 | 79.0 | 3.1 | 1.54 | 8.0 | 1.8 | 0.77 | 1.6 | 5.1 | 2.52 | 18.7 |
| February | 19.6 | 6.73 | 48.8 | 12.0 | 2.60 | 4.9 | 68.3 | 18.90 | 173.7 | 4.7 | 1.77 | 12.7 | 2.5 | 0.57 | 1.1 | 15.3 | 3.94 | 45.2 |
| March | 28.9 | 9.33 | 55.4 | 19.2 | 7.17 | 10.1 | 80.0 | 18.14 | 150.8 | 7.6 | 2.24 | 14.2 | 4.2 | 1.50 | 2.1 | 17.0 | 3.55 | 41.4 |
| April | 47.7 | 11.08 | 59.0 | 36.2 | 9.68 | 23.6 | 65.9 | 15.77 | 128.4 | 10.4 | 3.00 | 14.3 | 9.7 | 2.07 | 5.1 | 16.8 | 4.08 | 29.9 |
| May | 64.4 | 10.71 | 52.0 | 47.0 | 10.77 | 18.3 | 243.4 | 19.28 | 90.8 | 15.6 | 2.91 | 11.7 | 11.9 | 2.44 | 3.9 | 52.7 | 4.59 | 25.2 |
| June | 52.7 | 11.28 | 39.5 | 42.1 | 10.42 | 14.6 | 79.1 | 15.68 | 150.4 | 12.9 | 3.19 | 9.3 | 9.9 | 2.56 | 2.6 | 19.9 | 4.26 | 33.1 |
| July | 47.9 | 11.45 | 28.6 | 46.2 | 9.59 | 16.7 | 56.0 | 14.38 | 74.9 | 11.5 | 2.86 | 6.9 | 11.6 | 2.82 | 4.3 | 15.0 | 3.67 | 20.0 |
| August | 51.8 | 10.52 | 33.9 | 46.2 | 11.77 | 14.3 | 98.9 | 18.54 | 101.9 | 11.9 | 2.60 | 8.1 | 11.3 | 2.50 | 3.9 | 23.7 | 4.66 | 23.9 |
| September | 34.9 | 8.72 | 49.7 | 42.9 | 8.93 | 18.9 | 87.2 | 16.05 | 159.5 | 8.7 | 2.27 | 13.3 | 9.9 | 2.07 | 4.2 | 21.1 | 3.27 | 45.3 |
| October | 24.8 | 7.39 | 44.0 | 21.0 | 4.41 | 7.6 | 44.8 | 11.98 | 107.4 | 6.2 | 1.77 | 10.8 | 5.1 | 1.27 | 2.1 | 10.0 | 3.01 | 27.3 |
| November | 11.6 | 6.98 | 32.9 | 9.5 | 3.31 | 7.7 | 29.3 | 12.79 | 108.2 | 2.3 | 1.54 | 8.2 | 1.8 | 0.89 | 2.0 | 5.8 | 2.96 | 27.0 |
| December | 11.2 | 6.65 | 24.7 | 6.4 | 3.91 | 7.6 | 41.5 | 12.84 | 127.9 | 2.8 | 1.27 | 7.1 | 1.7 | 0.72 | 2.3 | 7.3 | 3.16 | 27.5 |
| Year | 30.9 | 7.32 | 39.9 | 25.8 | 6.73 | 8.4 | 59.2 | 11.09 | 102.5 | 7.1 | 2.13 | 9.8 | 6.1 | 1.59 | 2.1 | 15.5 | 2.93 | 28.9 |
| Winter | 12.4 | 6.41 | 32.2 | 9.6 | 3.13 | 5.3 | 26.8 | 11.46 | 102.6 | 2.9 | 1.51 | 8.8 | 1.6 | 0.70 | 1.7 | 6.4 | 2.89 | 28.5 |
| Equinox | 32.9 | 8.78 | 51.0 | 28.1 | 7.18 | 12.0 | 44.8 | 13.92 | 122.1 | 7.7 | 2.30 | 13.1 | 7.1 | 1.71 | 2.9 | 14.9 | 3.14 | 34.9 |
| Summer | 53.3 | 10.87 | 37.4 | 44.4 | 10.53 | 14.4 | 105.7 | 13.04 | 92.5 | 12.4 | 2.81 | 8.9 | 11.1 | 2.54 | 3.4 | 26.8 | 4.11 | 24.5 |

64. LERWICK.

NON-CYCLIC CHANGE †.

1933.

65. LERWICK.

MEAN VALUES OF $HR_H + VR_V$ *
(Unit 10,000 γ^2)

1933.

| | All Days. | | | Quiet Days. | | | Disturbed Days. | | | HR_H | VR_V | Sum | Mean Character Figure |
|-----------|-----------|-------|------|-------------|-------|------|-----------------|-------|-------|--------|--------|-----|-----------------------|
| | H. | D. | V. | H. | D. | V. | H. | D. | V. | | | | |
| January | -0.6 | +0.01 | +0.2 | +0.1 | +0.59 | +1.5 | - 9.1 | -1.52 | - 9.3 | 97 | 367 | 464 | 0.65 |
| February | -0.1 | -0.14 | +0.3 | +4.1 | +0.49 | +0.2 | -23.9 | -2.00 | -40.5 | 122 | 463 | 585 | 0.68 |
| March | +0.5 | -0.16 | -1.0 | +2.4 | +0.39 | -0.4 | -10.4 | +0.11 | -24.2 | 165 | 470 | 635 | 0.94 |
| April | -1.0 | -0.32 | -1.0 | +4.8 | +1.25 | +8.1 | - 2.0 | -0.77 | -15.2 | 158 | 551 | 709 | 1.00 |
| May | +0.8 | +0.16 | +0.5 | +3.3 | +0.30 | -1.0 | -93.8 | +3.84 | +19.7 | 253 | 608 | 861 | 0.74 |
| June | +0.4 | +0.06 | +0.2 | +1.4 | +0.2 | -1.7 | + 1.9 | +1.05 | + 6.0 | 137 | 399 | 536 | 0.53 |
| July | -0.3 | +0.05 | +0.4 | +0.5 | -0.81 | +2.8 | - 6.1 | -0.02 | - 6.7 | 118 | 338 | 456 | 0.48 |
| August | -0.3 | -0.09 | 0.0 | -1.5 | +0.69 | +5.1 | -16.0 | +0.22 | -20.0 | 142 | 384 | 526 | 0.55 |
| September | -0.2 | -0.01 | +0.1 | +3.5 | +1.40 | +2.6 | - 6.4 | +1.40 | - 9.8 | 137 | 522 | 659 | 0.83 |
| October | +0.2 | -0.04 | +0.3 | +4.4 | +0.62 | -0.2 | - 5.8 | -0.76 | -29.4 | 110 | 444 | 554 | 0.68 |
| November | +0.6 | -0.02 | 0.0 | +0.5 | -0.05 | +5.0 | - 5.4 | +1.31 | - 5.6 | 71 | 341 | 412 | 0.63 |
| December | +0.3 | -0.02 | -0.2 | +3.5 | +0.57 | -2.9 | - 2.9 | -1.65 | -10.1 | 68 | 290 | 358 | 0.42 |
| Year 1933 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 131 | 431 | 563 | 0.68 |

* See page 38
† See page 21

MEAN MONTHLY AND ANNUAL VALUES OF TERRESTRIAL MAGNETIC ELEMENTS.
(All days except those noted in monthly tables)

66. LERWICK.

1933.

| Month. | North Component. | West Component. | Vertical Component. | Total Force. | Declination (West.) | Inclination (North.) | Horizontal Force. |
|-----------|------------------|-----------------|---------------------|--------------|---------------------|----------------------|-------------------|
| January | 14076 | 3420 | 46629 | 48827 | 13 39.3 | 72 44.6 | 14485 |
| February | 14075 | 3416 | 46625 | 48823 | 13 38.4 | 72 44.6 | 14484 |
| March | 14071 | 3411 | 46623 | 48819 | 13 37.7 | 72 44.9 | 14479 |
| April | 14074 | 3406 | 46611 | 48808 | 13 36.2 | 72 44.5 | 14480 |
| May | 14078 | 3404 | 46605 | 48804 | 13 35.6 | 72 44.2 | 14483 |
| June | 14082 | 3400 | 46597 | 48797 | 13 34.4 | 72 43.8 | 14487 |
| July | 14060 | 3396 | 46592 | 48791 | 13 33.7 | 72 43.9 | 14484 |
| August | 14073 | 3390 | 46591 | 48788 | 13 32.7 | 72 44.4 | 14476 |
| September | 14064 | 3384 | 46586 | 48780 | 13 31.8 | 72 45.0 | 14468 |
| October | 14067 | 3380 | 46595 | 48789 | 13 30.6 | 72 45.1 | 14467 |
| November | 14070 | 3375 | 46605 | 48800 | 13 29.4 | 72 45.1 | 14470 |
| December | 14088 | 3371 | 46606 | 48800 | 13 28.5 | 72 45.3 | 14467 |
| Year 1933 | 14073 | 3396 | 46605 | 48802 | 13 34.0 | 72 44.6 | 14477 |

67. LERWICK.

| Date. | Month. | Date. | Month. | Date. | Month. | Date. | Month. |
|-------|--|-------|--|-------|--|-------|--|
| | JANUARY. | | MARCH (contd.) | | SEPTEMBER (contd.) | | NOVEMBER (contd.) |
| 1 | ☰ Moderate aurora 20h 10m - 22h 50m. | 19 | ☰ Glow seen 20h 10m. Active aurora 20h 45m - 21h 10m. Quiet arch 22h 20m, still persisting at 23h 45m. | 18 | ☰ Fine. Very faint bands seen 20h 30m - 20h 50m. | 9 | a .. Cloudy. |
| 3 | c .. Cloudy. | | | 20 | ☰ Faint glow 20h, eclipsed by cloud 21h 20m. | 10 | ☰ Fine. Glow all evening; bright patches on north horizon 20h 10m. |
| 4 | a .. Fine. | | | 21 | ☰ Cloudy. Faint glow north-north-west. | 11 | ☰ Variable cloud. Faint glow after 21h. |
| 5 | c .. Rather cloudy. | 20 | ☰ Glow seen through breaks in cloud, 20h onwards. | 22 | c .. Very cloudy. | 12 | ☰ Cloudy. Faint glow after 21h 30m. |
| 6 | b .. Fine, moonlight. | | | 23 | c .. Very cloudy. | 13 | c .. Very cloudy. |
| 7 | c .. Overcast most of evening. | 22 | ☰ Glow seen between clouds 20h 20m onwards; slight activity 20h 30m - 20h 36m. | 24 | c .. Fine. Moderate aurora 20h - 22h 15m. | 14 | c .. Cloudy - overcast. |
| 9 | b .. Fine, moonlight. | | | 25 | ☰ Fine. Faint aurora after 20h 15m; activity about 21h 10m. | 15 | c .. Cloudy. |
| 10 | c,b .. Very cloudy. | 23 | ☰ Faint glow and slight activity seen between clouds after 20h 20m. | 26 | ☰ Cloudy. Moonlight. | 16 | c .. Overcast - cloudy - fine. |
| 11 | b .. Fine, moonlight. | | | 29 | b .. Cloudy. Moonlight. | 17 | c .. Cloudy - fine. Faint glow most of evening. |
| 13 | c .. Variable cloud. | 24 | ☰ Glow seen through clouds 20h 10m onwards. | 30 | c,b .. Very cloudy. Moonlight. | 22 | ☰ Very cloudy. |
| 15 | ☰ Fine at first; rather cloudy after 21h. Faint aurora 21h. 25m-22h. | 25 | ☰ Very cloudy. Glow seen after 20h. | | | 23 | c .. Very cloudy. |
| 19 | ☰ Glow seen through clouds 19h 15m onwards. | 26 | c .. Very cloudy. | | | 24 | a .. Variable cloud. |
| 20 | c .. Fine at first, overcast after 20h. | 28 | ☰ Fine. Very feeble glow 22h 20m. | | | 25 | c .. Very cloudy. |
| 21 | c .. Overcast after 20h. | 29 | ☰ Fine. Moderate aurora 21h 40m onwards. | | | 26 | c .. Very cloudy. Moonlight. |
| 24 | c .. Overcast after 20h. | 30 | c .. Cloudy. | | | 27 | c .. Very cloudy. Moonlight. |
| 27 | ☰ Very cloudy. Glow through breaks in cloud 22h. | 31 | c .. Cloudy. | 1 | b .. Fine - rather cloudy. Moonlight. | 28 | c .. Very cloudy. Moonlight. |
| 28 | ☰ Very cloudy. Glow through breaks in cloud 21h 15m onwards. | | | 2 | b .. Fine - rather cloudy. Moonlight. | | |
| 29 | ☰ Almost completely overcast. Glow through breaks in cloud 21h. | | APRIL. | 4 | c .. Very cloudy. Moonlight. | | |
| 30 | ☰ Variable cloud. Glow through breaks 20h; bright patches 21h 20m. | 1 | c .. Cloudy. | 6 | c .. Very cloudy. Moonlight. | | |
| | FEBRUARY. | 3 | c .. Very cloudy at first, clearing after 21h. | 7 | b .. Fine. Moonlight. | | DECEMBER. |
| 1 | a .. Variable cloud. | 4 | a .. Fine moonlight. | 10 | ☰ Cloudy. Bright bands about 20h; glow between clouds 20h-21h. | 7 | c .. Cloudy. Overcast after 19h. |
| 2 | a .. Variable cloud. | 5 | b .. Fine, moonlight. | 11 | b .. Variable cloud. | 8 | c .. Cloudy. Overcast after 19h. |
| 4 | c .. Cloudy, moonlight. | 6 | c .. Very cloudy. | 12 | ☰ Variable cloud. Very faint glow 21h - 22h. | 9 | ☰ Cloudy. Aurora seen through breaks, N-NE, 20h onwards. |
| 5 | c .. Variable cloud, moonlight. | 11 | b .. Variable cloud. | 13 | b .. Overcast - fine. | 10 | ☰ Moderate aurora 17h onwards. |
| 8 | c,b .. Cloudy, moonlight. | 12 | ☰ Glow seen between clouds about 22h. | 14 | c .. Very cloudy. | 11 | c .. Very cloudy. |
| 12 | c,b .. Cloudy. | 13 | ☰ Glow seen between clouds about 22h. | 15 | ☰ Feeble glow between clouds during evening. | 12 | a .. Variable cloud. |
| 13 | c,b .. Cloudy. | 15 | b .. Very cloudy. | 16 | c .. Very cloudy. | 14 | c .. Overcast except about 20h. |
| 14 | ☰ Glow seen through breaks in clouds 19h onwards. Slight activity 19h 10m - 20h. | 16 | ☰ Fine. Glow 22h 30m - 23h. | 17 | ☰ Fine-cloudy. Faint glow behind clouds. | 15 | ☰ Mainly overcast. Faint glow seen about 17h-19h. |
| 15 | c .. Overcast after 20h. | 17 | ☰ Rather cloudy. Glow 22h 30m. | 19 | b .. Very cloudy. | 16 | ☰ Very cloudy. Faint glow seen at times. |
| 16 | c .. Overcast after 20h. | 18 | ☰ Cloudy. Glow 21h 40m. A few feeble rays 22h 10m. | 20 | ☰ Fine at first; cloudy after 21h. Moderate glow 21h 45m. | 18 | ☰ Fine. Moderate glow. |
| 17 | c .. Cloudy. | 19 | c .. Very cloudy. | 22 | b .. Cloudy. | 19 | c .. Mainly overcast. |
| 18 | c .. Cloudy. | 20 | c .. Very cloudy. | 23 | ☰ Glow seen through breaks in cloud 21h 30m. | 26 | c .. Very cloudy. |
| 19 | ☰ Cloudy. Glow seen at 19h; variable cloud. Glow 19h; disappeared later. | 21 | c .. Very cloudy. | 24 | ☰ Fine. Faint arch 18h 50m onwards; slight activity 22h-23h. | 28 | c .. Mainly overcast. |
| 20 | ☰ Glow most of evening behind cloud. | 22 | c .. Very cloudy. | 25 | ☰ Fine - rather cloudy. Faint glow from 21h; a few rays. | 30 | a .. Fine. Moonlight. |
| 21 | ☰ Glow most of evening behind cloud. Strongest at 19h. | 23 | ☰ Variable cloud. Glow to north after 22h. | 28 | c .. Cloudy. Moonlight. | 31 | c .. Very cloudy. |
| 22 | ☰ Glow most of evening behind cloud. Strongest about 19h. | 24 | a .. Rather cloudy. | 29 | c,b .. Cloudy. Moonlight. | | |
| 23 | ☰ Glow most of evening behind cloud. Strongest about 19h. | 27 | c .. Very cloudy. | 30 | c .. Very cloudy. | | |
| 25 | ☰ Cloudy. Glow most of evening. | 30 | a .. Rather cloudy. | 31 | c,b .. Variable cloud; moonlight. | | |
| | MARCH. | | SEPTEMBER. | | | | |
| 5 | b .. Fine - cloudy. Moonlight. | 1 | b .. Fine. Moonlight. | | | | |
| 6 | b .. Rather cloudy. Moonlight. | 3 | c .. Very cloudy. | | | | |
| 7 | b .. Cloudy. Moonlight. | 4 | b .. Fine, moonlight. | | | | |
| 8 | c .. Overcast most of evening. | 7 | b .. Fine, moonlight. | | | | |
| 9 | c .. Very cloudy. | 8 | a .. Fine, moonlight. | | | | |
| 10 | c .. Very cloudy. | 9 | ☰ Mainly fine. Glow seen at 21h 15m. | | | | |
| 11 | a .. Fine, hazy. | 10 | a .. Fine. Moonlight. | | | | |
| 12 | b .. Fine, hazy. | 13 | ☰ Aurora seen 21h 10m - 01h on 14th; bright and active 22h 50m - 23h 40m. | | | | |
| 14 | c .. Variable cloud. | 14 | c .. Almost entirely overcast. | 2 | c,b .. Variable cloud; moonlight. | | |
| 15 | c .. Very cloudy. | 16 | ☰ Cloudy. Glow seen through breaks. | 3 | c .. Very cloudy. | | |
| 16 | a .. Fine most of evening. | 17 | ☰ Fine. Faint glow on horizon. | 6 | c,b .. Overcast at first; clearing after 21h. Moonlight. | | |

In the interests of brevity there have been omitted from the table above all dates on which the sky throughout the evening remained completely overcast and on which, therefore, no opportunity arose of determining whether or not aurora occurred. The nights on which aurora was actually seen are indicated by the symbol ☰. The nights on which aurora was not seen, despite at least an occasional interval of more or less clear sky, are indicated by the symbol ..; in the latter case also, remarks on the weather are added to assist the reader in judging how far the fact of no observation of aurora may be taken as indicating that there was not actual aurora. The letters a,b,c have the following significance.

- a = Aurora absent
- b = Bright aurora absent: faint one might have been missed (high cloud amounts and/or moonlight).
- c = Aurora absent when sky was clear, but observation impossible for considerable part of evening owing to cloud.
- c,b = Observation impossible for considerable part of evening; faint aurora might have been missed even during the remainder.

A full description is available of the auroral phenomena observed.

M.O. 370
(Aberdeen)

Air Ministry
METEOROLOGICAL OFFICE

THE
OBSERVATORIES' YEAR BOOK
1933

Comprising the meteorological and geophysical results obtained from autographic records and eye observations at the observatories at Lerwick, Aberdeen, Eskdalemuir, Cahirciveen (Valentia Observatory), and Richmond (Kew Observatory), and the results of soundings of the upper atmosphere by means of registering balloons.

ABERDEEN

Published by the authority of the
METEOROLOGICAL COMMITTEE



LONDON
HIS MAJESTY'S STATIONERY OFFICE
1935

ABERDEEN OBSERVATORY.

| | | | | | | |
|---------------------------|----|----|----|----|----|-----------|
| Latitude | .. | .. | .. | .. | .. | 57° 10 N. |
| Longitude | .. | .. | .. | .. | .. | 2° 6 W. |
| G.M.T. of Local Mean Noon | .. | .. | .. | .. | .. | 12h. 8m. |

Heights in metres above Sea-Level.

| | | | | | | |
|-------------------------|----|----|----|----|----|----------------|
| Barometer | .. | .. | .. | .. | .. | 26.0* |
| Rain-gauge | .. | .. | .. | .. | .. | 11.4 and 24.1* |
| Robinson Cup Anemograph | .. | .. | .. | .. | .. | 36* |
| Dines Tube Anemographs | .. | .. | .. | .. | .. | 21 and 37 |

Heights in metres above ground.

| | | | | | | |
|--------------------------------------|----|----|----|----|----|------|
| Thermometer Bulbs, North Wall Screen | | | | | | 12.5 |
| Sunshine Recorder | .. | .. | .. | .. | .. | 20.7 |
| Robinson Cup Anemograph | .. | .. | .. | .. | .. | 23 |
| Dines Tube Anemograph | .. | .. | .. | .. | .. | 13 |
| Beckley Rain-gauge Rim | .. | .. | .. | .. | .. | 0.6 |

INTRODUCTION.

SITE

The Observatory, which was established in 1868 is housed in the top floor of the Cromwell Tower of King's College in Old Aberdeen. The College lies on a plain gradually rising from the sea from which it is distant about 1 mile (1.6 km.). There are no serious irregularities of surface in the vicinity excepting the two river valleys of the Don and the Dee. To the north at a distance of about 1 km. the Don flows eastwards to the sea; the Dee flows into the sea at a distance of about 3 km. to the south-east of the College. Between the College and the sea is a golf course covered for the most part with grass but during the last three years the town has been gradually expanding to the north-eastward of the Observatory; this growth has been very rapid during 1933 with the result that there now exists an inhabited area stretching almost half a mile (1 km.) between the Observatory and the sea in the north-east quadrant. Westwards is the High Street of the Old Town and beyond this is another street. Further west grass pasture extends for about 1 km. To the southward and south-westward lies the main area of the City of Aberdeen.

Because of the aforementioned developments and of their possible further extension under new town-planning schemes, it became necessary to seek another site for the pressure tube anemograph situated at Ladymill, east of the Observatory. This instrument was therefore dismantled, and a new pressure tube instrument, with one-inch pipes, was erected at a new site on the Glebe situated to the north-west of the Observatory, and at a distance of about 350 metres therefrom. To this site were also removed the Stevenson screen,

*These values differ slightly from those given in former years. See note on p.89.

rain-gauges, etc; from the Athletic Ground site north-east of the Observatory, because the surroundings of this latter site were likewise becoming unsatisfactory. All the outdoor instruments are therefore now grouped together. The change of site was made on 31st March 1933, and the fact is noted in the tables of rainfall, temperature on the grass, earth temperature, and in certain parts of the tables showing wind distribution.

On account of these changes of site, the plans and photographs given in the volume for 1928 do no longer apply as from 31st March 1933; new plans and photographs will appear in the volume for 1935.

Change of value adopted for height of Station above Mean Sea Level.- The numerous changes of late years call for some remarks upon the adopted values for the heights of station and instruments above M.S.L. Prior to 1st January, 1925, the value for the station level was 14.0 m., and that for the height of the barometer cistern was 26.8 m. As from 1st January 1925, however, following a careful redetermination of these heights the values were altered to 13.4m for the Station level and 26.0m for the height of the barometer cistern. The change of site of the rain-gauge enclosure in June 1928 altered the value for the station level to 11.4 m. at which figure it remained until 31st March 1933, when the recent removal of instruments to the Glebe site again altered it to 24.1 m. as from 1st April 1933. The actual heights of the barometer cistern, of the north-wall screen thermometer bulbs, and of the Robinson cup anemograph and the Campbell-Stokes Sunshine recorder have remained unaltered throughout.

METEOROLOGY.

The elements dealt with in the following tables are:-Atmospheric pressure, air temperature, humidity, rainfall, sunshine, wind speed and direction, earth temperature and minimum temperature on the grass, together with a diary of cloud and weather.

The instruments from which values of the above elements have been obtained and the methods of tabulating the records are described in the General Introduction to this volume. The following additional information refers especially to Aberdeen.

"Pressure and Temperature."-The photo-barograph, standard Fortin barometer and thermograph are housed in the Observatory room. The pressure scale value of the photo-barogram is 1 mb. = 1.18 mm. on the paper, when the paper is at normal atmospheric humidity. In similar circumstances the time scale is 1 hour = 9.3 mm. The records of the photo-barograph are standardized by means of control readings taken from the standard barometer. Up to the end of 1928 this instrument was Fortin Standard Barometer M.O. 273, but from the 1st January, 1929, it was replaced by Fortin Standard Barometer M.O. 1149. The N.P. L. certificate of this latter barometer shows a standard temperature varying from 286° A at 1,050 mb. to 287° A at 910 mb; corresponding corrections have been applied to the control readings.

The recording thermometers are placed in the North-wall screen already referred to. The scale value of the wet bulb thermograph record is 1° absolute = 3.20 millimetre on the paper; for the dry bulb thermograph the scale value varies slightly with the temperature, but is approximately 1° absolute = 3.4 millimetres. The time scale is 1 hour = 9.23 millimetres. Reading of the photo-thermograms is done by means of glass measuring scales, the records being standardized by control readings from Standard Thermometers M.O. 1698

(dry bulb) and M.O. 1697 (wet bulb). These thermometers have corrections, varying at different parts of the scale, of between -0.1° A and $+0.2^{\circ}$ A; these corrections have been applied to the control readings. The heights of the barometer cisterns and of the bulbs of the thermometers are given at the top of the appropriate tables.

It may be here emphasized that the bulbs of the thermometers in the North-wall screen are at the considerable height of 12.5 metres above the ground, and that readings from these thermometers are exclusively used for this publication (except as noted below under Humidity) and for the corresponding summaries printed in the Monthly Weather Report.*

"Rainfall".-The recording instrument in use is Beckley rain-gauge No. 2 with an area of 101.1 square inches (653 cm^2). The procedure adopted in tabulating the records is similar to that described in the General Introduction and calls for no comment. Control was by check gauge M.O. 266 during the year 1933.

"Humidity".-On those occasions when the temperature of the wet bulb has been 27.3° A or under, the relative humidity has been obtained from the records of a hair hygrometer. This instrument is accommodated inside the new large Stevenson screen at the new site. Until 31st March 1933, at the Athletic Ground site, the hygrometer was 13.2 m. below the level of the thermometer-bulbs in the North-wall screen, but from 1st April 1933, at the Glebe site this instrument has been only 0.5 m. below that level. In using its records an appropriate adjustment is made.

"Sunshine".-The sunshine recorder (Campbell-Stokes type) is exposed on the small circular tower on the Observatory roof on which the Robinson cup anemograph is erected. It is rigidly held by lead flaps soldered to the lead roof. The actual diameter of the sunshine sphere is 4.02 inches, and the focal length 2.97 inches, these figures being slightly in excess of the standard values (diameter $4.00 \pm .05$ inches, focal length $2.95 \pm .01$ inches). The exposure is excellent; the only obstruction is a flagpole to the east, of angular diameter about 1° , which may obstruct 0.1 hr. record about 7h between April and September. This loss has been allowed for, whenever practicable, in tabulating the records. In computing the percentage duration of sunshine the actual possible values for each day of the year 1933 have been employed, a procedure similar to that adopted from 1926 onwards.

"Wind Speed and Direction".-Continuing the practice adopted in July 1930, the values of wind speed for 1933 are those recorded by the Robinson cup anemograph, and are corrected for the effect of exposure in accordance with the factors given in the Table on p.12 of the General Introduction. It has been found that the exposure of the Pressure-tube anemograph at the new Glebe site, though better than that at the Ladymill site after the latter became affected by the north-eastward extension of the town, is not entirely satisfactory, particularly in the north-east quadrant. The cup anemograph is mounted up on the roof of the Observatory building, its cups being at a height of 23 m. above the ground, and about 7 m. above the roof of the main tower of the building.

*The temperatures for Aberdeen published in the "Daily Weather Report", and summaries from them given in the "Weekly Weather Report", are from different thermometers, viz., those in the Stevenson Screen, with their bulbs only 1.3 metres above the ground.

On the few occasions when the records of the cup-anemograph have been defective, the required values have been taken from the records of the pressure-tube instrument, and to these values appropriate exposure-factors have been applied. Values thus obtained are entered in brackets, as are also the mean hourly values for the days in question.

In the tables showing "Highest instantaneous wind speed recorded each day by the Dines tube anemograph" (Table 151) and "Distribution of wind speed: extreme velocities as recorded by the Dines tube anemograph" (Table 152), the values entered for the "Gusts" are those actually recorded by that instrument, but it must be remembered that these values are defective in that they are values recorded on sites whose exposures have not been entirely satisfactory.

In Table 152 the values of distribution of wind speed for each month, and those of highest hourly wind are taken from the records of the Robinson cup-anemograph, corrected for the effect of exposure as explained above.

"Earth Temperature".-Readings have been made at 9h G.M.T. of earth temperature at nominal depths of one foot and four feet below the surface of the grass.

The thermometers and the method of exposure are of the standard type described in the "Meteorological Observer's Handbook". The depths of the thermometer bulbs below the grass-covered surface of the ground are 30 and 122 cm.

The data published in the "Observatories' Year Book' 1922-1930 were the readings of an instrument with its bulb at a depth of 124 cm. This instrument, a description of which is given in the Year Book for 1930, p.86, was of unorthodox type, and was situated in the College Gardens until the end of June 1928. It was then removed to the anemometer enclosure, Ladymill. From 1st. January, 1930, the published data refer to new instruments of standard type which were in the anemometer enclosure at Ladymill until 8th. June, 1932. They were then removed to the Athletic Ground site, where they were installed near the screen and rain-gauges. The results of a comparison between the new and old instruments at a nominal depth of 122 cm. at the Ladymill site will be found in the Year Book for 1931, pp. 86-87.

For the period 18th June, 1932, to 25th March, 1933, comparative readings are available from the new 122 cm. thermometer at the Athletic Ground and the old instrument at Ladymill. The results indicate that at 122 cm. depth the Athletic Ground is about 1.5°A to 2°A warmer than Ladymill during June, July and August, and about 1°A colder in November, December, January and February. Similar comparative observations are not available for the College Gardens site, but some idea of the differences between that site and Ladymill can be obtained by comparing the readings at Ladymill during the four years, June 1928 to May 1932, with those obtained for many years prior to June 1928, at the College Gardens. These indicate that Ladymill is warmer than the College Gardens from September to April and colder from May to August, the maximum differences being approximately +2°A and -1°A. The continuity of the earth temperature readings has thus been seriously affected by the changes of site, and it is necessary to mention in this connexion that the thermometers were transferred at the end of March 1933 to the Glebe site, thus introducing another discontinuity. In Table 153 there are no entries of earth temperature at a depth of 122 cm. for the dates 1st. to 3rd. April; it was found to require this period for the temperature at 122 cm to resume its steady value after the disturbance of the soil during the sinking of the iron tube which contains the thermometer.

"Minimum Temperature on the Grass".- The grass minimum thermometer is exposed in the enclosure on two wooden pegs about 4 cm. above the grass. It is set at 18h and read at 7h, the reading being entered to the day of observation. The thermometer in use is M.O. 17944/27, and its readings require no correction.

"Cloud".-From the 1st. January, 1931, the recording of cloud-forms at Aberdeen has been in conformity with the definitions laid down in "Instructions for Meteorological Telegraphy" M.O. 191/1 (1930).

"Visibility".-In the subjoined table there is given a list of the objects used for the determination of the degree of visibility, together with their distances and bearings from the observation-point, which may be taken as the roof of the Observatory tower, the N.E. corner thereof being used for the nearer objects.

The range of visibility from the Observatory is somewhat limited by the high ground surrounding the city. From S.E. through S.toN. the distance of the visible horizon is between 2 and 4 miles (4 to 7 km.), but in the N.W. a higher hill, at a distance of 5 miles (8.5 km.), rises above the nearer ridges. To the N.N.E. however there is a clear view of the coastline as far as Cruden Scaurs, where the coast consists of cliffs over 100 feet high, and is nearly 19 miles (30 km.) distant. From N.N.E. to S.E. there is only the sea-line as horizon, which from the height of the Observatory tower is about 10 miles (16 km.) distant.

Definite objects exist at standard distances from A to H, but from I to M there are no definite objects, though there are adequate identification marks for K and L. Owing, however, to these marks being on the sea-coast, and to the generally clearer visibility to the seaward side of the Observatory, it has been deemed advisable to employ small letter entries for all visibility distances that are not definitely landward estimates. The distances I and J are based upon estimates between other available distances. The 21h observations of weather and visibility are made as a rule not actually at the Observatory, but in the neighbourhood within a radius of one or two miles. Apart from that it has to be remarked that, during darkness when the usual fixed objects cannot be seen, the estimates depend upon personal judgment, and upon the degree of obscuration, and alteration in the colour, of the surrounding lights of the town.

VISIBILITY OBJECTS AT ABERDEEN.

| OBJECT. | DESCRIPTION. | DISTANCE. | BEARING. |
|---------|---|--|----------------|
| A | Steam-pipe on Boiler house | 26 yards. | N.E. |
| B | Top of finial at East end of University Library .. | 55 " | E.S.E. |
| C | Gate in North Wall of Athletics ground.. .. | 110 " | E.N.E. |
| D | East wall of Athletics ground and trees along it .. | 218 " | E. |
| E | (i) Ventilator tops on Sunnybank School.. .. | 550 " | S.W. |
| F | Gasometer | 1,100 " | S.E. |
| G | (i) Turret of Salvation Army Citadel | 1 $\frac{1}{4}$ miles. | S.S.E. |
| | (ii) Coastguard watch-tower | 1 $\frac{3}{4}$ " | N.E. |
| | (i) Girdleness lighthouse-top | 2 $\frac{3}{4}$ " | S.E. |
| H | (ii) Springhill House | 2 $\frac{1}{4}$ " | W. |
| I (i) | No object. Estimate between Strabathie Hill (3 $\frac{1}{2}$ miles) and Brimmond Hill (5 $\frac{1}{4}$ miles) | (3 $\frac{1}{2}$ ") (5 $\frac{1}{4}$ ") | N.N.E. N.W. |
| J (j) | No object. Estimate between Brimmond Hill (5 $\frac{1}{4}$ miles) and Sea horizon (10 miles). | (5 $\frac{1}{4}$ ") (10 ") | N.W. E. |
| K (k) | Sand-patch, mouth of Ythan River | 12 $\frac{1}{2}$ " | N.N.E. |
| L (l) | Cruden Scaurs | 18 $\frac{1}{4}$ " | N.N.E. |
| M (m) | Cannot see so far. Used when "L" object shows clear detail and colour-differences. | | |

IDENTIFICATION NUMBERS OF INSTRUMENTS USED IN 1933.

The following were the instruments actually in use during the year 1933:-

| | | |
|--------------------------------------|----|--------------------|
| Standard Fortin Barometer .. | .. | M.O. 1149 |
| " Dry Bulb Thermometer .. | .. | M.O. 1698 |
| " Wet " " .. | .. | M.O. 1697 |
| Recording Beckley Rain-gauge .. | .. | 2 |
| Control Rain-gauge | .. | M.O. 266 |
| Glass for " | .. | M.O. 1657 and 1578 |
| Hair Hygograph | .. | M.O. 154/27 |
| Campbell-Stokes Sunshine Recorder .. | .. | M.O. 32 |
| Robinson Cup Anemograph | .. | M.O. 50 |
| Dines Tube Anemographs | .. | M.O. 1011 and 1040 |
| Earth Thermometers | .. | M.O. 6, M.O.11 |
| Grass Minimum Thermometer | .. | M.O. 17944/27 |

REVIEW OF METEOROLOGICAL RESULTS.

"Pressure".-Pressure over the year exceeded the normal by 2.7 mb. The greatest departure from the normal was shown by the month of December, which had an excess of 15.5 mb. September had an excess of 5.5 mb. while smaller excesses were shown by several other months. The only month showing any noteworthy defect from normal was June, whose average pressure was 3.8 mb. lower than the normal. The highest value recorded during the year was 1045.7 mb. on December 3rd. and the lowest was 976.7 mb. on January 2nd; the annual range was therefore 69 mb.

The mean diurnal inequalities for the months, seasons and year have been analysed harmonically, with the results set out in the accompanying Table. The unit employed for the individual months, is, as before, .01 mb, that for the seasons and the year is .001 mb., and the phase-angles are reduced to Local Mean Time. The average values of the various Coefficients for the period 1871-1926, computed by Dr. A. Crichton Mitchell* are given for comparison.

HARMONIC COMPONENTS OF THE DIURNAL INEQUALITY OF ATMOSPHERIC PRESSURE
ABERDEEN, LONGITUDE 2° 6' W.

Values of c_n, a_n , in the series $\sum c_n \sin(15nt + a_n)$, t being Local Mean Time reckoned in hours from midnight.

| Month and Season. | c_1 | | a_1 | | c_2 | | a_2 | | c_3 | | a_3 | | c_4 | | a_4 | |
|---------------------|---------|-----------|-------|-----------|---------|-----------|-------|-----------|---------|-----------|-------|-----------|---------|-----------|-------|-----------|
| | 1933 | 1871-1926 | 1933 | 1871-1926 | 1933 | 1871-1926 | 1933 | 1871-1926 | 1933 | 1871-1926 | 1933 | 1871-1926 | 1933 | 1871-1926 | 1933 | 1871-1926 |
| January | mb. .48 | mb. .094 | ° 273 | ° 171 | mb. .29 | mb. .227 | ° 147 | ° 151 | mb. .13 | mb. .130 | ° 10 | ° 355 | mb. .03 | mb. .054 | ° 129 | ° 221 |
| February | .35 | .156 | 99 | 176 | .26 | .270 | 146 | 149 | .12 | .104 | 340 | 355 | .05 | .026 | 61 | 96 |
| March | .38 | .164 | 183 | 158 | .29 | .295 | 146 | 151 | .05 | .052 | 312 | 336 | .06 | .031 | 29 | 35 |
| April | .27 | .153 | 164 | 155 | .26 | .284 | 144 | 151 | .04 | .019 | 202 | 198 | .03 | .044 | 355 | 359 |
| May | .05 | .098 | 261 | 135 | .20 | .237 | 141 | 143 | .08 | .059 | 165 | 163 | .02 | .022 | 330 | 329 |
| June | .18 | .057 | 324 | 104 | .16 | .219 | 123 | 141 | .03 | .065 | 133 | 155 | .01 | .008 | 26 | 331 |
| July | .24 | .089 | 149 | 137 | .23 | .208 | 147 | 144 | .07 | .068 | 150 | 159 | .03 | .013 | 21 | 345 |
| August | .10 | .112 | 107 | 162 | .26 | .232 | 132 | 145 | .05 | .041 | 200 | 187 | .02 | .029 | 331 | 336 |
| September | .10 | .119 | 259 | 146 | .32 | .287 | 151 | 148 | .00 | .027 | - | 342 | .05 | .053 | 338 | 339 |
| October | .25 | .185 | 178 | 183 | .34 | .274 | 161 | 149 | .08 | .075 | 29 | 349 | .03 | .027 | 53 | 20 |
| November | .25 | .132 | 236 | 197 | .29 | .229 | 168 | 152 | .06 | .103 | 15 | 354 | .02 | .014 | 211 | 172 |
| December | .05 | .164 | 259 | 169 | .23 | .211 | 146 | 146 | .14 | .122 | 10 | 356 | .06 | .051 | 205 | 204 |
| Arithmetic Mean ... | .225 | | | .261 | | | | | .071 | | | | .034 | | | |
| Year | .104 | .116 | 197 | 163 | .256 | .247 | 147 | 149 | .026 | .030 | 13 | 0 | .012 | .009 | 22 | 340 |
| Winter | .107 | | 246 | | .263 | | 152 | | .112 | | 3 | | .019 | | 156 | |
| Equinox | .229 | | 183 | | .300 | | 151 | | .016 | | 345 | | .036 | | 12 | |
| Summer | .031 | | 148 | | .209 | | 136 | | .053 | | 161 | | .018 | | 353 | |

NOTE.-"Winter" comprises the four months January, February, November, December, "Equinox" the months March, April, September, October; and "Summer" May to August.

*Diurnal Variation of Pressure and Temperature at Aberdeen, 1871-1926, by A. Crichton Mitchell D. Sc., Q.J.R. Met. Soc. 1929, p. 197

In 1933 the phase angles and amplitudes of the various terms do not, except in the case of 12-hour term, approach so closely to the 1871-1926 averages as was the case last year. This year the amplitudes of the 12-hour and 6-hour terms are higher than the average, while those of the two other terms have values less than the average.

December and May are the months showing the smallest amplitude of the 24-hour term while January shows the highest.

In the 12-hour term, the various months show a very fair approach to the average in their phase-angles, and the annual range in amplitude is very marked. The Spring maximum is normal in value and month of occurrence, but the Summer minimum is considerably below its average value and occurs earlier than usual, while the Autumn maximum is very strongly marked, but later than usual.

In the 8-hour term the Winter maximum is well marked, as also are the Equinoctial minima; but the Summer maximum is not well developed.

The 6-hour term follows its normal course fairly well; the Spring maximum exceeding its average value considerably.

"Temperature".-The mean annual temperature for 1933 was 1.3°A above the normal value. Except in the first two months, temperature was in excess throughout the year. Particularly was this the case over the period June to September; these four months showed excesses of 2.0° , 3.1° and 1.4°A respectively, July, with an average temperature of 289.4°A showing the greatest excess, as well as the highest monthly average.

"Rainfall".-The years total fall was 673 mm, which is 75 mm. below the normal amount. The beginning and end of the year might be characterized as wet, whereas the period from May to September was very dry, the drought being broken only by the rainfall of July, which was actually 7 mm. above the average. Deficits of between 30 and 40 mm. were recorded in the months of May, August, September, and December and one of over 20 mm. in June, while an excess of 42 mm. occurred in February and one of 43 mm. in October, which latter, together with an excess of 8 mm. in November more than counterbalanced the defect in December.

"Relative Humidity".-Despite the deficient rainfall and the Summer warmth the relative humidity over the year was above the normal by 1 per cent. The only month appreciably below the normal was August, whose value of 76.5 per cent was 2.7 per cent below the average. September, though having less than half its usual rainfall, recorded the very high relative humidity value of 85 per cent, thus exceeding its normal value by 4.5 per cent, whereas the very wet month of October had a relative humidity 1.4 per cent lower than the average.

"Sunshine".-There was a slight excess of sunshine over the year, actually about one half per cent of the possible. The distribution of sunshine throughout the year was very irregular, March, June, August, and September being outstandingly bright; April, May and October abnormally dull. June with 45 per cent of the possible sunshine was the brightest month of the year, showing an excess of 10 per cent, while March had an excess of 11 per cent, and August and September excesses of 8 per cent and 7 per cent respectively. Against these excesses were deficits of 14 per cent in May, 11 per cent in April and 9 per cent in October.

"Wind".-The average velocity of wind for the year was 4.2 m/s., slightly below those of the two previous years. The windiest month was February with an average velocity of 5.7 m/s, and the quietest month was July with 3.1 m/s. Gales were recorded on 3 days, February 26th and 27th and October 28th.

"Aurora".-Aurora was observed on 10 occasions, 3 in the earlier half of year and 7 in the latter half. Dates of occurrence will be found in the General Auroral Table.

"General Remarks".-The year 1933 is remarkable as being a year of outstanding warmth. It was drier than usual so far as rainfall was concerned, but the relative humidity of the air was higher than normal. Sunshine was almost equal to the average. Taking the months individually, January was cool and its air humid; February was wet and windy, with higher relative humidity than usual; March was warm and bright; April was warm and dull; May was dull and dry but the relative humidity of the air was high; June was warm, bright and dry; July was very warm and quiet but otherwise normal; August was warm, dry, bright, and quiet, with low relative humidity; September was warm, dry, and bright but had very high relative humidity; October was warm, dull, windy, and very wet; November was warm and dull, but otherwise fairly normal; December was dry, but did not differ materially from the average otherwise.

PRESSURE. Readings in millibars at exact hours, Greenwich Mean Time.

71. ABERDEEN: H_b (height of barometer cistern above M.S.L.) = 26.0 metres.

MARCH, 1933.

Table with 25 columns (1-24 hours + Mean) and 31 rows (Day 1-31). Includes sub-headers for 'Station Level' and 'Sea Level'.

72. ABERDEEN: H_b = 26.0 metres.

APRIL, 1933.

Table with 25 columns (1-24 hours + Mean) and 30 rows (Day 1-30). Includes sub-headers for 'Station Level' and 'Sea Level'.

NOTE. - When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

PRESSURE. Readings in millibars at exact hours, Greenwich Mean Time.

75. ABERDEEN: H_b (height of barometer cistern above M.S.L.) = 26.0 metres.

JULY, 1933.

Table with 25 columns (1-24 hours, Mean) and 31 rows (Day 1-31). Includes 'Station Level' and 'Mean (Sea Level)' rows. Data values are in millibars.

76. ABERDEEN: H_b = 26.0 metres.

AUGUST, 1933.

Table with 25 columns (1-24 hours, Mean) and 31 rows (Day 1-31). Includes 'Station Level' and 'Mean (Sea Level)' rows. Data values are in millibars.

NOTE. - When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

PRESSURE.

Readings in millibars at exact hours, Greenwich Mean Time.

77. ABERDEEN: H_b (height of barometer cistern above M.S.L.) = 26.0 metres.

SEPTEMBER, 1933.

Table with columns for Hour G. M. T. (1-24), Mean (Station Level), and Mean (Sea Level). Rows represent days of the month from 1 to 30.

78. ABERDEEN: H_b = 26.0 metres.

OCTOBER, 1933.

Table with columns for Day, Hour G. M. T. (1-24), Mean (Station Level), and Mean (Sea Level). Rows represent days of the month from 1 to 31.

NOTE. - When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

PRESSURE. Readings in millibars at exact hours, Greenwich Mean Time.

79. ABERDEEN: H_b (height of barometer cistern above M.S.L.) = 26.0 metres.

NOVEMBER, 1933.

Table with 25 columns (1-24 hours + Mean) and 31 rows (Day 1-30 + Mean). Columns 1-24 are labeled 'Station Level' and 'Hour G. M. T.'. Columns 25 and 26 are labeled 'Mean (Station Level)' and 'Mean (Sea Level)'. Data values are in millibars.

80. ABERDEEN: H_b = 26.0 metres.

DECEMBER, 1933.

Table with 25 columns (1-24 hours + Mean) and 31 rows (Day 1-30 + Mean). Columns 1-24 are labeled 'Station Level' and 'Hour G. M. T.'. Columns 25 and 26 are labeled 'Mean (Station Level)' and 'Mean (Sea Level)'. Data values are in millibars.

NOTE. - When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

84. ABERDEEN: North Wall Screen on Tower: h_t (height of thermometer bulb above ground) = 12.5 metres.

JANUARY, 1933.

Table with 25 columns (Hour G. M. T. 1-24, Mean) and 31 rows (Day 1-31). Each cell contains a temperature reading in degrees absolute.

85. ABERDEEN: North Wall Screen on Tower: h_t = 12.5 metres.

FEBRUARY, 1933.

Table with 25 columns (Hour G. M. T. 1-24, Mean) and 28 rows (Day 1-28). Each cell contains a temperature reading in degrees absolute.

NOTE. - The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is printed 75.0.

TEMPERATURE.

Readings in degrees absolute at exact hours, Greenwich Mean Time.

88. ABERDEEN: North Wall Screen on Tower: h_t (height of thermometer bulb above ground) = 12.5 metres.

MAY, 1933.

Table with 25 columns (Hour G. M. T., 1-24, Mean) and 31 rows (Day 1-31). Contains temperature readings in degrees absolute for Aberdeen in May 1933.

89. ABERDEEN: North Wall Screen on Tower: h_t = 12.5 metres.

JUNE, 1933.

Table with 25 columns (Day, Hour G. M. T., 1-24, Mean) and 31 rows (Day 1-31). Contains temperature readings in degrees absolute for Aberdeen in June 1933.

NOTE.- The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is printed 75.0.

Readings in degrees absolute at exact hours, Greenwich Mean Time.

90. ABERDEEN: North Wall Screen on Tower: h_t (height of thermometer bulb above ground) = 12.5 metres.

JULY, 1933.

Table with 25 columns (Hour G. M. T., 1-24, Mean) and 32 rows (Day 1-31). Contains temperature readings in degrees absolute for Aberdeen in July 1933.

91. ABERDEEN: North Wall Screen on Tower: h_t = 12.5 metres.

AUGUST, 1933.

Table with 25 columns (Day, Hour G. M. T., 1-24, Mean) and 31 rows (Day 1-31). Contains temperature readings in degrees absolute for Aberdeen in August 1933.

NOTE.- The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is printed 75.0.

TEMPERATURE

Readings in degrees absolute at exact hours, Greenwich Mean Time.

92. ABERDEEN: North Wall Screen on Tower: h_t (height of thermometer bulb above ground) = 12.5 metres.

SEPTEMBER, 1933.

Table with 25 columns (Hour G. M. T., 1-24, Mean) and 31 rows (Day 1-30, Mean). Contains temperature readings in degrees absolute for each hour of the day.

93. ABERDEEN: North Wall Screen on Tower: h_t = 12.5 metres.

OCTOBER, 1933.

Table with 25 columns (Day, Hour G. M. T., 1-24, Mean) and 31 rows (Day 1-31, Mean). Contains temperature readings in degrees absolute for each hour of the day.

NOTE.- The initial 2 or 3 of the readings is omitted, i.e. 275.0 degrees absolute is printed 75.0.

TEMPERATURE
Readings in degrees absolute at exact hours, Greenwich Mean Time.

94. ABERDEEN: North Wall Screen on Tower: h_t (height of thermometer bulb above the ground) = 12.5 metres.

NOVEMBER, 1933.

Table with 24 columns (1-24) and 31 rows (Day 1-30, Mean). Columns 1-24 represent hours from 1 to 24. Each cell contains a temperature reading in degrees absolute. The Mean row at the bottom shows average temperatures for each hour, with values ranging from 79.1 to 80.9.

95. ABERDEEN: North Wall Screen on Tower: h_t = 12.5 metres.

DECEMBER, 1933.

Table with 24 columns (1-24) and 31 rows (Day 1-30, Mean). Columns 1-24 represent hours from 1 to 24. Each cell contains a temperature reading in degrees absolute. The Mean row at the bottom shows average temperatures for each hour, with values ranging from 77.1 to 78.9.

NOTE.- The initial 2 or 3 of the readings is omitted, i.e. 275.0 degrees absolute is printed 75.0.

TEMPERATURE: ANNUAL MEANS OF HOURLY VALUES. From Readings in degrees absolute at exact hours, Greenwich Mean Time.

96. ABERDEEN: North Wall Screen on Tower H_t 12.5 metres.

1933.

Table with 24 columns (Hour 1 to 24) and 2 rows of temperature data. Values range from 80.54 to 83.86.

TEMPERATURE: MONTHLY MEANS AND DIURNAL INEQUALITIES. The departures from the mean of the day are adjusted for non-cyclic change†.

97. ABERDEEN: North Wall Screen on Tower H_t 12.5 metres.

1933.

Table with 25 columns (Month, Mean, Hour 1-24) and 12 rows (Jan to Dec, Year). Shows monthly means and diurnal inequalities.

ABSOLUTE EXTREMES OF TEMPERATURE FOR EACH DAY. Maximum and Minimum for the interval Oh. to 24h., Greenwich Mean Time.

98. ABERDEEN: North Wall Screen on Tower: H_t 12.5 metres.

1933.

Large table with 24 columns (Month, Day) and 24 rows (Day 1-24). Shows maximum and minimum temperatures for each day.

Note. - The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is printed 75.0.

† See page 21.

RELATIVE HUMIDITY. Percentages at exact hours, Greenwich Mean Time.

99. ABERDEEN: North Wall Screen on Tower: ht (height of thermometer bulbs above the ground) = 12.5 metres.

JANUARY, 1933.

Table with 25 columns (1-24) and 25 rows (Day 1-31). Columns 1-24 contain percentage values. Column 25 is 'Mean'. Column 26 is 'Vapour Pressure' in mb. Includes a summary row for 'Mean' and 'Vapour Pressure'.

100. ABERDEEN: North Wall Screen on Tower: ht = 12.5 metres.

FEBRUARY, 1933.

Table with 25 columns (1-24) and 25 rows (Day 1-28). Columns 1-24 contain percentage values. Column 25 is 'Mean'. Column 26 is 'Vapour Pressure' in mb. Includes a summary row for 'Mean' and 'Vapour Pressure'.

*Computed from the mean temperatures and the mean relative humidity. †Mean of the column. ‡Mean of the row

RELATIVE HUMIDITY. Percentages at exact hours, Greenwich Mean Time.

101. ABERDEEN: North Wall Screen on Tower: ht (height of thermometer bulbs above the ground) = 12.5 metres.

MARCH, 1933.

Table with 25 columns (Hour G.M.T. 1-24, Mean, Vapour Pressure) and 32 rows (Day 1-31, Mean, Vapour Pressure). Contains percentage data for relative humidity and vapour pressure values.

102. ABERDEEN: North Wall Screen on Tower: ht = 12.5 metres.

APRIL, 1933.

Table with 25 columns (Hour G.M.T. 1-24, Mean, Vapour Pressure) and 32 rows (Day 1-30, Mean, Vapour Pressure). Contains percentage data for relative humidity and vapour pressure values.

*Computed from the mean temperatures and the mean relative humidity.

†Mean of the column.

‡Mean of the row.

RELATIVE HUMIDITY. Percentages at exact hours, Greenwich Mean Time.

105. ABERDEEN: North Wall Screen on Tower: h_t (height of thermometer bulbs above the ground) = 12.5 metres.

JULY, 1933.

Table for July 1933 showing relative humidity percentages for 24 hours over 31 days. Includes columns for Hour G.M.T., 1-24, Mean, Vapour Pressure, and Vapour* Pressure.

106. ABERDEEN: North Wall Screen on Tower: h_t = 12.5 metres.

AUGUST, 1933.

Table for August 1933 showing relative humidity percentages for 24 hours over 31 days. Includes columns for Day, Hour G.M.T., 1-24, Mean, Vapour Pressure, and Vapour* Pressure.

* Computed from the mean temperatures and the mean relative humidity.

† Mean of the column.

‡ Mean of the row.

RELATIVE HUMIDITY. Percentages at exact hours, Greenwich Mean Time.

109. ABERDEEN: North Wall Screen on Tower: ht (height of thermometer bulbs above the ground) = 12.5 metres.

NOVEMBER, 1935.

Table with 25 columns (1-24) and 25 rows (Day 1-25). Columns 1-24 show relative humidity percentages. Column 25 shows Vapour Pressure in mb. Includes a 'Mean' row at the bottom of the data section.

110. ABERDEEN: North Wall Screen on Tower: ht = 12.5 metres.

DECEMBER, 1935.

Table with 25 columns (1-24) and 25 rows (Day 1-25). Columns 1-24 show relative humidity percentages. Column 25 shows Vapour Pressure in mb. Includes a 'Mean' row at the bottom of the data section.

* Computed from the mean temperatures and the mean relative humidity.

† Mean of the column.

‡ Mean of the row.

RELATIVE HUMIDITY AND VAPOUR PRESSURE: ANNUAL MEANS FROM HOURLY VALUES.
For exact hours, Greenwich Mean Time.

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111. ABERDEEN: North Wall Screen on Tower: h_t (height of thermometer bulbs above the ground) = 12.5 metres.

1933.

| Hour G. M. T. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Relative Humidity. | 85.4 | 85.8 | 86.1 | 86.1 | 85.9 | 85.1 | 85.9 | 81.8 | 79.3 | 77.5 | 75.9 | 75.3 | 74.5 | 74.6 | 75.3 | 76.4 | 77.7 | 79.1 | 80.6 | 81.7 | 82.6 | 83.4 | 84.2 | 84.5 | 80.9 |
| Vapour pressure in millibars*. | mb. 9.1 | mb. 9.0 | mb. 9.0 | mb. 8.9 | mb. 8.9 | mb. 9.0 | mb. 9.1 | mb. 9.2 | mb. 9.3 | mb. 9.4 | mb. 9.6 | mb. 9.6 | mb. 9.6 | mb. 9.7 | mb. 9.7 | mb. 9.7 | mb. 9.6 | mb. 9.6 | mb. 9.5 | mb. 9.4 | mb. 9.3 | mb. 9.3 | mb. 9.2 | mb. 9.1 | mb. 9.3 |

*Computed from the mean temperature and mean relative humidity.

RELATIVE HUMIDITY: MONTHLY MEANS AND DIURNAL INEQUALITIES.
The departures from the mean of the day are adjusted for non-cyclic change.†

112. ABERDEEN: North Wall Screen on Tower: h_t = 12.5 metres.

1933.

| Month | Mean | Hour 1. | G.M.T. 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. |
|-------|------|------------|--------------|-------|-------|------|------|------|------|------|------|------|------|-------|-------|------|------|------|------|------|------|------|------|------|------|
| Jan. | 83.4 | +3.2 | +3.2 | +2.9 | +3.5 | +2.5 | +2.9 | +1.7 | +0.8 | +0.1 | -1.1 | -3.6 | -4.5 | -5.8 | -5.6 | -5.3 | -3.1 | -0.6 | +0.3 | +1.1 | +1.1 | +1.8 | +2.1 | +3.1 | |
| Feb. | 81.9 | +0.8 | 0.0 | +0.1 | +0.3 | +1.9 | +1.9 | +2.7 | +2.5 | 0.0 | +0.4 | -2.2 | -3.5 | -3.5 | -4.2 | -3.1 | -0.1 | +0.7 | +1.5 | +1.2 | -0.8 | +0.2 | +0.3 | +1.3 | +1.4 |
| Mar. | 79.4 | +5.2 | +6.4 | +6.7 | +6.3 | +6.6 | +6.1 | +6.5 | +3.9 | -0.7 | -5.6 | -8.3 | -8.2 | -11.3 | -10.9 | -9.1 | -7.9 | -3.7 | -0.5 | +1.0 | +1.3 | +2.2 | +3.9 | +5.5 | +4.8 |
| Apr. | 79.5 | +5.4 | +6.3 | +6.3 | +5.9 | +6.1 | +5.7 | +3.9 | -0.4 | -4.1 | -5.3 | -6.3 | -5.9 | -6.4 | -6.0 | -5.0 | -4.8 | -4.9 | -3.0 | -0.4 | +1.2 | +0.3 | +2.8 | +4.1 | +4.6 |
| May | 82.3 | +7.2 | +6.9 | +7.3 | +7.2 | +6.8 | +5.5 | +2.4 | -1.1 | -3.3 | -5.2 | -6.4 | -6.4 | -6.7 | -7.0 | -6.1 | -5.6 | -4.8 | -3.7 | -2.1 | -0.5 | +1.9 | +3.1 | +4.8 | +5.7 |
| June | 78.4 | +7.6 | +9.0 | +10.6 | +10.3 | +8.9 | +6.1 | +1.5 | -1.4 | -4.3 | -4.7 | -6.1 | -6.4 | -6.7 | -6.3 | -6.5 | -6.0 | -8.7 | -6.1 | -4.1 | -1.5 | +1.5 | +4.0 | +5.1 | +5.9 |
| July | 78.2 | +8.3 | +9.6 | +9.3 | +10.3 | +9.3 | +6.0 | +2.7 | -1.8 | -5.8 | -8.4 | -9.4 | -8.4 | -9.4 | -9.9 | -9.1 | -7.3 | -4.9 | -5.3 | -1.2 | +2.5 | +4.6 | +5.6 | +6.4 | +6.5 |
| Aug. | 76.5 | +8.5 | +6.9 | +8.1 | +8.2 | +7.8 | +5.5 | +3.3 | -0.3 | -4.2 | -5.7 | -6.4 | -7.1 | -6.7 | -6.9 | -6.6 | -6.2 | -6.1 | -4.3 | -1.8 | +0.2 | +2.4 | +2.7 | +5.1 | +5.4 |
| Sept. | 85.0 | +5.0 | +5.4 | +5.6 | +6.1 | +6.3 | +6.4 | +4.3 | +2.9 | +0.5 | -5.1 | -7.0 | -8.1 | -8.8 | -8.8 | -8.3 | -6.7 | -3.9 | +1.5 | +0.1 | +1.9 | +2.9 | +3.3 | +4.6 | +4.3 |
| Oct. | 80.9 | +1.9 | +2.8 | +2.7 | +2.5 | +3.2 | +2.6 | +3.7 | +2.0 | -0.3 | -1.2 | -2.7 | -4.8 | -4.8 | -4.7 | -4.6 | -3.9 | -1.5 | +0.1 | +1.4 | +1.4 | +0.9 | +1.0 | +0.7 | +1.4 |
| Nov. | 83.5 | +0.7 | +0.4 | +0.2 | +0.4 | -0.2 | +1.1 | +0.4 | +1.8 | +1.4 | +0.8 | -0.2 | -1.6 | -3.6 | -2.3 | -2.4 | -0.9 | -0.2 | +1.0 | +0.8 | +1.3 | +1.0 | +0.7 | -0.2 | -0.2 |
| Dec. | 82.3 | +0.7 | +0.9 | +1.1 | -0.2 | -0.2 | -0.3 | +1.8 | +1.1 | +1.8 | +0.3 | -1.1 | -2.2 | -2.8 | -2.4 | -1.8 | -1.1 | -0.1 | +1.1 | +1.4 | +0.9 | +1.0 | +1.0 | -0.7 | -0.4 |
| Year | 80.9 | +4.4 | +4.8 | +5.1 | +5.1 | +4.9 | +4.1 | +2.9 | +0.8 | -1.6 | -3.4 | -5.0 | -5.6 | -6.4 | -6.2 | -5.7 | -4.5 | -3.2 | -1.6 | -0.3 | +0.7 | +1.7 | +2.5 | +3.2 | +3.5 |

† See page 21.

RAINFALL: ANNUAL TOTALS OF HOURLY VALUES.

Amounts, in millimetres; durations, in hours, for periods of sixty minutes between the exact hours, Greenwich Mean Time.

113. ABERDEEN: H_r = 11.4 metres + 0.6 metres. up to 31 March.
24.1 metres + 0.6 metres from 1 April.

1933.

| Hour G. M. T. | 0 to 1 | 1 to 2 | 2 to 3 | 3 to 4 | 4 to 5 | 5 to 6 | 6 to 7 | 7 to 8 | 8 to 9 | 9 to 10 | 10 to 11 | 11 to Noon | Noon to 13 | 13 to 14 | 14 to 15 | 15 to 16 | 16 to 17 | 17 to 18 | 18 to 19 | 19 to 20 | 20 to 21 | 21 to 22 | 22 to 23 | 23 to 24 | 0 to 24 |
|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|----------------|------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|
| Amount. | mm. 33.1 | mm. 29.9 | mm. 27.9 | mm. 35.9 | mm. 29.2 | mm. 24.0 | mm. 29.7 | mm. 28.8 | mm. 32.7 | mm. 23.8 | mm. 26.9 | mm. 20.7 | mm. 19.8 | mm. 24.3 | mm. 34.4 | mm. 33.9 | mm. 29.3 | mm. 27.0 | mm. 30.6 | mm. 24.9 | mm. 22.9 | mm. 22.2 | mm. 31.0 | mm. 29.1 | mm. 672.9 |
| Duration. | hr. 29.4 | hr. 30.7 | hr. 27.1 | hr. 31.3 | hr. 27.2 | hr. 23.8 | hr. 29.2 | hr. 26.6 | hr. 28.2 | hr. 18.4 | hr. 16.3 | hr. 16.2 | hr. 20.6 | hr. 20.8 | hr. 29.8 | hr. 30.1 | hr. 30.5 | hr. 31.6 | hr. 28.5 | hr. 26.8 | hr. 26.1 | hr. 31.5 | hr. 27.5 | hr. 25.2 | hr. 633.4 |

114. ABERDEEN.

NOTES ON RAINFALL.

1933.

Notable Falls of the Year.

There was no fall of outstanding character during 1933. The heaviest falls recorded were 29.5 mm. on March 3rd - 4th; 30.6 mm. on Oct. 8th, 25 mm. of which fell in rather less than 8 hours; and 31.9 mm. on Oct. 23rd, 25 mm. of which fell in 10 hours. The greatest intensities recorded were 5 mm. in 30 min. during a thunderstorm on 28th April, and a similar fall in the same time on 23rd August. The records of the Jardi rate-of-rainfall recorder show that during a fall of 4.9 mm. accompanying a thunderstorm on 11th July a momentary intensity of 123 mm. per hour was registered. The maximum intensity during the thunderstorm on the 28th April already referred to, was 55 mm. per hour.

Dry Periods.

(Periods of 7 days or over with no rainfall or with trifling falls.)

- Jan. 20 - 28. 9 days with no rain.
 - Mar. 22 - 30. 9 days with trace only.
 - May 26 - June 7. 14 days with 0.3 mm.
 - June 27 - July 5. 9 days with trace only.
 - Sept. 1 - 12. 12 days with 0.2 mm.
 - Sept. 27 - Oct. 6. 10 days with 0.2 mm.
 - Dec. 15 - 22. 8 days with 0.1 mm.
- There were no periods of either partial or absolute drought.

Wet Periods.

There was one rain spell, - from Feb. 16 - Mar. 6. In these 19 days 95.5 mm. were recorded, no day having less than 0.2 mm.
The period from Oct. 21 to Nov. 3. though not continuously wet, yielded 98 mm.

RAINFALL

Amounts in millimetres, for periods of sixty minutes, between the exact hours, Greenwich Mean Time.

115. ABERDEEN: H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 11.4 metres + 0.6 metres.

JANUARY, 1933.

Table for January 1933 rainfall data. Columns include Hour G.M.T., 0-1 to 24, and Duration 0-24. Rows list hours 1-31 and summary rows for Sum and Total Duration.

116. ABERDEEN: H_r = 11.4 metres + 0.6 metres.

FEBRUARY, 1933.

Table for February 1933 rainfall data. Columns include Hour G.M.T., 0-1 to 24, and Duration 0-24. Rows list hours 1-28 and summary rows for Sum and Total Duration. Some cells contain asterisks or parentheses.

RAINFALL

117. ABERDEEN: Hr (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + hr (height of receiving surface above ground) = 11.4 metres + 0.6 metres.

MARCH, 1933.

Table with columns for Hour G. M. T., mm. (0-1 to 23-24), hr. (0-24), and Duration (0-24). Rows list hours 1-31 and a summary row.

118. ABERDEEN: Hr = 24.1 metres + 0.6 metres.

APRIL, 1933.

Table with columns for Hour G. M. T., mm. (0-1 to 23-24), hr. (0-24), and Duration (0-24). Rows list hours 1-30 and a summary row.

RAINFALL

Amounts in millimetres, for periods of sixty minutes, between the exact hours, Greenwich Mean Time.

119. ABERDEEN: H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 24.1 metres + 0.6 metres.

MAY, 1933.

Table for Aberdeen rainfall in May 1933. Columns include Hour G.M.T., rain amounts in mm for each hour, and Duration in hr. for each hour. Summary row shows total rainfall of 25.3 mm and total duration of 21.7 hours.

120. ABERDEEN: H_r = 24.1 metres + 0.6 metres.

JUNE, 1933.

Table for Aberdeen rainfall in June 1933. Columns include Hour G.M.T., rain amounts in mm for each hour, and Duration in hr. for each hour. Summary row shows total rainfall of 21.8 mm and total duration of 27.7 hours.

Amounts in millimetres, for periods of sixty minutes, between the exact hours, Greenwich Mean Time.

121. ABERDEEN: H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 24.1 metres + 0.6 metres.

JULY, 1933.

Table with 24 columns for hourly rainfall (0-1 to 23-24) and 2 rows for Total Duration and Sum. Rows 1-31 represent hourly data for July 1933.

122. ABERDEEN: H_r = 24.1 metres + 0.6 metres.

AUGUST, 1933.

Table with 24 columns for hourly rainfall (0-1 to 23-24) and 3 rows for Total Duration, Sum, and Hour G.M.T. Rows 1-31 represent hourly data for August 1933.

Averages for periods of sixty minutes centred at the Half hours, Greenwich Mean Time

M.S.L. + h_a (height of anemograph above ground) = 15 metres + 23 metres.

JANUARY, 1933.

Table with columns for days 12-13 to 23-24, Mean, and Day. Each day column contains two columns of wind speed data (m/s) for two different heights. The table covers the period from January 12th to January 31st, 1933.

FEBRUARY, 1933.

Table with columns for days 12-13 to 23-24, Mean, and Day. Each day column contains two columns of wind speed data (m/s) for two different heights. The table covers the period from February 12th to February 28th, 1933.

Averages for periods of sixty minutes, centred at the Half hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 13 metres + 23 metres.

MARCH, 1933.

Table for March 1933 showing wind direction and speed data in m/s. Columns include time intervals (12-13 to 23-24), wind speed at 13m and 23m heights, and Mean/Day values.

APRIL, 1933.

Table for April 1933 showing wind direction and speed data in m/s. Columns include time intervals (12-13 to 23-24), wind speed at 13m and 23m heights, and Mean/Day values.

Averages for periods of sixty minutes centred at the Half hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 13 metres + 23 metres.

SEPTEMBER, 1933.

Table with 14 columns for time periods (12-13 to 23-24), Mean, and Day. Rows contain wind speed data in degrees and m/s for various heights (330, 170, 90, 120, 180, 290, 120, 110, 70, 80, 120, 50, 60, 360, 120, 100, 160, 80) across the days of the month.

OCTOBER, 1933.

Table with 14 columns for time periods (12-13 to 23-24), Mean, and Day. Rows contain wind speed data in degrees and m/s for various heights (---, 10, 210, 310, 310, 200, 70, 100, 160, 220, 290, 320, 200, 300, 220, 290, 310, 160, 150, 120, 90, 140, 30, 20, 320, 320, 330, 60, 10, 300, 290) across the days of the month.

Averages for periods of sixty minutes centred at the Half hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 13 metres + 23 metres.

NOVEMBER, 1933.

Table with 26 columns (12-13 to 23-24, Mean, Day) and multiple rows of wind speed and direction data for November 1933.

DECEMBER, 1933.

Table with 26 columns (12-13 to 23-24, Mean, Day) and multiple rows of wind speed and direction data for December 1933.

MARCH, 1933.

157. ABERDEEN.

Table for 157. ABERDEEN, March 1933. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Data rows 1-31 show various cloud and weather observations.

158. ABERDEEN.

APRIL, 1933.

Table for 158. ABERDEEN, April 1933. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Data rows 1-30 show various cloud and weather observations.

K

161. ABERDEEN.

JULY, 1933.

Table for July 1933 showing weather data for Aberdeen. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Data spans from July 1st to July 31st, with a mean cloud amount of 7.5.

162. ABERDEEN.

AUGUST, 1933.

Table for August 1933 showing weather data for Aberdeen. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Data spans from August 1st to August 31st, with a mean cloud amount of 6.8.

165. ABERDEEN.

Table for Aberdeen, November 1933. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Data rows 1-30 show various cloud types like Cumuli, Stratus, and their amounts/visibility over time.

166. ABERDEEN.

Table for Aberdeen, December 1933. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Data rows 1-31 show various cloud types like Cumuli, Stratus, and their amounts/visibility over time.

M.O. 370
(Eskdalemuir)

Air Ministry
METEOROLOGICAL OFFICE

THE
OBSERVATORIES' YEAR BOOK
1933

Comprising the meteorological and geophysical results obtained from autographic records and eye observations at the observatories at Lerwick, Aberdeen, Eskdalemuir, Cahirciveen (Valentia Observatory), and Richmond (Kew Observatory), and the results of soundings of the upper atmosphere by means of registering balloons.

ESKDALEMUIR

Published by the authority of the
METEOROLOGICAL COMMITTEE



LONDON
HIS MAJESTY'S STATIONERY OFFICE

1935

ESKDALEMUIR OBSERVATORY.

| | | | | | |
|---------------------------|----|----|----|----|-----------|
| Latitude | .. | .. | .. | .. | 55° 19 N. |
| Longitude | .. | .. | .. | .. | 3° 12 W. |
| G.M.T. of local Mean Noon | .. | | | .. | 12h. 13m. |

"Heights in metres above Sea-Level"

| | | | | | |
|-----------------------|----|----|----|----|-------|
| Barometer | .. | .. | .. | .. | 237.3 |
| Rain-gauge | .. | .. | .. | .. | 242.0 |
| Dines Tube Anemograph | .. | | | .. | 250 |

"Heights in metres above ground"

| | | | | | |
|------------------------|----|----|----|----|-----|
| Thermometer Bulbs | .. | .. | .. | .. | 0.9 |
| Sunshine Recorder | .. | .. | .. | .. | 1.5 |
| Dines Tube Anemograph | .. | | | .. | 15 |
| Beckley Rain-gauge Rim | .. | | | .. | 0.4 |

INTRODUCTION.

HISTORICAL.

Early in the twentieth century the increasing artificial magnetic disturbance at Kew Observatory, Richmond, due to the westward extension of the electric tramway system from London, made desirable the establishment of a magnetic observatory in a locality unlikely to be affected, at least for a number of years, by electric power or traction system. A committee of the Royal Society of London selected a site in the parish of Eskdalemuir, Dumfries-shire, for the new observatory. The nearest towns or industrial centres are Langholm and Lockerbie, distant approximately 16 and 18 miles (26 and 29 km.) by road, and there is no point of railroad within 9 miles (14km.) of the Observatory. Installation of the instrumental apparatus commenced in the summer of 1908, the Observatory at that time forming a part of the then recently established National Physical Laboratory.

Although the Observatory was established primarily in the interests of the study of terrestrial magnetism the field of geophysical work undertaken has been considerably wider and has included, almost from the beginning, meteorology, atmospheric electricity (mainly atmospheric potential gradient), and seismology. In the earliest years Milne, Wiechert, Omori, and Galitzin seismographs were in operation at Eskdalemuir, but seismological observations ceased in October, 1925, when the three-component installation of Galitzin seismographs was transferred to Kew Observatory. In 1910, when the majority of the various initial difficulties had been overcome, Eskdalemuir passed from the control of the National Physical Laboratory to that of the Meteorological Office. In consequence of this change the meteorological work assumed increased importance, and from the beginning of 1914 the Observatory has served as a telegraphic reporting station of the Meteorological Office.

Summaries of the results of observations made in 1909-10 were published in the Report of the Observatory Department of the National Physical Labora-

tory, 1909-10. The results for subsequent years are included in the publications mentioned in the Preface to the present volume.

SITE.

Eskdalemuir Observatory, some $3\frac{1}{2}$ miles ($5\frac{1}{2}$ kilometres) north-north-west of Eskdalemuir Parish Church in the county of Dumfries-shire, is situated on a rising shoulder of moorland which is bounded on the east by the road leading north to Ettrick and Selkirk, on the west by the small Davington Burn, and at the southern extremity by the small hamlet of Davington.

The hillside in the immediate vicinity of the Observatory slopes generally from the north-west to south-east. The mean height above sea level of the Observatory site is about 800 feet (244 metres). Cassock Hill, slightly more than a mile distant to the north-west is 1,205 feet (367 metres), while the bench mark at Davington School, $\frac{1}{4}$ mile (0.4 km.) to south-east, is 699 feet (213 metres) above M.S.L. To the east the ground slopes fairly rapidly to the valley bottom, the level of the Ettrick road at a point about $\frac{1}{4}$ mile (0.4 km.) east of the underground magnet house being 682 feet (208 metres). The River White Esk is rather less than $\frac{1}{2}$ mile (0.8 km.) to the east. Immediately beyond the river, and almost due east of the Observatory, Dumfedling Hill rises to a height of nearly 1,200 feet (366 metres) above M.S.L. Some 4 or 5 miles (8 km.) to the north is a high ridge, following approximately the boundary between Dumfries-shire and Selkirkshire, the highest point of which is Ettrick Pen (north-north-west) 2,200 feet (670 metres) above M.S.L. Rather more than half a mile (0.8 km.) to the west, and beyond Davington Burn, the ground rises to 1,040 feet (317 m.), and reaches nearly 1,200 feet (366 m.) half a mile (0.8 km.) further on. To the south and south-south-east the Observatory commands a view of the White Esk Valley as far as Hart Manor, 4 miles ($6\frac{1}{2}$ km.) distant, and beyond that the upper slope of Cauldkine Hill, about 10 miles (16 km.) distant, is visible. The surrounding country is bare and wild and there are but few trees to relieve the monotony of the grass-covered hills and moorland.

Within the Observatory grounds the soil is peaty and in many places is more or less boggy at all seasons. Some two feet, or less, below the surface a clay-like substance containing soft rock is encountered. The local geological formation is described as "rock of the Tarannon Llandovery series traversed by igneous dykes."

Photographs, site plan, and a brief description of the Observatory will be found in the Introduction to "The Observatories' Year Book," 1928.

METEOROLOGY.

The elements dealt with in the following tables are:-Atmospheric pressure, air temperature, humidity, rainfall, sunshine, solar radiation, wind speed and direction, earth temperature and minimum temperature on the grass. There is also a diary of cloud and weather.

Notes on Instruments.

Brief description of the recording instruments and of the methods of tabulating the records, with notes on the information contained in the Tables are given in the General Introduction to the Tables. The following particulars, which refer specially to Eskdalemuir, are to be regarded as ampli-

fying the information contained therein. References to full accounts of other instruments used at Eskdalemuir appear below.

In January the former standard Kew pattern barometer, which was used as standard throughout 1932, was superseded by the standard Fortin barometer. The two barometers are close together in the north-west ground floor room, which has a small daily range of temperature.

The photographic mercurial barograph is situated in the east room of the underground magnet house. The daily range of temperature to which the instrument is subject is normally less than 0.05°C ., the annual range being about 4°C .. The scale value of the records is 1 millimetre on the paper = 0.85 millibar, and the time scale is 9.1 millimetres on the paper = 1 hour.

As in former years, records of pressure were also obtained from (a) a Dines float barograph¹, and (b) a Richard barograph, pen recording, the records of which are changed weekly.

"Temperature."-The photographic thermograph and the standard mercurial thermometers, dry bulb and wet bulb, are situated in a wooden hut, provided with louvred sides and double roof, which is some 200 feet (60 m.) north-north-east of the main building. The installation is similar to that described on p.10, except that a special enclosure is provided inside the hut to accommodate the optical and photographic arrangements.

The scale values of the thermograph records are 1°A . = 3.064 mm. and 2.438 mm. on the paper for the dry and wet bulb records respectively, while the time scale is 1 hour = 9.250 mm.

Auxiliary records of temperature are obtained from one or more instruments of the bimetallic type described in the "Meteorological Observers' Handbook". These instruments are situated in the hut which contains the photographic thermograph.

"Humidity." - In addition to the dry and wet bulb thermograph described above there is a Richard hair hygrometer which is situated in the louvred hut.

As is stated in the General Introduction, the records from this instrument are utilised when the wet bulb reading does not exceed 273°A .. On the records obtained in 1932 a change of 10 per cent. in relative humidity is represented by about 0.8 centimetre, the time scale being 1 hour = 11.4 mm.

"Rainfall."-The recording instrument is a Beckley self-registering rain-gauge, which is described on page 11. The time scale of the record is 1 hour = 9.24 millimetres on the paper and the rain scale has a magnification of 3.35 . The instrument has been in use at Eskdalemuir since 1908 and was originally installed at Fort William in July, 1890.

The conical part of the gauge funnel is surrounded by a cylindrical copper casing lined with asbestos on the inner side and of diameter equal to that of the funnel, viz. 11.27 inches (28.6 cm.). Within the enclosure so formed is a gas jet, and a flame of suitable dimensions is maintained, as circumstances dictate, to melt snow which may be collected.

¹Q.J.R. Meteor. Soc., Vol. LV, pp. 37-53, 1929.

The gauge is surrounded by a circular turf wall or dyke, the top of which is on a level with the rim of the gauge; the external and internal diameters of the dyke being 11.5 feet (3.5 m.) and 7 feet (2 m.) respectively.

A standard 8-inch (20.3 cm.) rain-gauge is situated some 24.5 feet (7.5m) to the east of the Beckley gauge and is surrounded by a turf dyke of similar dimensions. Readings of amounts of rain received in the 8-inch gauge are made at 7h and 18h G.M.T. It is customary to adjust the indications of the recording gauge to agree with the readings of the standard check gauge.

Auxiliary autographic records of precipitation were obtained by means of a Hellman-Fuess snow-gauge which is situated in a pit 8 feet (2.4 m.) wide and almost due north of the 8 - inch standard gauge, the pit being surrounded by a low wall of earth and turf, the top of the wall being approximately level with the rim of the gauge. The records so obtained are used only in the event of failure or uncertainty of the Beckley autographic record.

"Sunshine."-The record of sunshine is obtained from a Campbell-Stokes recorder described on p. 11.

The recorder is fixed on a stone pillar and has a reasonably free exposure, the chief obstacle being hills to east and west. The elevation of hills between 70° and 110° east of south varies from 2.5° to 5° , while between 50° and 135° west of south the high ground varies in elevation from 3° to 4.4° , being generally about 3.5° . As sunshine can be recorded when the sun is 3° above the horizon only in the most favourable circumstances, it appears that the loss of record occasioned by the neighbouring high ground is of relatively small extent and is confined mainly to a possible defect of record at the beginning of the day during a few weeks centred about the equinoxes.

"Solar Radiation."-Measurements of the intensity of radiation received from the sun by a surface which is normal to the line drawn from the instrument to the sun are affected by means of an Ångström compensating pyrheliometer¹. The intensity of radiation is expressed in milliwatts per square centimetre (lmw. per sq. cm. = 0.01435 gramme calorie per sq. cm. per minute). In addition, the value is given of the function $(p/p_0) \sec Z$, in which 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. This affords a measure of the mass of atmosphere which the solar radiation has had to penetrate before reaching the earth. Entries in the column headed "Sky" are intended to show the presence or absence of haze, mist or cloud in the direct path of the solar radiation recorded.

"Wind."-A Dines tube anemograph, furnished with direction recorder, is situated in the main building. The vane-head is 15 metres above a tangent plane to the slope of the hillside and approximately 7 metres above the general level of the roof of the building.

¹For descriptions see "The Observer's Handbook", 1921 ed., Meteorological Office, London; "Astrophysical Journal", Vol IX, 1899; "Actes de la societe royale des Sciences d'Upsal", 1893; also "Geophysical Memoirs", No. 21 (1923), Meteorological Office, London.

Following some structural repairs to the observatory building, the pyrheliometer was re-erected in an embrasure of the tower in June 1930.

In August 1933, the anemograph was replaced by another of similar pattern, except that the suction and pressure effects are now transmitted to the speed recorder by means of copper pipes of 2.5 cm. internal diameter, instead of by "compo" tube of 1.3 cm. internal diameter. During the period of transition (Aug. 9-11) the hourly wind speed and direction were estimated.

Apart from the surrounding hills, the exposure of the vane-head is tolerably free in all directions save to the west where at a distance of some 130 feet (40 m.) is a rather large building, of which the height is somewhat greater than that of the main building. With winds from nearly due west the direction records show markedly greater turbulence than with other winds.

"Earth Temperature."- Readings have been made at 9h G.M.T. of the earth temperature at nominal depths of one foot and four feet below the surface of the grass lawn a few yards south of the thermometer hut. The thermometers and the method of exposure are of the standard type described in the "Meteorological Observers' Handbook." The depths of the thermometer bulbs below the grass-covered surface of the ground are 30 cm. (1 foot) and 122 cm. (4 feet). In December, 1930, two more thermometers, graduated in degrees absolute, were installed at 1 foot and 4 feet respectively alongside the other two thermometers graduated in degrees Fahrenheit, the former being retained as spares. The Fahrenheit pair were replaced as standards by the absolute pair at the beginning of 1931.

"Minimum Temperature on the Grass."- The thermometer used for readings of grass minimum temperature is of the spirit type with index, and when exposed, between 18h and 7h G.M.T., is supported at a height of one or two inches (4 cm.) above close-cropped grass a few metres from the louvred thermometer hut.

"Visibility."- The descriptions of the selected visibility objects, together with the distances and bearings from the point of observation, are given in the subjoined table. Auxiliary objects and guide criteria are given in brackets. Certain of the nearer objects may be identified by reference to the photographs and site plan. Unless otherwise stated, the distances and bearings are with reference to certain of the windows on the upper floor of the main building.

The situation of the Observatory and the nature of the immediate surroundings allow of only a very limited choice of objects. The objects A to D are situated mainly to the north, while the more distant objects are towards south to south-east, i.e., down valley. Four miles or so to the north of the Observatory the hills rise in places to rather more than 2,000 feet above sea level and at times visibility in this direction is distinctly less than towards south. On other occasions the hills to the north are visible but nearer objects down the valley are invisible owing to valley mist. With the exception of the cottage at Finglandshiel, and Cauldkine Hill, the objects more distant than D are below the level of the Observatory. There are no objects at distances which approximate sufficiently closely to the standard distances for objects H, J, and K. When it is estimated that the range of visibility is such that objects at these standard distances would be visible the corresponding small letter entries are made in the Diary of Cloud and Weather. The estimates of visibility in the dark depend largely on the judgment of the observer. There are no lights other than those in the Observatory buildings and in two cottages within a radius of one mile.

VISIBILITY OBJECTS AT ESKDALEMUIR.

| Object | Distance | Bearing | |
|--------|--|----------|------|
| A | (i) White wooden post | 25 yards | NE. |
| | (ii) Twigs on trees nearest the boundary wall in front of the main building | 25 " | S. |
| | (iii) Small thermometer screen viewed from steps facing the back entrance to the main building | 26 " | NNE. |
| B | (i) Theodolite pillar | 55 " | N. |
| | (ii) Chimney (or cowl) on the large thermometer screen | 60 " | NE. |
| C | Posts and shafts on underground magnetograph house | 107 " | N. |
| D | Standards on Observatory reservoir | 217 " | NNW. |
| E | (i) Church and Manse, Davington | 550 " | SE. |
| | (ii) (Davington Farm House) | 470 " | SSE. |
| F | (i) Chimneys at Burncleuch | 1180 " | SSE. |
| | (ii) (Cottage at Finglandshiel) | 1550 " | NE. |
| G | Trees at Garwaldwaterfoot | 2160 " | SSE. |
| H (h) | (Lower slope of Raeburn Hill) | 2½ miles | SSE. |
| I | Hart Manor | 4 " | SSE. |
| J (j) | (Cauldkine Hill, 1,478 feet, near Westerkirk; not clearly visible) .. | 10½ " | SSE. |
| K (k) | (Cauldkine Hill, 1,478 feet, near Westerkirk; plainly visible) .. | | |
| L (l) | No objects available.. .. . | | |
| M (m) | | | |

Note:-The descriptions of auxiliary objects and guide criteria are given in brackets.

IDENTIFICATION NUMBERS OF INSTRUMENTS IN USE IN 1933.

Standard Barometer:-

| | |
|--|---------|
| January 1 - January 14 - (Kew pattern Barometer) | 1320 |
| January 15 - December 31 -(Fortin Barometer) | 1716/27 |
| Standard Dry Bulb Thermometer M.O. | 19123 |
| Standard Wet Bulb Thermometer M.O. | 1695 |
| Hair Hygrograph M.O. | 59 |
| Recording Beckley Rain-gauge | 4 |
| Control Rain-gauge M.O. | 336/30 |
| Control Rain-gauge, glass for M.O. | 1568 |
| Campbell-Stokes Sunshine Recorder M.O. | 99 |
| Ångström compensating Pyrheliometer | 116 |

Dines Tube Anemograph:-

| | |
|---------------------------------------|------------|
| January 1 - August 9 | 1032 |
| August 11 - December 31 | 1019, 1081 |
| Grass Minimum Thermometer.. .. . M.O. | 23002 |
| Earth Thermometer, 1 Ft. M.O. | 24009 |
| " " 4 Ft. M.O. | 4 |

CORRECTIONS TO INSTRUMENTS IN USE IN 1933

The corrections to the instruments in use during 1933 are given below. In all cases the corrections are those given in the certificate of examination issued by the National Physical Laboratory. The corrections here given have been applied. The date on which each of the instruments mentioned was brought into use is given for purposes of reference.

Kew pattern Barometer, M.O. 1320, July 14, 1931.*

| at | 920 | 940 | 960 | 980 | 1000 | 1020 | 1040 | 1060 | mb. |
|----|------|------|------|------|------|------|------|------|-----|
| | -0.4 | -0.3 | -0.2 | -0.1 | -0.1 | -0.0 | +0.1 | +0.1 | |

Attached thermometer: + 0.1 at 290°A.

*These corrections, if applied to readings of the barometer, would bring the readings into agreement with the atmospheric pressure, provided the instrument were at a temperature of 273°A. (0°C.) and in latitude 45°.

Fortin Barometer, M.O. 1716/27, Jan. 15, 1933.

| | | | | | | | | |
|----|-------|-------|-------|-------|-------|-------|-------|-----|
| at | 880 | 910 | 940 | 970 | 1000 | 1030 | 1050 | mb. |
| | -0.10 | -0.05 | -0.05 | -0.05 | -0.05 | -0.05 | -0.05 | |

Attached thermometer, No. 5592, Jan. 15, 1933.

| | | | | | | | | |
|----|------|------|------|------|------|------|------|-----|
| at | 273 | 278 | 283 | 288 | 293 | 298 | 303 | °A. |
| | -0.1 | -0.2 | -0.2 | -0.4 | -0.3 | -0.2 | -0.2 | |

Dry Bulb Thermometer, M.O. 19123. January 27th, 1919.

| | | | | | | | | | |
|----|------|------|-----|-----|-----|------|------|------|--------|
| at | 263 | 268 | 273 | 278 | 283 | 288 | 293 | 298 | 303°A. |
| | +0.2 | +0.1 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 |

Wet Bulb thermometer, M.O. 1695. May 17th, 1930.

| | | | | | | | |
|----|-----|-----|------|-----|-----|-----|--------|
| at | 253 | 263 | 273 | 283 | 293 | 303 | 313°A. |
| | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 |

Grass Minimum Thermometer, M.O. 23002 at

| | | | | | |
|------|------|-----|-----|-----|--------|
| 253 | 263 | 273 | 283 | 293 | 303°A. |
| -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | -0.1 |

Earth Thermometer 1 Ft. M.O. 24009 - No corrections.

4 Ft. M.O. 4, from 260 to 310°A., + 0.1.

NOTE ON THE REDUCTION OF BAROMETER READINGS.

The Fortin barometer, M.O. 1716/27 by Casella, London, has been used as the standard since 1st January, 1929. Before this date a Kew pattern mercury barometer M.O. 1320 by J. Hicks, London, was the standard instrument from 16th December, 1913. The latter was re-introduced on July 14, 1931 when the Fortin barometer developed a leak and was sent away for repair and remained in use until January 14, 1933; the repaired Fortin barometer was then re-introduced.

1. "Reduction to Pressure at Station Level".- The corrections for index error (including those for capacity and capillarity) as given in the N.P.L. certificates are reproduced above. The corrections for temperature for the barometer are those given in the "International Meteorological Tables" as appropriate to a Fortin barometer. The adoption of such corrections for a Kew pattern barometer, although technically incorrect, would not lead to appreciable systematic error in actual practice. The table of corrections to the barometer readings on this account for various readings of the attached thermometer is as set out in "The Observatories' Year Book," 1928.

The corrections for the variation of gravity as obtained from the expression

$$g = 980.617 (1 - 0.00259 \cos 2\lambda) (1 - 5z/4E)$$

where λ = latitude

z = height of the station.

E = earth's radius

are as follow:-

| | | | | | | | | | |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| at reading of | 900 | 920 | 940 | 960 | 980 | 1000 | 1020 | 1040 | mb. |
| Correction | +0.78 | +0.80 | +0.81 | +0.83 | +0.85 | +0.87 | +0.88 | +0.90 | mb. |

2. "Reduction to Mean Sea Level".- The correction to reduce pressure at station level to pressure at sea level is calculated according to the usage of the "International Meteorological Tables" with certain minor modifications which are set out in "The Observatories' Year Book", 1928. In the same volume is given a copy of the Table actually in use.

NOTES ON THE METEOROLOGICAL SUMMARIES.

The number of years for which meteorological results are available is insufficient as yet to yield a completely representative set of normal values. Although certain meteorological data are available for 1909 and 1910 it is only since 1911 that the reductions have been made in accordance with an approximately uniform plan. In the following notes the normal or average values referred to are for the period 1911 to 1926, unless otherwise stated.

"Pressure".-As was the case throughout the British Isles the mean pressure for the year was above normal, the excess being 3.1 mb. In the months, March, June, and October, the mean pressure was sub-normal; in each of the other months it was above the average, the greatest excess being in December viz. 14.2 mb. The extreme instantaneous values recorded were 1013.3 mb. on December 3, and 950.3 mb. on March 17. The greatest and least mean daily values were 1012.4 mb. on December 3, and 953.3 mb. on March 17. The largest value of the range during a calendar day was 33.2 mb. on March 20. The mean value of the absolute daily range of pressure varied between 9.8 mb. in January, and 3.9 mb. in May. The annual mean value of the daily range was a little below normal.

"Pressure (Diurnal Variation)".-In the mean diurnal inequality for each month there are two maxima, in the late forenoon and usually an hour or two before midnight, and two minima, in the early morning and afternoon. In all months, except January, February and November, the night maximum of the representative inequalities for the years 1911-20 is the larger. In 1933 the principal maximum occurred at night in February, April, July, August and October. The principal minimum in the representative inequalities is in the afternoon except in February, March, August and November, but in 1933 the principal minimum falls in the early morning in January, March, April, July and October. Compared with the mean diurnal inequality for 1911-20⁽¹⁾,

(1) "On the Diurnal Variation of Atmospheric Pressure at Eskdalemuir and Castle O'er, Dumfries-shire," by A. Crichton Mitchell, D.Sc., "Quarterly Journal of the Royal Meteorological Society. Vol. L, No. 210, April, 1924.

in 1933 the early morning and afternoon troughs are slightly enhanced, while the late afternoon crest is increased and the night crest diminished.

The results of the harmonic analysis of the monthly and seasonal mean diurnal inequalities for 1933 are given in the accompanying table. For purposes of comparison the corresponding data ⁽¹⁾ derived from the mean inequalities for the period 1911-20 are also given. In computing the Fourier coefficients for 1933 the unit employed was .001 mb. Although for 1933, as for recent years, the phase angles are given to the nearest 1°, this course is scarcely justified, at least for the third and fourth components, by the character of the data from which the harmonic coefficients for the months and seasons of a single year are computed. The phase angles α_1 etc, given in the table below refer to Local Mean Time, whereas in the corresponding tables for 1922 and 1923 the phase angles refer to Greenwich Mean Time.

As is usually the case the amplitude and phase of the 24-hour term fluctuate irregularly from month to month. The ratio of the mean of the twelve monthly values of c_1 to the value of c_1 for the year as a whole considerably exceeds unity. c_1 is noticeably high for January, February, and October, and low for December. The value of c_2 for the summer was below the corresponding normal, those for year, winter and equinox being higher. The variation in the 8-hour term from month to month is fairly normal, the amplitude being largest in winter months and least at the time of equinoctial phase transition.

HARMONIC COEFFICIENTS OF THE DIURNAL INEQUALITY OF ATMOSPHERIC PRESSURE

ESKDALEMUIR, LONGITUDE 3° 12 W.

Values of c_n, α_n in the series $c_n \sin(15nt + \alpha_n)$, t being Local Mean Time reckoned in hours from midnight.

| Month and Season | C_1 | | α_1 | | C_2 | | α_2 | | C_3 | | α_3 | | C_4 | | α_4 | |
|------------------|-------|---------|------------|---------|-------|---------|------------|---------|-------|---------|------------|---------|-------|---------|------------|---------|
| | 1933 | 1911-20 | 1933 | 1911-20 | 1933 | 1911-20 | 1933 | 1911-20 | 1933 | 1911-20 | 1933 | 1911-20 | 1933 | 1911-20 | 1933 | 1911-20 |
| | mb. | mb. | ° | ° | mb. | mb. | ° | ° | mb. | mb. | ° | ° | mb. | mb. | ° | ° |
| Jan. | .53 | .094 | 275 | 346.4 | .29 | .235 | 187 | 151.6 | .15 | .125 | 347 | 345.3 | .06 | .046 | 232 | 213.9 |
| Feb. | .40 | .118 | 80 | 215.1 | .25 | .273 | 127 | 138.1 | .11 | .083 | 346 | 341.2 | .06 | .042 | 82 | 67.7 |
| Mar. | .15 | .128 | 279 | 185.3 | .33 | .304 | 161 | 145.3 | .03 | .053 | 318 | 335.0 | .06 | .051 | 24 | 24.5 |
| Apr. | .10 | .205 | 165 | 92.3 | .28 | .299 | 149 | 154.8 | .09 | .022 | 175 | 156.3 | .03 | .045 | 1 | 355.7 |
| May | .17 | .225 | 1 | 52.7 | .20 | .270 | 158 | 147.4 | .06 | .075 | 160 | 160.1 | .02 | .035 | 323 | 330.1 |
| June | .24 | .152 | 22 | 53.9 | .19 | .234 | 159 | 146.1 | .07 | .084 | 141 | 160.6 | .01 | .018 | 322 | 325.7 |
| July | .09 | .171 | 110 | 69.4 | .22 | .211 | 158 | 141.2 | .06 | .077 | 120 | 155.8 | .02 | .023 | 300 | 300.0 |
| Aug. | .07 | .114 | 78 | 114.6 | .23 | .239 | 146 | 147.7 | .03 | .057 | 149 | 157.2 | .04 | .047 | 309 | 330.8 |
| Sept. | .11 | .121 | 29 | 87.7 | .35 | .313 | 166 | 151.6 | .03 | .012 | 241 | 110.7 | .06 | .050 | 349 | 344.7 |
| Oct. | .32 | .110 | 149 | 76.0 | .47 | .315 | 161 | 159.5 | .06 | .060 | 3 | 8.2 | .01 | .041 | 340 | 32.9 |
| Nov. | .11 | .125 | 29 | 183.5 | .37 | .242 | 168 | 168.1 | .09 | .101 | 2 | 9.2 | .03 | .015 | 214 | 146.2 |
| Dec. | .03 | .137 | 164 | 87.1 | .27 | .213 | 156 | 146.9 | .13 | .124 | 10 | 4.2 | .06 | .067 | 209 | 212.8 |
| Arithmetic Mean | .19 | .142 | ... | ... | ... | .262 | ... | ... | .08 | .073 | ... | ... | .04 | .040 | ... | ... |
| Year | .031 | .085 | 40 | 90.8 | .279 | .260 | 159 | 150.1 | .024 | .020 | 13 | 41.7 | .012 | .016 | 319 | 341.9 |
| Winter | .052 | .038 | 326 | 165.4 | .278 | .236 | 162 | 150.9 | .120 | .106 | 356 | 355.5 | .029 | .023 | 200 | 189.1 |
| Equinox. .. | .069 | .108 | 159 | 103.9 | .351 | .306 | 160 | 152.8 | .009 | .021 | 244 | 4.4 | .040 | .044 | 4 | 8.9 |
| Summer | .112 | .153 | 34 | 67.2 | .209 | .238 | 155 | 145.8 | .053 | .074 | 142 | 158.5 | .023 | .030 | 313 | 324.3 |

NOTE.-"Winter"comprises the four months January, February, November, December.
 "Equinox"the months March, April, September, October.
 "Summer" the months May to August.

⁽¹⁾ "On the Diurnal Variation of Atmospheric Pressure at Eskdalemuir and Castle O'er, Dumfries-shire," by A.Crichton Mitchell, D.Sc., "Quarterly Journal of the Royal Meteorological Society. Vol. L, No.210, April, 1924.

"Temperature".-The mean temperature, 280.79°A . (46°OF), for the year 1933 is nearly 1°A above the normal value. The extreme temperatures recorded during the year were 302.2°A . (84°OF) on July 5 and 263.9°A . (15°OF) on January 25, the former being the highest ever recorded at the Observatory. January 24 with a mean daily temperature of 268.9°A . (24°OF) was the coldest day of the year and July 5 with 293.6°A . (69°OF) was the hottest. From March to November, both months inclusive, the mean monthly temperatures were continuously above the normal, the greatest excess occurring in July and September, when it was in each case 2.4°A . Another noteworthy feature was that the mean monthly temperature for March, June, July, August and September was in each case the highest mean monthly temperature since records commenced for months of the same name. The minimum temperature was 273.0°A . (32°OF), or less, on 93 days, 59 being in the first four months of the year. There were 6 "ice-days", i.e. days with maximum temperature below 273.0°A . (32°OF).

The values of the absolute range of temperature within a calendar month vary between 26.2°A . (47°OF .) in August and 13.8°A . (24°OF .) in December.

"Humidity".- As is mentioned in the General Introduction, owing to a change in the hygrometric tables used, the results from 1926 onward are not strictly comparable with those of earlier years. Compared with the mean values for 1911-25 the chief departures of the values of mean relative humidity in 1933 are - 5 in March, and - 4 in February, June and October. The mean relative humidity, 82.0 per cent. for the year, is less than that for the years 1911-25, whilst the mean vapour pressure, 9.0 mb. is slightly greater than the mean for the years 1922-30. The extreme daily mean values of relative humidity and vapour pressure were 98.2 per cent. on December 25, 39.9 per cent. on March 23, 18.9 mb. on August 3, 3.6 mb. on February 18 and 22. The lowest hourly reading of relative humidity was 19 per cent. on March 23.

"Precipitation".-1933 was the driest year experienced since records commenced, the total amount of rainfall, 1117.6 mm. (44.00 in.) being 28.8 per cent. less than the mean for the period 1911-30. The wettest months were January with 196.9 mm. (7.75 in.) February with 177.7 mm. (7.00 in.) and July with 173.9 mm. (6.85 in.) September with 26.4 mm. (1.04 in.) and December with 33.2 mm. (1.31 in.) were the driest months, the former being the driest September since 1910 and the latter the driest December on record. The greatest amount recorded during a calendar day was 45.1 mm. (1.78 in.) on February 1. There were 170 days on which precipitation was nil or amounted to less than 0.2 mm. Precipitation amounting to 0.2 mm. or more was recorded on 195 days; to 1.0 mm. or more on 147 days; to 20.0 mm. or more on 9 days.

Snow or sleet fell on 43 days, but on no day from April 21 to October 25 inclusive. Observations of "snow lying" at 7h number 13, 5 of which were in February, and 4 in December. There were no large falls of snow.

"Sunshine".- The year's total duration of bright sunshine, 1332.4 hr. represents 30 per cent. of the theoretically "possible" duration; whereas the average percentage of "possible" for the years 1911-30 is 26.9. As regards the percentage of "possible" June was the sunniest and December the least sunny month of 1933. In all, there were 82 days without sunshine, 13 of these being in January, and 16 in December, and 87 days with 50 per cent. or more of the "possible" sunshine. The day with the most sunshine was July 3, with 15.6 hr. (90 per cent.) this day having also the highest value of the percentage of "possible" sunshine. September with 152.7 hr. was the sunniest September since sunshine records commenced in 1909.

"Wind".- The mean wind speed for the year, 4.0 m/s (8.9 mi/hr), was 1.1 m/s (2.5 mi/hr) less than the normal value and was the lowest yearly mean since records commenced. In comparison with the normal monthly values, all months, except February and October, showed a deficiency, amounting in December to as much as 2.8 m/s (6.3 mi/hr) and in November to 2.2 m/s (4.9 mi/hr). There were only 8 hours of gale force (mean speed greater than 17.1 m/s), all occurring in January. The highest gust of the year, 32 m/s (72 mi/hr) together with the highest hourly speed 22 m/s (49 mi/hr) and the highest mean daily speed 14.6 m/s (32.7 mi/hr) occurred on January 2. The quietest day was December 17, with a mean wind speed of 0.0 m/s.

The distribution of wind directions throughout the year differed little from normal, there being a slight decrease in the frequency of winds from between south and west. Winds from between south and west predominated in January, February, March, April, July, August and October, while in the remaining months the prevailing winds were from between north and east, the decrease in the frequency of southwesterly winds during November and the persistence of northeasterlies in December being very marked.

"Grass Minimum Temperature".- There were 103 occasions of ground frost (i.e., grass minimum temperature not greater than 272.1°A. or 30°·4 F.), but none of these occurred between June 13 and September 14. The lowest grass minimum temperature was 261.9°A. (12°·0F.) on January 25. The mean grass minimum temperature for each of the months January, February, March, November and December is less than 273.0°A. (32°·0 F.).

"Cloud and Weather".- (A) The mean amount of cloud observed at the six hours of observation is 7.3, which is below the normal. April and May, each with 8.3, have the largest mean amount, and September has the smallest, 6.1. The largest mean amount for an observational hour is 8.8 at 9h in April; the least is 3.7 at 21h in September. For the year as a whole there was most cloud at 9h and 13h and least at 21h. In seven months the mean cloud amount was least at 21h, and in six months it was greatest at 9h. There were two days, March 12 and March 26 on which no cloud was seen at the normal hours of observation. On 31 days the amount 10 was recorded at every hour of observation.

(B) Thunder was heard on 18 days, while there were observations of solar halo on 21 days, of lunar halo on 6 days, and of aurora or auroral glow on 7 days.

(C) The numbers of occasions on which the range of visibility was estimated to be (1) not greater than 500 metres (550 yards), corresponding with the entries X to E, and (2) at least 20 kilometres (12½ miles), corresponding with the entries k, l, m, are summarized below. The limitations to which the estimates of visibility are subject are mentioned on p. 157. It is to be noted that the group (1) above consists of the occasions which are held to merit the description "fog, moderate, thick, or dense", while the entries k, l, m, denote "very good or excellent visibility".

There were more occasions of fog and fewer of estimates k, l, and m than in 1932. Fog was most frequent in December, but entirely absent (at the standard hours of observation) in June, July and October. There were 162 estimates of m, visibility 50 km. (31 mi) or more, distributed among 71 days. 84 of the occasions were associated with increasing barometric pressure, and 108 with winds from west-south-west through north to north-east.

| 1933 | NUMBER OF OCCASIONS OF- | | | | | | | | | | | | | |
|-------|-------------------------|----|-----|-----|-----|-----|-------|----------------------|-----|-----|-----|-----|-----|-------|
| | VISIBILITY X to E | | | | | | | VISIBILITY, k, l, m. | | | | | | |
| | 7h | 9h | 13h | 15h | 18h | 21h | Total | 7h | 9h | 13h | 15h | 18h | 21h | Total |
| Jan. | - | 3 | 1 | 2 | 1 | - | 7 | 9 | 12 | 10 | 10 | 9 | 6 | 56 |
| Feb. | - | 1 | - | - | - | 2 | 3 | 9 | 10 | 10 | 14 | 15 | 16 | 74 |
| Mar. | 4 | 3 | 1 | 1 | 1 | - | 10 | 7 | 12 | 15 | 16 | 9 | 7 | 66 |
| Apr. | 1 | - | - | - | - | 2 | 3 | 12 | 11 | 13 | 16 | 12 | 11 | 75 |
| May | - | - | - | - | - | 1 | 1 | 15 | 15 | 19 | 20 | 17 | 13 | 99 |
| June | - | - | - | - | - | - | - | 15 | 18 | 22 | 22 | 24 | 16 | 117 |
| July | - | - | - | - | - | - | - | 17 | 20 | 24 | 26 | 23 | 18 | 128 |
| Aug. | 1 | - | - | - | - | - | 1 | 14 | 16 | 23 | 23 | 22 | 16 | 114 |
| Sept. | 2 | - | - | - | - | 1 | 3 | 11 | 17 | 19 | 20 | 18 | 13 | 98 |
| Oct. | - | - | - | - | - | - | - | 15 | 13 | 21 | 22 | 18 | 19 | 108 |
| Nov. | 1 | 1 | - | - | - | - | 2 | 13 | 11 | 8 | 13 | 14 | 15 | 74 |
| Dec. | 7 | 5 | 5 | 6 | 5 | 4 | 32 | 11 | 8 | 5 | 10 | 9 | 11 | 54 |
| Year | 16 | 13 | 7 | 9 | 7 | 10 | 62 | 148 | 163 | 189 | 212 | 190 | 161 | 1063 |

ATMOSPHERIC ELECTRICITY.

Notes on the Instruments.

Autographic records of atmospheric electrical potential gradient were obtained by means of an electrograph of the Kelvin water-dropper type, the potential at the water-jet being registered by a Dolezalek quadrant electrometer. On January 4th, the double nozzle of the water jet was altered to a single nozzle; otherwise in all essential details the electrograph arrangements, the method of making scale tests and the method of reducing the autographic curve readings to potential gradient in the open were as described in "The Observatories' Year Book," 1928, pp. 160-161. Insulation tests were carried out each day, using an eye-reading method. The system was charged, and the fall in potential during a two minutes interval was measured by noting the change in position of the spot of light on a scale placed in front of the recording drum.

The scale value of the photographic record obtained by means of the Dolezalek electrometer used in conjunction with the water-dropper remained at about 2.0 volts per mm. until the end of September. In October and November it was about 1.9 and in December about 2.1 volts per mm. The number of determinations of the reduction factor (i.e., the ratio of the potential at one metre above the ground in the open to the potential at the water-jet) was about six per month, each determination being based on fifteen or more readings (at intervals of half a minute) of the potential in the open. The values of the monthly reduction factor finally adopted for 1932 were obtained by a smoothing process, the adopted value for a given month being $\frac{a + 2b + c}{4}$ where a, b, c, are the unsmoothed monthly mean factors for the three successive months centred in the given month.

All determinations of scale value and reduction factor were obtained with a particular Wulf quartz-thread electrometer. This instrument was calibrated

by means of a high tension battery, the potentials of which were measured by a potentiometer and standard cell. According to the scale value adopted for the Wulf electrometer in 1933, the instrument was about 2 per cent. less sensitive than in 1932.

INDENTIFICATION NUMBER OF INSTRUMENT USED IN 1933.

Wulf bifilar electrometer 3040

Notes on the Tables and Results.

As far as possible an electrical character figure is assigned to each day and values of potential gradient are assigned for 2-3h, 8-9h, 14-15h and 20-21h G.M.T. of all days, while values for all hours are assigned on days classified as 0a, 1a, or 2a. The character figures are given in Table 268, the significance of these symbols being as follows:-

- 0, denotes a day during which from midnight to midnight no negative potential was recorded.
- 1, denotes the existence of negative potential at one or more times during the same period, but with a total duration of less than three hours.
- 2, denotes negative potential extending in the aggregate over three hours or more during the same period.
- a, denotes that within the 24 periods of 60 minutes for which an estimate of the mean potential gradient has to be made in the process of tabulation there was in no case a range of potential gradient in the open exceeding 1,000 volts per metre.
 - b, denotes that, during the same period, a range of 1,000 volts or more per metre was reached in one hour at least but in fewer than six hours.
 - c, denotes that, during the same period, a range of 1,000 volts or more per metre was reached in at least six hours.

Table 265 contains the values of electrical potential gradient at 2-3h, 8-9h, 14-15h and 20-21h G.M.T.; the value for a given hour represents the mean for the period of 60 minutes between exact hours, instead of centering at the exact hour, as was done in years prior to 1932. Blanks indicate that the trace was in some way defective. If it is possible to assign an approximate value of the potential gradient on such days, this value is given in brackets. The reduction factors used in converting the potential at the water-jet to potential gradient in volts per metre, in the open, are also given.

In Table 266 are given, for 0a days, (1) the mean diurnal inequalities for the months, seasons and year, (2) particulars of the number of days and of the non-cyclic changes and (3) the corresponding mean values of potential gradient. The inequalities, or the mean values, for the year and seasons are the means of the inequalities or means respectively, for the appropriate months.

Corresponding data for 1a and 2a days combined appear in Table 267.

It should be noted that, in these tables, "Winter" denotes the four months January, February, November, December; "Equinox" the four months March, April, September, October; and "Summer" the four months May to August.

In addition to the electrical character for each day, Table 268 contains the daily, monthly and annual values of duration (in hours and tenths) of negative potential gradient. On 6 days of defective record when negative potential may have occurred dashes are entered; the sign of the gradient has been assumed positive during periods of defective record in which no precipitation was observed. If precipitation was recorded for less than an hour during such defective periods an approximate value of the duration of negative potential for that hour has been assigned, and the total for the day given in brackets. When, during highly oscillatory gradients, there was uncertainty as to the times of changes of sign, half of the total duration of doubtful sign was accounted negative. The total duration of negative potential gradient in each month and the average daily duration are entered in the lower part of the table. For the 359 days of assignable duration of negative potential gradient the total number of hours was 572.8 as compared with 809.8 in 1932; an average of 1.60 hours per day, as against 2.26 hours per day in 1932.

Following the practice adopted in 1923 the mean values of potential gradient given in Table 265 are of two kinds, viz., (a) the mean of all the positive values of potential in the column and (b) the algebraic mean derived from all days on which all four hours were represented. The mean values for the month, as derived from the (a) and (b) values respectively, are shown in the last line, and the means for the year are given at the foot of the December table. It is to be expected that the mean derived from the values at 2-3h, 8-9h, 14-15h, 20-21h, on a sufficiently large number of days, will approximate closely to the mean value derived from all hourly values of all the days.

The (a) mean exceeds or is equal to the (b) mean in May, July, August, September, October and December and is exceeded by the mean value on 0a days, in all months excepting May, August and December. The general tendency is for the 1933 values to be higher than those of 1932, this being the case in seven months for both the (a) mean and the (b) mean.

Annual mean values for recent years, derived by giving equal weight to the twelve monthly means, of the (a) and the (b) means and of the means for 0a days are as follows:-

| | | | | 0a | (a) | (b) |
|------|----|----|----|------|------|------|
| | | | | v/m. | v/m. | v/m. |
| 1922 | .. | .. | .. | 257 | 225 | 182 |
| 1923 | .. | .. | .. | 278 | 235 | 159 |
| 1924 | .. | .. | .. | 236 | 214 | 157 |
| 1925 | .. | .. | .. | 284 | 243 | 209 |
| 1926 | .. | .. | .. | 249 | 201 | 177 |
| 1927 | .. | .. | .. | 259 | 223 | 193 |
| 1928 | .. | .. | .. | 237 | 219 | 150 |
| 1929 | .. | .. | .. | 276 | 240 | 216 |
| 1930 | .. | .. | .. | 247 | 211 | 194 |
| 1931 | .. | .. | .. | 243 | 205 | 197 |
| 1932 | .. | .. | .. | 223 | 198 | 190 |
| 1933 | .. | .. | .. | 237 | 218 | 218 |

The highest values of the (a) and (b) means occur in January. The mean value of 0a days is also highest in January, being 355 volts per metre.

Noteworthy occasions of high potential gradient were as follows:-

- (i) January 19d 12h 13m to 20h 57m. Associated with fog, the potential gradient remained above 650 v/m, the upper limit of registration (1100 v/m) being exceeded at times.
- (ii) December 10d 18h 47m to 21h 23m. The potential gradient remained above 600 v/m, exceeding 970 v/m at times. The sky was overcast and previously there had been a period during which sleet fell intermittently, associated with mainly negative potential gradient, but with some excursions to the positive side.
- (iii) December 11d 15h 33m to 19h 21m. The sky was almost cloudless during the period. Potential gradient remained above 600v/m, the average for the whole period being about 800 v/m.
- (iv) December 14d 18h 20m to 20h 10m. The potential gradient was above 800 v/m and exceeded 1050 v/m continuously for 30 minutes. The sky was partly clouded.
- (v) December 19d 11h 12m to 14h 13m. During fog, the potential gradient remained above 800 v/m and the upper limit of registration (1050 v/m) was exceeded frequently.
- (iv) December 20d 12h 20m to 19h 7m. Associated with fog, 600v/m was exceeded continuously, the mean for the whole period being about 800 v/m.

The following were noteworthy occasions of continuous negative potential gradient:-

- (i) January 2d 18h 27m to 3d 2h 38m. During continuous rain the potential gradient remained negative and was less than -1000v/m for an aggregate time of more than 5 hours.
- (ii) January 31d 18h 17m to February 1d 10h 13m. Nearly 16 hours of continuous negative potential gradient, associated with continuous rain. The lower limit of registration at the time (-950 v/m) was exceeded for long periods amounting to more than 10 hours in the aggregate.
- (iii) March 5d 17h 38m to 6d 3h 2m. During continuous rain, the potential gradient remained negative. There were three separate periods each lasting for more than one hour, during which the lower limit of registration (-950 v/m) was exceeded.
- (iv) July 25d 2h 16m to 7h 10m. The potential gradient although negative was not very low and the lower limit of registration (-1050 v/m) was only exceeded once. Rain fell throughout.

On the following occasions long periods of negative potential gradient were broken by short excursions to the positive side:-

- (i) February 4d 20h 3m to 5d 4h 0m. This was a period of continuous rain. The potential gradient remained negative except for some short excursions to +60 v/m. Early and late in the period the potential gradient, although negative, was not very low but in the middle of the period the lower limit of registration (-950 v/m) was exceeded frequently.
- (ii) March 8d 15h 30m to 9d 2h 3m. Rain fell continuously throughout. There were several excursions to the positive side, during one of which the potential gradient reached +610 v/m. For one period lasting nearly two hours, potential gradient was less than -950 v/m.
- (iii) April 30d 4h 3m to 16h 8m. Apart from four excursions to the positive side the potential gradient remained negative throughout, the lower limit of registration (-1000 v/m) being exceeded at times. During two short excursions the potential gradient rose to +100 v/m. Rain fell continuously during the period.
- (iv) May 7d 4h 52m to 10h 52m. During this period of continuous rain, the potential gradient remained below -1000 v/m for long periods. There were two short excursions to the positive side and in one of these the upper limit of registration (+1000 v/m) was exceeded.
- (v) July 31d 0h 13m to 6h 39m. During continuous rain the potential gradient remained negative, apart from an interval, of fifteen minutes duration, when a potential gradient of +100 v/m was reached.

There are considerable irregularities in the mean diurnal inequalities of potential gradient on 0a days for individual months, although in most months the principal maximum occurs in the late evening. When compared with normal values for 1911-21 the mean inequalities for the seasons, summer and equinox, correspond fairly closely to normal, excepting that the secondary maximum about 6-7h is more prominent. In the mean diurnal inequality for the winter season, the chief difference is that the principal minimum occurs some hours late at 6-7h., and is almost equalled by the minimum occurring about noon.

TERRESTRIAL MAGNETISM.

Notes on the Instruments.

The standard magnetographs,¹ which have been in regular use since 1909, are situated in the east chamber of the underground magnet house and until December 31, 1931 they were arranged so as to record changes of the three geographical components of terrestrial magnetic force, viz., the north component, N (or + X), west component, W (or - Y), and the vertically downward component, V (or + Z). From January 1, 1932, the instruments recording changes in the north component, N, and the west component, W, were altered so as to record changes in the horizontal component, H, and the magnetic declination, D, respectively.

The instruments for the north and west components were of the Adie bifilar type, in which torsion of the bifilar suspension, of fine tungsten or steel wire, is utilised to bring the magnets into an azimuth approximately

¹For a general description of magnetograph arrangements see "A Dictionary of Applied Physics," Vol. II, Macmillan, London.

perpendicular to the directions of the components whose changes they respectively record. The alteration to the north component instrument consisted in turning the torsion head of the suspension until the magnet was in the azimuth perpendicular to the magnetic meridian. The alteration to the west component instrument consisted in replacing the bifilar tungsten wire suspension with a unifilar suspension of eight strands of unspun silk. In each of these instruments the magnet is about 13.8 cm. in length and is suspended within a copper shell, or frame, of suitable dimensions to ensure that the movements of the magnet are sufficiently damped. To the magnet is rigidly attached a semi-circular plane mirror, immediately beneath which is a fixed mirror of similar form and dimensions. Each magnet and mirror system is contained within a brass cylindrical case, cemented on to a pier and surmounted by a tall bell-jar of glass. Light from a brightly illuminated slit passes through a collimator, is incident upon the two mirrors and after reflection passes along a wooden channel and thence, through a horizontal hemi-cylindrical lens, to photographic paper wound on a clock-driven cylinder. The hemi-cylindrical lens is set in the side of the case containing the recording drums, and matters are so arranged that the beams of light reflected from the two mirrors are brought to a focus by the lens which condenses the two vertical images to two sharply focussed dots on the paper. Hence the record obtained consists of two traces, the one straight and known as the base line, the other curved and representing the angular movements of the suspended magnet, and therefore the changes in the component of terrestrial magnetic force.

The standard instrument for the vertical component is a Watson multiple-magnet balance.² In this instrument the magnet system consists of eight magnetised steel rods, each 10 cm. long and 0.2 cm. in diameter, carried by an aluminium frame to the centre of which are attached the moving mirror and also the knife-edge, which bears upon an agate plane and about which the system balances. Copper damping plates and a temperature-compensating device are provided. The recording arrangements are similar to those described above, save that the hemi-cylindrical condensing lens and the recording drum are vertical.

One clock serves to operate the three drums and also makes the time marks at two-hourly intervals.

To the containing case of each instrument is fitted a drying tube containing calcium chloride.

A determination of the azimuth of the magnet of the horizontal component magnetograph is carried out each year by comparing the deflections produced by an auxiliary magnet with its axis (a) magnetic east-west and (b) inclined at a known small angle to this azimuth. Drift of the magnet system of the Watson balance has been compensated from time to time in the past by adjusting the position of a small control magnet which was fixed vertically to the lower part of the pier on which the balance stands. This control magnet was removed during October 1932 and has not since been replaced.

The azimuth lines in use in the east chamber are those which were determined in 1914 and of which particulars are given on p. 70 of "Hourly Values from Autographic Records, Geophysical Section", 1913.

²Terrestrial Magnetism, Vol. VI.

The diurnal range of temperature in the east chamber of the magnet house is normally negligible. Temperature is ascertained daily at 9h 30m by the thermometers within the instrument cases. The daily values appear in Tables 272, 276, etc. ; the monthly means of the readings so obtained during 1933, together with the mean values for the years 1911-1932, were as follows:-

EXCESS OF MEAN TEMPERATURE ABOVE 280°A.

| Month. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|-------------------|------|------|------|------|-----|------|------|------|-------|------|------|------|
| Mean 1933 | 3.1 | 1.9 | 1.4 | 1.8 | 2.5 | 3.8 | 5.1 | 6.1 | 6.6 | 6.3 | 5.1 | 4.0 |
| Mean 1911- 32. | 3.5 | 2.9 | 2.5 | 2.4 | 2.8 | 3.6 | 4.7 | 5.7 | 6.3 | 6.1 | 5.5 | 4.4 |

The annual range of temperature during 1933 was 5°·4 C., the mean range for the previous twenty years being 4°·2 C.

The constants of the standard magnetographs were as follows:-

| | Horizontal Force | Declination | Vertical Force |
|---|---|-------------|----------------|
| Time scale 1 hour = | 15.5 mm. | 15.5 mm. | 15.5 mm. |
| Time marks | Every two hours, beginning at exact hour. | | |
| Error of time mark | Not more than ± 1 min. | | |
| Period of vibration, seconds .. | 14.3 | 10.9 | 7.5 |
| Logarithmic decrement ¹ | .385 | .626 | - |
| Angular equivalent of 1 mm. on paper, radians | .00032 | .00029 | .0003 |
| Twist of bifilar suspension .. | 33° | - | - |
| length of bifilar suspension | | | |
| Ratio $\frac{\text{mean breadth of suspension}}{\text{length of bifilar suspension}}$ | 73 | - | - |
| Temperature coefficient, per 1° C. | - 9γ | - | +13γ |
| Direction of marked pole | West. | North | - |
| Mean Azimuth of magnet | 256 | 346 | 346° |

The temperature coefficient of the Horizontal Force variometer (formerly the N component variometer) has remained sensibly constant for many years.

In former issues of the Observatories' Year Book the temperature coefficient of the Vertical Force magnetograph has been given as +26γ per 1°C. A recent re-examination of the question shows that this was approximately the value until early in 1929. During that year however several adjustments were made to the instrument and as a result of these the temperature coefficient apparently was considerably reduced. The trend of base line values in relation to temperature variations in the magnetic chamber shows that in 1930

¹Log. decr. = $\log_e a_n - \log_e a_{n+1}$; where a_n, a_{n+1} are the amplitudes of two successive swings on the same side of the zero position.

and 1931 the temperature coefficient of the vertical force variometer was about $+10\gamma$ and that in 1932 and 1933 the coefficient was approximately $+13\gamma$ per 1°C .

Determinations of scale value of the standard magnetographs are carried out at intervals of two weeks. The method adopted is that due to Broun. It consists essentially in measuring the photographically recorded deflection of the suspended or pivoted magnet produced by an auxiliary or test magnet situated at a known distance from the deflected magnet. Two sets of relative positions of the deflecting and deflected magnets are used. For the H and D instruments they may be termed the "end on" and "broadside on" positions, the magnet axes being in one plane. In the case of the V instrument the deflecting magnet is vertical; in one position the line joining its centre to that of the deflected magnet is collinear with the axis of the latter, but in the other position it is perpendicular thereto. On a given occasion deflections are produced with the test magnet first on one side of the deflected magnet and then, at the same distance, on the other side, two deflections being produced at each side by reversal of the test magnet. Thus four deflection dots are obtained on the record. The two sets of relative positions of the magnets are employed on alternate occasions. The distance between the deflected and deflecting magnets is 90 cm., and approximate values of the double deflections produced are 47 and 93 mm. for the H instrument, 45 and 89 mm. for the D, and 58 mm. for the V. In deducing the scale values the force producing the deflections on the H and V instruments is determined from the deflection on the D instrument of which the scale value is known from its dimensions. The advantage of the method lies in the fact that by using the same deflecting distance in all cases, the magnetic moment of the test magnet is eliminated.

In the following table are given the scale values, obtained by overlapping means, which were employed in reducing the curve readings for 1933.

SCALE VALUES OF THE MAGNETOGRAPHS (γ per mm. on the paper).

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|------------------|---|------|------|------|------|------|------|------|-------|------|------|------|
| Horizontal Force | 4.60 | 4.60 | 4.56 | 4.57 | 4.56 | 4.56 | 4.56 | 4.56 | 4.56 | 4.58 | 4.57 | 4.55 |
| Vertical Force | 3.75 | 3.75 | 3.73 | 3.65 | 3.67 | 3.70 | 3.74 | 3.74 | 3.74 | 3.76 | 3.76 | 3.75 |
| Declination | _____ 1 mm. = 1'.00, or 4.82 γ _____ | | | | | | | | | | | |

In addition to the standard magnetographs there are in the west chamber of the underground magnet house auxiliary instruments of the Adie pattern (formerly the standard instruments at Kew Observatory) which also record changes in declination, D, horizontal force, H and vertically downward force, V. Declination records have been obtained since August, 1927, while the vertical force (Adie) and horizontal force records commenced in March and December, 1928. The general arrangements of these instruments are similar to those of the instruments in the east chamber. The declination magnet

is suspended by a bundle of silk fibres (the torsion effect of which is negligible) and the scale value of the record is 1.17 to 1 mm. The vertical force balance consists of a single magnet, of which the dimensions are approximately 13.5 cm. x 2 cm. x 0.2 cm. With the object of reducing loss of record during magnetic storms the scale values of the auxiliary H and V records are arranged to be considerably greater than those of the standard H and V records. Thus, in 1933 the scale values of the Adie H and V records were approximately 10γ and 5γ per mm. respectively. Determinations of scale value are made by the method due to Broun. To facilitate the necessary adjustment, from time to time, of the azimuth of the horizontal force magnet, magnetic meridian lines (and lines perpendicular thereto) representing a sufficient range of values of declination were laid down in the west chamber in December, 1928, on the basis of simultaneous observations of declination in the chamber and in the east magnetic hut.

The routine absolute observations of the magnetic elements are made in the east magnetic hut; as a rule two complete sets of observations are made every week, but a determination of declination is made on nearly every weekday. Declination and horizontal force were determined by means of the Kew pattern unifilar magnetometer (which was employed by Rücker and Thorpe in their magnetic surveys of the British Isles, 1886-1892) placed on Pier No. 5. Determinations of inclination (dip) are made by means of the Schulze inductor placed on Pier No. 6.

For a detailed description of the method of observation with the Kew pattern magnetometer reference should be made elsewhere.¹

In determining declination four readings are taken, two with the magnet erect, two with the magnet inverted. A correction is applied to the mean of the observations for the observed torsion in the silk suspending fibre. The fixed mark is about one half-mile (0.8 km.) distant from Pier No. 5, and its bearing is taken as 8° 12' 30" west of south.

Determination of the horizontal intensity comprises observations of (a) the time of vibration of the collimator magnet, and (b) the deflection of a mirror magnet by the collimator magnet. Usually deflection observations have been made for three distances of the collimator magnet, the order of the positions of the latter being: on east arm at 35 cm., 30 cm., 25 cm.; on west arm at 25 cm., 30 cm., 35 cm., Thus the mean times for the deflections at the three distances are very nearly, if not exactly, identical and the observations are concentrated at the 25 cm. distance. Commencing on April 28, 1931, deflections were observed at 25 cm. only, except on one occasion per month when deflections were observed at the three distances 35cm., 30cm. and 25 cm. By observing deflections at 25 cm. only the time of observation is reduced by about 16 minutes. The time interval between the mean times of the vibration and deflection experiments is usually about half an hour. The horizontal intensity, H, is calculated from $H = \sqrt{mH_V \times H_R/m}$ where mH_V is obtained from the vibration experiment and H_R/m from the deflections made at the 25 cm. distance, m being the moment of the collimator magnet. H_R/m is corrected for the distribution of magnetism in the magnets. From the latter part of 1913 until the end of 1923 the value of this correction, viz., $\log_{10}(1 + P/25^2 + Q/25^4)$, applied to the observations of a given month was a mean

¹Dict. of Applied Physics, Vol. II, p. 532 or Stewart and Gee's "Practical Physics."

value derived from the observations obtained during the seven months including the given month as fourth of the seven. The monthly values so derived show considerable fluctuations, and it is improbable that P and Q actually varied to the extent implied. Commencing in 1924 the value of the correction used in reducing the horizontal intensity observations has been the mean of the mean values for each of the years 1917-24, 1917-25, etc. The value employed for 1933 was the mean for the years 1917-31, viz. $\cdot 00542$. The mean value of the logarithm for the years 1917-33 is $\cdot 00544$. If this value had been employed in 1933 instead of $\cdot 00542$, the published values of H and V would be increased by $0\cdot 4$ and $1\cdot 0\gamma$ respectively. A variation of $\cdot 00020$ in the value of $\log_{10}(1 + P/25^2 + Q/25^4)$ corresponds with a variation of about 4γ in the derived value of H.

The values of P, Q, and $\log_{10}(1 + P/25^2 + Q/25^4)$ for individual years are as follows:-

| Year. | P. | Q. | $\log_{10}(1 + P/25^2 + Q/25^4)$. |
|-------|---------|---------|------------------------------------|
| 1917 | + 6.862 | + 418.9 | $\cdot 00520$ |
| 1918 | + 7.604 | + 68.6 | $\cdot 00533$ |
| 1919 | + 9.126 | - 603.5 | $\cdot 00563$ |
| 1920 | + 8.224 | - 216.6 | $\cdot 00544$ |
| 1921 | + 7.978 | + 25.3 | $\cdot 00554$ |
| 1922 | + 6.607 | + 513.1 | $\cdot 00513$ |
| 1923 | + 6.371 | + 614.3 | $\cdot 00508$ |
| 1924 | + 7.899 | - 128.6 | $\cdot 00531$ |
| 1925 | + 8.214 | - 261.7 | $\cdot 00538$ |
| 1926 | + 9.675 | - 938.4 | $\cdot 00564$ |
| 1927 | +10.422 | -1265.0 | $\cdot 00580$ |
| 1928 | + 8.713 | - 547.2 | $\cdot 00541$ |
| 1929 | + 9.741 | - 917.4 | $\cdot 00571$ |
| 1930 | + 8.683 | - 536.5 | $\cdot 00540$ |
| 1931 | + 8.765 | - 684.6 | $\cdot 00530$ |
| 1932 | +10.445 | -1315.5 | $\cdot 00576$ |
| 1933 | + 8.626 | - 499.2 | $\cdot 00541$ |

The Schulze inductor¹ consists essentially of a coil of insulated wire which can be rotated continuously and rapidly about an axis which coincides with a diameter of the coil. This axis is capable of rotation about a horizontal and vertical axis. The inclination and azimuth of the coil axis are read off on a vertical and horizontal scale respectively. The windings of the coil are led off from a commutator to a Broca galvanometer. To effect a determination of magnetic inclination, the coil is then rotated steadily at the rate of about 360 revolutions per minute and the inclination of the axis of rotation is adjusted until the galvanometer deflection is the same in magnitude and sign whether the sense of rotation is positive or negative. In this position the rotation axis of the coil coincides with the direction of

¹For description of, and discussion of method of observation with, earth inductors see papers by-

H. Wild. Met. Zeit., 1895, p. 41.

O. Venske. Ber. uber die Tat. des Preuss. Met. Inst. in 1924, p. 91 (and references given therein).

N.E. Dorsey. Terr. Mag., Vol. 18, p. 1, 1913.

the earth's field and the inclination to the horizontal may be read off from the vertical circle. Two series of settings are made, one with the vertical circle facing east, the other with the circle facing west.

The base line values of the magnetograph records are deduced from the results of the absolute observations, any of the latter obtained during times of considerable disturbances being excluded.

In the case of horizontal force and declination, the equivalent value of the mean curve ordinate, corresponding to the period of observation, is subtracted from the observed value of the element to give the deduced base line value of the record. Similarly, by the combined use of the curve ordinates at the times of the inclination and horizontal force observations the value of H corresponding to the inclination observations is obtained and thence the base value for V. The base line values finally adopted are obtained from a curve drawn smoothly through points given by the deduced values, due allowance being made for discontinuities in the records.

Some of the absolute determinations of D, I and H are summarized in the subjoined table, and the values of m, the moment of collimator magnet 60a, are also given. Considerations of space make it necessary to limit the observations printed to about two per week, but, as indicated above, absolute observations of some of the elements are made more frequently. For each set of absolute observations are shown the deduced base line values of H, D, and V and, in brackets, the adopted base line values. Thus, an entry 15823 (18) signifies:-deduced base line value 15823, adopted base line value 15818. The adopted values were obtained as described in the foregoing, and therefore the base line values corresponding to dates between those given in the table may be obtained by interpolation.

The hourly readings are obtained from the magnetograms, standardized as described in the foregoing, by means of a ruled glass scale. The reading for any given hour G.M.T. is that ordinate estimated to be the mean reading for 60 minutes between exact hours. The product of this ordinate and the scale value is added to the adopted base line value, and the sum so obtained is the hourly value printed in the tables.

IDENTIFICATION NUMBERS OF INSTRUMENTS IN USE IN 1933.

Unifilar Magnetometer, Kew pattern .. Elliott, No. 60.
(with collimator magnet, 60a, and
mirror magnet, 60c).

Dip Inductor Schulze, No. 103.

Notes on Tables.

The hourly values of H, D, and V, obtained as described above, appear in three of the four monthly tables. The mean value for the day is computed as the mean of the twenty-four hourly values.

The letters "Q" and "D" denote the five quiet and the five most disturbed days as selected at De Bilt.

In the fourth table for each month are given:-

- (a) the values and times of the daily maximum and minimum and the values of the absolute daily range for each of the elements H, D and V.
- (b) the value of $HR_H + VR_V$ for each day, where R_H , R_V denote the absolute ranges for a calendar day of the horizontal and vertical components, (This measure of magnetic activity was adopted in 1932 by the International Commission for Terrestrial Magnetism and Atmospheric Electricity. In volumes of The Observatories' Year Book prior to that of 1932 the values of the quantity $R_N^2 + R_W^2 + R_V^2$ were used as a measure of activity).
- (c) the daily magnetic character figures, assigned according to the international scheme, wherein "0", "1", "2", respectively, denote quiet, moderately disturbed, and highly disturbed conditions.
- (d) the daily values of temperature in the underground magnetograph chamber.

Mean diurnal inequalities of the components N, W, V, H, D, and I on all days and on international quiet and disturbed days are given, for the months, seasons and year, in Tables 317 to 334. In calculating diurnal inequalities the non-cyclic change has been eliminated on the assumption that its time-rate is linear. The inequalities of N, W, and I have been computed from those of H, D, and V, by means of the formulæ:

$$\begin{aligned} \delta N &= \cos D. \quad H - \left(\frac{180 \times 60}{\pi} \right) H \sin D. \delta D \\ \delta W &= \sin D. \quad H + \left(\frac{180 \times 60}{\pi} \right) H \cos D. \delta D \\ \delta I &= \frac{180 \times 60}{\pi} \cos I \quad \left(\frac{\delta V \cos I - \delta H \sin I}{H} \right) \end{aligned}$$

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in which δD and δI are expressed in minutes of arc, and where H , D , and I for any given month are the respective mean values for that month as published in Table 338. The values of the mean diurnal inequalities of the several elements on the three different types of day are brought together in Table 335, and the values of the non-cyclic change of H , D , and V are given in Table 336.

The results of harmonic analysis of the mean diurnal inequalities of N , W , and V for the months, seasons¹ and year are to be found in Tables 339 and 340, in which are given the values of a_n , b_n , c_n , and α_n , in the two equivalent series $\sum(a_n \cos 15nt^\circ + b_n \sin 15nt^\circ)$ and $\sum c_n \sin(15nt^\circ + \alpha_n)$. In the former series t is reckoned in hours from midnight G.M.T., whilst the published values of α_n refer to Local Mean Time. The values of the harmonic coefficients have been computed from the inequalities as given in the tables and have been corrected, where necessary, on account of the fact that the hourly values are not instantaneous but mean values. The factors by which the coefficients have to be multiplied (vide Report of the British Association, 1883, p. 98) are 1.00286 for a_1 , b_1 , c_1 ; 1.01152 for a_2 , b_2 , c_2 ; 1.02617 for a_3 , b_3 , c_3 ; and 1.04720 for a_4 , b_4 , c_4 . The values were obtained to two decimal places and finally were rounded off to 0.1 γ .

The mean values of $HR_H + VR_V$ are summarized in Table 337.

In Table 338 appear for the months and year the mean values of N , W , V , D , I , H and Total Force, T . The means of N , W , I and T are derived from the corresponding mean values of H , D and V , which are the means of hourly values on all days in the month or year. Tables 341 and 342 contain mean values of the magnetic elements for 1933 and recent years at a number of observatories.

Review of Results of Magnetic Observations.

"Mean and Extreme Values of the Magnetic Elements", 1933.-The mean values[†] are given on p.178 in Table 1 along with the corresponding values for the previous year. The values of H , D , and V have been computed from the hourly values derived from the autographic records of all days, standardized by

¹The seasons are defined for this purpose as follows:- "Winter", January, February, November, December; "Equinox," March, April, September, October; "Summer", May, June, July, August.

[†]See remarks on p. 176.

means of the absolute observations; those of N, W, I, and T have been deduced from the values of H, D, and V.

TABLE 1.

| Year. | H. | D. (West). | | I. | | N. | W. | V. | T. |
|---------|-------|---------------|------|----|------|-------|------|-------|-------|
| | γ | ° | ' | ° | ' | γ | γ | γ | γ |
| 1932 .. | 16571 | 14 | 23.7 | 69 | 45.0 | 16050 | 4120 | 44916 | 47875 |
| 1933 .. | 16558 | 14 | 12.1 | 69 | 45.2 | 16052 | 4062 | 44890 | 47847 |

Westerly declination was on the average 11.6 less in 1933 than in 1932. The rate of decrease is practically the average rate of recent years. Between 1913 and 1920 the average rate of decrease was 9.35. As compared with the 1932 value horizontal force shows a fall of 13γ, which is less than the average annual rate of decrease between 1912 and 1927 (14.3γ). Practically no change in the average value of the north component has occurred since 1925, but as in recent years the west component decreased by some 60γ. Inclination has increased by 0.2. The values of vertical and total force have decreased somewhat.

Mean values derived from (a) international quiet days and (b) international disturbed days are as follows: (a) H, 16561γ; D, 14° 12.2'; N, 16055γ; W, 4063γ; V, 44890γ; (b) H, 16552γ; D, 14° 11.9'; N, 16047γ; W, 4060γ; V, 44890γ.

The differences between the mean annual values of N, W, and V, derived from all, international quiet, and international disturbed days in the years 1926-33 inclusive, are given below, together with the mean differences for the years 1915-1925. In every year of the series quoted the mean value of N and of W on quiet days exceeded the mean value on all and on disturbed days. The only years in the period 1915-25, for which either the all or the disturbed day mean value of V exceeded the quiet day value were 1917, 1919, 1921

| | <u>Quiet day mean-All day mean.</u> | | | <u>Quiet day mean-Disturbed day mean</u> | | |
|-----------|-------------------------------------|------|------|--|------|------|
| | N | W | V | N | W | V |
| | γ | γ | γ | γ | γ | γ |
| 1933 .. | +2.9 | +1.2 | +0.1 | + 7.7 | +3.4 | +0.2 |
| 1932 .. | +3.5 | +0.9 | +1.9 | + 9.4 | +3.9 | +1.8 |
| 1931 .. | +2.5 | +1.2 | -0.5 | + 7.4 | +3.1 | -0.9 |
| 1930 .. | +7.0 | +2.8 | +1.6 | +16.1 | +5.6 | +3.7 |
| 1929 .. | +3.8 | +1.4 | +0.2 | +11.1 | +2.8 | +1.9 |
| 1928 .. | +4.5 | +1.4 | -1.6 | + 7.7 | +2.6 | -3.4 |
| 1927 .. | +2.9 | +1.1 | -0.3 | + 9.1 | +2.4 | -2.7 |
| 1926 .. | +4.8 | +2.0 | -0.7 | +16.1 | +5.7 | -1.4 |
| 1915-1925 | +2.7 | +1.2 | +0.7 | + 8.5 | +3.3 | +1.5 |

The resultant vector representing the average excess of the mean values on quiet days over the mean values on all days, for the years 1915-1925, has a magnitude of 3γ ; its azimuth is 336° , measured from true north through east, and it is inclined at about 77° to the downwardly directed vertical. The vertical plane which contains this vector approximates very closely in azimuth to the vertical plane passing through Eskdalemuir and the pole (taken as 78°N 68°W) of the axis of magnetization of the earth. (cf. S. Chapman, "On certain average characteristics of world-wide magnetic disturbance". Lond. Proc. Roy. Soc. Series A. Vol. 115, p.242.)

The extreme values of H, D, and V actually recorded during 1933 are given in Table II.

TABLE II.

| Component. | Maximum | | Minimum | | Absolute Annual Range |
|------------------|----------------|---------------------|----------------|---------------------|-----------------------|
| | Value | Date, 1933 | Value | Date, 1933 | |
| Horizontal Force | 16916 γ | d h m May 1 16 8 | 16306 γ | d h m May 2 0 43 | 610 γ |
| Declination | 15° 3'2 | May 1 17 33 | 13° 26'3 | Sept. 13 19 42 | 1° 36'9 |
| Vertical Force | 45222 γ | May 1 16 18 | 44619 γ | May 1 21 32 | 603 γ |

The range of $1^\circ 36'9$ in declination is equivalent to a range of 408γ in the component of force perpendicular to the magnetic meridian.

"Magnetic Character of the Year".-The Eskdalemuir practice of tabulating for each day the value of ΣR^2 has been discontinued in favour of the now internationally-accepted formula for magnetic activity viz., $HR_H + VR_V$. The magnetic character figures on the scale 0, 1, 2 which were assigned in accordance with the international scheme are summarized in Table III. This table contains also the monthly mean values of the international character figures, which for 1933 are based on the estimates made at 41 observatories, and the mean monthly values of $HR_H + VR_V$ for all, international quiet (Q), and international disturbed (D) days.

The Eskdalemuir mean value of $HR_H + VR_V$ for the year, like the mean character figure, is less than for 1932. The mean sunspot numbers for the years 1923-33, are, in order, 5.8, 16.7, 44.3, 63.9, 69.0, 76.8, 64.2, 38.9, 20.9, 11.2 and 5.5.

The mean values of $HR_H + VR_V$ for all days suggest that May was the most disturbed month.

In Table III the annual mean values are the means of the monthly values entered in the corresponding columns.

TABLE III.

| Month. | Magnetic Character Figures. Number of | | | Mean Character Figure | | Mean Value of $\frac{HR_H + VR_V^*}{10,000\gamma^2}$ | | |
|------------|--|----------|----------|-----------------------|----------------|--|--------|--------|
| | "0" days | "1" days | "2" days | Eskdale-muir | Inter-national | All days | Q days | D days |
| 1933 | | | | | | | | |
| January | 12 | 18 | 1 | .65 | .65 | 220 | 62 | 410 |
| February | 14 | 9 | 5 | .68 | .65 | 288 | 76 | 788 |
| March | 10 | 16 | 5 | .84 | .71 | 330 | 102 | 744 |
| April | 5 | 22 | 3 | .93 | .76 | 353 | 178 | 575 |
| May | 10 | 19 | 2 | .74 | .62 | 485 | 184 | 1154 |
| June | 14 | 14 | 2 | .60 | .55 | 296 | 170 | 612 |
| July | 17 | 13 | 1 | .48 | .54 | 277 | 202 | 476 |
| August | 15 | 13 | 3 | .61 | .60 | 303 | 179 | 660 |
| September | 6 | 20 | 4 | .93 | .77 | 351 | 201 | 872 |
| October | 15 | 13 | 3 | .61 | .65 | 291 | 118 | 580 |
| November | 17 | 10 | 3 | .53 | .63 | 226 | 85 | 535 |
| December | 21 | 8 | 2 | .39 | .53 | 182 | 66 | 490 |
| Year, 1933 | 156 | 175 | 34 | .67 | .64 | 300 | 135 | 658 |
| Year, 1932 | 126 | 208 | 32 | .74 | .71 | 327 | 139 | 701 |
| Year, 1931 | 137 | 208 | 20 | .68 | .66 | 345 | 185 | 679 |
| Year, 1930 | 94 | 230 | 41 | .85 | .83 | 556 | 195 | 1246 |
| Year, 1929 | 118 | 213 | 34 | .75 | .67 | - | - | - |
| Year, 1928 | 96 | 246 | 24 | .80 | .63 | - | - | - |
| Year, 1927 | 95 | 231 | 39 | .85 | .63 | - | - | - |
| Year, 1926 | 90 | 227 | 48 | .89 | .65 | - | - | - |
| Year, 1925 | 145 | 191 | 29 | .69 | .56 | - | - | - |
| Year, 1924 | 191 | 153 | 22 | .54 | .55 | - | - | - |
| Year, 1923 | 235 | 111 | 19 | .41 | .48 | - | - | - |
| Year, 1922 | 174 | 145 | 46 | .65 | .65 | - | - | - |

"Diurnal Inequalities".-The mean diurnal inequalities for all days, and international quiet and disturbed days, for the months, seasons and the year, are given in Tables 317-334, and the corresponding inequality ranges in Table 335.

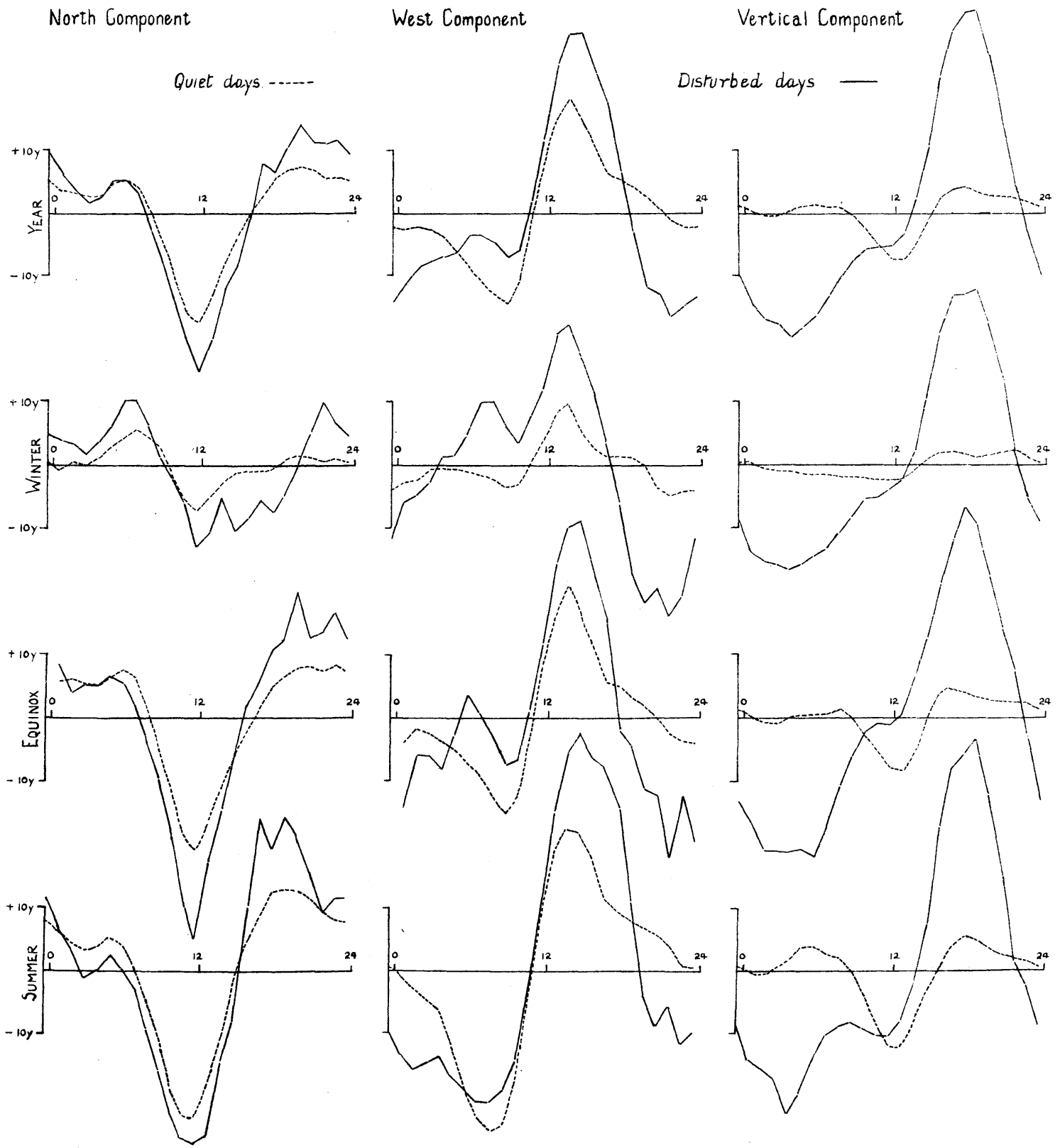
The inequalities of H, D and V for international quiet and disturbed days are shown graphically in Plate III, while in Plate IV are given vector diagrams illustrating the diurnal variation of magnetic force in the horizontal, the prime vertical and the meridian planes.

The ranges of the annual mean inequalities of H, D and V for all days and for quiet and disturbed days are the smallest (or about equal to the smallest) since 1924, except that in V the Q-day range is not so small as the very low value of 1932.

$$\frac{*NR_N + WR_W + VR_V}{10,000\gamma^2} \text{ in 1930 and 1931}$$

DIURNAL VARIATION OF MAGNETIC FORCE

ESKDALEMUIR 1933



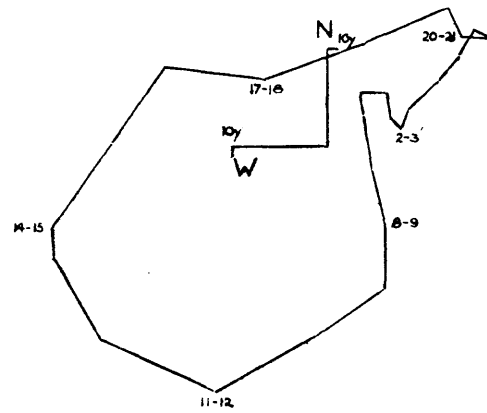
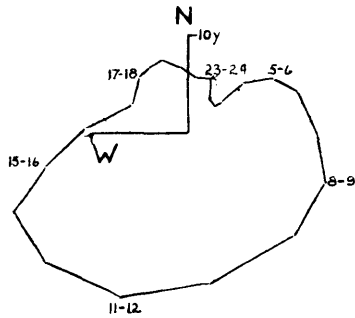
VECTOR DIAGRAMS ILLUSTRATING DIURNAL VARIATION OF MAGNETIC FORCE

ESKDALEMUIR 1933

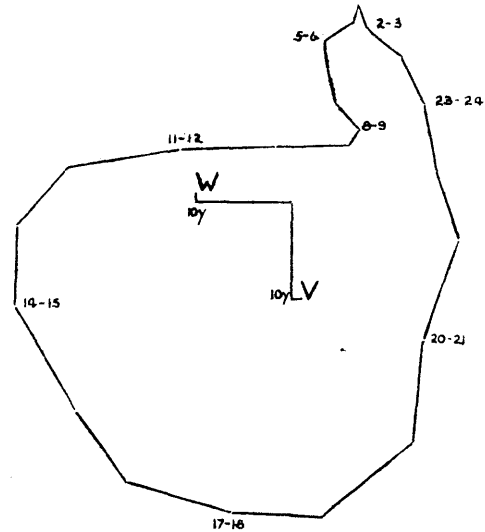
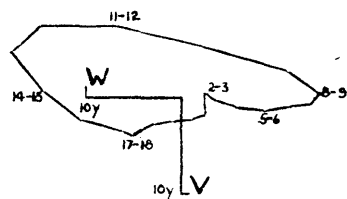
Quiet days

Disturbed days

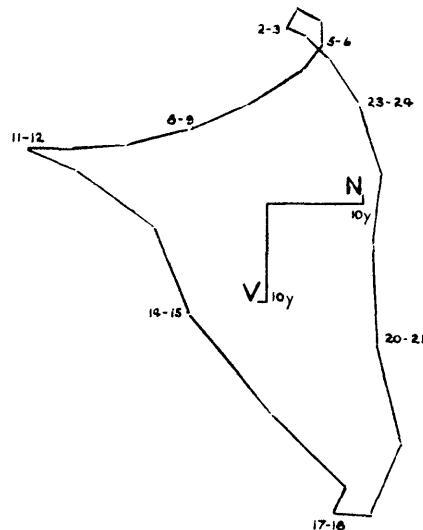
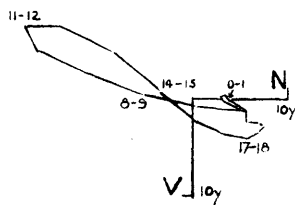
HORIZONTAL
Components



Prime
Vertical
Components



Meridian
Components



The average values of the diurnal inequality ranges for the year and seasons for the period 1916-26 (not the values of the range of the representative mean diurnal inequalities for this period) are given below, along with the 1933 values expressed as a percentage of the average values. The units employed are γ for force and l' for declination. The mean sun spot number for 1916-26 is 46.7; that for 1933 is 5.5.

The 1933 ranges are all below the average.

| | | All days | | | | | International quiet days. | | | | | International disturbed days. | | | | |
|----------|------------|----------|------------|------|------|-------|---------------------------|------|------|------|-------|-------------------------------|------|------|------|-------|
| | | N. | W. | V. | H. | D. | N. | W. | V. | H. | D. | N. | W. | V. | H. | D. |
| | | Year, | 1916-26 .. | 36.6 | 38.7 | 21.9 | 35.6 | 8.26 | 32.7 | 37.0 | 12.1 | 32.4 | 8.00 | 48.3 | 53.7 | 65.6 | 49.7 | 11.14 |
| | 1933% .. | 77 | 86 | 83 | 71 | 84 | 76 | 87 | 93 | 74 | 84 | 81 | 85 | 80 | 68 | 93 |
| Winter, | 1916-26 .. | 22.1 | 27.7 | 15.9 | 18.3 | 6.31 | 19.0 | 19.4 | 5.2 | 15.9 | 4.42 | 30.1 | 49.5 | 53.8 | 27.5 | 10.50 |
| | 1933% .. | 68 | 95 | 89 | 73 | 90 | 69 | 75 | 87 | 71 | 70 | 79 | 93 | 83 | 82 | 96 |
| Equinox, | 1916-26 .. | 41.5 | 44.2 | 27.2 | 39.0 | 9.57 | 37.8 | 42.0 | 13.1 | 37.2 | 9.04 | 56.0 | 65.3 | 82.0 | 55.4 | 13.76 |
| | 1933% .. | 85 | 86 | 82 | 81 | 86 | 78 | 87 | 97 | 85 | 90 | 98 | 82 | 68 | 86 | 88 |
| Summer, | 1916-26 .. | 54.0 | 55.6 | 26.5 | 56.1 | 11.33 | 45.6 | 53.4 | 19.8 | 46.7 | 11.12 | 78.3 | 67.9 | 70.2 | 85.5 | 12.80 |
| | 1933% .. | 77 | 87 | 94 | 76 | 90 | 81 | 90 | 89 | 91 | 91 | 66 | 88 | 86 | 68 | 96 |

"Daily Range".-The values of mean absolute daily range for the months and seasons of the year, together with the corresponding means for 1916-26 are given in Table IV; the ranges are also expressed as percentages of the mean absolute daily range for the year. The declination ranges, measured in minutes of arc have been multiplied by 4.82 to convert them to units of force of the component perpendicular to the magnetic meridian.

TABLE IV.-ABSOLUTE DAILY RANGE. MEAN MONTHLY VALUES.

| Month | Mean Absolute Daily Range | | | | | | Mean Daily Range expressed as Percentage of Yearly Mean.. | | | | | |
|------------|---------------------------|----------|----------|--------------|----------|----------|---|-----|-----|--------------|-----|-----|
| | 1933 | | | Mean 1916-26 | | | 1933 | | | Mean 1916-26 | | |
| | H | D | V | N | W | V | H | D | V | N | W | V |
| January .. | γ | γ | γ | γ | γ | γ | % | % | % | % | % | % |
| February.. | 56 | 61 | 29 | 69 | 73 | 39 | 78 | 84 | 73 | 80 | 88 | 81 |
| March.. .. | 64 | 75 | 40 | 69 | 76 | 38 | 89 | 103 | 100 | 80 | 92 | 80 |
| April.. .. | 81 | 76 | 43 | 95 | 94 | 57 | 113 | 104 | 107 | 110 | 113 | 119 |
| May | 85 | 90 | 47 | 98 | 88 | 54 | 118 | 123 | 117 | 114 | 106 | 113 |
| June | 99 | 84 | 71 | 102 | 88 | 59 | 138 | 115 | 177 | 119 | 106 | 123 |
| July | 72 | 71 | 39 | 92 | 85 | 46 | 100 | 97 | 97 | 107 | 102 | 96 |
| August .. | 73 | 66 | 35 | 86 | 82 | 43 | 101 | 90 | 87 | 100 | 99 | 90 |
| September. | 75 | 80 | 39 | 98 | 88 | 55 | 104 | 110 | 97 | 114 | 106 | 115 |
| October .. | 86 | 83 | 47 | 100 | 92 | 63 | 120 | 104 | 117 | 116 | 111 | 131 |
| November . | 74 | 71 | 37 | 94 | 93 | 57 | 103 | 97 | 93 | 109 | 112 | 119 |
| December . | 57 | 67 | 30 | 62 | 66 | 34 | 79 | 92 | 75 | 72 | 80 | 71 |
| | 44 | 56 | 25 | 60 | 64 | 33 | 61 | 77 | 63 | 70 | 77 | 69 |
| Winter .. | 55 | 65 | 31 | 65 | 70 | 36 | 76 | 89 | 77 | 76 | 84 | 75 |
| Equinox .. | 81 | 80 | 43 | 97 | 92 | 58 | 113 | 110 | 107 | 113 | 111 | 121 |
| Summer .. | 80 | 75 | 46 | 95 | 86 | 51 | 111 | 103 | 115 | 110 | 104 | 106 |
| Year | 72 | 73 | 40 | 86 | 83 | 48 | - | - | - | - | - | - |

The mean daily ranges of H, D and V are smaller than those for any other year since 1925.

The frequency distribution of absolute daily ranges recorded in 1933 is shown in Table V, which also contains the percentage distribution for the period 1916-1926.

TABLE V.-FREQUENCY DISTRIBUTION OF ABSOLUTE DAILY RANGE

| Range | Number of Cases 1933 | | | Percentage Distribution | | | | | |
|--------------|----------------------|----|----|-------------------------|---------|------|---------|------|---------|
| | | | | H | | N | | D |  | W |  | V |
| Y | H. | D. | V. | 1933 | 1916-26 | 1933 | 1916-26 | 1933 | 1916-26 |
| 0-9 | 0 | 0 | 26 | 0.0 | 0.0 | 0.0 | 0.0 | 7.1 | 6.3 |
| 10-19 | 12 | 5 | 78 | 3.3 | 1.7 | 1.4 | 0.9 | 21.4 | 20.2 |
| 20-29 | 32 | 21 | 93 | 8.8 | 4.9 | 5.8 | 4.5 | 25.5 | 24.8 |
| 30-39 | 33 | 30 | 43 | 9.0 | 7.8 | 8.2 | 7.5 | 11.8 | 14.3 |
| 40-49 | 39 | 43 | 34 | 10.7 | 9.9 | 11.8 | 10.6 | 9.3 | 8.1 |
| 50-59 | 50 | 58 | 21 | 13.7 | 12.2 | 15.9 | 12.0 | 5.8 | 4.8 |
| 60-69 | 51 | 61 | 21 | 14.0 | 12.9 | 16.7 | 13.1 | 5.8 | 4.2 |
| 70-79 | 36 | 29 | 6 | 9.9 | 10.3 | 7.9 | 12.4 | 1.6 | 3.1 |
| 80-89 | 23 | 24 | 10 | 6.3 | 8.1 | 6.6 | 8.6 | 2.7 | 2.3 |
| 90-99 | 18 | 26 | 14 | 4.9 | 6.5 | 7.1 | 7.5 | 3.8 | 2.1 |
| 100-109 | 11 | 14 | 5 | 3.0 | 5.3 | 3.8 | 4.7 | 1.4 | 1.1 |
| 110-119 | 18 | 15 | 4 | 4.9 | 4.0 | 4.1 | 3.5 | 1.1 | 1.2 |
| 120-129 | 11 | 8 | 1 | 3.0 | 3.5 | 2.2 | 2.7 | 0.3 | 0.8 |
| 130-139 | 6 | 9 | 3 | 1.6 | 2.6 | 2.5 | 2.2 | 0.8 | 0.8 |
| 140-149 | 10 | 8 | 1 | 2.7 | 1.7 | 2.2 | 2.2 | 0.3 | 0.5 |
| 150-159 | 4 | 4 | 1 | 1.1 | 1.3 | 1.1 | 1.2 | 0.3 | 0.7 |
| 160-169 | 1 | 2 | 1 | 0.3 | 1.2 | 0.5 | 0.9 | 0.3 | 0.5 |
| 170-179 | 2 | 3 | 0 | 0.5 | 0.8 | 0.8 | 1.0 | 0.0 | 0.4 |
| 180-189 | 1 | 0 | 1 | 0.3 | 0.6 | 0.0 | 0.7 | 0.3 | 0.5 |
| 190-199 | 0 | 2 | 0 | 0.0 | 0.5 | 0.5 | 0.6 | 0.0 | 0.3 |
| 200+ | 7 | 3 | 2 | 1.9 | 4.4 | 0.8 | 3.1 | 0.5 | 3.1 |
| Days omitted | 0 | 0 | 0 | .. | .. | .. | .. | .. | .. |

The intervals of maximum frequency in 1933 lie between 60 and 69 γ for H and D, and 20-29 γ for V. These differ only slightly from the run of recent years. In 1923, the year of the last sunspot minimum, the intervals were 40-49 γ for N and W, 10-19 γ for V.

On 17 days in 1933 the absolute range in either H or D was 160 γ or more. The numbers of such days for N and W in the years 1915 to 1931 were, in order, 30, 47, 35, 56, 58, 36, 27, 32, 11, 10, 24, 46, 41, 48, 50, 88, 17, whilst in 1932 for H and D the number was 31. The frequency of occurrence in 1933 of ranges in excess of 199 γ is conspicuously low. There were only two days in 1932 and one day in 1933 on which the range in each of H, D, and V was 200 γ or more as compared with 18 such days for N, W and V in 1926, seven in 1927, five in 1928, nine in 1929, 16 in 1930, and one in 1931.

"Irregular changes in Declination".-In connexion with the supply of declination data to mine surveyors it has been the practice to classify the hourly periods between the exact hours G.M.T. into four groups according to the range in declination within each period. The range limits, which were adopted in consultation with representative mine surveyors, are:- less than 5', between 5' and 15', between 15' and 30', and greater than 30'. This method of classification has been applied to the declination records obtained in the year 1933, and the actual frequencies of occurrence of hourly ranges in the last three of the four divisions mentioned are set out below. A range of 30' is equivalent to a change of 145 γ in the component of horizontal force perpendicular to the magnetic meridian.

Number of cases per month

| Range Interval .. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Year. |
|-------------------|------|------|------|------|-----|------|------|------|-------|------|------|------|-------|
| 5' to 15' .. | 69 | 75 | 84 | 78 | 52 | 38 | 26 | 47 | 77 | 63 | 63 | 46 | 718 |
| 15' to 30' .. | 3 | 13 | 10 | 5 | 11 | 4 | 1 | 4 | 5 | 4 | 8 | 5 | 73 |
| >30' .. | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 8 |

Hourly Distribution. 1933
Hour ending at (G.M.T.)

| Range Interval | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|----------------|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 5' to 15' | 47 | 49 | 52 | 36 | 23 | 17 | 15 | 14 | 7 | 4 | 4 | 8 | 6 | 12 | 13 | 30 | 27 | 31 | 51 | 54 | 53 | 58 | 51 | 56 |
| 15' to 30' | 5 | 5 | 1 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 3 | 2 | 6 | 13 | 10 | 5 | 8 | 6 |
| >30' | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 |

On the average quiet day the most conspicuous change in declination is that from the most easterly value at about 8h or 9h to the most westerly value at about 13h or 14h, the rate of change being greatest between 10h and 12h. The hourly range due to the regular diurnal variation at this time of day is less than 5', but doubtless it happens at times that the occurrence of slight disturbance results in the hourly range exceeding 5', whereas the occurrence of the same degree of irregularity at another hour of the day would not cause the hourly range to exceed 5'. Thus the figures given above for the range interval 5'-15' tend to exaggerate somewhat the incidence of irregular changes between 9h and 13h. The hourly distributions of the frequency of occurrence of ranges between 5' and 15' and between 15' and 30' exhibit the well known tendency for irregular changes to occur predominantly during the "night" hours-at least in Europe.

"Principal Magnetic Disturbances during" 1933.-Particulars of the principal magnetic disturbances recorded during the year are given in Table VI. Corresponding information for the same disturbances is given in the Lerwick Section. The magnetograms for the most highly disturbed days are not reproduced in this volume, but photographic copies may be obtained on application to the Director, Meteorological Office, Air Ministry, Kingsway, London, W.C.2.

Remarks on Magnetic and Allied Phenomena, 1933.

January.--(Average character figure 0.65).

The first fourteen days were quiet, apart from slight activity on the evenings of the 1st and 2nd and on the 6th and 7th following a very small movement of the "sudden commencement" type at 6d 0h 34m.

Disturbance began with small and rapid oscillations in H and D at 14d 19h 40m and lasted throughout the 14th and 15th. The 19th and early hours of 20th were also slightly disturbed.

The largest disturbance of the month began early on the 22nd and lasted till the end of the 30th. The most noticeable features are an irregular hump in V between 17h and 20h on the 22nd and a dip of 45γ between 0h and 4h on the 24th, the movements in H and D being rapid and irregular throughout. We have noted before the occurrence of characteristic small movements in H, even on quiet days, during the four hours preceding midnight. These consist of very small and rapid oscillations, superposed on a sharp rise followed by a more gradual fall. Such movement was very well marked on the 27th between 20h 50m and 21h 30m.

February.--(Average character figure 0.68).

Conditions were quiet for the first half of the month and again, after slight activity on the 14th and 15th, until the afternoon of 18th. Disturbance then began and, developing during the next 24 hours, reached a moderate degree of intensity during the night of the 19th-20th. The disturbance continued at about the same intensity till the end of 24th, diminished somewhat during the next two days and died away towards the end of 27th. The most regular feature of the disturbance was the enhancement of the afternoon maxima and morning minima of V. Large multiple dips occurred between 22h and 6h on the first three nights, and on the 21st a sharp peak of 60γ was superimposed on the usual hump at about 16h. There were many irregular fluctuations in H and D, notably at 19d 18h-20h, 19d 23h - 20d 3h, 21d 21h - 22d 2h and 24d 21h-23h, those in D being chiefly in the direction of diminished value; there was also a sharp dip in D of about 29γ coinciding with the peak in V at 21d 16h and other dips or bays too numerous to specify.

March.--(Average character figure 0.84).

There was almost continuous activity of a very small order throughout the first seventeen days. During the early hours of the 18th there was an increase of activity in H, accompanied by a shallow dip in V and oscillations in D. At 18d 22h 18m there were very abrupt movements in all three elements. H rose by 140γ in 8 minutes, fell by 292γ in the next 55 minutes and returned

rapidly to near its normal value. V fell rapidly to a minimum 70% below its former value at about 23h 30m, while in D there were two dips of about 18' with minima at 22h 50m and 0h 15m. After 19d 2h there was only a slight activity but disturbance was renewed soon after 18h and continued until 20d 4h. The succeeding days were considerably disturbed up till the end of the 24th. The general characteristics of this disturbance were of normal type with maxima of V in the afternoons and minima in the early morning, the movements of H and D being very rapid from 15h to 22h while V was above its mean value, and much slower between 22h and 6h while V was below its mean value.

The disturbance died away during the 25th, but conditions did not become entirely calm, and there was further slight disturbance on the 27th-29th.

April.--(Average character figure 0.93).

After continuous activity throughout the first nine days conditions became quiet towards the end of the 10th. The afternoon of 14th was slightly disturbed and from that time until the end of 26th, although movements were not large, there was great activity in H and D except during the early hours of 25th and 26th.

A well-marked "sudden commencement" at 30d 16h 28m was followed by very rapid oscillations in H for some hours, but it was not until the following afternoon that large disturbance developed.

A sunspot, 30 millionths of the hemisphere in area, passed the central meridian at 20.0d and another (area 15 millionths) at 27.5.*

May.--(Average character figure 0.74).

The storm of May 1st was the largest of the year. V rose very rapidly after 15h, and from that time until 18h there were violent oscillations in all three elements. After 17h V and H fell rapidly but irregularly to simultaneous sharp minima at about 21h 31m; these were followed by an abrupt rise in both components and a period of comparative quiet from 22h till 24h. After another sharp dip in both components, with minima at 0h 43m, there was a rapid rise and the disturbance came to an end shortly before 2h. The 2nd was quiet until 22h, but after this there was minor activity in H and D and a somewhat enhanced diurnal oscillation of V until the afternoon of 7th.

Slight disturbance took place from 13th to 19th; the succeeding days, though free from disturbance, were not entirely quiet until about 26d 2h when conditions became very calm. At noon on 27th there was a renewal of activity. A small "sudden commencement" at 29h 6h 25m, following another 24 hours of quiet conditions, marked another slight increase of activity; This developed into a disturbance of small intensity which lasted until the end of June 1st.

June.--(Average character figure 0.60).

Apart from slight disturbance on the 8th and 9th conditions were fairly quiet for the first twelve days, especially from 5d 2h till 7d 12h.

*"The Observatory", Feb. 1934.

Disturbance began to develop at the end of the 12th. On the 13th between 0h and 8h there was a dip of 100 γ in V, but movements were small after this, the most disturbed period being 13d 22h - 14d 1h. By the 16th conditions were again quiet.

Further slight disturbance took place on the 19th-21st, the night of 25th-26th and from the morning of 27th till the end of the month.

July.--(Average character figure 0.48).

There was slight activity on the 8th-12th and 17th-18th; otherwise conditions were quiet until about noon of the 23rd. After this there was some disturbance until 24d 17h, when the oscillations in H and D ceased rather suddenly. The rest of the month was moderately quiet apart from a small outburst between 22h and 24h on the 27th.

August.--(Average character figure 0.61).

The first four days of the month were quiet. Disturbance began to develop early on the 5th and reached its greatest intensity between 18h and 20h, during which interval the maximum of V and the minima of H and D for the storm occurred. After 20h the disturbance consisted of activity of only a small order and it died away during the evening of the 6th.

The succeeding days became progressively quieter until the afternoon of 12th. There was then an increase of activity which developed into a small disturbance on the night of the 13th-14th. Conditions continued to be slightly disturbed until the morning of the 25th, especially during the afternoon of 18th.

September.--(Average character figure 0.93).

There was minor activity throughout the first eight days. On the 9th there occurred a disturbance which was unusual in that greatest intensity was in the morning from about 5h till 10h, during which time V and H were below their undisturbed values and D above. Movements were small and irregular throughout the 9th and most of the 10th. Disturbance was renewed on the 13th, continued with moderate intensity till the morning of 15th and thereafter decreased until the afternoon of 18th. There is a well-marked example of an apparent repetition during this disturbance, very similar groups of movements occurring at about 20h on both the 13th and 14th.

There was minor activity throughout most of the rest of the month until 29d 20h, after which conditions were quiet.

A sunspot, 70 millionths of the hemisphere in area, passed the central meridian at 5.4d.*

October.--(Average character figure 0.61).

Slight disturbance took place during the early hours of the 5th and was almost continuous thereafter until the end of the 14th with the exception of a comparatively quiet period during most of the 11th and again from the afternoon of 12th till the morning of the 13th. A considerable amount of minor

*"The Observatory", Feb. 1934.

activity followed, but conditions became quiet during the 27th and so remained until the afternoon of November 2nd.

November.--(Average character figure 0.53).

From the 5th to 11th inclusive there was disturbance of small intensity. Conditions were then quiet until the end of the month, apart from slight activity on the nights of 20th-21st, 21st-22nd and 27th-28th.

December.--(Average character figure 0.39).

A quiet month, with only slight disturbance from the 3rd to 6th inclusive and on the afternoons and evenings of the 9th and 16th. During the latter two days there were enhanced afternoon maxima in V, but these were followed by only very small dips shortly before midnight.

169. ESKDALEMUIR: H_b (height of barometer cistern above M.S.L.) = 237.3 metres.

MARCH, 1933.

Table for station 169, ESKDALEMUIR, March 1933. Columns include Hour G.M.T., Day, Station Level (1-31), and Mean (Station Level). Rows show hourly pressure readings in millibars.

170. ESKDALEMUIR: H_b = 237.3 metres.

APRIL, 1933

Table for station 170, ESKDALEMUIR, April 1933. Columns include Day, Station Level (1-30), and Mean (Station Level). Rows show hourly pressure readings in millibars.

NOTE.- When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

171. ESKDALEUIR: H_b (height of barometer cistern above M.S.L.) = 237·3 metres.

MAY, 1933.

Table with 24 columns (1-24) and 25 rows (Day 1-31). Includes 'Station Level' and 'Mean (Station Level)' rows.

172. ESKDALEUIR: H_b = 237·3 metres.

JUNE, 1933.

Table with 24 columns (1-24) and 25 rows (Day 1-30). Includes 'Station Level' and 'Mean (Station Level)' rows.

NOTE.- When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005·6 mb. is written 005·6. This rule does not, however, apply to monthly means.

173. ESKDALEMUIR: H_b (height of barometer cistern above M.S.L.) = 237.3 metres.

JULY, 1933.

Table with 25 columns (1-24 hours, Mean) and 31 rows (Day 1-31). Includes 'Station Level' and 'Mean (Sea Level)' rows. Data values are in millibars.

174. ESKDALEMUIR: H_b = 237.3 metres.

AUGUST, 1933.

Table with 25 columns (1-24 hours, Mean) and 31 rows (Day 1-31). Includes 'Station Level' and 'Mean (Sea Level)' rows. Data values are in millibars.

NOTE.- When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

TEMPERATURE

Readings in degrees absolute at exact hours, Greenwich Mean Time.

182. ESKDALEMUIR: Louvred Hut: h_t (height of thermometer bulb above ground) = 0.9 metres.

JANUARY, 1933.

Table with 26 columns (Hour G. M. T., 1-24, Mean) and 31 rows (Day 1-31). Contains temperature readings in degrees absolute.

183. ESKDALEMUIR: Louvred Hut: h_t = 0.9 metres.

FEBRUARY, 1933.

Table with 26 columns (Day, Hour G. M. T., 1-24, Mean) and 28 rows (Day 1-28). Contains temperature readings in degrees absolute.

NOTE. - The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is printed 75.0.

188. ESKDALEMUIR: Louvred Hut: h_t (height of thermometer bulb above ground) = 0.9 metres.

JULY, 1933.

Table with columns: Hour G. M. T., Day, 1-24, Mean. Rows represent hourly temperature readings for July 1933. Values range from approximately 81.2 to 93.6 degrees absolute.

189. ESKDALEMUIR: Louvred Hut: h_t = 0.9 metres.

AUGUST, 1933.

Table with columns: Day, 1-24, Mean. Rows represent hourly temperature readings for August 1933. Values range from approximately 82.2 to 93.3 degrees absolute.

NOTE. - The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is printed 75.0.

TEMPERATURE

Readings in degrees absolute at exact hours, Greenwich Mean Time.

190. ESKDALEMUIR: Louvred Hut: h_t (height of thermometer bulb above ground) = 0.9 metres.

SEPTEMBER, 1933.

Table with 25 columns (1-24) and 31 rows (Day 1-30, Mean). Each cell contains a temperature reading in degrees absolute. The Mean row shows an average of 83.1 for column 1 and 85.4 for column 24.

191. ESKDALEMUIR: Louvred Hut: h_t = 0.9 metres.

OCTOBER, 1933.

Table with 25 columns (1-24) and 31 rows (Day 1-30, Mean). Each cell contains a temperature reading in degrees absolute. The Mean row shows an average of 79.5 for column 1 and 80.9 for column 24.

NOTE. - The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is printed 75.0.

TEMPERATURE
Readings in degrees absolute at exact hours, Greenwich Mean Time.

192. ESKDALEMUIR: Louvred Hut: h_t (height of thermometer bulb above ground) = 0.9 metres.

NOVEMBER, 1933.

Table with 25 columns (Hour G. M. T., 1-24, Mean.) and 31 rows (Day 1-31). Each cell contains a temperature value in degrees absolute. Includes a Mean. row at the bottom.

193. ESKDALEMUIR: Louvred Hut: h_t = 0.9 metres.

DECEMBER, 1933.

Table with 25 columns (Day, 1-31, Mean.) and 31 rows (Hour G. M. T., 1-31). Each cell contains a temperature value in degrees absolute. Includes a Mean. row at the bottom and an Hour G. M. T. row at the very bottom.

NOTE. - The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is printed 75.0.

TEMPERATURE. From readings in degrees absolute at exact hours, Greenwich Mean Time.

194. ESKDALEMUIR: Louvred Hut: ht = 0.9 metres.

1933.

Table with 25 columns: Hour 1, G.M.T. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, Noon, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, Mean. Rows show temperature readings for each hour of the day.

TEMPERATURE: MONTHLY MEANS AND DIURNAL INEQUALITIES. The departures from the mean of the day are adjusted for non-cyclic change.

195. ESKDALEMUIR: Louvred Hut: ht = 0.9 metres.

1933.

Table with 25 columns: Month, Mean, Hour 1, G.M.T. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, Noon, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24. Rows show monthly mean temperatures and diurnal inequalities for each month.

ABSOLUTE EXTREMES OF TEMPERATURE FOR EACH DAY. Maximum and Minimum for the interval Oh to 24h Greenwich Mean Time.

196. ESKDALEMUIR: Louvred Hut: ht = 0.9 metres.

1933.

Table with 25 columns: Month, Jan., Feb., Mar., Apr., May, June, July, Aug., Sept., Oct., Nov., Dec. Each month has sub-columns for Max. and Min. temperatures. Rows show daily maximum and minimum temperatures for each day of the year.

Note.- The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees is printed 75.0.

RELATIVE HUMIDITY

Percentages at exact hours, Greenwich Mean Time.

197. ESKDALEMUIR: Louvred Hut: ht (height of thermometer bulbs above ground) = 0.9 metres.

JANUARY, 1933.

Table for January 1933 showing relative humidity percentages by hour (1-24) and mean, along with vapour pressure (mb.) and mean values.

198. ESKDALEMUIR: Louvred Hut: ht = 0.9 metres.

FEBRUARY, 1933.

Table for February 1933 showing relative humidity percentages by hour (1-24) and mean, along with vapour pressure (mb.) and mean values.

*Computed from the mean temperatures and the mean relative humidities. †Mean of the column. ‡Mean of the row.

RELATIVE HUMIDITY
Percentages at exact hours, Greenwich Mean Time.

199. ESKDALEMUIR: Louvred Hut: ht (height of thermometer bulbs above ground) = 0.9 metres.

MARCH, 1933.

Table with 24 columns (Hour G. M. T., 1-24, Mean, Vapour Pressure*) and 31 rows (Day 1-31, Mean, Vapour Pressure*). Contains relative humidity percentages and vapour pressure values for March 1933.

200. ESKDALEMUIR: Louvred Hut: ht = 0.9 metres.

APRIL, 1933.

Table with 24 columns (Hour G. M. T., 1-24, Mean, Vapour Pressure*) and 31 rows (Day 1-31, Mean, Vapour Pressure*). Contains relative humidity percentages and vapour pressure values for April 1933.

*Computed from the mean temperatures and the mean relative humidities. †Mean of the column. ‡Mean of the row.

RELATIVE HUMIDITY
Percentages at exact hours, Greenwich Mean Time.

207. ESKDALEMUIR: Louvred Hut ht (height of thermometer bulbs above ground) = 0.9 metres.

NOVEMBER, 1933.

Table with 25 columns (1-24, Mean) and 30 rows (1-30). Columns 1-24 contain percentage values. Columns 25-26 contain Mean and Vapour Pressure* values. Includes a summary row for Mean and Vapour Pressure*.

208. ESKDALEMUIR: Louvred Hut: ht = 0.9 metres.

DECEMBER, 1933.

Table with 25 columns (1-24, Mean) and 31 rows (1-31). Columns 1-24 contain percentage values. Columns 25-26 contain Mean and Vapour Pressure* values. Includes a summary row for Mean and Vapour Pressure*.

*Computed from the mean temperatures and the mean relative humidities. †Mean of the column. ‡Mean of the row.

209. ESKDALEMUIR: (Louvred Hut) $h_t = 0.9$ metres.

1933.

| Hour G. M. T. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Noon | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Mean |
|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Relative Humidity | 88.5 | 88.6 | 89.0 | 89.0 | 88.6 | 87.7 | 86.4 | 83.8 | 81.0 | 78.4 | 75.6 | 73.6 | 72.3 | 71.8 | 72.3 | 73.8 | 75.7 | 78.7 | 81.4 | 83.9 | 85.7 | 86.8 | 87.7 | 88.0 | 82.0 |
| Vapour Pressure (in Millibars)* | 8.3 | 8.2 | 8.1 | 8.1 | 8.1 | 8.2 | 8.3 | 8.6 | 8.8 | 8.9 | 9.1 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.1 | 9.0 | 8.8 | 8.7 | 8.5 | 8.4 | 8.4 | 8.3 | 8.7 |

*Computed from the mean temperature and the mean relative humidity.

RELATIVE HUMIDITY: MONTHLY MEANS AND DIURNAL INEQUALITIES.
The departures for the mean of the day are adjusted for non-cyclic change.

210. ESKDALEMUIR: (Louvred Hut) $h_t = 0.9$ metres.

1933.

| | Mean | Hour 1 | G.M.T. 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Noon | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|-----------|------|--------|----------|-------|-------|-------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|-------|-------|
| January | 88.3 | +2.3 | +1.5 | +0.8 | -0.1 | -0.3 | +0.2 | +1.1 | +0.8 | +0.6 | +1.0 | -0.3 | -1.7 | -3.8 | -3.8 | -3.2 | -1.6 | -1.1 | -0.2 | +0.6 | +0.9 | +1.4 | +1.8 | +1.7 | +1.6 |
| February | 81.9 | +2.4 | +2.7 | +3.0 | +2.4 | +3.4 | +4.2 | +4.7 | +4.7 | +3.7 | +1.1 | -1.9 | -3.9 | -4.6 | -6.0 | -6.3 | -6.1 | -4.4 | -2.2 | -0.8 | -0.9 | -0.4 | +1.0 | +1.4 | +1.8 |
| March | 78.3 | +7.8 | +8.3 | +9.6 | +9.5 | +9.9 | +9.4 | +9.1 | +7.3 | +1.8 | -4.0 | -9.3 | -13.6 | -14.7 | -14.9 | -15.3 | -13.5 | -9.9 | -4.0 | +0.6 | +1.7 | +4.9 | +5.1 | +7.1 | +8.3 |
| April | 80.8 | +8.5 | +8.7 | +8.7 | +8.3 | +8.1 | +7.0 | +3.8 | +1.1 | -1.7 | -5.5 | -8.9 | -10.0 | -11.3 | -13.0 | -10.7 | -10.0 | -9.1 | -4.8 | -0.3 | +3.1 | +5.9 | +6.3 | +7.9 | +7.9 |
| May | 77.9 | +9.7 | +10.6 | +10.9 | +11.5 | +10.2 | +6.5 | +3.7 | -0.2 | -5.1 | -6.7 | -9.2 | -10.8 | -13.2 | -12.9 | -14.1 | -11.4 | -7.6 | -5.3 | -0.7 | +4.0 | +5.7 | +7.7 | +8.7 | +8.0 |
| June | 74.2 | +11.3 | +12.0 | +12.9 | +12.7 | +10.4 | +7.6 | +2.6 | -1.5 | -4.5 | -7.6 | -8.8 | -12.8 | -13.5 | -14.0 | -13.9 | -12.1 | -9.9 | -7.4 | -1.8 | +3.6 | +6.6 | +8.8 | +10.4 | +10.0 |
| July | 80.7 | +10.1 | +10.8 | +11.9 | +12.0 | +10.1 | +8.6 | +5.2 | -1.9 | -5.3 | -7.6 | -10.1 | -10.8 | -12.3 | -11.9 | -11.3 | -11.0 | -9.1 | -6.5 | -3.1 | +1.4 | +5.2 | +6.8 | +8.5 | +10.4 |
| August | 81.6 | +10.1 | +9.5 | +9.4 | +10.3 | +9.4 | +7.9 | +6.7 | +3.2 | -1.3 | -4.9 | -8.7 | -12.4 | -14.1 | -14.7 | -13.6 | -12.3 | -11.2 | -6.5 | -1.7 | +3.7 | +5.9 | +7.9 | +8.9 | +8.8 |
| September | 82.7 | +7.6 | +8.0 | +8.5 | +8.6 | +8.9 | +8.7 | +6.8 | +1.9 | -0.9 | -5.0 | -9.2 | -11.0 | -13.2 | -14.4 | -13.2 | -12.8 | -9.8 | -2.9 | +0.9 | +5.1 | +6.2 | +6.8 | +7.1 | +7.3 |
| October | 81.9 | +5.5 | +4.9 | +5.4 | +5.2 | +5.4 | +4.9 | +5.1 | +2.3 | -1.1 | -4.8 | -8.1 | -9.8 | -10.3 | -9.7 | -9.2 | -6.8 | -3.2 | +0.3 | +1.4 | +2.4 | +3.5 | +4.8 | +5.7 | +5.1 |
| November | 87.2 | +1.7 | +1.3 | +1.7 | +1.8 | +2.7 | +1.8 | +2.1 | +1.7 | +0.2 | -0.7 | -2.3 | -4.2 | -3.9 | -4.3 | -2.3 | -0.7 | 0.0 | 0.0 | +0.1 | -0.6 | +0.3 | +0.7 | +1.6 | +1.2 |
| December | 88.5 | +0.9 | +0.7 | +0.6 | +1.0 | +0.8 | +0.4 | +1.2 | +1.7 | +1.5 | +1.2 | +0.8 | -0.2 | -1.7 | -2.5 | -2.4 | -0.1 | -0.5 | -0.3 | -0.8 | -1.2 | -0.8 | -0.1 | -0.3 | +0.2 |
| Year | 82.0 | +6.5 | +6.6 | +7.0 | +7.0 | +6.6 | +5.6 | +4.3 | +1.7 | -1.1 | -3.7 | -6.4 | -8.5 | -9.7 | -10.2 | -9.7 | -8.2 | -6.3 | -3.3 | -0.6 | +1.9 | +3.7 | +4.8 | +5.7 | +6.0 |

† See page 21

RAINFALL: ANNUAL TOTALS OF HOURLY VALUES.

† Amounts in millimetres; durations, in hours, for periods of sixty minutes between the exact hours, Greenwich Mean Time.

211. ESKDALEMUIR: $H_T = 242.0$ metres + 0.4 metres.

1933.

| Hour G. M. T. | 0 to 1 | 1 to 2 | 2 to 3 | 3 to 4 | 4 to 5 | 5 to 6 | 6 to 7 | 7 to 8 | 8 to 9 | 9 to 10 | 10 to 11 | 11 to Noon | Noon to 13 | 13 to 14 | 14 to 15 | 15 to 16 | 16 to 17 | 17 to 18 | 18 to 19 | 19 to 20 | 20 to 21 | 21 to 22 | 22 to 23 | 23 to 24 | 0 to 24 |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|----------|------------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------|
| Amount | 77.1 | 62.5 | 54.9 | 54.9 | 46.3 | 43.6 | 39.1 | 36.1 | 40.0 | 44.3 | 31.0 | 39.7 | 49.9 | 36.8 | 35.8 | 51.4 | 41.5 | 51.3 | 38.7 | 40.2 | 38.9 | 41.4 | 54.9 | 67.3 | 1117.6 |
| Duration | 35.5 | 35.3 | 34.5 | 33.4 | 29.7 | 30.5 | 33.0 | 28.7 | 31.4 | 32.6 | 27.3 | 30.4 | 37.7 | 31.7 | 28.2 | 28.7 | 29.2 | 32.8 | 31.5 | 30.4 | 27.9 | 32.4 | 34.9 | 36.1 | 763.8 |

† The totals and durations for individual months are printed in the tables on the following pages.

212. ESKDALEMUIR:

NOTES ON RAINFALL.

1933.

Rainfall Duration. There were 149 days on which no duration of rainfall was registered. There were 74 days on which the duration of rainfall was registered as 0.1 to 1.0 hour, 37 days with 1.1 to 2.0 hours, 46 days with 2.1 to 5.0 hours, 26 days with 6.1 to 12.0 hours, and 33 days with more than 12 hours. The day with the greatest duration was February 4, when the duration was 16.7 hours, the amount falling being 28.0 mm.

Notable falls of the Year.

(a) The greatest amount in a 60-minute period was 14.9 mm., which was recorded between 15 and 16h, July 27th, and on this occasion 5 mm. of rain fell in 6 minutes.

Falls of 5 mm. in one hour or less occurred on 19 days.

(b) Details of the greatest continuous falls are as follows:-

| Date. | Amount. | Duration. |
|-------------------------------|---------|-----------|
| | mm. | hrs. |
| January 2nd - 3rd | 32.1 | 8.7 |
| January 14th - 15th | 25.8 | 12.4 |
| January 31st. - February 1st. | 78.5 | 17.2 |
| March 8th - 9th | 26.3 | 17.3 |
| July 30th - 31st | 29.1 | 9.2 |

On July 27th, 13.5 mm. fell in 18 minutes, a "noteworthy fall".

Wet Periods. There were no "rain spells" (i.e., periods of fifteen or more consecutive days on each of which 0.2 mm. or more of rain fell) and no "wet spells" (i.e., periods of fifteen or more consecutive days on each of which 1.0 mm. or more of rain fell).

Dry Periods. (a) There were no periods of "absolute drought" (i.e. fifteen or more consecutive days to none of which is credited 0.2 mm. of rain or more) or of "partial drought" (i.e. twenty-nine or more consecutive days, the mean daily rainfall of which does not exceed 0.2 mm.).

(b) There was one "dry spell" (i.e., periods of at least 15 consecutive days to none of which is credited 1 mm. of rain or more) viz., November 21st. to December 6th.

RAINFALL

Amounts in millimetres, for periods of sixty minutes, between the exact hours, Greenwich Mean Time.
215. ESKDALEMUIR: Hr (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + hr (height of receiving surface above ground) = 242.0 metres + 0.4 metres.

MARCH, 1933.

Table with 24 columns for hours (0-1 to 24) and 2 rows for 'Day' and 'Sum.'. Each cell contains rainfall amounts in mm or hr. Includes a 'Total Duration' row at the bottom.

216. ESKDALEMUIR: Hr = 242.0 metres + 0.4 metres.

APRIL, 1933.

Table with 24 columns for hours (0-1 to 24) and 2 rows for 'Day' and 'Sum.'. Each cell contains rainfall amounts in mm or hr. Includes a 'Total Duration' row at the bottom.

RAINFALL

Amounts in millimetres, for periods of sixty minutes, between the exact hours, Greenwich Mean Time. 217. ESKDALEMUIR: H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 242.0 metres + 0.4 metres.

MAY, 1935.

Table with 26 columns (Hour G. M. T., 0-1 to 24, Duration 0-24) and 31 rows (Day 1 to 31, Sum, Total Duration). Contains rainfall data for May 1935.

218. ESKDALEMUIR: H_r = 242.0 metres + 0.4 metres.

JUNE, 1935.

Table with 26 columns (Hour G. M. T., 0-1 to 24, Duration 0-24) and 31 rows (Day 1 to 30, Sum, Total Duration, Hour G. M. T.). Contains rainfall data for June 1935.

RAINFALL

Amounts in millimetres, for periods of sixty minutes, between the exact hours, Greenwich Mean Time.

225. ESKDALEMUIR: Hr (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + hr (height of receiving surface above ground) = 242.0 metres + 0.4 metres.

NOVEMBER, 1933.

Table with 24 columns for hours (0-1 to 24) and 31 rows for days (1-30). Columns include rainfall in mm and hr. Summary row shows total rainfall of 54.9 hr.

224. ESKDALEMUIR: Hr = 242.0 metres + 0.4 metres.

DECEMBER, 1933.

Table with 24 columns for hours (0-1 to 24) and 31 rows for days (1-31). Columns include rainfall in mm and hr. Summary row shows total rainfall of 60.6 hr.

DURATION OF BRIGHT SUNSHINE.

For periods of sixty minutes, between the exact hours of Local Apparent Time.
229. ESKDALEMUIR. h_s (height of recorder above ground) = 1.5 metres.

MAY, 1933.

Table for station 229, ESKDALEMUIR. Columns include hours of sunshine (3-4 to 20-21), total hours, percentage, and radiation by Ångström Pyrheliometer (Time G. M. T., Intensity, p/p. Sec.2., Sky).

230. ESKDALEMUIR. h_s = 1.5 metres.

JUNE, 1933.

Table for station 230, ESKDALEMUIR. Columns include hours of sunshine (3-4 to 20-21), total hours, percentage, and radiation by Ångström Pyrheliometer (Time G. M. T., Intensity, p/p. Sec.2., Sky).

239. ESKDALEMUIR:

H_a (height of anemograph above M.S.L.) = Height of ground above

Table with 24 columns (Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12) and 32 rows (Day 1-31, Mean). Each cell contains wind speed data in degrees and m/s.

240. ESKDALEMUIR: H_a = 235 metres + 15 metres.

Table with 24 columns (Day, Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12) and 32 rows (Day 1-31, Mean). Each cell contains wind speed data in degrees and m/s.

Averages for periods of sixty minutes, centred at the Half hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 235 metres + 15 metres.

MARCH, 1933.

Table with columns for 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, Mean, Day. Each column contains wind speed data in m/s and degrees for two stations.

APRIL, 1933.

Table with columns for 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, Mean, Day. Each column contains wind speed data in m/s and degrees for two stations.

WIND: DIRECTION AND SPEED.

Direction expressed in degrees from North (E = 90°, S = 180°, W = 270°, N = 360°) Speed in metres per second.

243. ESKDALEMUIR:

H_a (height of anemograph above M.S.L.) = Height of ground above

Table with 24 columns: Hour G.M.T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12. Each time interval has two sub-columns for wind speed in degrees and m/s. Rows include days 1-31 and a Mean row.

244. ESKDALEMUIR: H_a = 235 metres + 15 metres.

Table with 24 columns: Day, 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12. Each time interval has two sub-columns for wind speed in degrees and m/s. Rows include days 1-31 and a Mean row.

*During period 9h on 9th to 16h on 11th values estimated - new Dines Pressure Tube Anemometer erected.

WIND: DIRECTION AND SPEED.
Direction expressed in degrees from North (E = 90°, S = 180°, W = 270°, N = 360°). Speed in metres per second.

245. ESKDALEMUIR:

H_a (height of anemograph above M.S.L.) = Height of ground above

Table with 25 columns (Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12) and 31 rows (Day 1-31). Each cell contains wind direction and speed data in degrees and m/s.

246. ESKDALEMUIR: H_a = 235 metres + 15 metres.

Table with 25 columns (Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12) and 31 rows (Day 1-31). Each cell contains wind direction and speed data in degrees and m/s.

WIND: DIRECTION AND SPEED.

Averages for periods of sixty minutes, centred at the Half hours, Greenwich Mean Time.

M.S.L. + ha (height of anemograph above ground) = 235 metres + 15 metres.

NOVEMBER, 1933.

Table with columns for time periods (12-13 to 23-24), Mean, and Day. Rows contain wind speed data in m/s for various heights (200, 320, 360, 340, 250, 50, 220, 200, 350, 190, 180, 150, 120, 40, 20, 110, 150, 160, 30, 70, 20, 70, 10, 50, 110, 150, 160).

DECEMBER, 1933.

Table with columns for time periods (12-13 to 23-24), Mean, and Day. Rows contain wind speed data in m/s for various heights (120, 80, 60, 50, 30, 90, 40, 30, 20, 230, 150, 50, 160, 10, 170, 220, 160, 200, 230, 210, 210, 180, 160, 30, 210, 150, 200, 230, 210, 180, 160).

255. ESKDALEMUIR.

Table for March 1933, Eskdalemuir. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Data rows 1-31 and Mean Cloud Am't.

256. ESKDALEMUIR.

Table for April 1933, Eskdalemuir. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Data rows 1-30 and Mean Cloud Am't.

Table for July 1933, ESKDALEMUIR. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Rows 1-31 show daily weather observations.

Table for August 1933, ESKDALEMUIR. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Rows 1-31 show daily weather observations.

261. ESKDALEMUIR.

Table for September 1933, station 261. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Includes a Mean Cloud Am't. row.

262. ESKDALEMUIR.

OCTOBER, 1933.

Table for October 1933, station 262. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Includes a Mean Cloud Am't. row.

Table for November 1933. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Rows 1-30 show daily weather data.

Summary row for November 1933 showing Mean Cloud Am't. and other aggregated data.

Table for December 1933. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Rows 1-31 show daily weather data.

Summary row for December 1933 showing Mean Cloud Am't. and other aggregated data.

Final summary row for the year showing Mean Annual Cloud Am't. and other aggregated data.

POTENTIAL GRADIENT (reduced to level surface): VOLTS PER METRE.
 Mean values for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

243

265. ESKDALEMUIR.

1933.

| Month. | JULY. Factor 6.22 | | | | AUGUST. Factor 6.21 | | | | SEPTEMBER. Factor 6.28 | | | | |
|-------------|----------------------|-------|---------|---------|-----------------------|-------|---------|---------|------------------------|---------|---------|---------|-----|
| Hour G.M.T. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | |
| Day | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | |
| 1 | 320 | 155 | 180 | 375 | 155 | 130 | 145 | 220 | 105 | 115 | 145 | 345 | |
| 2 | 130 | 140 | 125 | 270 | 170 | 165 | 80 | 360 | 320 | 350 | 115 | 395 | |
| 3 | - | - | 240 | - | - | 315 | - | - | 135 | 195 | 105 | 25 | |
| 4 | 150 | 115 | 185 | 235 | - | - | - | - | - | 170 | 80 | 155 | |
| 5 | 155 | 70 | 120 | 435 | - | - | 180 | 375 | 335 | 165 | 115 | 190 | |
| 6 | 305 | 250 | 280 | 280 | 165 | 190 | 145 | 140 | 125 | 230 | 150 | - | |
| 7 | 165 | 105 | 270 | 475 | 175 | 105 | 180 | 130 | - | 235 | 135 | 165 | |
| 8 | - | - | 125 | Z± | 90 | 130 | 140 | 115 | 150 | 140 | 130 | 230 | |
| 9 | 95 | 195 | 120 | 115 | 75 | 100 | 155 | 185 | 75 | - | 105 | 180 | |
| 10 | Z- | 170 | 130 | Z- | - | 115 | 130 | 240 | 155 | 115 | 130 | 240 | |
| 11 | 195 | 175 | Z± | Z± | 135 | 165 | 110 | 70 | 215 | 140 | 110 | 150 | |
| 12 | -100 | -25 | -15 | 90 | 210 | 155 | 145 | 295 | 170 | 90 | 135 | 155 | |
| 13 | 50 | Z- | Z+ | 180 | 340 | 150 | 185 | 235 | 150 | 130 | 115 | 265 | |
| 14 | 155 | Z- | Z± | 215 | 125 | 370 | 150 | 230 | 220 | 290 | 135 | 355 | |
| 15 | 190 | 110 | Z+ | Z± | 220 | 60 | 305 | 120 | 165 | 135 | 150 | 325 | |
| 16 | 220 | 140 | 145 | 350 | 145 | 185 | 140 | 230 | 130 | 270 | 245 | 335 | |
| 17 | 185 | 160 | 130 | 165 | 65 | -90 | 240 | 100 | 220 | 205 | 170 | 170 | |
| 18 | 195 | 40 | 80 | 250 | 115 | 155 | 50 | Z- | 90 | 165 | 120 | 380 | |
| 19 | 220 | 145 | 130 | 60 | 175 | 170 | 140 | 245 | 295 | 315 | 220 | Z± | |
| 20 | - | - | - | - | 305 | 100 | Z- | 200 | 320 | - | Z± | 275 | |
| 21 | - | 80 | 135 | 270 | 120 | 40 | 35 | 215 | 300 | 190 | 90 | 250 | |
| 22 | 105 | 215 | 150 | 315 | 400 | 135 | Z- | 195 | 160 | 175 | 100 | 190 | |
| 23 | 115 | 155 | 105 | 245 | 340 | 245 | Z- | -170 | 235 | 375 | 90 | 280 | |
| 24 | 395 | 255 | 45 | 95 | 335 | 260 | 170 | 30 | 235 | -25 | 100 | 290 | |
| 25 | -305 | 315 | 100 | 360 | 35 | - | - | - | 250 | 285 | 100 | 155 | |
| 26 | (130) | (70) | 80 | 250 | - | - | - | - | 145 | 150 | 180 | 235 | |
| 27 | 230 | - | Z± | Z+ | - | - | - | - | 115 | 235 | 165 | 345 | |
| 28 | 115 | 115 | 155 | 385 | - | - | - | 440 | 200 | 105 | 190 | 280 | |
| 29 | 295 | 120 | Z± | 130 | 150 | 355 | 215 | 485 | 205 | 240 | 230 | 170 | |
| 30 | 140 | 135 | 115 | 80 | 535 | 165 | 160 | 345 | - | - | 170 | 105 | |
| 31 | Z- | 230 | -30 | 110 | 140 | 235 | 100 | 90 | - | - | - | - | |
| (a) | 185 | 153 | 143 | 239 | 197 | 175 | 149 | 221 | 194 | 200 | 138 | 237 | |
| (b) | 144 | 145 | 132 | 254 | 186 | 160 | 154 | 203 | 193 | 184 | 136 | 250 | |
| Mean | (a) 180 | | (b) 169 | | (a) 185 | | (b) 176 | | (a) 192 | | (b) 191 | | |
| Month. | OCTOBER. Factor 6.28 | | | | NOVEMBER. Factor 6.23 | | | | DECEMBER. Factor 6.21 | | | | |
| Hour G.M.T. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | |
| Day | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | v/m. | |
| 1 | 105 | 85 | 190 | 195 | 115 | 145 | 445 | 255 | 340 | 150 | 300 | 245 | |
| 2 | 120 | 90 | 190 | 320 | 70 | 175 | 170 | 240 | 150 | 155 | 310 | 425 | |
| 3 | 95 | 190 | 225 | 480 | 175 | 115 | Z- | 300 | 250 | 115 | 150 | 130 | |
| 4 | 240 | 320 | - | 255 | 145 | 80 | 145 | 490 | 100 | 160 | 145 | 185 | |
| 5 | 230 | 195 | 165 | 205 | 290 | 115 | 165 | 285 | 90 | 120 | 225 | 175 | |
| 6 | 60 | 140 | 190 | 320 | 190 | 95 | 330 | 335 | 110 | 150 | 280 | 205 | |
| 7 | 70 | 105 | 50 | -105 | 135 | 65 | 155 | 280 | 120 | 115 | 215 | 210 | |
| 8 | 25 | 395 | 180 | 320 | 310 | 540 | 395 | 175 | 95 | 115 | 200 | 255 | |
| 9 | 215 | 155 | Z- | 240 | 85 | 160 | 95 | 245 | 140 | 130 | Z- | 200 | |
| 10 | 175 | 215 | 140 | 265 | 290 | 220 | 190 | 280 | 190 | 35 | Z- | 750 | |
| 11 | 150 | 160 | 155 | 250 | 220 | 235 | 200 | 285 | 170 | 265 | 155 | 615 | |
| 12 | 180 | 155 | 165 | 400 | 130 | 175 | 195 | 380 | -150 | 175 | 335 | 750 | |
| 13 | 140 | 210 | 170 | 160 | 125 | Z± | Z± | 270 | Z± | 170 | 205 | 260 | |
| 14 | 130 | 505 | 55 | 330 | 265 | 205 | 275 | 315 | 85 | 305 | 290 | 745 | |
| 15 | 335 | 155 | Z- | 165 | Z- | Z- | 175 | 160 | 170 | 245 | 200 | 460 | |
| 16 | 165 | Z± | 135 | 235 | 85 | Z- | 65 | 190 | 230 | 200 | 365 | 340 | |
| 17 | 135 | 100 | - | 60 | 95 | 95 | 155 | Z- | 120 | 220 | 470 | 420 | |
| 18 | 320 | 330 | 225 | 295 | 75 | Z- | Z- | 45 | 240 | 435 | 395 | 540 | |
| 19 | 190 | 200 | 155 | 310 | 35 | 225 | 265 | Z+ | 515 | 575 | 810 | 620 | |
| 20 | 210 | 250 | 180 | 290 | 90 | 70 | 220 | 590 | 540 | 405 | 820 | 820 | |
| 21 | 145 | 5 | 90 | 140 | 800 | 405 | - | 80 | 680 | 370 | 470 | 225 | |
| 22 | 85 | 165 | 120 | 230 | 115 | 410 | 195 | 390 | 130 | 115 | 200 | 100 | |
| 23 | Z- | 155 | 105 | 420 | 410 | 355 | 175 | 325 | 105 | 235 | 140 | 395 | |
| 24 | 60 | 140 | 120 | 155 | 315 | 300 | 465 | 270 | 165 | 100 | 125 | Z- | |
| 25 | 85 | 225 | 145 | 195 | 185 | 45 | 130 | 290 | 80 | 140 | 335 | 205 | |
| 26 | 140 | 195 | 120 | 320 | 135 | 135 | 195 | 405 | Z- | 260 | 565 | 395 | |
| 27 | 250 | 155 | 175 | 330 | 325 | 490 | 225 | 565 | 155 | 375 | 290 | 370 | |
| 28 | 180 | Z± | Z± | 280 | 280 | 160 | 320 | 155 | 510 | 220 | 80 | 115 | |
| 29 | Z± | 170 | 180 | 225 | 105 | 100 | 195 | 390 | 290 | 220 | 320 | 345 | |
| 30 | 180 | 150 | 215 | 340 | 165 | 190 | 230 | 350 | 50 | 170 | 125 | 560 | |
| 31 | Z- | 120 | 165 | 255 | - | - | - | - | 255 | 245 | 600 | Z+ | |
| (a) | 158 | 187 | 154 | 266 | 199 | 204 | 222 | 298 | 217 | 216 | 314 | 381 | |
| (b) | 143 | 194 | 155 | 261 | 199 | 203 | 232 | 332 | 207 | 230 | 305 | 378 | |
| Mean | (a) 191 | | (b) 188 | | (a) 231 | | (b) 241 | | (a) 282 | | (b) 280 | | |
| | | | | | | | | (a) | | 209 | 199 | 190 | 273 |
| | | | | | | | | (b) | | 203 | 201 | 191 | 277 |
| | | | | | | | | | | (a) 216 | | (b) 218 | |

Note:—The 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.
 (a) Mean of all positive readings. (b) Mean from all complete days using both positive and negative readings.

POTENTIAL GRADIENT (reduced to level surface): DIURNAL INEQUALITIES (in volts per metre).
The departures from the mean of the day are adjusted for non-cyclic change.†

266. ESKDALEMUIR.

* 0a Days Only.

1933.

Table with 24 columns (hours 0-24) and rows for months (Jan-Mar, Apr-Jun, July-Sept, Oct-Dec, Year, Winter, Equinox, Summer). Columns include v/m values, Non Cyclic Change, No. of Days Used, and Mean Values.

267. ESKDALEMUIR.

* 1a and 2a Days Only.

1933.

Table with 24 columns (hours 0-24) and rows for months (Jan-Mar, Apr-Jun, July-Sept, Oct-Dec, Year, Winter, Equinox, Summer). Columns include v/m values, Non Cyclic Change, No. of Days Used, and Mean Values.

† see page 21

* Note. For explanation of 0a, 1a and 2a Days, see page 164

268. ESKDALEMUIR.

1933.

| Month | JANUARY | | FEBRUARY | | MARCH | | APRIL | | MAY | | JUNE | |
|-------------------|---------|-----------|---------------------------------|-----------|---------------------------------|-----------|---------------------------------|-----------|---------------------------------|-----------|---------------------------------|-----------|
| | Day. | Character | Duration of Negative Pot. Grad. | Character | Duration of Negative Pot. Grad. | Character | Duration of Negative Pot. Grad. | Character | Duration of Negative Pot. Grad. | Character | Duration of Negative Pot. Grad. | Character | Duration of Negative Pot. Grad. |
| | | Hours | | Hours | | Hours | | Hours | | Hours | | Hours |
| 1 | 1b | 1-1 | 2c | 12-0 | 1b | 1-7 | 1a | 0-6 | 1a | 1-0 | 1a | 1-4 |
| 2 | 2c | 13-7 | 1c | 2-4 | 2b | 4-3 | 1a | 2-7 | 0a | ... | 1b | 2-6 |
| 3 | 2c | 5-9 | 1a | 0-1 | 2b | 4-4 | 1a | 0-7 | 2b | 5-7 | 0a | ... |
| 4 | 2c | 7-1 | 2c | 12-0 | 2b | 3-6 | 0a | ... | 2c | 7-3 | 0a | ... |
| 5 | 2b | 3-9 | 2c | 12-1 | 2c | 9-0 | 1a | 0-5 | 1c | 2-9 | 0a | ... |
| 6 | 2c | 4-3 | 1a | 1-0 | 2b | 3-8 | 0a | ... | 2c | 3-7 | 0a | ... |
| 7 | 2b | 4-9 | 2c | 6-6 | 1b | 1-0 | 0a | ... | 2c | 6-1 | 0a | ... |
| 8 | 2b | 3-5 | 1a | 0-3 | 2c | 7-8 | 0a | ... | 1b | 0-7 | 0a | ... |
| 9 | 0a | ... | 2c | 6-5 | 2b | 5-4 | (2b) | --- | 1a | 0-8 | 0a | ... |
| 10 | 1b | 1-6 | 1b | 2-8 | 0a | ... | 0a | ... | 0a | ... | 2b | 5-9 |
| 11 | 1b | 2-5 | 0a | ... | 0a | ... | 1b | 2-9 | 1a | 1-1 | 0a | ... |
| 12 | (1b) | 1-1 | 1a | 0-5 | 0a | ... | 1a | 0-7 | 0a | ... | 1b | 0-6 |
| 13 | 1b | 0-9 | 0a | ... | 0a | ... | 0a | ... | 1a | 0-5 | 1a | 0-8 |
| 14 | 1b | 0-5 | 0a | ... | 1b | 2-8 | 0a | ... | 1b | 0-9 | 0a | ... |
| 15 | 2c | 7-4 | 0a | ... | 2c | 5-1 | 1a | 0-5 | 0a | ... | 0a | ... |
| 16 | (0a) | ... | 1b | 0-6 | 2c | 5-1 | 1a | 0-2 | 2c | 7-1 | 1b | 2-9 |
| 17 | (1a) | 0-1 | 0a | ... | 1b | 0-6 | 2a | 3-8 | 1a | 0-3 | 2c | 5-0 |
| 18 | 0a | ... | 0a | ... | 1c | 1-9 | 1b | 0-7 | 1a | 0-5 | 2c | 7-4 |
| 19 | 1a | 0-1 | 1b | 0-7 | 1b | 0-9 | 1b | 1-1 | 1a | 0-2 | 2c | 5-5 |
| 20 | 0a | ... | 1b | 0-7 | 0a | ... | 1b | 0-6 | 1b | 2-3 | 0a | ... |
| 21 | 0a | ... | 1b | 0-1 | 0a | ... | 0a | ... | 1b | 0-6 | 0a | ... |
| 22 | 0a | ... | 0a | ... | 0a | ... | 0a | ... | 2b | 3-3 | 1b | 1-6 |
| 23 | 0a | ... | 0a | ... | 0a | ... | 0a | ... | 2c | 3-5 | 0a | ... |
| 24 | 0a | ... | 1b | 0-8 | 0a | ... | 1a | 0-7 | 1a | 1-1 | 1b | 2-0 |
| 25 | 0a | ... | 1c | 2-2 | 0a | ... | 2b | 5-1 | 0a | ... | 0a | ... |
| 26 | 0a | ... | 2c | 9-0 | 0a | ... | 1a | 0-3 | 0a | ... | 1a | 1-2 |
| 27 | 0a | ... | 2c | 11-4 | 0a | ... | 2c | 4-7 | 1a | 0-1 | 0a | ... |
| 28 | 0a | ... | 0a | ... | 0a | ... | 2b | 4-0 | 1a | 1-7 | 0a | ... |
| 29 | 0a | ... | 1a | 0-1 | 1a | 0-1 | 2c | 3-8 | 1a | 0-4 | 0a | ... |
| 30 | 1b | 0-1 | 2c | 3-6 | 2c | 3-6 | 2b | 12-3 | 0a | ... | 0a | ... |
| 31 | 2c | 6-7 | 2c | 5-1 | 2c | 5-1 | 2c | 5-1 | 0a | ... | 0a | ... |
| Total | --- | 65-4 | --- | 81-8 | --- | 66-2 | --- | 45-9 | --- | 51-8 | --- | 36-7 |
| No. of days used. | --- | 31 | --- | 28 | --- | 31 | --- | 29 | --- | 31 | --- | 30 |
| Mean | --- | 2-1 | --- | 2-9 | --- | 2-1 | --- | 1-6 | --- | 1-7 | --- | 1-2 |
| | | | | | | | | | | | | |
| Month | JULY | | AUGUST | | SEPTEMBER | | OCTOBER | | NOVEMBER | | DECEMBER | |
| | Day. | Character | Duration of Negative Pot. Grad. | Character | Duration of Negative Pot. Grad. | Character | Duration of Negative Pot. Grad. | Character | Duration of Negative Pot. Grad. | Character | Duration of Negative Pot. Grad. | Character | Duration of Negative Pot. Grad. |
| | | Hours | | Hours | | Hours | | Hours | | Hours | | Hours |
| 1 | 1a | 0-5 | 1a | 0-2 | 0a | ... | 0a | ... | 1b | 2-2 | 0a | ... |
| 2 | 0a | ... | 1a | 0-2 | 0a | ... | 1a | 0-1 | 1b | 2-2 | 0a | ... |
| 3 | 0a | ... | (0a) | ... | 1a | 0-5 | 0a | ... | 2c | 5-9 | 1a | 0-4 |
| 4 | 0a | ... | 0a | ... | 1a | 0-1 | 0a | ... | 0a | ... | 0a | ... |
| 5 | 0a | ... | 0a | ... | 1a | 0-1 | 0a | ... | 0a | ... | 1a | 0-1 |
| 6 | 0a | ... | 0a | ... | 0a | ... | 0a | ... | 0a | ... | 1a | 0-1 |
| 7 | 1b | 1-6 | 0a | ... | 0a | ... | 2b | 3-8 | 0a | ... | 1b | 1-4 |
| 8 | 1b | 1-6 | 0a | ... | 0a | ... | 1b | 2-2 | 0a | ... | 0a | ... |
| 9 | 1b | 2-0 | 1a | 0-7 | 0a | ... | 2c | 4-8 | 2b | 3-2 | 2c | 7-2 |
| 10 | 2c | 5-1 | 0a | ... | 0a | ... | 0a | ... | 0a | ... | 2b | 5-6 |
| 11 | 2c | 3-8 | 1a | 0-8 | 0a | ... | 1b | 1-7 | 0a | ... | 1b | 1-3 |
| 12 | 2b | 4-3 | 0a | ... | 0a | ... | 1a | 0-1 | 0a | ... | 1b | 2-7 |
| 13 | 1c | 2-2 | 0a | ... | 1a | 0-1 | 1a | 0-5 | 2c | 6-8 | 1b | 0-2 |
| 14 | 1b | 1-4 | 1b | 0-5 | 0a | ... | 1b | 1-7 | 1a | 1-1 | 0a | ... |
| 15 | 1c | 1-7 | 1b | 2-9 | 0a | ... | 2c | 4-4 | 2c | 11-6 | 0a | ... |
| 16 | 1b | 1-5 | 0a | ... | 0a | ... | 2c | 3-9 | 1c | 2-3 | 0a | ... |
| 17 | 0a | ... | 2b | 4-8 | 1a | 0-2 | 1a | 0-1 | 2c | 3-3 | 0a | ... |
| 18 | 0a | ... | 2c | 3-9 | 1b | 1-8 | 0a | ... | 2c | 8-0 | 0a | ... |
| 19 | 1a | 0-1 | 1b | 2-1 | 1b | 1-5 | 0a | ... | 1c | 2-5 | 1b | 0-3 |
| 20 | (1b) | --- | 1b | 1-7 | (2c) | --- | 0a | ... | 1b | 0-7 | 0a | ... |
| 21 | 0a | ... | 1b | 1-6 | (1b) | (2-7) | 1b | 1-1 | 0a | ... | 0a | ... |
| 22 | 0a | ... | 2b | 5-1 | 0a | ... | 0a | ... | 0a | ... | 0a | ... |
| 23 | 0a | ... | 1b | 2-7 | 0a | ... | 2b | 3-1 | 0a | ... | 0a | ... |
| 24 | 1a | 1-5 | 1a | 0-1 | 1b | 2-7 | 1a | 0-1 | 0a | ... | 2b | 3-1 |
| 25 | 2b | 5-7 | (1b) | --- | 1b | 0-7 | 1a | 0-6 | 1a | 0-7 | 2b | 3-1 |
| 26 | 1a | 0-1 | (0a) | ... | 1a | 0-1 | 1b | 1-5 | 0a | ... | 1b | 2-9 |
| 27 | 2c | 3-0 | (1a) | --- | 0a | ... | 1b | 0-9 | 0a | ... | 1b | 1-3 |
| 28 | 1a | 0-1 | (2c) | --- | 1a | 0-4 | 2c | 9-4 | 1b | 2-3 | 1a | 0-1 |
| 29 | 2c | 3-3 | 1a | 0-1 | 0a | ... | 1c | 2-3 | 1a | 0-2 | 0a | ... |
| 30 | 1b | 1-6 | 1a | 0-1 | 0a | ... | 1a | 0-1 | 0a | ... | 2b | 3-5 |
| 31 | 2c | 9-5 | 2b | 3-7 | 2c | 3-7 | 2c | 3-7 | 2c | 3-7 | 0a | ... |
| Total | --- | 50-5 | --- | 31-2 | --- | 10-9 | --- | 46-1 | --- | 53-0 | --- | 33-3 |
| No. of days used. | --- | 30 | --- | 28 | --- | 2-9 | --- | 31 | --- | 30 | --- | 31 |
| Mean | --- | 1-7 | --- | 1-1 | --- | 0-4 | --- | 1-5 | --- | 1-8 | --- | 1-1 |

Annual Values. Character Frequency ... 0 1 2 Duration ... Total. No. of Days. Mean. 149 140 76 572-8 359 1-60

10-5/0-2/B/1933/012/BB 160

GREEN.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.

Mean values for periods of sixty minutes, ending at the hours of Greenwich Mean Time.

269. ESKDALEMUIR. (H.)

16,000 γ (.16 C.G.S. unit) +

JANUARY, 1933.

Table with columns for Hour G. M. T., Day, and 24 intervals (0-1 to 23-24) plus a Mean column. Rows represent days from 1 to 31. Values range from 540 to 580.

Yellow.

10.5 B 1933 011 01 BB 146

MAGNETIC DECLINATION (WEST).

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

270. ESKDALEMUIR. (D.)

14° +

JANUARY, 1933.

Table with columns for Hour G. M. T., Day, and 24 intervals (0-1 to 23-24) plus a Mean column. Rows represent days from 1 to 31. Values range from 14.2 to 22.0.

Q denotes an "International Quiet Day", while D denotes a disturbed day, used for computation of Tables 323-334.

023

TERRESTRIAL MAGNETIC FORCE: VERTICAL COMPONENT.

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

275. ESKDALEMUIR. (V.)

44,000 γ (·44 C.G.S. unit) +

FEBRUARY, 1933.

Table with columns for Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, and Mean. Rows include Day 1-28 and Mean values.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS. MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE

276. ESKDALEMUIR.

FEBRUARY, 1933.

Table with columns for Day, Horizontal Force (Maximum, Minimum, Range), Declination (Maximum, Minimum, Range), Vertical Force (Maximum, Minimum, Range), H_R+V_R 10,000 γ, Magnetic Character of Day (0-2), and Temperature in Magnet House. Rows include Day 1-28 and Mean values.

For explanation see page 176. Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 323-334.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

277. ESKDALEMUIR. (H.)

16,000 γ (•16 C.G.S.unit) +

MARCH, 1933.

Table with 25 columns (0-1 to 23-24) and 25 rows (Day 1 to Mean). Each cell contains a numerical value representing magnetic force measurements.

10.5 B 1933 031 01 BB140.
0.2

MAGNETIC DECLINATION (WEST).
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

278. ESKDALEMUIR. (D.)

14° +

MARCH, 1933.

Table with 25 columns (0-1 to 23-24) and 25 rows (Day 1 to Mean). Each cell contains a numerical value representing magnetic declination measurements.

Q denotes an "International Quiet Day", while D denotes a disturbed day, used for the computation of Tables 323-334.

033

TERRESTRIAL MAGNETIC FORCE: VERTICAL COMPONENT. Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time

279. ESKDALEMUIR. (V.)

44,000 γ (·44 C.G.S.unit) +

MARCH, 1933.

Table of terrestrial magnetic force data for ESKDALEMUIR (V.) in March 1933. Columns include Hour G. M. T., Day, and 24 hourly intervals (0-1 to 23-24) plus a Mean column. Values range from 882 to 911.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS: MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

280. ESKDALEMUIR.

MARCH, 1933.

Table of daily extremes of terrestrial magnetic elements and temperature for ESKDALEMUIR in March 1933. Columns include Day, Horizontal Force (Maximum, Minimum, Range), Declination (Maximum, Minimum, Range), Vertical Force (Maximum, Minimum, Range), Hr_V + Vr_Y (10,000 γ^2), Magnetic Character of Day (0-2), and Temperature in Magnet House (200 + °A).

§ For explanation see page 176 Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 323-334.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT. Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

281. ESKDALEMUIR.(H.)

16,000 γ (-16 C.G.S.unit) +

APRIL, 1933.

Table with 24 columns (0-1 to 23-24) and 31 rows (Day 1 to 30 D). Each cell contains a numerical value representing magnetic force. A 'Mean' row is at the bottom.

10.5 B 1933 041 01 BB140.

MAGNETIC DECLINATION (WEST). Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

282. ESKDALEMUIR.(D)

14° +

APRIL, 1933.

Table with 24 columns (0-1 to 23-24) and 31 rows (Day 1 to 30 D). Each cell contains a numerical value representing magnetic declination. A 'Mean' row is at the bottom.

Q denotes an "International Quiet Day", while D denotes a disturbed day, used for computation of tables 323-334.

043

TERRESTRIAL MAGNETIC FORCE: VERTICAL COMPONENT. Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

283. ESKDALEMUIR.(v.)

44,000 γ (·44 C.G.S.unit) +

APRIL, 1933.

Table with 24 columns (Hour G. M. T. to Mean) and 30 rows (Day 1 to Day 30 D). It contains magnetic force data for each hour of the day in April 1933.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS: MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

284. ESKDALEMUIR.

APRIL, 1933.

Table with 18 columns (Day, Horizontal Force, Declination, Vertical Force, HRM+VR, Magnetic Character of Day, Temperature in Magnet House) and 30 rows (Day 1 to Day 30 D). It shows daily extremes of magnetic elements and temperature.

§ For explanation see page 176. Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 323-334.

285. ESKDALEMUIR. (H.)

16,000 γ ($\cdot 16$ C.G.S. unit) +

MAY, 1933.

Table with 24 columns (0-1 to 23-24) and 25 rows (Hour G. M. T. to Mean). Data represents magnetic force values for various time intervals.

10.5
0.2 B 1933 051 01 BB140

MAGNETIC DECLINATION (WEST).

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

286. ESKDALEMUIR. (D.)

14° +

MAY, 1933.

Table with 24 columns (0-1 to 23-24) and 25 rows (Hour G. M. T. to Mean). Data represents magnetic declination values for various time intervals.

Q denotes an "International Quiet Day", while D denotes a disturbed day, used for computation of tables 323-334.

287. ESKDALEMUIR. (V.)

44,000 γ ($\cdot 44$ C.G.S. unit) +

MAY, 1933.

Table with 25 columns (Hour G. M. T. to Mean) and 31 rows (Day 1 D to 31 D). Data represents vertical magnetic force values in gamma units.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS.
MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

288. ESKDALEMUIR.

MAY, 1933.

Table with 16 columns (Day, Horizontal Force, Declination, Vertical Force, HRh+VR, Magnetic Character, Temperature) and 31 rows (Day 1 D to 31 D). Data includes magnetic extremes and temperature in magnet house.

§ For explanation see page 176. Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 323-334.

067

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

289. ESKDALEMUIR. (H.)

16,000 γ (*16 C.G.S. unit) +

JUNE, 1933.

Table with 26 columns (Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, Mean) and 31 rows (Day 1-30). Values range from 543 to 588.

10.5
0.2 B 1933 061 01 BB 140

MAGNETIC DECLINATION (WEST).
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

290. ESKDALEMUIR. (D.)

14° +

JUNE, 1933.

Table with 26 columns (Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, Mean) and 31 rows (Day 1-30). Values range from 7.7 to 13.5.

Q denotes an "International Quiet Day", while D denotes a disturbed day, used for the computation of Tables 323-334.

291. ESKDALEMUIR. (V.)

44,000 γ (·44 C.G.S. unit) +

JUNE, 1933.

Table with 25 columns (Hour G. M. T., 0-1 to 23-24, Mean) and 30 rows (Day 1-30). Each cell contains a numerical value representing magnetic force.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS: MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

292. ESKDALEMUIR.

JUNE, 1933.

Table with 15 columns (Day, Horizontal Force, Declination, Vertical Force, HRH+VR, Magnetic Character of Day, Temperature in Magnet House) and 30 rows (Day 1-30). Each cell contains numerical data for magnetic elements and temperature.

For explanation see page 176. Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 323-334.

072

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

293. ESKDALEMUIR. (H.)

16,000 γ (+16 C.G.S. unit) +

JULY, 1933.

Table with 24 columns (0-1 to 23-24) and 25 rows (Day 1 to Mean). Contains magnetic force data for ESKDALEMUIR (H.) in 1933.

071

BB 140.

MAGNETIC DECLINATION (WEST).

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

294. ESKDALEMUIR. (D.)

14° +

JULY, 1933.

Table with 24 columns (0-1 to 23-24) and 25 rows (Day 1 to Mean). Contains magnetic declination data for ESKDALEMUIR (D.) in 1933.

Q denotes an "International Quiet Day", while D denotes a disturbed day, used for computation of tables 323-334.

295. ESKDALEMUIR. (V.)

44,000 γ (.44 C.G.S. unit) +

JULY, 1933.

Table with 24 columns (0-1 to 23-24) and 25 rows (Day 1 to Mean). Each cell contains a numerical value representing magnetic force.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS:
MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

296. ESKDALEMUIR.

JULY, 1933.

Table with 13 columns: Day, Horizontal Force (Maximum, Minimum, Range), Declination (Maximum, Minimum, Range), Vertical Force (Maximum, Minimum, Range), HR_H+VR_S 10,000 γ^2 , Magnetic Character of Day (0-2), and Temperature in Magnet House (200+). Rows include days 1-31 and a Mean row.

§ For explanation see page 176. Q denotes an "International Quiet Day", while D denotes a disturbed day for the computation of Tables 323-334.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

297. ESKDALEMUIR. (H.)

16,000γ (+16 C.G.S.unit) +

AUGUST, 1935.

Table with 25 columns (0-1 to 23-24) and 25 rows (Day 1 Q to Mean). Values range from 544 to 609.

081

BB140.

MAGNETIC DECLINATION (WEST).
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

298. ESKDALEMUIR. (D.)

14° +

AUGUST, 1935.

Table with 25 columns (0-1 to 23-24) and 25 rows (Day 1 Q to Mean). Values range from 7.0 to 13.9.

Q denotes an "International Quiet Day", while D denotes a disturbed day, used for computation of tables 323-334.

083

TERRESTRIAL MAGNETIC FORCE: VERTICAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

299. ESKDALEMUIR. (V.)

44,000γ (.44 C.G.S. unit) +

AUGUST, 1933.

Table with 24 columns (Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, Mean) and 31 rows (Day 1 Q to 31 Q). Data represents vertical magnetic force measurements.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS;
MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

300. ESKDALEMUIR.

AUGUST, 1933.

Table with 11 main columns: Day, Horizontal Force (Maximum, Minimum, Range), Declination (Maximum, Minimum, Range), Vertical Force (Maximum, Minimum, Range), RRH + VRV (10,000γ), Magnetic Character of Day (0-2), Temperature in Magnet House (200 +). Data includes daily extremes for August 1933.

§ For explanation see page 176. Q denotes an "International Quiet Day", while D denotes a disturbed day for the computation of Tables 323-334.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

301. ESKDALEMUIR. (H.)

16,000 γ (+16 C.G.S.unit) +

SEPTEMBER, 1933.

Table with 23 columns (0-1 to 23-24) and 24 rows (Day 1 to Mean). Contains magnetic force data for ESKDALEMUIR (H.) in 1933.

091

BB.140

MAGNETIC DECLINATION (WEST).

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

302. ESKDALEMUIR. (D.)

14° +

SEPTEMBER, 1933.

Table with 23 columns (0-1 to 23-24) and 24 rows (Day 1 to Mean). Contains magnetic declination data for ESKDALEMUIR (D.) in 1933.

Q denotes an International Quiet Day, while D denotes a disturbed day used for the computation of Tables 323-334.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

305. ESKDALEMUIR. (H.)

16,000 γ (*16 C.G.S.unit) +

OCTOBER, 1933.

Table with 24 columns (0-1 to 23-24) and 31 rows (Day 1 Q to 31). Each cell contains a numerical value representing magnetic force. A 'Mean' row is at the bottom.

MAGNETIC DECLINATION (WEST).
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time

306. ESKDALEMUIR. (D.)

14° +

OCTOBER, 1933.

Table with 24 columns (0-1 to 23-24) and 31 rows (Day 1 Q to 31). Each cell contains a numerical value representing magnetic declination. A 'Mean' row is at the bottom.

Q denotes an "International Quiet Day", while D denotes a disturbed day, used for computation of tables 323-334.

307. ESKDALEMUIR. (V.)

44,000 γ (*44 C.G.S. unit) +

OCTOBER, 1933.

Table with 25 columns (Hour G. M. T., 0-1 to 23-24, Mean) and 31 rows (Day 1 Q to 31). Data represents magnetic force values in γ.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS.
MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

308. ESKDALEMUIR.

OCTOBER, 1933.

Table with 13 columns (Day, Horizontal Force, Declination, Vertical Force, HRH+VRV, Magnetic Character, Temperature) and 31 rows (Day 1 Q to 31). Data includes magnetic extremes and temperature.

§ For explanation see p.176.

Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 323-334.

TERRESTRIAL MAGNETIC FORCE: HORIZONTAL COMPONENT. Mean values for the periods of sixty minutes ending at the hours of Greenwich Mean Time.

309. ESKDALEMUIR. (H.)

16,000 γ (·16 C.G.S. unit) +

NOVEMBER, 1933.

Table with 26 columns (Hour G. M. T., 0-1 to 23-24, Mean) and 31 rows (Day 1-5, 6 D, 7 D, 8 D, 9, 10, 11 D, 12, 13, 14 Q, 15 Q, 16, 17 Q, 18, 19, 20, 21, 22, 23, 24 Q, 25, 26 Q, 27 D, 28, 29, 30, Mean). Values range from 544 to 559.

111

BB 140

MAGNETIC DECLINATION (WEST). Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

310. ESKDALEMUIR. (D.)

14° +

NOVEMBER, 1933.

Table with 26 columns (Hour G. M. T., 0-1 to 23-24, Mean) and 31 rows (Day 1-5, 6 D, 7 D, 8 D, 9, 10, 11 D, 12, 13, 14 Q, 15 Q, 16, 17 Q, 18, 19, 20, 21, 22, 23, 24 Q, 25, 26 Q, 27 D, 28, 29, 30, Mean). Values range from 6.0 to 10.6.

Q denotes an "International Quiet Day", while D denotes a disturbed day, used for the computation of Tables 323-334.

113

TERRESTRIAL MAGNETIC FORCE: VERTICAL COMPONENT. Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

287

311. ESKDALEMUIR. (V.)

44,000 γ (+44 C.G.S. unit) +

NOVEMBER, 1933.

Table with 25 columns (Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, Mean) and 30 rows (Day 1-30). Values range from 865 to 925.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS. MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

312. ESKDALEMUIR.

NOVEMBER, 1933.

Table with 18 columns (Day, Horizontal Force, Declination, Vertical Force, HR+VR, Magnetic Character of Day, Temperature in Magnet House) and 30 rows (Day 1-30). Includes sub-columns for Maximum, Minimum, and Range for each force component.

§ For explanation see page 176. Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 323-334.

313. ESKDALEMUIR. (H.)

16,000 γ (*16 C.G.S.unit) +

DECEMBER, 1933.

Table with 24 columns (0-1 to 23-24) and 32 rows (Day 1 Q to 31). Values range from 548 to 560.

560 at 0-lh. Jan. 1st. 1934.

121

BB140.

MAGNETIC DECLINATION (WEST).

Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

314. ESKDALEMUIR. (D.)

14° +

DECEMBER, 1933.

Table with 24 columns (0-1 to 23-24) and 32 rows (Day 1 Q to 31). Values range from 4.6 to 7.5.

6.3 at 0-lh. Jan. 1st. 1934.

Q denotes an "International Quiet Day", while D denotes a disturbed day, used for the computation of Tables 323-334.

123-

TERRESTRIAL MAGNETIC FORCE: VERTICAL COMPONENT.
Mean values for periods of sixty minutes ending at the hours of Greenwich Mean Time.

315. ESKDALEMUIR. (V.)

44,000 γ (+44 C.G.S. unit) +

DECEMBER, 1933.

Table with 25 columns (Hour G. M. T., 0-1 to 23-24, Mean) and 31 rows (Day 1 Q to 31). Contains numerical data for magnetic force components.

894 at 0-lh. Jan. 1st. 1934.

DAILY EXTREMES OF TERRESTRIAL MAGNETIC ELEMENTS:
MAGNETIC CHARACTER FIGURES: TEMPERATURE IN MAGNET HOUSE.

316. ESKDALEMUIR.

DECEMBER, 1933.

Table with 19 columns (Day, Horizontal Force, Declination, Vertical Force, HRH+VRv, Magnetic Character, Temperature) and 31 rows (Day 1 Q to 31). Contains data for magnetic extremes and temperature.

§ For explanation see page 173. Q denotes an "International Quiet Day", while D denotes a disturbed day used for the computation of Tables 323-334.

DIURNAL INEQUALITIES OF THE GEOGRAPHICAL COMPONENTS OF MAGNETIC FORCE. INTERNATIONAL QUIET DAYS.

Departures from mean of the day adjusted for non-cyclic change.

Table 323: NORTH COMPONENT. (QUIET DAYS) 1933. Columns: Hour (0-1 to 23-24), G.M.T. (1-2 to 23-24), MONTH AND SEASON, and 24 columns of departure values for each hour.

Table 324: WEST COMPONENT. (QUIET DAYS) 1933. Columns: MONTH AND SEASON, and 24 columns of departure values for each hour.

Table 325: VERTICAL COMPONENT. (QUIET DAYS) 1933. Columns: MONTH AND SEASON, and 24 columns of departure values for each hour.

RANGE OF MEAN DIURNAL INEQUALITIES FOR THE MONTHS, YEAR AND SEASONS OF 1933. NOTE. -The ranges are those shown in Tables 317 to 334, in the preparation of which the non-cyclic change has been eliminated †.

335. ESKDALEMUIR.

1933.

Table with columns for Month and Season, and sub-columns for All Days, Quiet Days, and Disturbed Days, each further divided into N, W, and V components.

NON-CYCLIC CHANGE †.

MEAN VALUES OF HRH + VRV*

(Unit 10,000γ²)

336. ESKDALEMUIR.

1933.

337. ESKDALEMUIR.

1933.

Table for 336 and 337 showing Mean Monthly and Annual Values of HRH, VRV, and Sum, along with Mean Character Figures.

† See page 21. * See page 176.

MEAN MONTHLY AND ANNUAL VALUES OF TERRESTRIAL MAGNETIC ELEMENTS. (All days except those noted in monthly tables.)

338. ESKDALEMUIR.

1933. Errata 1964

Table showing Mean Monthly and Annual Values of Terrestrial Magnetic Elements: North, West, Vertical, Total, Declination, Inclination, and Horizontal Force.

Table with columns for Latitude, Longitude, and magnetic elements (Declination, Inclination, Horizontal Force, Vertical Force) for years 1933, 1932, and 1931. Rows list various observatories such as Sodankylä, Lerwick, Lovö, Sitka, etc.

Notes. - *Results derived from absolute observations only.-

† A local anomaly is known to exist at the site of the observatory.-

Abinger. - The values of Inclination and Vertical Force depend upon direct measurement of the vertical component of the earth's field with a coil-magnetometer.
Swordlovska Observations were discontinued at the end of 1931.
Seddin Observations were discontinued at the end of 1931.
Swordlovska. - The mean values for 1930 and 1931 are derived from continuous records at Wyssokaya Doubrawa and absolute observations at Swordlovska.

M.O. 370
(Cahirciveen)

Air Ministry
METEOROLOGICAL OFFICE

THE
OBSERVATORIES' YEAR BOOK
1933

Comprising the meteorological and geophysical results obtained from autographic records and eye observations at the observatories at Lerwick, Aberdeen, Eskdalemuir, Cahirciveen (Valentia Observatory), and Richmond (Kew Observatory), and the results of soundings of the upper atmosphere by means of registering balloons.

CAHIRCIVEEN (VALENTIA OBSERVATORY)

Published by the authority of the
METEOROLOGICAL COMMITTEE



LONDON
HIS MAJESTY'S STATIONERY OFFICE

1935

CAHIRCIVEEN (VALENTIA OBSERVATORY).

| | | | | |
|-----------------------------|----|----|----|------------|
| Latitude | .. | .. | .. | 51° 56' N. |
| Longitude | .. | .. | .. | 10° 15' W. |
| G.M.T. of Local Mean Noon.. | | | | 12h 41m. |

"Heights in metres above Sea Level."

| | | | | |
|-------------------------|----|----|----|------|
| Barometer | .. | .. | .. | 13.7 |
| Rain-gauge | .. | .. | .. | 9.1 |
| Robinson Cup Anemograph | .. | | | 26 |
| Dines Tube Anemograph | .. | | | 30 |

"Heights in metres above Ground".

| | | | | |
|-------------------------|----|----|--|------|
| Thermometer Bulbs | .. | .. | | 1.3 |
| Sunshine Recorder | .. | .. | | 12.8 |
| Robinson Cup Anemograph | .. | | | 14 |
| Dines Tube Anemograph | .. | | | 13 |
| Beckley Rain-gauge Rim | .. | | | 0.5 |

INTRODUCTION.

SITE.

Valentia Observatory derives its name from the fact that it was originally established on Valentia Island in 1867. It was removed to the mainland in March, 1892, and now lies in a direct line between the old site on Valentia Island and the town of Cahirciveen, about $2\frac{1}{2}$ miles (4 km.) north-east from the former, and three-quarters of a mile (1 km.) south-west of the latter. It is quite remote from any other buildings. The general character of the country surrounding the Observatory is hilly. The eastern bank of the Cahir river is about 150 metres to the westward, and in that direction there is no very high ground between the Observatory and the open sea, some $3\frac{1}{2}$ miles (6 km.) away. To the north-west, however, are hills varying in height from 400 (120 m.) to 900 feet (275 m.), the highest being less than 3 miles (5 km.) distant. These are only separated by a narrow gully running in a N N W direction from other hills equally high, which stretch away to the northward: the nearest of these is but little more than a mile ($1\frac{1}{2}$ km.) from the Observatory. Beyond the town of Cahirciveen to the north-east the river opens out considerably, and the country in this direction becomes an open boggy basin, rising by only a gentle gradient. Southward of this, however, it soon rises again, and at about a mile south-east of the Observatory it culminates in the hill Benteo upwards of 1,245 feet (380 m.) in height. Still further south it opens out once more to a distance of nearly 5 miles

(8 km.) from the Observatory, where there is a range of hills running east and west, and varying in height from 400 (120 m.) to 1,300 feet (400 m.). To the south-west there is an opening to the sea, between Valentia Island and the mainland; and the circle of hills is completed by those on the island itself, the highest of which is about 800 feet (240 m.) high, and bears about west-south-west from the Observatory. Photographs of the Observatory building, together with a site plan, showing the disposition of the various instruments were reproduced in the introduction to the 1928 volume.

METEOROLOGY.

The elements dealt with in the following tables are: atmospheric pressure, air temperature, humidity, rainfall, sunshine, wind speed and direction, earth temperature, minimum temperature on the grass, together with a diary of cloud, visibility and weather.

"Pressure and Temperature".-The photographic barograph and thermograph are installed in a room on the ground floor of the Observatory tower. The standard Fortin barometer, from which the control readings at 9h. 15h. and 21h. are taken, is mounted in the same room beside a window which faces the north-east. The stems of the dry and wet bulb thermometers pass out into the screen placed against the north wall of the tower. Close to the bulbs of these thermometers are the bulbs of the standard thermometers from which the control readings at 9h. 15h. and 21h. are taken.

"Rainfall."-The Beckley rain-gauge and the 8-inch (20.3 cm.) check gauge are placed in a railed-off enclosure about 40 metres to the north of the tower.

"Sunshine".-The recorder is cemented to a wooden rail on the roof of the tower. The exposure of the sunshine recorder is such that there is no appreciable loss of record due to obstructions in the months of May, June, July, and August. During the remainder of the year the hill Bentee lying to the south-east cuts off early morning sunshine. The reduction in possible record, assuming that the recorder becomes sensitive to sunshine only when the sun is at an altitude of more than three degrees, is shown in the following table for the 1st and 15th of each month:-

| Reduction in Possible Record in Tenths of an Hour. | | | | | | | | |
|--|------|------|------|------|-------|------|------|------|
| Month. | Jan. | Feb. | Mar. | Apr. | Sept. | Oct. | Nov. | Dec. |
| | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. |
| 1st. | .5 | .5 | .7 | .5 | .3 | .7 | .5 | .6 |
| 15th | .6 | .5 | .7 | .3 | .5 | .7 | .5 | .5 |

"Wind, Speed and Direction".-Up to 1925 measurements of wind speed and direction as given in tables 413-424, were obtained from the Robinson cup anemograph on the roof of the Observatory tower. From 1926 to 1931 measurements of wind speed and direction refer to records from an old pattern Dines tube anemograph. A comparison between the mean velocities as recorded by

this tube anemograph and the cup anemograph is given in the General Introduction. A new Dines tube anemograph with 1 -inch connecting pipes, was brought into use as from January 1st 1932. The new instrument was erected alongside the old instrument with its head at the same height: a comparison extending over the period May, 1931, to January, 1932, showed that the new instrument recorded higher velocities than the old. In hourly mean values the difference was nearly uniform and equal to .4 m/s or 1 mi/hr. In great velocities the increase was approximately 12 per cent of the velocity recorded by the old instrument.

The site of the pressure tube anemograph is in an open field, about 250 metres S E by E of the Observatory tower. About 1 mile ($1\frac{1}{2}$ km.) to the south-east is the highest point (1,245 feet) of the hill Bente which extends for some little distance in a northerly and south-westerly direction. A description of the surrounding country has already been given.

In a few instances where records of the Dines tube anemograph have been defective, the required values have been obtained from the records of the cup anemograph, a suitable adjustment of such values having been made in accordance with the table in the General Introduction showing the effect of exposure on the two instruments, Values thus obtained are entered as interpolated values.

"Earth Temperature".-The thermometers are at depths of 30 cm. and 122 cm. below the grass covered surface of the ground. The site is well exposed. The thermometers are of the standard type described in the "Meteorological Observers' Handbook."

"Minimum Temperature on the Grass".-The grass minimum thermometer is of the type described in the General Introduction. It is exposed over short grass in the field enclosure. It is set at 18h and read at 7h on the succeeding day, the observation being entered to the day of reading.

"Visibility".-Lists of the objects used for visibility observations and their distances and bearings from the point of observations are given in the following tables.

LANDWARDS VISIBILITY OBJECTS AT VALENTIA OBSERVATORY.

| Indication letter of object. | Standard distance of object. | Actual distance of object | Bearing of object in degrees from N. | Description of object. |
|------------------------------|------------------------------|---------------------------|--------------------------------------|--|
| A | Metres. 25 | Metres. 25 | 350° | Gate near workshop. |
| B | 50 | 50 | 345° | White post in fence of instrument enclosure. |
| C | 100 | 100 | 125° | Hedge at S. end of vegetable garden. |
| D | 200 | 200 | 330° | Notice board on beach. |
| E | 500 | 475 | 100° | Bungalow. |

LANDWARDS VISIBILITY OBJECTS AT VALENTIA OBSERVATORY (Cpntd.)

| Indication letter of object. | Standard distance of object. | Actual distance of object. | Bearing of object in degrees from N. | Description of object. |
|------------------------------|------------------------------|----------------------------|--------------------------------------|--|
| F | Metres. 1,000 | Metres. 1,100 | 50° | Parsonage. |
| G | 2,000 | 1,910 | 55° | Wireless school |
| Intermediate object. | - | 3,500 | 20° | Top of Castlequin Mountain |
| h | 4,000 | - | - | No object available. (Top of Castlequin well visible.) |
| I | 7,000 | 7,600 | 40° | Top of Knocknadober Mountain |
| J | 10,000 | 10,000 | 220° | Kilkeaveragh Mountain. |
| Intermediate object | - | 17,000 | 55° | Drung Hill. |
| k | 20,000 | - | - | No object available. (Drung Hill well visible). |
| l | 30,000 | - | - | No object available. |
| m | 50,000 | - | - | No object available. |

SEAWARDS VISIBILITY OBJECTS AT VALENTIA OBSERVATORY.

| | | | | |
|---------------------|--------|--------|------|--|
| F | 1,000 | 1,000 | 235° | Farmhouse on skyline. |
| G | 2,000 | 2,200 | 265° | Laght Point. |
| H | 4,000 | 3,760 | 280° | Black Rock. |
| I | 7,000 | 6,500 | 250° | Ridge between two hills on Valentia. |
| J | 10,000 | 10,000 | 220° | Kilkeaveragh mountain. |
| k | 20,000 | - | - | No object available. |
| Intermediate object | - | 23,500 | 320° | Mount Eagle. |
| | - | 25,500 | 325° | Croaghmarhin Mountain. |
| l | 30,000 | - | - | No object available. (Croaghmarhin well visible.) |
| m | 50,000 | - | - | No object available. (Croaghmarhin exceptionally visible.) |

Two observations, one in a landwards direction, the other in a seawards direction, are made at each hour of observations. The position of the Observatory is such that a distinction between visibility landwards and seawards cannot be made when the range of visibility is less than 1,000 yards. Objects corresponding with the letters A to E have therefore been included in the table of landwards objects only. Kilkeaveragh Mountain is used as both a landwards and seawards object corresponding with J.

Entries of "l" and "m" for visibility in a landwards direction are made:-

(a) When Croaghmarhin Mountain (see table of seawards objects) is clearly visible and there is reason to believe that the range of visibility in a landwards direction is as good as, or nearly as good as, visibility seawards.

(b) When Croaghmarhin Mountain is invisibly but there is reason to believe from the appearance of Drung Hill that the range of visibility landwards is greater than the range seawards and is sufficiently good to justify the entry made.

When the mountains used as objects at 3,500 metres and beyond are cloud capped the appropriate entries for the range of visibility are determined by the clearness or otherwise with which the lower parts of the mountains can be seen.

The Observatory is far removed from smoky industrial areas; the observations are therefore not much affected by smoke pollution of the atmosphere.

Notes on the Meteorological Summaries

"The Weather of 1933".-The year was notably dry with a slight deficiency in sunshine and a marked absence of high winds. February, September, October, November and December were all very dry and March exceptionally mild though excessive in rainfall.

"Pressure".-No change in the valves used for reducing pressure at station level to pressure at mean sea level was made at Valentia Observatory by the introduction in 1928 of the revised scheme as set out in the General Introduction.

Mean pressure for the year was 1.5 millibars above normal. Of the monthly mean pressures nine were higher and three were lower than normal. The departures ranged from an excess of ten millibars in December to a deficiency of five millibars in March.

Details of the Fourier analysis of the diurnal inequalities of pressure for the year are given in Table A, together with normal values referring to the period 1871-1915. The coefficients are given to the nearest .001 mb. and the phase angles to the nearest 1° except for the third and fourth components in which case the values referring to the current year are taken to the nearest 5° only.

"Temperature".-Mean temperature for the year 1933 was 1.2°A (2.2°F.) above

normal. For the individual months, March, with an excess of 3.1°A (5.6°F.) showed the greatest departure.

The harmonic analysis of the monthly and seasonal diurnal inequalities of temperature is given in Table B, together with normal values referring to the period 1871-1915. The coefficients are given to the nearest $.001^{\circ}\text{A}$ and the phase angles to the nearest 1° except for the third and fourth components in which case the values referring to the current year are taken to the nearest 5° only.

"Rainfall".-The total rainfall for the year was 19 per cent. below normal, the actual deficit being 267 millimetres. The month with the highest rainfall was March, with 167 millimetres, this amount being 45 per cent more than normal. The lowest monthly total was that for February, the 56 millimetres which fell during that month being 42 per cent. of the normal amount.

"Bright Sunshine".-The total amount of bright sunshine for the year 1933 was about 2 per cent. less than the normal. Generally, the winter months had more than average sunshine, the greatest excess being about 62 per cent. for December. The most notable deficiency was for June, the total sunshine for this month being 26 per cent below normal.

"Cloud and Weather".-The mean amount of cloud at all observation hours was 7.0 . The most cloudy month was June with mean cloud amount of 7.9 . The month with least cloud was September with a mean of 5.0 .

"Visibility".-The observations of visibility in tables 429-440 refer to visibility in a landwards direction. The observations, when the range of visibility seawards differs from the range landwards, are shown in the following table:-

| Date | Hour | Visibility Landwards | Visibility Seawards |
|--------|------|----------------------|---------------------|
| Jan. 1 | 18 | I | J |
| " 5 | 13 | J | l |
| Feb. 1 | 9 | k | J |
| " 6 | 13 | J | I |
| " 7 | 15 | J | k |
| " 8 | 9 | J | k |
| " 25 | 9 | J | k |
| Mar. 6 | 18 | J | k |
| " 10 | 21 | J | k |
| " 28 | 7 | k | J |
| " 30 | 7 | J | l |
| Apr. 1 | 9 | J | k |
| " 6 | 9 | k | I |
| May 2 | 7 | h | I |
| " 2 | 13 | I | J |
| " 2 | 15 | I | J |
| " 3 | 13 | h | I |
| " 3 | 15 | J | k |
| " 15 | 13 | J | k |
| " 16 | 13 | J | k |
| " 17 | 9 | J | k |
| June 7 | 18 | k | l |

| Date | Hour | Visibility Landwards | Visibility Seawards |
|----------|------|----------------------|---------------------|
| June 11 | 18 | J | H |
| " 22 | 9 | J | I |
| " 22 | 13 | I | J |
| " 22 | 18 | J | k |
| July 11 | 9 | J | k |
| " 17 | 7 | h | I |
| " 17 | 13 | J | I |
| " 17 | 15 | I | J |
| " 22 | 13 | J | H |
| " 24 | 18 | k | J |
| " 25 | 18 | k | J |
| " 29 | 13 | J | k |
| Aug. 1 | 7 | k | J |
| " 22 | 15 | J | k |
| Sept. 12 | 18 | J | k |
| Oct. 18 | 13 | I | J |
| " 20 | 7 | J | k |
| " 20 | 13 | J | k |
| Nov. 2 | 21 | J | l |
| " 8 | 15 | k | l |

IDENTIFICATION NUMBERS OF INSTRUMENTS IN USE 1933

| | | | |
|-----------------------------------|------|----------|---|
| Standard Fortin Barometer | M.O. | 463 | |
| Standard Dry Bulb Thermometer | M.O. | 1701 | Corrections Nil. (255°-266°+ .2 (267°-268°+ .1° |
| Standard Wet Bulb Thermometer | M.O. | 1702 | Corrections (269°-272° Nil. (273° and above, --1° |
| Recording Beckley Rain-gauge | | | |
| Control Rain-gauge | M.O. | 402 | |
| Glass for Control Rain-gauge | M.O. | 1572 | |
| Campbell Stokes Sunshine Recorder | M.O. | 5 | |
| Robinson Cup Anemograph | Beck | 46 | |
| Dines Tube Anemograph | | | (2.0°F. - .3°F. (12.0°F. - .2°F. |
| Grass Minimum Thermometer | M.O. | 18136/29 | Corrections (32.0°F. Nil. (52.0°F. Nil. (72.0°F. Nil. |
| Earth Thermometer 1 ft. | M.O. | 9 | Corrections (260°A. + .1° (280°A and above, Nil. (273° A Nil. |
| Earth Thermometer 4 ft. | M.O. | 24005 | Corrections (278°A - .1°A. (283°A and above, Nil. |

All thermometer corrections are applied before tabulation.

TABLE A.

"Diurnal Variation of Barometric Pressure Fourier Coefficients."

Cahirciveen (Valentia Observatory), Longitude 10° 15' W.

Values of c_n, x_n in the series $\sum c_n \sin (15nt + x_n)$, t being Local Mean Time reckoned in hours from midnight.

| Month or Season | c_1 | | x_1 | | c_2 | | x_2 | | c_3 | | x_3 | | c_4 | | x_4 | |
|-----------------|----------|-----------|-------|-----------|----------|-----------|-------|-----------|----------|-----------|-------|-----------|----------|-----------|-------|-----------|
| | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 |
| January .. . | mb. .297 | mb. .098 | ° 354 | ° 174 | mb. .344 | mb. .319 | ° 157 | ° 153 | mb. .176 | mb. .157 | ° 360 | ° 351 | mb. .072 | mb. .071 | ° 195 | ° 207 |
| February .. . | .361 | .122 | 231 | 203 | .384 | .344 | 142 | 148 | .073 | .119 | 360 | 343 | .029 | .043 | 85 | 95 |
| March .. . | .411 | .114 | 71 | 149 | .335 | .352 | 145 | 149 | .034 | .048 | 235 | 340 | .039 | .038 | 345 | 51 |
| April .. . | .067 | .098 | 46 | 191 | .299 | .310 | 145 | 149 | .012 | .032 | 160 | 181 | .036 | .035 | 45 | 15 |
| May .. . | .204 | .172 | 167 | 178 | .266 | .277 | 150 | 147 | .042 | .074 | 130 | 166 | .025 | .014 | 350 | 350 |
| June .. . | .186 | .192 | 120 | 200 | .216 | .255 | 155 | 146 | .068 | .075 | 160 | 160 | .011 | .002 | 75 | 11 |
| July .. . | .199 | .242 | 179 | 183 | .266 | .251 | 137 | 143 | .111 | .079 | 140 | 163 | .022 | .013 | 105 | 16 |
| August .. . | .249 | .237 | 249 | 190 | .321 | .281 | 143 | 145 | .056 | .052 | 160 | 161 | .017 | .034 | 330 | 350 |
| September.. . | .119 | .195 | 25 | 203 | .396 | .346 | 156 | 153 | .013 | .005 | 190 | 49 | .057 | .044 | 360 | 10 |
| October .. . | .225 | .194 | 150 | 199 | .378 | .335 | 163 | 161 | .061 | .073 | 345 | 1 | .030 | .013 | 80 | 69 |
| November .. . | .162 | .071 | 99 | 179 | .333 | .347 | 168 | 161 | .126 | .133 | 360 | 5 | .041 | .035 | 190 | 167 |
| December .. . | .247 | .167 | 136 | 186 | .338 | .311 | 156 | 160 | .162 | .162 | 15 | 357 | .063 | .075 | 210 | 196 |
| Arithmetic Mean | .227 | .159 | ... | ... | .323 | .311 | ... | ... | .078 | .084 | ... | ... | .037 | .035 | ... | ... |
| Year .. . | .073 | .150 | 135 | 189 | .319 | .307 | 152 | 151 | .029 | .034 | 25 | 3 | .002 | .004 | 105 | 83 |
| Winter .. . | .031 | .112 | 165 | 187 | .344 | .329 | 155 | 156 | .133 | .142 | 5 | 355 | .041 | .043 | 190 | 181 |
| Equinox .. . | .153 | .142 | 82 | 190 | .350 | .335 | 153 | 153 | .011 | .014 | 295 | 308 | .034 | .030 | 20 | 29 |
| Summer .. . | .146 | .209 | 183 | 188 | .266 | .266 | 146 | 145 | .068 | .070 | 150 | 163 | .010 | .015 | 25 | 355 |

TABLE B.

"Diurnal Variation of Temperature Fourier Coefficients."

Cahirciveen (Valentia Observatory), Longitude 10° 15' W.

Values of c_n, x_n in the series $\sum c_n \sin(15nt + xn)$, t being Local Mean Time reckoned in hours

from midnight.

| Month or Season | c_1 | | x_1 | | c_2 | | x_2 | | c_3 | | x_3 | | c_4 | | x_4 | |
|-----------------|-------------|-------------|------------|------------|-------------|-------------|------------|------------|-------------|-------------|------------|------------|-------------|-------------|------------|------------|
| | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 | 1933 | 1871-1915 |
| | $^{\circ}A$ | $^{\circ}A$ | $^{\circ}$ | $^{\circ}$ | $^{\circ}A$ | $^{\circ}A$ | $^{\circ}$ | $^{\circ}$ | $^{\circ}A$ | $^{\circ}A$ | $^{\circ}$ | $^{\circ}$ | $^{\circ}A$ | $^{\circ}A$ | $^{\circ}$ | $^{\circ}$ |
| January | .764 | .496 | 234 | 239 | .292 | .269 | 44 | 52 | .113 | .114 | 190 | 226 | .025 | .025 | 45 | 43 |
| February | .997 | .820 | 224 | 235 | .385 | .377 | 34 | 53 | .147 | .085 | 235 | 231 | .065 | .032 | 205 | 203 |
| March | 1.254 | 1.351 | 239 | 234 | .387 | .420 | 47 | 59 | .095 | .036 | 305 | 335 | .068 | .091 | 235 | 215 |
| April | 1.611 | 1.806 | 250 | 239 | .277 | .369 | 82 | 70 | .133 | .143 | 40 | 43 | .101 | .063 | 260 | 240 |
| May | 1.569 | 2.126 | 246 | 241 | .201 | .194 | 102 | 99 | .133 | .246 | 65 | 57 | .089 | .031 | 345 | 315 |
| June | 1.462 | 2.072 | 246 | 242 | .100 | .117 | 153 | 91 | .108 | .206 | 70 | 60 | .059 | .022 | 355 | 15 |
| July | 1.677 | 1.873 | 243 | 242 | .131 | .163 | 98 | 68 | .171 | .197 | 75 | 55 | .060 | .003 | 120 | 23 |
| August | 1.843 | 1.780 | 243 | 242 | .322 | .304 | 78 | 67 | .163 | .168 | 35 | 48 | .041 | .032 | 310 | 250 |
| September | 2.224 | 1.607 | 236 | 241 | .441 | .468 | 76 | 69 | .100 | .071 | 35 | 23 | .092 | .102 | 215 | 233 |
| October | .947 | 1.131 | 235 | 241 | .421 | .424 | 71 | 67 | .125 | .076 | 300 | 278 | .103 | .071 | 225 | 239 |
| November | .819 | .716 | 235 | 239 | .391 | .354 | 55 | 63 | .174 | .120 | 235 | 253 | .024 | .022 | 155 | 105 |
| December | .591 | .446 | 246 | 234 | .348 | .272 | 52 | 57 | .113 | .103 | 210 | 240 | .066 | .032 | 20 | 60 |
| Arithmetic Mean | 1.313 | 1.352 | ... | ... | .308 | .311 | ... | ... | .131 | .130 | ... | ... | .066 | .044 | ... | ... |
| Year | 1.305 | 1.348 | 240 | 240 | .283 | .325 | 65 | 66 | .019 | .037 | 30 | 42 | .029 | .044 | 275 | 231 |
| Winter | .781 | .819 | 233 | 237 | .349 | .317 | 46 | 56 | .128 | .104 | 220 | 238 | .006 | .014 | 80 | 86 |
| Equinox | 1.494 | 1.472 | 240 | 239 | .372 | .419 | 69 | 66 | .077 | .054 | 350 | 9 | .087 | .081 | 235 | 228 |
| Summer | 1.639 | 1.963 | 244 | 242 | .173 | .191 | 96 | 78 | .137 | .203 | 60 | 56 | .059 | .013 | 335 | 306 |

NOTE.—The seasonal means are derived from the following grouping of months:—"Winter": January, February, November and December; "Equinox": March, April, September and October; "Summer": May to August inclusive.

TERRESTRIAL MAGNETISM.

Notes on the Magnetic Observations for the year 1933.

Absolute observations of declination, horizontal force and inclination were made weekly at Valentia Observatory during the year 1933. The instruments in use were Dover unifilar, No. 139, with collimator magnet 139A and mirror magnet 139C, and Dover dip circle, No. 118. These instruments are the same as in previous years except that Dover dip circle, No. 239 was used from May 1930 to October 1931. The mean times of observations were 10.22 for declination, 11.41 for horizontal force and 14.30 for inclination, all according to Greenwich Mean Time. In the individual observations the greatest departure from the mean time in any element was 4 minutes. The deflection of the mirror magnet was measured for two distances of the collimator magnet, namely, 30 cm. and 40 cm. The complete deflection observation consisted of eight readings of the mirror magnet. The distribution constant, P , used for 1933 was computed from the mean deflections for 30 cm. and 40 cm. for the seven years 1926-1932 inclusive. The mean P so obtained was 7.67. The moment of the collimator magnet has decreased at the rate of about 1 unit per annum.

The values of declination, horizontal force and inclination obtained in the absolute observations are given in detail in Table C, but in Table D the

mean monthly values are computed only from such of these absolute observations as were taken at times subsequently found, by reference to the Eskdalemuir magnetograph curves, to be free from serious disturbance. Observations in Table C taken at disturbed times, and not, therefore, utilised for mean values in Table D, are marked with an asterisk. The north, west and vertical components and the total force for each month and the year are computed from the corresponding mean values of the observed elements.

Westerly declination has diminished by $10\cdot9$ as compared with 1932. From 1931 to 1932 the decrease was $11\cdot4$ and in the previous 12 months $10\cdot8$. The average annual decrease for five year periods since 1910 is as follows:-

| | | | | |
|---------|---------|---------|---------|---------|
| 1910-15 | 1915-20 | 1920-25 | 1925-30 | 1928-33 |
| 8'2 | 9'2 | 11'1 | 11'0 | 10'7 |

The rate of the eastward movement of the magnetic needle increased slowly up to about 1927, but is now apparently decreasing again.

Northerly inclination decreased $0\cdot1$ from 1932 to 1933. Changes during the past few years have been irregular but, on the whole, it appears that inclination is diminishing at a slow rate.

Up to 1920 the mean annual values of horizontal force had shown a steady decline from year to year. In the years 1921 to 1924, 1927, 1931 and in 1933 the change was in the opposite direction, each year having a mean value higher than that of the preceding year.

The amount of annual change is shown in the following table:-

| Period. | Annual Change. |
|---------|-----------------------------------|
| 1910-15 | 5 γ decrease (mean value). |
| 1915-20 | 6 γ " (mean value). |
| 1920-21 | 8 γ increase. |
| 1921-22 | 1 γ " |
| 1922-23 | 3 γ " |
| 1923-24 | 2 γ " |
| 1924-25 | 5 γ decrease. |
| 1925-26 | 14 γ " |
| 1926-27 | 2 γ increase. |
| 1927-28 | 11 γ decrease. |
| 1928-29 | 5 γ " |
| 1929-30 | 8 γ " |
| 1930-31 | 2 γ increase. |
| 1931-32 | 6 γ decrease. |
| 1932-33 | 2 γ increase. |

The reversal of the annual change in horizontal force in certain years was not accompanied by a corresponding reversal in total force. The average annual decrease in total force for five year periods since 1910 is as follows:

| | | | | |
|-------------|-------------|-------------|-------------|-------------|
| 1910-15 | 1915-20 | 1920-25 | 1925-30 | 1928-33 |
| 49 γ | 33 γ | 32 γ | 20 γ | 18 γ |

The total force has continued to decrease, but at a rate which is apparently diminishing gradually. The individual changes from year to year as shown in Table D are somewhat irregular, but this may be due in considerable measure to instrumental uncertainties. The total force is computed from the horizontal force and the inclination, using the formula $T = H \sec. I$, so that

an error of 0.1 in I would give an error approximately 4γ in T at Valentia. In addition, it is to be remembered that the secular change data for Valentia are obtained from absolute observations made at fixed hours at any of which the value obtained for an element may differ, by an amount which is not necessarily constant, from its true mean value for the day of observation. It is by no means improbable that owing to this and errors of observation, uncertainties to the extent of several tenths of a minute of arc may be introduced into the mean value of I for the year. For the average change over a series of years these possible errors are naturally much diminished and the average fall of 33γ per annum in the total force obtained from the values in Table D is probably a close approximation to the true change. This continued decrease in the total force indicates that the rise in the value of the horizontal force observed in certain years was not a true increase in the magnetic field but merely a component increase arising from the fall in the inclination, which becomes proportionally more effective in the horizontal component as the actual inclination angle itself becomes smaller. The magnetic field in the Valentia district continues to become less year by year, therefore, although, without observations of inclination, the opposite would have appeared to be the case in some years.

TABLE C.

"Cahirciveen (Valentia Observatory). Absolute Magnetic Observations, 1933".

Latitude 51° 56' N. Longitude 10° 15' W.

| Date | Westerly Declination | | Horizontal Force | Northerly Inclination | | Date | Westerly Declination | | Horizontal Force | Northerly Inclination | |
|------------|----------------------|-------|------------------|-----------------------|-------|-------------|----------------------|-------|------------------|-----------------------|-------|
| | ° | ' | Y | ° | ' | | ° | ' | Y | ° | ' |
| January 6 | 17 | 4.1* | 17807* | 68 | 0.2* | July 7 | 16 | 54.1 | 17813 | 67 | 56.9 |
| " 13 | 17 | 0.2 | 17811 | 67 | 57.9 | " 14 | 16 | 51.9 | 17814 | 67 | 57.6 |
| " 20 | 16 | 59.8 | 17815 | 67 | 58.0 | " 21 | 16 | 53.7 | 17812 | 67 | 57.0 |
| " 27 | 16 | 59.8 | 17814 | 67 | 57.3 | " 28 | 16 | 52.8 | 17806 | 67 | 57.5 |
| February 3 | 17 | 0.0 | 17809 | 67 | 59.0 | August 4 | 16 | 52.8 | 17822 | 67 | 57.0 |
| " 10 | 16 | 58.6 | 17820 | 67 | 59.0 | " 11 | 16 | 51.1 | 17805 | 67 | 58.3 |
| " 17 | 16 | 57.5 | 17810 | 67 | 58.3 | " 18 | 16 | 53.8 | 17811 | 67 | 57.9 |
| " 24 | 16 | 58.5* | 17805* | 68 | 0.5* | " 25 | 16 | 54.8 | 17792 | 67 | 58.8 |
| March 3 | 16 | 57.9 | 17823 | 67 | 57.7 | September 1 | 16 | 54.8 | 17808 | 67 | 58.0 |
| " 10 | 16 | 57.0 | 17827 | 67 | 58.0 | " 8 | 16 | 54.8 | 17814 | 67 | 57.9 |
| " 17 | 16 | 56.0 | 17819 | 67 | 58.3 | " 15 | 16 | 55.3* | 17777* | 67 | 59.3* |
| " 24 | 16 | 58.8* | 17793* | 67 | 59.3* | " 22 | 16 | 55.6 | 17793 | 67 | 58.6 |
| " 31 | 16 | 57.0 | 17799 | 67 | 58.0 | " 29 | 16 | 52.3 | 17816 | 67 | 57.5 |
| April 7 | 16 | 56.3 | 17804 | 67 | 58.1 | October 6 | 16 | 53.0 | 17795 | 67 | 57.4 |
| " 13 | 16 | 55.1 | 17806 | 67 | 58.1 | " 13 | 16 | 49.1* | 17798* | 67 | 58.9 |
| " 21 | 16 | 55.0 | 17792 | 67 | 57.9 | " 20 | 16 | 52.8 | 17801 | 67 | 57.4 |
| " 28 | 16 | 54.8 | 17801 | 67 | 58.6 | " 27 | 16 | 49.3 | 17818 | 67 | 57.1 |
| May 5 | 16 | 56.4 | 17800 | 67 | 57.9 | November 3 | 16 | 50.9 | 17825 | 67 | 57.8 |
| " 12 | 16 | 55.1 | 17806 | 67 | 57.8 | " 10 | 16 | 51.0 | 17804 | 67 | 59.1 |
| " 19 | 16 | 55.2 | 17797 | 67 | 58.7 | " 17 | 16 | 50.8 | 17831 | 67 | 57.5 |
| " 26 | 16 | 53.7 | 17805 | 67 | 57.8 | " 24 | 16 | 51.0 | 17825 | 67 | 57.1 |
| June 2 | 16 | 56.0 | 17806 | 67 | 57.9 | December 1 | 16 | 50.2 | 17822 | 67 | 57.0 |
| " 8 | 16 | 55.9 | 17823 | 67 | 57.2 | " 8 | 16 | 51.4 | 17819 | 67 | 57.6 |
| " 16 | 16 | 53.6 | 17804 | 67 | 58.4 | " 15 | 16 | 50.7 | 17831 | 67 | 57.2 |
| " 23 | 16 | 53.3 | 17810 | 67 | 57.8 | " 22 | 16 | 50.1 | 17823 | 67 | 57.8 |
| " 30 | 16 | 52.0 | 17811 | 67 | 57.3 | " 29 | 16 | 49.5 | 17824 | 67 | 57.7 |

*Disturbance at these times. Values not utilised in computing means given in Table D.

TABLE D.

"Cahirciveen (Valentia Observatory.)"

Magnetic Data for the Year 1933.

| 1933 | Declination (West) | | Inclination (North) | | Horizon- tal Force | North | West | Vertical | Total |
|--------------|-----------------------|------|------------------------|------|-----------------------|-------|------|----------|--------|
| | ° | ' | ° | ' | γ | γ | γ | γ | γ |
| January .. | 16 | 59.9 | 67 | 57.7 | 17813 | 17033 | 5208 | 44006 | 47474 |
| February .. | 16 | 58.7 | 67 | 58.8 | 17813 | 17037 | 5202 | 44043 | 47509 |
| March | 16 | 57.0 | 67 | 58.0 | 17817 | 17043 | 5194 | 44025 | 47493 |
| April | 16 | 55.3 | 67 | 58.2 | 17801 | 17030 | 5181 | 43992 | 47456 |
| May | 16 | 55.1 | 67 | 58.1 | 17802 | 17032 | 5181 | 43990 | 47456 |
| June | 16 | 54.2 | 67 | 57.7 | 17811 | 17042 | 5178 | 44000 | 47468 |
| July | 16 | 53.1 | 67 | 57.3 | 17811 | 17043 | 5173 | 43984 | 47454 |
| August.. .. | 16 | 53.1 | 67 | 58.0 | 17807 | 17039 | 5172 | 44001 | 47467 |
| September.. | 16 | 54.4 | 67 | 58.0 | 17808 | 17038 | 5179 | 44003 | 47470 |
| October .. | 16 | 51.7 | 67 | 57.3 | 17805 | 17040 | 5165 | 43969 | 47437 |
| November .. | 16 | 50.9 | 67 | 57.9 | 17821 | 17056 | 5165 | 44030 | 47500 |
| December .. | 16 | 50.4 | 67 | 57.5 | 17824 | 17060 | 5164 | 44023 | 47494 |
| Year, 1933.. | 16 | 54.5 | 67 | 57.9 | 17811 | 17041 | 5180 | 44005 | 47473 |
| Year, 1932.. | 17 | 5.4 | 67 | 58.5 | 17809 | 17023 | 5234 | 44024 | 47490 |
| Year, 1931.. | 17 | 16.8 | 67 | 58.7 | 17815 | 17011 | 5292 | 44048 | 47514 |
| Year, 1930.. | 17 | 27.6 | 67 | 59.8 | 17813 | 16992 | 5345 | 44081 | 47546 |
| Year, 1929.. | 17 | 37.3 | 67 | 59.6 | 17821 | 16985 | 5395 | 44093 | 47559 |
| Year, 1928.. | 17 | 48.0 | 67 | 59.3 | 17826 | 16973 | 5449 | 44096 | 47563 |
| Year, 1927.. | 17 | 59.5 | 67 | 59.2 | 17837 | 16965 | 5509 | 44119 | 47588 |
| Year, 1926.. | 18 | 10.8 | 68 | 0.1 | 17835 | 16945 | 5565 | 44147 | 47612 |
| Year, 1925.. | 18 | 22.4 | 68 | 0.0 | 17849 | 16939 | 5626 | 44177 | 47646 |
| Year, 1920.. | 19 | 17.9 | 68 | 5.3 | 17840 | 16837 | 5896 | 44353 | 47806 |
| Year, 1915.. | 20 | 3.8 | 68 | 7.9* | 17869 | 16785 | 6130 | 44519* | 47972* |
| Year, 1910.. | 20 | 44.6 | 68 | 13.0 | 17892 | 16732 | 6337 | 44771 | 48215 |

* Mean of 11 months only.

543. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_p (height of barometer cistern above M.S.L.) = 13.7 metres.

JANUARY, 1933.

Table with 25 columns (1-24) and 31 rows (Day 1-31). Columns represent hours of the day. Rows represent station levels. Data is pressure in millibars. Includes mean values for station and sea levels.

544. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_p = 13.7 metres.

FEBRUARY, 1933.

Table with 25 columns (1-24) and 28 rows (Day 1-28). Columns represent hours of the day. Rows represent station levels. Data is pressure in millibars. Includes mean values for station and sea levels.

NOTE.- When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

PRESSURE
Readings in millibars at exact hours, Greenwich Mean Time.

345. CAHIRCIVEEN (VALENTIA OBSERVATORY): Hb (height of barometer cistern above M.S.L.) = 13.7 metres.

MARCH, 1933.

Table with 25 columns (1-24 hours, Mean) and 31 rows (Station Level 1-31). Data includes pressure readings in millibars for each hour and station level, with mean values at the bottom.

346. CAHIRCIVEEN (VALENTIA OBSERVATORY): Hb = 13.7 metres.

APRIL, 1933.

Table with 25 columns (1-24 hours, Mean) and 31 rows (Station Level 1-31). Data includes pressure readings in millibars for each hour and station level, with mean values at the bottom.

NOTE.- When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

Readings in millibars at exact hours, Greenwich Mean Time.

347. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_b (height of barometer cistern above M.S.L.) = 13.7 metres.

MAY, 1933.

Table with 25 columns (Hour G. M. T. 1-24, Mean) and 31 rows (Day 1-31). Station level is indicated on the left side. Data includes pressure readings in millibars.

348. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_b = 13.7 metres.

JUNE, 1933.

Table with 25 columns (Hour G. M. T. 1-24, Mean) and 30 rows (Day 1-30). Station level is indicated on the left side. Data includes pressure readings in millibars.

NOTE.- When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

PRESSURE
Readings in millibars at exact hours, Greenwich Mean Time.

349. CAHRCIVEEN (VALENTIA OBSERVATORY): Hb (height of barometer cistern above M.S.L.) = 13.7 metres.

JULY, 1933.

Table with 26 columns (Hour G.M.T., 1-24, Mean) and 31 rows (Day 1-31). Data represents pressure readings in millibars at station level and sea level.

350. CAHRCIVEEN (VALENTIA OBSERVATORY): Hb = 13.7 metres.

AUGUST, 1933.

Table with 26 columns (Hour G.M.T., 1-24, Mean) and 31 rows (Day 1-31). Data represents pressure readings in millibars at station level and sea level.

NOTE.- When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

353. CAHRCIVEEN (VALENTIA OBSERVATORY): H_b (height of barometer cistern above M.S.L.) = 13.7 metres.

NOVEMBER, 1933.

Table with 24 columns (1-24) and 31 rows (1-30). Columns 1-24 represent hours of the day. Rows 1-30 represent station levels. Includes mean values for station and sea levels at the bottom.

354. CAHRCIVEEN (VALENTIA OBSERVATORY): H_b 13.7 metres.

DECEMBER, 1933.

Table with 24 columns (1-24) and 31 rows (1-30). Columns 1-24 represent hours of the day. Rows 1-30 represent station levels. Includes mean values for station and sea levels at the bottom.

NOTE. - When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

TEMPERATURE

Readings in degrees absolute at exact hours, Greenwich Mean Time.

358. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: h_t (height of thermometer bulbs above ground) = 1.3 metres.

JANUARY, 1933.

| Hour G. M. T. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Day | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A |
| 1 | 79.1 | 79.3 | 79.3 | 79.1 | 78.6 | 79.1 | 79.2 | 79.6 | 79.9 | 79.8 | 81.6 | 82.1 | 82.1 | 82.4 | 82.5 | 82.1 | 81.3 | 80.2 | 80.9 | 81.0 | 80.5 | 80.1 | 80.8 | 80.9 | 80.5 |
| 2 | 80.8 | 81.1 | 81.9 | 81.8 | 81.5 | 81.5 | 81.9 | 82.6 | 83.5 | 84.1 | 84.9 | 85.0 | 85.1 | 85.1 | 85.5 | 85.8 | 84.8 | 83.4 | 83.1 | 82.5 | 82.1 | 82.4 | 81.9 | 82.0 | 83.1 |
| 3 | 80.9 | 81.2 | 80.7 | 81.0 | 81.0 | 79.0 | 80.2 | 80.4 | 80.6 | 80.0 | 81.1 | 80.7 | 79.0 | 80.2 | 80.5 | 80.2 | 80.8 | 80.5 | 79.0 | 79.0 | 79.2 | 79.9 | 80.1 | 80.6 | 80.3 |
| 4 | 80.0 | 80.0 | 79.8 | 79.3 | 79.1 | 79.0 | 79.0 | 78.3 | 78.9 | 79.2 | 80.0 | 80.3 | 81.8 | 81.0 | 80.2 | 80.2 | 79.8 | 79.5 | 79.7 | 80.1 | 79.9 | 79.4 | 79.2 | 80.2 | 79.8 |
| 5 | 78.9 | 80.0 | 77.8 | 78.1 | 78.5 | 79.8 | 80.0 | 78.1 | 79.0 | 79.1 | 78.5 | 78.3 | 78.2 | 79.9 | 80.3 | 80.0 | 78.1 | 78.9 | 79.5 | 80.1 | 80.8 | 80.9 | 79.9 | 80.7 | 79.3 |
| 6 | 81.2 | 80.5 | 80.6 | 79.4 | 80.9 | 80.8 | 80.5 | 80.0 | 78.9 | 80.0 | 80.4 | 81.2 | 81.4 | 82.0 | 81.9 | 81.0 | 80.5 | 80.2 | 78.0 | 78.5 | 80.0 | 80.6 | 80.1 | 81.0 | 80.4 |
| 7 | 81.1 | 81.9 | 82.0 | 82.2 | 82.3 | 82.4 | 82.8 | 83.0 | 83.1 | 83.4 | 83.9 | 84.0 | 84.0 | 84.0 | 83.8 | 83.4 | 83.7 | 83.8 | 83.8 | 84.0 | 84.1 | 84.3 | 84.2 | 84.3 | 83.2 |
| 8 | 84.3 | 84.4 | 84.5 | 84.5 | 84.7 | 84.7 | 84.7 | 84.4 | 84.4 | 84.2 | 84.4 | 84.4 | 84.3 | 84.5 | 84.5 | 84.7 | 84.5 | 84.6 | 84.3 | 84.2 | 84.2 | 84.4 | 84.4 | 82.9 | 84.4 |
| 9 | 82.4 | 82.1 | 81.8 | 81.6 | 81.1 | 80.9 | 80.3 | 80.1 | 80.7 | 79.3 | 80.0 | 81.0 | 82.5 | 82.4 | 82.6 | 82.8 | 82.1 | 82.1 | 82.0 | 82.0 | 81.9 | 82.0 | 81.9 | 82.0 | 81.6 |
| 10 | 81.9 | 82.4 | 81.9 | 81.6 | 81.8 | 81.6 | 81.5 | 81.8 | 82.0 | 82.0 | 82.1 | 82.1 | 82.5 | 82.6 | 83.0 | 83.0 | 82.9 | 82.4 | 82.7 | 83.0 | 83.0 | 82.0 | 81.9 | 81.6 | 82.2 |
| 11 | 81.9 | 81.1 | 81.0 | 80.2 | 80.1 | 79.9 | 79.0 | 79.1 | 78.9 | 79.0 | 78.5 | 79.1 | 80.0 | 79.0 | 79.1 | 79.1 | 77.5 | 76.8 | 75.1 | 75.1 | 74.9 | 74.6 | 74.2 | 74.9 | 78.4 |
| 12 | 74.5 | 74.8 | 75.2 | 77.0 | 77.0 | 78.2 | 78.8 | 78.0 | 78.9 | 79.0 | 79.9 | 80.8 | 80.8 | 80.2 | 80.4 | 80.6 | 80.7 | 80.6 | 80.9 | 80.3 | 80.0 | 79.4 | 79.8 | 79.3 | 78.9 |
| 13 | 80.0 | 79.9 | 78.5 | 80.4 | 80.0 | 80.2 | 80.9 | 81.0 | 81.1 | 81.5 | 81.5 | 82.0 | 82.3 | 82.8 | 82.9 | 82.4 | 81.6 | 80.3 | 80.9 | 80.0 | 79.0 | 79.4 | 78.6 | 79.0 | 80.7 |
| 14 | 78.1 | 79.0 | 80.1 | 80.8 | 81.0 | 81.0 | 81.2 | 81.5 | 82.0 | 82.1 | 82.4 | 82.6 | 83.0 | 83.0 | 83.0 | 83.0 | 82.6 | 82.9 | 83.0 | 82.9 | 83.0 | 83.1 | 80.2 | 80.0 | 81.7 |
| 15 | 80.4 | 79.8 | 80.0 | 79.4 | 79.6 | 77.5 | 79.5 | 78.0 | 76.5 | 77.0 | 76.9 | 76.6 | 77.0 | 77.4 | 78.1 | 78.2 | 77.2 | 77.9 | 78.0 | 77.0 | 75.4 | 75.0 | 74.9 | 75.6 | 77.7 |
| 16 | 74.8 | 74.9 | 75.0 | 75.0 | 75.1 | 75.4 | 77.1 | 76.0 | 75.0 | 75.1 | 74.9 | 75.5 | 75.9 | 76.2 | 76.6 | 76.5 | 76.3 | 75.7 | 74.5 | 73.9 | 74.0 | 74.9 | 73.1 | 73.1 | 75.2 |
| 17 | 72.2 | 72.0 | 72.0 | 71.9 | 71.5 | 71.3 | 71.1 | 71.8 | 70.9 | 71.8 | 72.6 | 73.7 | 74.9 | 75.4 | 75.9 | 75.1 | 74.9 | 73.9 | 73.5 | 73.1 | 73.1 | 73.9 | 74.3 | 75.4 | 73.1 |
| 18 | 76.1 | 76.9 | 77.1 | 76.3 | 77.0 | 78.2 | 78.3 | 77.0 | 78.1 | 79.0 | 79.0 | 79.9 | 79.7 | 79.4 | 79.0 | 79.0 | 78.1 | 79.0 | 78.7 | 78.7 | 77.3 | 76.7 | 76.2 | 76.0 | 77.9 |
| 19 | 74.1 | 73.9 | 73.4 | 73.9 | 74.9 | 74.9 | 75.6 | 75.0 | 77.4 | 78.7 | 78.9 | 79.1 | 79.4 | 79.1 | 79.0 | 79.1 | 79.4 | 80.0 | 80.1 | 80.0 | 80.1 | 80.4 | 80.5 | 81.2 | 77.7 |
| 20 | 81.0 | 80.4 | 80.4 | 80.7 | 79.9 | 79.0 | 79.4 | 78.8 | 79.1 | 79.9 | 80.5 | 81.0 | 81.1 | 81.5 | 81.4 | 81.4 | 81.2 | 81.8 | 81.1 | 81.2 | 81.2 | 81.4 | 81.0 | 81.1 | 80.6 |
| 21 | 81.3 | 81.4 | 81.3 | 81.3 | 81.4 | 81.5 | 81.6 | 81.7 | 81.7 | 81.5 | 81.5 | 81.5 | 81.5 | 81.3 | 81.4 | 81.6 | 81.2 | 81.4 | 81.0 | 80.9 | 80.9 | 80.9 | 80.9 | 81.1 | 81.4 |
| 22 | 81.3 | 81.4 | 81.2 | 81.0 | 81.1 | 81.0 | 81.1 | 81.0 | 81.0 | 81.0 | 81.3 | 81.5 | 81.8 | 81.8 | 81.7 | 81.4 | 81.0 | 80.9 | 80.9 | 80.9 | 80.7 | 80.4 | 80.2 | 80.3 | 81.1 |
| 23 | 80.2 | 80.0 | 79.9 | 79.9 | 79.9 | 80.0 | 80.0 | 80.0 | 80.1 | 80.1 | 80.3 | 80.5 | 80.5 | 80.6 | 80.3 | 80.1 | 79.8 | 79.4 | 79.4 | 79.4 | 79.4 | 79.6 | 79.6 | 79.7 | 79.9 |
| 24 | 79.8 | 79.4 | 79.9 | 79.7 | 79.7 | 79.3 | 79.1 | 79.1 | 79.0 | 79.1 | 79.1 | 79.8 | 79.3 | 79.4 | 79.2 | 78.4 | 78.0 | 77.8 | 76.9 | 76.2 | 75.6 | 76.0 | 74.9 | 74.9 | 78.5 |
| 25 | 73.5 | 75.0 | 73.8 | 73.9 | 72.8 | 72.2 | 73.4 | 73.4 | 73.8 | 73.9 | 74.1 | 75.1 | 75.8 | 76.0 | 76.0 | 76.0 | 74.9 | 73.7 | 72.9 | 72.5 | 72.0 | 71.0 | 71.0 | 70.9 | 73.7 |
| 26 | 70.7 | 70.4 | 70.0 | 69.9 | 69.6 | 69.0 | 69.1 | 70.0 | 70.5 | 71.0 | 71.6 | 73.1 | 75.0 | 76.0 | 76.3 | 76.3 | 75.6 | 75.0 | 75.2 | 75.0 | 74.5 | 74.3 | 74.6 | 74.4 | 72.7 |
| 27 | 74.1 | 75.0 | 75.2 | 74.3 | 74.9 | 74.7 | 74.7 | 75.0 | 75.0 | 75.0 | 75.8 | 76.8 | 76.9 | 76.9 | 77.0 | 76.5 | 75.8 | 75.7 | 75.1 | 75.0 | 74.4 | 74.2 | 74.9 | 75.0 | 75.3 |
| 28 | 75.0 | 75.6 | 75.0 | 75.0 | 75.0 | 76.5 | 74.9 | 74.5 | 74.4 | 75.2 | 75.1 | 76.0 | 76.7 | 76.6 | 77.1 | 78.0 | 76.9 | 76.6 | 76.8 | 77.0 | 76.5 | 77.1 | 76.9 | 77.1 | 75.9 |
| 29 | 77.0 | 77.7 | 76.9 | 76.5 | 76.3 | 76.7 | 76.8 | 76.9 | 77.0 | 77.0 | 76.9 | 77.1 | 77.8 | 77.8 | 77.8 | 77.8 | 77.8 | 77.6 | 77.1 | 77.0 | 76.9 | 77.2 | 77.2 | 77.8 | 77.2 |
| 30 | 77.7 | 77.1 | 76.2 | 76.5 | 77.5 | 78.5 | 79.3 | 79.8 | 80.0 | 80.2 | 80.8 | 80.9 | 80.0 | 81.0 | 80.1 | 80.1 | 80.1 | 80.1 | 79.9 | 80.1 | 79.7 | 80.0 | 80.1 | 80.1 | 80.7 |
| 31 | 80.8 | 80.4 | 80.6 | 80.5 | 80.5 | 80.9 | 81.0 | 81.4 | 81.9 | 81.1 | 82.0 | 82.6 | 82.7 | 82.2 | 82.5 | 82.9 | 82.4 | 82.9 | 82.7 | 83.0 | 83.0 | 83.0 | 83.1 | 83.2 | 81.9 |
| Mean | 78.5 | 78.7 | 78.5 | 78.5 | 78.5 | 78.5 | 78.8 | 78.6 | 78.8 | 79.0 | 79.4 | 79.8 | 80.1 | 80.2 | 80.3 | 80.2 | 79.7 | 79.5 | 79.3 | 79.1 | 79.0 | 79.0 | 78.8 | 78.9 | 79.2 |

359. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: h_t = 1.3 metres.

FEBRUARY, 1933.

| Hour G. M. T. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 83.4 | 83.8 | 84.0 | 84.0 | 84.4 | 84.4 | 84.1 | 84.0 | 83.1 | 83.1 | 82.5 | 82.6 | 82.2 | 81.6 | 82.0 | 81.8 | 81.0 | 80.9 | 80.9 | 80.6 | 80.4 | 80.1 | 80.0 | 79.7 | 82.3 |
| 2 | 79.7 | 79.7 | 79.3 | 80.0 | 80.0 | 80.0 | 79.8 | 79.8 | 79.6 | 80.0 | 80.5 | 80.6 | 80.9 | 81.0 | 81.1 | 81.1 | 80.0 | 79.0 | 76.8 | 75.4 | 75.8 | 75.0 | 77.0 | 78.0 | 79.2 |
| 3 | 79.0 | 79.0 | 79.4 | 79.8 | 80.1 | 80.4 | 81.0 | 81.6 | 81.9 | 82.8 | 83.0 | 83.4 | 83.8 | 84.4 | 84.1 | 84.3 | 84.2 | 84.2 | 84.2 | 84.0 | 84.1 | 84.0 | 83.9 | 84.0 | 82.4 |
| 4 | 84.0 | 84.1 | 84.1 | 84.1 | 84.2 | 84.3 | 84.4 | 84.1 | 84.1 | 84.3 | 84.4 | 84.3 | 84.3 | 84.4 | 84.7 | 84.8 | 84.8 | 84.1 | 84.0 | 84.9 | 84.8 | 84.7 | 84.5 | 84.5 | 84.4 |
| 5 | 84.4 | 84.4 | 84.9 | 84.9 | 84.7 | 84.4 | 84.2 | 84.8 | 84.5 | 84.8 | 85.0 | 85.1 | 85.0 | 85.0 | 85.0 | 85.1 | 85.0 | 85.0 | 85.0 | 84.9 | 84.9 | 84.6 | 84.1 | 84.0 | 84.7 |
| 6 | 83.9 | 83.8 | 83.4 | 83.4 | 83.1 | 83.0 | 83.0 | 83.0 | 83.0 | 83.5 | 83.7 | 84.0 | 84.0 | 84.0 | 83.9 | 84.0 | 84.0 | 83.8 | 84.5 | 84.0 | 83.2 | 83.3 | 83.3 | 83.1 | 83.6 |
| 7 | 83.1 | 83.4 | 83.3 | 83.8 | 83.8 | 83.0 | 83.0 | 83.0 | 83.0 | 83.0 | 83.9 | 84.0 | 84.1 | 84.4 | 84.0 | 84.3 | 84.1 | 83.9 | 84.4 | 85.0 | 85.0 | 85.0 | 85.0 | 85.1 | 83.9 |
| 8 | 85.3 | 85.1 | 85.0 | 85.1 | 85.4 | 85.1 | 85.0 | 85.0 | 85.0 | 85.1 | 85.1 | 85.5 | 86.0 | 86.0 | 86.3 | 86.0 | 85.9 | 85.4 | 85.2 | 85.0 | 85.0 | 85.1 | 85.0 | 84.7 | 85.3 |
| 9 | 84.6 | 84.8 | 84.8 | 84.9 | 84.7 | 85.0 | 84.9 | 84.9 | 85.0 | 84.6 | 84.7 | 84.3 | 84.4 | 85.1 | 85.0 | 84.0 | 83.9 | 83.1 | 82.9 | 83.0 | 83.2 | 83.0 | 82.4 | 82.5 | 84.2 |
| 10 | 82.4 | 82.3 | 82.7 | 82.8 | 83.0 | 81.9 | 82.0 | 81.4 | 81.3 | 81.9 | 82.2 | 82.2 | 82.2 | 81.9 | 82.1 | 81.9 | 81.1 | 81.1 | 79.5 | 79.0 | 78.8 | 78.3 | 77.8 | 76.3 | 81.2 |
| 11 | 76.0 | 76.0 | 75.9 | 75.4 | 75.0 | 74.9 | 75.0 | 74.7 | 76.0 | 77.0 | 77.1 | 78.0 | 78.1 | 78.4 | 78.5 | 78.5 | 78.0 | 77.0 | 76.1 | 75 | | | | | |

TEMPERATURE

360. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: h_t (height of thermometer bulbs above ground) = 1.3 metres.

MARCH, 1933.

| Hour G. M. T. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean | |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Day | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | |
| 1 | 79.5 | 79.5 | 78.4 | 78.4 | 79.1 | 79.1 | 77.7 | 77.6 | 76.2 | 77.0 | 79.0 | 80.6 | 82.0 | 82.1 | 81.9 | 82.0 | 81.1 | 80.5 | 80.0 | 80.9 | 80.9 | 79.8 | 80.3 | 80.8 | 79.7 | |
| 2 | 80.9 | 80.9 | 81.1 | 81.2 | 81.0 | 80.8 | 80.9 | 81.0 | 81.0 | 81.0 | 81.7 | 82.0 | 82.4 | 82.4 | 82.6 | 82.8 | 82.3 | 81.9 | 80.9 | 81.0 | 81.1 | 81.0 | 81.0 | 81.0 | 80.9 | 81.4 |
| 3 | 80.5 | 80.4 | 80.3 | 80.2 | 80.1 | 80.1 | 80.1 | 80.4 | 80.7 | 81.0 | 81.1 | 81.5 | 82.0 | 82.2 | 82.1 | 82.0 | 82.0 | 81.9 | 81.4 | 81.4 | 81.9 | 82.0 | 81.9 | 81.7 | 81.2 | 81.2 |
| 4 | 81.7 | 81.9 | 81.7 | 81.7 | 81.4 | 81.4 | 81.0 | 81.1 | 81.4 | 81.9 | 82.6 | 82.8 | 82.1 | 82.0 | 82.2 | 82.3 | 82.1 | 81.5 | 80.9 | 80.9 | 81.0 | 81.1 | 80.1 | 80.1 | 80.1 | 81.6 |
| 5 | 79.5 | 80.4 | 80.4 | 80.5 | 80.0 | 79.9 | 80.0 | 81.0 | 81.1 | 81.4 | 81.9 | 81.9 | 82.0 | 82.5 | 82.9 | 83.3 | 83.0 | 82.4 | 81.5 | 81.3 | 80.8 | 79.5 | 79.0 | 78.6 | 81.1 | 81.1 |
| 6 | 79.0 | 80.3 | 80.0 | 80.0 | 80.5 | 80.4 | 80.7 | 80.3 | 80.9 | 81.0 | 81.2 | 81.1 | 80.9 | 80.4 | 83.0 | 81.7 | 82.2 | 81.1 | 80.9 | 81.4 | 80.0 | 80.0 | 81.4 | 81.4 | 81.4 | 80.8 |
| 7 | 82.0 | 81.6 | 82.0 | 81.5 | 80.9 | 81.0 | 81.6 | 81.3 | 82.0 | 82.1 | 82.0 | 82.4 | 82.1 | 83.1 | 83.2 | 83.2 | 82.8 | 81.3 | 80.6 | 80.5 | 80.5 | 80.8 | 81.0 | 81.0 | 81.1 | 81.7 |
| 8 | 81.6 | 81.5 | 81.9 | 82.0 | 82.0 | 82.1 | 82.1 | 82.1 | 82.2 | 82.4 | 82.9 | 83.0 | 83.1 | 83.3 | 83.7 | 83.8 | 83.9 | 83.9 | 83.9 | 83.9 | 83.9 | 83.9 | 83.9 | 83.9 | 83.9 | 82.9 |
| 9 | 83.7 | 83.6 | 83.5 | 83.6 | 83.4 | 83.2 | 83.1 | 83.1 | 83.0 | 83.0 | 83.1 | 83.3 | 83.5 | 83.9 | 84.0 | 83.9 | 83.6 | 83.5 | 83.2 | 83.2 | 83.5 | 83.7 | 83.9 | 83.9 | 83.7 | 83.5 |
| 10 | 83.6 | 83.6 | 83.4 | 83.2 | 83.1 | 83.4 | 83.2 | 83.3 | 83.3 | 83.8 | 84.2 | 84.4 | 84.9 | 85.1 | 85.2 | 85.1 | 84.8 | 83.9 | 83.0 | 82.6 | 82.4 | 81.8 | 82.1 | 82.1 | 82.1 | 83.6 |
| 11 | 82.2 | 82.7 | 82.9 | 83.0 | 82.8 | 82.5 | 82.0 | 82.6 | 83.0 | 84.0 | 84.6 | 84.7 | 85.5 | 85.3 | 85.4 | 85.0 | 84.6 | 83.6 | 82.2 | 81.9 | 80.7 | 80.0 | 80.0 | 80.0 | 79.0 | 83.0 |
| 12 | 77.5 | 76.9 | 76.8 | 76.5 | 76.9 | 75.9 | 75.9 | 75.3 | 77.6 | 80.1 | 82.1 | 83.1 | 83.6 | 83.4 | 83.8 | 83.5 | 83.1 | 82.4 | 81.0 | 80.1 | 79.0 | 78.1 | 78.9 | 78.1 | 79.6 | 79.6 |
| 13 | 79.0 | 79.0 | 79.9 | 79.9 | 79.9 | 79.6 | 80.5 | 81.0 | 81.9 | 82.5 | 83.4 | 83.7 | 84.0 | 84.4 | 84.0 | 83.4 | 83.5 | 83.7 | 82.7 | 82.3 | 81.0 | 81.2 | 81.1 | 81.1 | 81.7 | 81.7 |
| 14 | 82.7 | 81.9 | 81.9 | 81.0 | 80.0 | 80.3 | 79.0 | 79.0 | 80.2 | 82.3 | 83.0 | 83.4 | 83.6 | 83.9 | 83.9 | 83.8 | 83.9 | 83.4 | 83.7 | 83.6 | 83.4 | 82.0 | 81.0 | 81.0 | 82.0 | 82.2 |
| 15 | 82.1 | 82.2 | 82.4 | 82.5 | 82.4 | 82.0 | 82.4 | 82.7 | 83.4 | 83.5 | 83.9 | 84.0 | 84.0 | 84.0 | 83.5 | 83.8 | 83.4 | 83.7 | 83.5 | 82.0 | 81.2 | 80.9 | 80.7 | 79.0 | 82.7 | 82.7 |
| 16 | 79.0 | 79.7 | 79.0 | 80.2 | 79.4 | 79.0 | 79.0 | 79.9 | 81.1 | 80.9 | 82.4 | 83.0 | 83.0 | 83.4 | 83.0 | 81.8 | 81.1 | 81.4 | 81.0 | 80.0 | 80.0 | 79.0 | 79.0 | 79.0 | 79.0 | 80.6 |
| 17 | 79.4 | 79.9 | 79.0 | 77.9 | 77.4 | 77.6 | 78.0 | 78.3 | 78.9 | 80.1 | 80.9 | 81.2 | 82.0 | 81.0 | 81.0 | 80.9 | 80.4 | 80.0 | 79.2 | 78.7 | 77.8 | 77.1 | 76.1 | 76.1 | 79.2 | 80.8 |
| 18 | 76.2 | 76.8 | 80.0 | 81.0 | 81.0 | 81.0 | 81.1 | 81.0 | 82.1 | 81.9 | 82.9 | 83.0 | 83.0 | 83.1 | 82.5 | 80.2 | 80.0 | 79.2 | 79.0 | 81.6 | 81.7 | 81.4 | 81.0 | 81.1 | 80.8 | 80.8 |
| 19 | 81.0 | 80.8 | 80.5 | 80.1 | 80.0 | 80.0 | 80.9 | 78.4 | 80.0 | 80.9 | 79.1 | 79.4 | 81.0 | 80.3 | 81.0 | 78.8 | 80.0 | 81.0 | 80.9 | 80.7 | 78.8 | 79.5 | 79.9 | 79.4 | 78.0 | 80.0 |
| 20 | 79.1 | 79.9 | 79.9 | 80.1 | 80.3 | 80.8 | 81.0 | 81.0 | 81.5 | 82.0 | 82.5 | 83.0 | 83.1 | 83.8 | 83.9 | 83.3 | 82.7 | 82.0 | 81.1 | 81.6 | 81.9 | 81.8 | 82.0 | 82.4 | 81.6 | 81.6 |
| 21 | 82.3 | 82.3 | 82.1 | 82.3 | 82.3 | 82.4 | 82.5 | 82.7 | 82.8 | 83.1 | 83.6 | 84.0 | 84.0 | 84.1 | 84.1 | 84.0 | 83.8 | 83.9 | 84.0 | 83.6 | 83.8 | 83.7 | 83.5 | 83.6 | 83.2 | 83.2 |
| 22 | 83.5 | 83.8 | 83.5 | 83.6 | 83.9 | 83.9 | 84.4 | 85.0 | 85.0 | 85.9 | 86.6 | 86.4 | 86.6 | 86.4 | 86.1 | 85.9 | 85.4 | 85.2 | 85.0 | 85.0 | 85.0 | 84.9 | 84.2 | 84.4 | 84.4 | 85.0 |
| 23 | 84.3 | 84.7 | 84.0 | 84.0 | 84.0 | 83.6 | 83.2 | 83.6 | 83.5 | 83.0 | 83.4 | 83.5 | 83.5 | 83.5 | 83.8 | 83.4 | 83.5 | 83.3 | 83.4 | 83.3 | 83.3 | 83.1 | 83.3 | 83.3 | 83.0 | 83.6 |
| 24 | 82.9 | 82.6 | 82.3 | 81.9 | 82.3 | 82.6 | 82.5 | 82.8 | 83.5 | 83.5 | 83.5 | 84.5 | 84.7 | 84.5 | 84.4 | 84.1 | 84.0 | 83.6 | 83.5 | 83.6 | 83.5 | 83.2 | 83.0 | 83.0 | 83.3 | 83.3 |
| 25 | 82.9 | 83.0 | 82.8 | 82.7 | 82.6 | 82.4 | 82.4 | 82.9 | 83.7 | 83.7 | 84.2 | 84.9 | 84.0 | 83.8 | 83.6 | 83.4 | 83.3 | 83.3 | 83.4 | 83.3 | 83.1 | 82.8 | 82.9 | 82.8 | 82.8 | 83.3 |
| 26 | 82.3 | 81.9 | 82.3 | 82.2 | 82.3 | 82.3 | 82.3 | 83.0 | 83.7 | 84.4 | 85.3 | 85.4 | 85.4 | 85.4 | 85.7 | 85.4 | 85.0 | 84.6 | 83.7 | 82.4 | 81.7 | 81.0 | 80.1 | 79.0 | 83.3 | 83.3 |
| 27 | 78.4 | 78.1 | 78.4 | 77.8 | 77.9 | 78.0 | 76.9 | 78.0 | 80.4 | 82.0 | 83.0 | 83.9 | 84.0 | 84.4 | 84.6 | 85.2 | 84.5 | 84.1 | 82.9 | 81.6 | 81.0 | 79.9 | 79.0 | 78.4 | 80.9 | 80.9 |
| 28 | 78.0 | 78.2 | 78.2 | 77.8 | 79.1 | 78.5 | 79.3 | 80.4 | 81.3 | 82.0 | 83.5 | 83.8 | 84.2 | 84.5 | 84.1 | 83.2 | 82.6 | 81.4 | 80.9 | 80.9 | 80.9 | 81.0 | 80.9 | 81.1 | 81.1 | 81.0 |
| 29 | 81.1 | 80.9 | 81.0 | 81.9 | 81.3 | 80.9 | 80.7 | 81.9 | 82.0 | 81.5 | 82.9 | 83.1 | 83.4 | 83.5 | 83.0 | 82.9 | 82.6 | 81.9 | 81.8 | 80.5 | 81.8 | 81.6 | 81.9 | 81.2 | 81.9 | 81.9 |
| 30 | 81.0 | 81.5 | 81.0 | 80.9 | 79.8 | 80.6 | 80.5 | 80.1 | 80.9 | 80.7 | 81.9 | 82.1 | 82.2 | 82.5 | 83.0 | 83.0 | 83.0 | 82.6 | 82.4 | 82.3 | 82.1 | 82.4 | 81.9 | 81.9 | 82.0 | 81.7 |
| 31 | 82.0 | 81.4 | 81.4 | 81.7 | 81.9 | 82.0 | 82.0 | 81.6 | 82.0 | 82.0 | 82.0 | 81.6 | 82.0 | 83.0 | 83.2 | 83.8 | 82.9 | 82.0 | 81.9 | 81.0 | 81.1 | 81.0 | 81.0 | 80.5 | 81.9 | 81.9 |
| Mean | 80.9 | 81.0 | 81.0 | 81.0 | 80.9 | 80.9 | 80.9 | 81.0 | 81.6 | 82.0 | 82.7 | 83.1 | 83.3 | 83.4 | 83.4 | 83.2 | 83.0 | 82.5 | 82.0 | 81.8 | 81.6 | 81.3 | 81.1 | 81.0 | 81.9 | 81.9 |

361. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: h_t = 1.3 metres.

APRIL, 1933.

| Hour G. M. T. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean | |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 80.4 | 80.6 | 81.8 | 82.0 | 82.1 | 82.2 | 82.0 | 82.0 | 81.8 | 82.7 | 82.8 | 83.0 | 83.3 | 83.5 | 83.8 | 83.4 | 83.0 | 82.7 | 82.0 | 80.4 | 79.9 | 78.0 | 77.4 | 77.0 | 81.6 | |
| 2 | 76.0 | 76.2 | 79.0 | 80.0 | 81.1 | 81.9 | 81.9 | 82.4 | 82.9 | 83.1 | 83.5 | 84.0 | 84.1 | 84.1 | 84.0 | 83.9 | 83.7 | 83.5 | 83.3 | 83.2 | 83.2 | 83.0 | 83.0 | 83.1 | 82.1 | 82.1 |
| 3 | 83.1 | 83.0 | 83.1 | 83.1 | 83.0 | 83.0 | 82.6 | 83.1 | 83.2 | 83.6 | 83.9 | 84.1 | 84.6 | 84.7 | 84.6 | 84.6 | 84.0 | 83.7 | 83.0 | 82.5 | 82.0 | 81.6 | 81.9 | 81.9 | 83.3 | 83.3 |
| 4 | 81.8 | 82.0 | 82.3 | 82.4 | 82.6 | 82.5 | 83.0 | 83.5 | 83.9 | 84.0 | 84.9 | 85.1 | 85.1 | 85.6 | 85.5 | 85.0 | 84.6 | 84.3 | 83.7 | 83.4 | 83.2 | 83.1 | 83.1 | 83.0 | 83.6 | 83.6 |
| 5 | 83.1 | 83.1 | 83.1 | 83.1 | 83.1 | 83.0 | 83.2 | 83.6 | 84.0 | 84.0 | 84.8 | 85.0 | 84.9 | 84.4 | 84.0 | 83.9 | 84.0 | 83.8 | 83.3 | 82.9 | 82.7 | 82.5 | 83.0 | 83.0 | 83.6 | 83.6 |
| 6 | 82.6 | 83.0 | 83.1 | 82.3 | 83.0 | 82.9 | 83.2 | 83.9 | 84.5 | 84.9 | 85.0 | 85.0 | 84.9 | 85.4 | 85.7 | 86.0 | 85.4 | 84.4 | 83.1 | 83.0 | 82.8 | 82.4 | 82.4 | 81.7 | 83.8 | 83.8 |
| 7 | 81.2 | 81.1 | 81.3 | 81.9 | 82.1 | 81.8 | 81.0 | 84.0 | 84.2 | 86.0 | 86.2 | 86.0 | 86.0 | 86.5 | 85.7 | 85.3 | 85.3 | 85.0 | 84.3 | 84.1 | 84.1 | 84.1 | 84.1 | 84.0 | 83.9 | 83.9 |
| 8 | 84.0 | 84.0 | 83.9 | 83.6 | 83.4 | 83.5 | 83.8 | 84.0 | 85.0 | 85.4 | 86.0 | 85.9 | 86.4 | 86.0 | 85.8 | 86.0 | 85.7 | 85.2 | 84.9 | 85.1 | 85.0 | 85.0 | 84.8 | 84.6 | 84.9 | 84.9 |
| 9 | 84.6 | 84.4 | 84.3 | 84.4 | 84.1 | 84.0 | 84.0 | 84.8 | 84.6 | 84.9 | 85.8 | 86.3 | 86.0 | 86.1 | 86.1 | 86.0 | 86.0 | 85.3 | 84.8 | 84.2 | 84.1 | 84.0 | 83.9 | 83.8 | 84.9 | 84.9 |
| 10 | 83.9 | 83.7 | 83.7 | 83.8 | 83.8 | 83.8 | 84.0 | 84.0 | 83.5 | | | | | | | | | | | | | | | | | |

TEMPERATURE

Readings in degrees absolute at exact hours, Greenwich Mean Time.

362. CAHIRCIVEEN (Valentia Observatory): North Wall Screen; h_t (height of thermometer bulbs above ground) = 1.3 metres.

MAY, 1933.

| Hour G. M. T. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean | |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Day | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | |
| 1 | 82.0 | 81.9 | 82.0 | 81.9 | 81.8 | 81.1 | 81.9 | 82.1 | 83.1 | 83.6 | 84.1 | 84.8 | 85.4 | 86.1 | 85.8 | 85.5 | 83.7 | 84.9 | 84.4 | 83.6 | 83.5 | 83.1 | 83.0 | 82.9 | 83.4 | 83.4 |
| 2 | 82.9 | 82.8 | 82.3 | 82.3 | 82.0 | 82.5 | 83.0 | 83.0 | 83.0 | 83.0 | 82.7 | 82.1 | 81.9 | 82.0 | 82.2 | 82.6 | 83.1 | 83.6 | 83.9 | 84.0 | 84.5 | 84.4 | 85.0 | 84.4 | 84.4 | 83.0 |
| 3 | 85.3 | 85.0 | 85.0 | 84.2 | 84.9 | 83.3 | 83.8 | 83.9 | 83.9 | 85.2 | 85.9 | 87.0 | 86.0 | 86.6 | 85.6 | 85.5 | 86.1 | 86.0 | 85.9 | 85.4 | 84.7 | 84.5 | 85.0 | 85.0 | 85.1 | 85.1 |
| 4 | 85.0 | 85.1 | 84.9 | 84.5 | 84.4 | 84.0 | 84.7 | 85.1 | 86.2 | 86.8 | 86.6 | 87.1 | 87.7 | 86.6 | 86.4 | 86.3 | 86.5 | 86.0 | 85.4 | 85.1 | 84.9 | 85.0 | 85.0 | 85.0 | 85.0 | 85.6 |
| 5 | 85.1 | 85.0 | 84.8 | 84.8 | 84.9 | 84.9 | 85.0 | 85.0 | 85.3 | 86.0 | 86.1 | 85.3 | 85.6 | 86.0 | 85.7 | 85.8 | 85.7 | 85.5 | 85.0 | 84.7 | 84.3 | 84.1 | 83.9 | 83.4 | 83.4 | 85.1 |
| 6 | 83.0 | 83.2 | 83.0 | 82.9 | 83.0 | 82.9 | 84.7 | 85.0 | 84.0 | 85.0 | 85.1 | 85.7 | 86.5 | 86.1 | 85.5 | 85.6 | 85.3 | 85.0 | 84.7 | 84.4 | 84.0 | 84.0 | 84.4 | 84.3 | 84.3 | 84.5 |
| 7 | 84.1 | 84.1 | 84.1 | 84.1 | 84.3 | 84.0 | 84.1 | 84.9 | 85.0 | 85.5 | 85.4 | 86.0 | 86.1 | 86.4 | 85.6 | 85.6 | 85.4 | 85.1 | 85.0 | 84.8 | 84.0 | 83.6 | 83.2 | 83.5 | 84.8 | 84.8 |
| 8 | 83.9 | 84.0 | 83.5 | 83.0 | 83.4 | 84.0 | 85.0 | 85.5 | 85.9 | 86.0 | 86.9 | 87.0 | 87.1 | 87.0 | 86.1 | 86.4 | 86.1 | 85.9 | 85.1 | 84.0 | 84.0 | 84.5 | 84.7 | 84.7 | 85.1 | 85.1 |
| 9 | 84.9 | 83.9 | 83.8 | 84.0 | 83.0 | 83.6 | 84.0 | 84.4 | 85.9 | 85.3 | 85.7 | 85.0 | 84.2 | 84.2 | 85.1 | 85.0 | 85.0 | 85.0 | 85.1 | 84.9 | 84.8 | 84.8 | 84.5 | 84.8 | 84.8 | 84.6 |
| 10 | 84.2 | 83.9 | 84.0 | 83.9 | 83.5 | 83.0 | 84.0 | 84.4 | 85.0 | 85.1 | 85.5 | 86.0 | 86.3 | 86.7 | 85.9 | 86.2 | 86.0 | 86.0 | 85.4 | 85.3 | 85.1 | 84.9 | 84.9 | 84.9 | 84.9 | 85.0 |
| 11 | 84.9 | 84.1 | 83.8 | 82.9 | 83.0 | 83.3 | 83.9 | 85.0 | 84.6 | 84.9 | 85.0 | 85.6 | 85.4 | 86.8 | 87.0 | 86.3 | 86.1 | 85.9 | 85.3 | 84.7 | 84.7 | 84.7 | 84.1 | 84.0 | 84.9 | 84.9 |
| 12 | 83.8 | 83.3 | 83.1 | 82.7 | 82.4 | 82.9 | 83.1 | 83.9 | 84.2 | 85.3 | 86.4 | 87.3 | 87.6 | 87.9 | 87.8 | 86.0 | 86.0 | 85.4 | 85.1 | 84.7 | 84.5 | 84.4 | 84.2 | 84.1 | 84.8 | 84.8 |
| 13 | 84.2 | 84.1 | 84.3 | 84.1 | 84.0 | 84.2 | 84.8 | 85.0 | 85.5 | 85.8 | 86.0 | 86.0 | 86.2 | 86.2 | 86.3 | 86.4 | 86.0 | 85.4 | 85.5 | 85.1 | 85.0 | 85.0 | 85.0 | 85.0 | 85.0 | 85.2 |
| 14 | 85.0 | 84.9 | 84.5 | 84.3 | 84.2 | 84.3 | 84.5 | 85.0 | 86.0 | 86.4 | 87.3 | 87.8 | 88.0 | 88.0 | 87.9 | 88.0 | 87.1 | 86.5 | 85.9 | 85.1 | 84.4 | 83.4 | 83.0 | 82.4 | 85.6 | 85.6 |
| 15 | 82.0 | 82.0 | 81.4 | 81.6 | 81.0 | 81.4 | 83.0 | 85.0 | 85.4 | 86.0 | 86.7 | 87.5 | 88.0 | 87.7 | 87.1 | 87.1 | 86.5 | 86.0 | 85.6 | 85.4 | 85.4 | 85.4 | 85.2 | 85.0 | 84.8 | 84.8 |
| 16 | 84.9 | 84.9 | 84.9 | 84.8 | 84.9 | 85.0 | 85.1 | 85.1 | 85.4 | 86.0 | 86.5 | 87.2 | 88.0 | 88.4 | 88.7 | 88.4 | 88.0 | 87.7 | 87.2 | 86.8 | 86.2 | 86.0 | 86.0 | 85.8 | 86.3 | 86.3 |
| 17 | 85.5 | 85.4 | 85.4 | 85.5 | 85.5 | 85.6 | 85.9 | 86.3 | 86.5 | 87.0 | 88.0 | 88.0 | 88.9 | 89.0 | 89.2 | 88.2 | 88.0 | 88.0 | 87.0 | 85.9 | 85.4 | 85.7 | 85.6 | 85.9 | 86.7 | 86.7 |
| 18 | 86.0 | 86.0 | 85.9 | 85.5 | 85.6 | 86.0 | 86.1 | 86.5 | 86.9 | 86.9 | 87.4 | 87.0 | 87.4 | 87.4 | 86.6 | 86.1 | 86.0 | 86.1 | 86.4 | 86.2 | 86.2 | 86.1 | 86.0 | 85.8 | 86.3 | 86.3 |
| 19 | 85.8 | 85.9 | 85.9 | 85.9 | 85.9 | 85.7 | 86.0 | 86.4 | 87.0 | 87.8 | 87.2 | 87.1 | 87.1 | 87.4 | 88.0 | 87.4 | 87.1 | 87.0 | 86.6 | 86.5 | 86.5 | 86.5 | 86.4 | 86.2 | 86.6 | 86.6 |
| 20 | 86.2 | 86.4 | 86.3 | 86.0 | 86.0 | 86.0 | 86.0 | 86.6 | 88.0 | 87.6 | 87.9 | 89.0 | 89.1 | 88.9 | 88.9 | 89.0 | 88.1 | 87.2 | 87.1 | 86.1 | 85.6 | 85.1 | 84.4 | 84.0 | 86.9 | 86.9 |
| 21 | 84.1 | 84.3 | 84.4 | 83.5 | 83.4 | 83.9 | 85.0 | 85.9 | 86.1 | 86.4 | 87.0 | 88.2 | 88.1 | 87.1 | 87.6 | 87.9 | 87.3 | 87.0 | 86.4 | 85.8 | 84.5 | 84.0 | 82.5 | 81.9 | 85.6 | 85.6 |
| 22 | 81.4 | 80.9 | 81.0 | 80.4 | 80.4 | 82.0 | 84.3 | 85.8 | 87.4 | 87.0 | 87.0 | 87.1 | 87.4 | 87.2 | 87.5 | 88.0 | 87.4 | 86.9 | 86.3 | 85.9 | 85.0 | 84.4 | 84.0 | 83.4 | 84.9 | 84.9 |
| 23 | 82.2 | 82.0 | 82.2 | 82.2 | 80.3 | 82.0 | 84.5 | 85.9 | 86.2 | 86.7 | 87.0 | 87.5 | 87.2 | 87.2 | 87.1 | 87.1 | 87.0 | 86.5 | 86.3 | 85.6 | 84.2 | 83.6 | 82.4 | 81.4 | 84.8 | 84.8 |
| 24 | 81.2 | 82.7 | 83.8 | 84.8 | 85.1 | 85.9 | 86.0 | 86.8 | 86.5 | 86.8 | 85.1 | 86.7 | 86.2 | 86.8 | 86.6 | 85.9 | 86.1 | 85.5 | 84.9 | 84.3 | 84.0 | 83.9 | 83.6 | 83.5 | 85.1 | 85.1 |
| 25 | 83.3 | 83.5 | 83.8 | 84.0 | 83.3 | 84.3 | 83.9 | 85.8 | 85.8 | 85.2 | 85.1 | 86.0 | 86.4 | 86.3 | 86.3 | 86.1 | 85.9 | 85.4 | 85.1 | 85.0 | 84.9 | 84.6 | 84.5 | 84.5 | 84.9 | 84.9 |
| 26 | 83.8 | 83.7 | 84.1 | 84.1 | 84.1 | 84.5 | 84.8 | 85.1 | 86.0 | 86.1 | 85.8 | 85.8 | 85.0 | 85.5 | 86.0 | 86.7 | 86.3 | 86.1 | 85.9 | 85.1 | 85.0 | 84.1 | 83.6 | 83.1 | 85.0 | 85.0 |
| 27 | 83.3 | 83.4 | 83.3 | 83.6 | 83.4 | 84.0 | 84.1 | 84.6 | 85.1 | 85.4 | 86.0 | 86.5 | 86.8 | 86.7 | 87.1 | 87.6 | 87.0 | 86.0 | 86.0 | 85.0 | 84.0 | 83.4 | 82.7 | 82.0 | 84.9 | 84.9 |
| 28 | 82.0 | 82.0 | 82.0 | 82.8 | 82.8 | 83.2 | 84.5 | 85.1 | 86.5 | 87.8 | 89.0 | 89.4 | 90.0 | 90.0 | 90.1 | 89.2 | 87.0 | 86.2 | 86.1 | 86.0 | 86.0 | 85.9 | 85.7 | 85.4 | 86.0 | 86.0 |
| 29 | 85.4 | 85.4 | 85.4 | 85.1 | 85.1 | 85.3 | 86.6 | 86.1 | 87.6 | 87.5 | 87.8 | 87.8 | 88.1 | 88.0 | 87.9 | 87.4 | 87.2 | 87.0 | 86.2 | 86.0 | 85.3 | 84.9 | 84.9 | 85.1 | 86.4 | 86.4 |
| 30 | 85.0 | 85.4 | 85.3 | 85.6 | 85.5 | 85.5 | 86.0 | 86.4 | 86.5 | 86.2 | 86.3 | 86.5 | 86.6 | 86.9 | 86.9 | 86.7 | 87.0 | 86.5 | 86.0 | 85.9 | 85.3 | 85.0 | 85.0 | 84.6 | 86.0 | 86.0 |
| 31 | 84.0 | 83.0 | 82.8 | 82.1 | 81.3 | 82.2 | 85.0 | 86.0 | 88.4 | 88.4 | 88.5 | 88.8 | 89.0 | 89.0 | 89.4 | 89.6 | 89.3 | 88.4 | 88.0 | 87.8 | 87.1 | 87.2 | 87.1 | 87.0 | 86.6 | 86.6 |
| Mean | 84.0 | 83.9 | 83.9 | 83.8 | 83.6 | 83.9 | 84.6 | 85.2 | 85.8 | 86.1 | 86.4 | 86.7 | 86.9 | 87.0 | 86.9 | 86.8 | 86.4 | 86.1 | 85.8 | 85.3 | 84.9 | 84.7 | 84.5 | 84.3 | 85.3 | 85.3 |

363. CAHIRCIVEEN (Valentia Observatory): North Wall Screen; h_t = 1.3 metres.

JUNE, 1933.

| Hour G. M. T. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean | |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 86.7 | 86.2 | 85.8 | 85.9 | 86.0 | 86.9 | 87.3 | 87.5 | 88.3 | 88.8 | 88.9 | 89.0 | 88.5 | 88.5 | 88.4 | 87.9 | 87.8 | 88.0 | 87.9 | 87.1 | 86.4 | 85.9 | 85.9 | 86.0 | 87.3 | 87.3 |
| 2 | 85.4 | 85.4 | 85.6 | 85.4 | 85.7 | 86.0 | 86.9 | 87.6 | 89.0 | 89.7 | 89.3 | 89.1 | 89.6 | 89.7 | 90.2 | 91.0 | 90.0 | 89.9 | 88.7 | 88.2 | 87.6 | 87.1 | 86.9 | 85.9 | 85.9 | 87.9 |
| 3 | 85.4 | 85.0 | 84.8 | 84.0 | 83.2 | 84.0 | 85.1 | 86.9 | 87.8 | 88.1 | 88.9 | 88.4 | 88.2 | 88.5 | 88.0 | 87.8 | 87.9 | 88.8 | 88.3 | 88.0 | 87.4 | 86.5 | 86.0 | 85.0 | 86.8 | 86.8 |
| 4 | 85.0 | 84.0 | 84.8 | 85.8 | 86.9 | 88.0 | 89.5 | 90.0 | 89.0 | 89.0 | 88.0 | 89.4 | 90.0 | 90.0 | 90.4 | 90.3 | 90.0 | 89.4 | 88.8 | 87.9 | 87.4 | 87.0 | 86.0 | 85.0 | 86.9 | 86.9 |
| 5 | 86.5 | 86.4 | 86.2 | 86.2 | 86.1 | 86.8 | 88.2 | 89.3 | 90.0 | 89.0 | 89.5 | 89.9 | 90.2 | 90.1 | 90.0 | 89.9 | 90.0 | 88.9 | 87.0 | 86.8 | 87.4 | 87.3 | 87.3 | 87.3 | 88.2 | 88.2 |
| 6 | 87.1 | 87.1 | 87.1 | 87.0 | 86.9 | 87.1 | 88.1 | 88.0 | 90.1 | 90.5 | 90.3 | 90.1 | 90.6 | 91.0 | 90.3 | 90.0 | 89.5 | 89.0 | 88.9 | 88.4 | 87.9 | 87.9 | 87.8 | 87.6 | 88.7 | 88.7 |
| 7 | 87.6 | 87.5 | 87.4 | 87.4 | 87.5 | 87.6 | 87.5 | 88.0 | 88.0 | 88.2 | 88.1 | 88.1 | 88.4 | 88.2 | 86.0 | 85.0 | 85.1 | 85.9 | 86.9 | 86.5 | 85.7 | 84.9 | 84.8 | 84.8 | 86.9 | 86.9 |
| 8 | 84.2 | 84.7 | 84.5 | 83.9 | 83.7 | 85.3 | 86.2 | 86.9 | 87.1 | 87.6 | 88.0 | 88.3 | 88.8 | 88.9 | 88.4 | 89.0 | 89.0 | 88.1 | 87.6 | 87.0 | 86.0 | 86.0 | 85.9 | 85.1 | 86.7 | 86.7 |
| 9 | 85.1 | 84.9 | 84.5 | 84.1 | 84.0 | 84.9 | 85.7 | 86.4 | 87.0 | 87.6 | 88.0 | 88.6 | 89.1 | 89.5 | 89.4 | 90.0 | 89.8 | 88.8 | 88.4 | 87.6 | 87.0 | 86.4 | 85.7 | 85.0 | 87.0 | 87.0 |
| 10 | 85.0 | 85.4 | 84.7 | | | | | | | | | | | | | | | | | | | | | | | |

TEMPERATURE

364. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: h_t (height of thermometer bulbs above ground) = 1.3 metres.

JULY, 1933.

| Hour G. M. T. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean | |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Day | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | |
| 1 | 84.3 | 83.5 | 82.4 | 81.6 | 81.9 | 83.4 | 85.7 | 88.4 | 89.5 | 90.7 | 91.0 | 90.9 | 91.1 | 91.4 | 91.4 | 92.1 | 91.9 | 90.6 | 90.9 | 90.4 | 89.2 | 88.8 | 88.0 | 87.9 | 88.2 | |
| 2 | 88.0 | 88.0 | 89.0 | 89.2 | 89.1 | 89.0 | 89.9 | 90.9 | 92.0 | 92.4 | 93.8 | 93.1 | 95.0 | 94.5 | 95.0 | 95.4 | 94.2 | 93.9 | 93.3 | 93.3 | 92.3 | 91.9 | 91.5 | 91.2 | 91.8 | |
| 3 | 90.4 | 90.2 | 89.8 | 89.6 | 88.3 | 89.1 | 91.5 | 93.5 | 94.9 | 95.9 | 94.6 | 95.0 | 94.2 | 94.5 | 95.2 | 95.5 | 95.9 | 93.9 | 93.1 | 92.9 | 91.6 | 90.8 | 90.0 | 90.0 | 92.5 | |
| 4 | 89.5 | 89.0 | 88.8 | 88.7 | 88.7 | 89.9 | 92.1 | 94.0 | 94.9 | 96.5 | 97.0 | 95.3 | 95.3 | 95.4 | 95.9 | 95.9 | 95.0 | 95.0 | 94.8 | 94.2 | 93.9 | 93.2 | 92.1 | 91.1 | 93.2 | |
| 5 | 91.0 | 90.3 | 89.4 | 89.4 | 90.5 | 92.2 | 93.9 | 95.0 | 95.0 | 94.5 | 95.6 | 96.7 | 97.2 | 97.4 | 97.4 | 97.3 | 96.3 | 95.4 | 94.9 | 93.9 | 93.0 | 92.6 | 92.0 | 91.2 | 93.8 | |
| 6 | 91.3 | 90.9 | 91.4 | 91.5 | 91.9 | 92.1 | 94.8 | 96.0 | 96.5 | 97.0 | 96.4 | 95.2 | 94.8 | 95.1 | 94.9 | 95.8 | 96.2 | 96.1 | 94.5 | 93.2 | 92.0 | 92.0 | 92.3 | 92.0 | 92.0 | 93.9 |
| 7 | 91.5 | 91.4 | 91.0 | 90.0 | 89.8 | 90.0 | 90.4 | 90.0 | 90.3 | 90.0 | 89.4 | 90.5 | 91.5 | 91.9 | 91.0 | 90.9 | 91.3 | 90.2 | 90.7 | 90.0 | 89.5 | 90.0 | 90.0 | 89.4 | 90.5 | |
| 8 | 89.1 | 89.1 | 89.0 | 88.6 | 88.5 | 88.9 | 89.4 | 89.1 | 91.0 | 91.3 | 91.0 | 91.0 | 92.0 | 92.2 | 91.1 | 91.4 | 91.4 | 91.0 | 91.0 | 89.6 | 90.0 | 89.4 | 89.2 | 89.0 | 90.1 | |
| 9 | 88.4 | 88.0 | 87.0 | 87.5 | 87.9 | 88.0 | 87.2 | 87.4 | 87.4 | 87.9 | 88.9 | 89.9 | 90.0 | 90.0 | 89.9 | 89.8 | 89.0 | 90.0 | 90.4 | 90.1 | 89.8 | 89.0 | 89.0 | 88.5 | 88.8 | |
| 10 | 89.0 | 89.0 | 88.9 | 88.9 | 88.9 | 88.4 | 88.6 | 89.0 | 89.0 | 89.3 | 89.4 | 89.7 | 90.1 | 89.5 | 90.4 | 90.1 | 89.5 | 88.3 | 88.4 | 88.2 | 87.7 | 87.4 | 87.5 | 87.4 | 88.9 | |
| 11 | 87.4 | 87.3 | 87.4 | 87.4 | 87.5 | 87.5 | 87.6 | 87.7 | 87.7 | 88.0 | 88.3 | 88.8 | 89.1 | 89.1 | 88.3 | 89.1 | 89.2 | 89.3 | 88.7 | 88.2 | 88.2 | 87.8 | 88.0 | 87.9 | 88.1 | |
| 12 | 87.8 | 87.5 | 87.7 | 87.8 | 87.9 | 87.5 | 87.0 | 87.9 | 89.0 | 89.4 | 89.6 | 88.4 | 89.4 | 90.0 | 90.8 | 90.2 | 89.9 | 88.9 | 88.6 | 88.0 | 87.1 | 87.3 | 87.1 | 87.2 | 88.4 | |
| 13 | 87.4 | 87.6 | 88.9 | 89.0 | 88.9 | 88.6 | 88.1 | 88.0 | 88.1 | 89.0 | 88.9 | 89.2 | 89.6 | 89.5 | 90.0 | 89.9 | 89.0 | 88.6 | 88.4 | 88.0 | 88.1 | 87.9 | 87.9 | 87.8 | 88.6 | |
| 14 | 87.7 | 87.4 | 87.4 | 87.0 | 87.3 | 87.6 | 87.4 | 88.1 | 88.9 | 89.9 | 90.0 | 89.0 | 89.0 | 89.0 | 89.5 | 88.9 | 88.4 | 87.7 | 86.7 | 87.0 | 86.9 | 86.0 | 87.0 | 85.8 | 87.8 | |
| 15 | 85.1 | 85.6 | 85.2 | 84.9 | 84.0 | 84.4 | 86.0 | 86.4 | 87.4 | 88.1 | 87.8 | 87.5 | 88.3 | 89.0 | 88.8 | 89.0 | 89.1 | 88.7 | 88.5 | 88.0 | 87.6 | 87.3 | 87.1 | 87.3 | 87.1 | |
| 16 | 86.8 | 86.8 | 86.5 | 86.1 | 85.9 | 86.9 | 87.3 | 88.1 | 88.8 | 88.5 | 89.5 | 90.1 | 90.0 | 90.1 | 89.9 | 90.1 | 89.9 | 89.3 | 88.7 | 88.4 | 87.9 | 87.6 | 87.3 | 87.6 | 88.2 | |
| 17 | 87.9 | 88.0 | 88.4 | 88.9 | 89.0 | 89.1 | 89.2 | 89.2 | 89.9 | 89.9 | 90.0 | 90.9 | 91.1 | 91.1 | 91.0 | 91.0 | 91.0 | 91.0 | 90.4 | 89.4 | 89.0 | 88.9 | 88.5 | 88.1 | 89.6 | |
| 18 | 88.1 | 88.2 | 88.5 | 88.1 | 88.0 | 88.2 | 88.3 | 88.8 | 89.5 | 90.4 | 91.0 | 91.4 | 91.6 | 91.5 | 91.0 | 90.9 | 90.5 | 90.0 | 89.6 | 89.2 | 89.4 | 89.2 | 89.0 | 88.9 | 89.5 | |
| 19 | 88.5 | 88.7 | 88.4 | 87.5 | 87.5 | 87.8 | 88.2 | 89.0 | 89.3 | 88.1 | 89.9 | 90.0 | 90.8 | 91.0 | 90.9 | 90.1 | 90.4 | 90.0 | 89.6 | 89.1 | 88.0 | 88.6 | 88.5 | 87.9 | 89.1 | |
| 20 | 87.2 | 87.4 | 87.3 | 87.2 | 87.8 | 88.0 | 88.1 | 88.2 | 88.9 | 89.0 | 89.9 | 90.0 | 90.0 | 89.4 | 90.0 | 90.1 | 90.0 | 89.9 | 89.0 | 88.1 | 87.4 | 87.0 | 87.2 | 86.4 | 88.5 | |
| 21 | 86.4 | 86.1 | 86.0 | 85.9 | 86.0 | 86.0 | 87.0 | 88.9 | 90.5 | 89.4 | 90.0 | 90.3 | 90.5 | 90.7 | 90.4 | 91.0 | 91.0 | 90.0 | 89.8 | 89.9 | 89.4 | 89.4 | 89.4 | 89.2 | 88.8 | |
| 22 | 89.1 | 89.0 | 89.0 | 89.0 | 88.9 | 89.0 | 89.4 | 90.1 | 91.0 | 91.0 | 90.9 | 91.6 | 92.2 | 91.8 | 92.4 | 91.9 | 90.1 | 89.9 | 89.2 | 89.0 | 88.8 | 88.7 | 88.6 | 88.6 | 90.0 | |
| 23 | 88.8 | 88.6 | 88.1 | 88.1 | 88.0 | 88.0 | 88.4 | 88.8 | 89.4 | 89.9 | 90.6 | 90.9 | 90.4 | 90.8 | 91.4 | 92.0 | 92.0 | 91.3 | 91.0 | 90.1 | 90.0 | 90.0 | 89.9 | 89.9 | 89.8 | |
| 24 | 89.9 | 89.4 | 89.3 | 89.0 | 89.0 | 89.0 | 89.2 | 89.8 | 90.1 | 90.4 | 91.0 | 91.5 | 92.0 | 91.6 | 91.5 | 91.4 | 91.0 | 91.0 | 90.6 | 90.8 | 90.0 | 89.9 | 89.9 | 89.5 | 90.3 | |
| 25 | 89.0 | 89.0 | 89.0 | 89.0 | 88.7 | 88.8 | 88.9 | 89.0 | 89.1 | 90.0 | 90.0 | 90.3 | 91.0 | 91.0 | 91.4 | 91.0 | 90.8 | 90.5 | 90.2 | 89.7 | 89.0 | 88.3 | 88.0 | 88.3 | 89.6 | |
| 26 | 88.4 | 88.6 | 88.8 | 88.1 | 87.6 | 87.8 | 88.0 | 88.9 | 90.1 | 90.0 | 91.0 | 91.1 | 90.7 | 90.7 | 90.7 | 90.1 | 90.1 | 89.4 | 89.5 | 88.9 | 87.9 | 87.1 | 87.1 | 87.2 | 89.1 | |
| 27 | 87.0 | 87.1 | 87.0 | 87.4 | 87.1 | 87.1 | 87.0 | 87.0 | 87.2 | 88.4 | 89.0 | 89.4 | 89.7 | 90.1 | 90.0 | 90.0 | 90.0 | 89.4 | 89.0 | 88.3 | 87.0 | 86.3 | 86.1 | 85.9 | 88.0 | |
| 28 | 87.4 | 88.0 | 88.5 | 88.4 | 88.0 | 88.0 | 89.4 | 89.8 | 90.0 | 90.3 | 90.1 | 90.6 | 90.4 | 90.9 | 91.0 | 90.9 | 90.4 | 90.2 | 89.9 | 89.5 | 89.7 | 89.5 | 89.5 | 89.2 | 89.5 | |
| 29 | 88.0 | 89.2 | 89.1 | 88.7 | 88.9 | 88.8 | 88.5 | 89.0 | 89.2 | 88.7 | 90.0 | 90.0 | 89.9 | 89.3 | 89.7 | 89.0 | 89.2 | 89.0 | 88.8 | 88.0 | 87.9 | 87.3 | 86.7 | 86.8 | 88.8 | |
| 30 | 86.0 | 85.3 | 85.0 | 85.0 | 86.5 | 87.2 | 88.0 | 88.6 | 89.0 | 88.4 | 88.6 | 89.1 | 89.7 | 90.4 | 91.0 | 91.0 | 90.7 | 89.9 | 89.8 | 89.2 | 89.0 | 89.2 | 88.9 | 88.9 | 88.5 | |
| 31 | 88.5 | 88.4 | 88.2 | 88.0 | 88.0 | 88.2 | 88.4 | 88.1 | 88.7 | 89.2 | 89.1 | 89.3 | 89.7 | 90.0 | 89.4 | 88.9 | 88.8 | 88.4 | 88.3 | 88.1 | 88.0 | 88.0 | 87.9 | 87.8 | 88.6 | |
| Mean | 88.2 | 88.1 | 88.1 | 87.9 | 87.9 | 88.2 | 88.8 | 89.4 | 90.1 | 90.4 | 90.7 | 90.9 | 91.2 | 91.3 | 91.3 | 91.3 | 91.0 | 90.5 | 90.2 | 89.7 | 89.2 | 89.0 | 88.7 | 88.5 | 89.6 | |

365. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: h_t = 1.3 metres.

AUGUST, 1933.

| Day | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Day | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A |
| 1 | 87.7 | 87.4 | 87.2 | 87.1 | 87.0 | 86.9 | 87.1 | 87.5 | 88.5 | 89.7 | 90.2 | 90.6 | 91.0 | 91.2 | 91.0 | 91.0 | 90.6 | 90.3 | 90.0 | 89.4 | 88.5 | 88.5 | 88.4 | 88.4 | 89.0 |
| 2 | 88.6 | 88.6 | 88.7 | 88.7 | 88.8 | 88.9 | 89.1 | 89.6 | 90.1 | 90.4 | 91.3 | 91.4 | 91.6 | 92.0 | 92.6 | 91.9 | 91.1 | 90.5 | 89.8 | 89.6 | 89.5 | 89.5 | 89.4 | 89.4 | 90.1 |
| 3 | 89.4 | 89.2 | 89.0 | 89.0 | 88.8 | 88.8 | 88.9 | 89.2 | 89.6 | 90.0 | 91.1 | 92.0 | 92.8 | 92.4 | 92.4 | 92.0 | 92.4 | 91.9 | 91.4 | 90.3 | 89.3 | 88.8 | 88.0 | 87.4 | 90.2 |
| 4 | 87.0 | 87.0 | 86.9 | 86.4 | 86.4 | 86.6 | 86.8 | 87.9 | 94.4 | 95.7 | 96.2 | 95.4 | 95.6 | 95.4 | 95.1 | 95.2 | 94.9 | 94.4 | 93.6 | 93.0 | 92.0 | 91.4 | 90.7 | 90.5 | 91.8 |
| 5 | 90.0 | 89.6 | 89.0 | 89.2 | 89.1 | 89.4 | 90.7 | 92.6 | 94.6 | 96.2 | 96.1 | 96.7 | 96.4 | 96.6 | 96.5 | 96.3 | 95.9 | 94.3 | 93.5 | 92.5 | 91.7 | 91.3 | 90.8 | 91.3 | 92.9 |
| 6 | 90.9 | 90.5 | 90.4 | 90.3 | 90.1 | 90.0 | 90.0 | 90.5 | 91.7 | 92.7 | 93.0 | 93.2 | 93.7 | 93.2 | 92.4 | 92.2 | 92.2 | 91.7 | 90.6 | 91.0 | 90.4 | 89.7 | 89.3 | 89.3 | 91.4 |
| 7 | 89.0 | 88.1 | 87.8 | 86.9 | 86.4 | 86.0 | 89.0 | 90.3 | 91.2 | 91.6 | 91.2 | 92.0 | 92.0 | 91.9 | 91.0 | 90.6 | 90.7 | 90.6 | 90.4 | 90.1 | 89.9 | 89.6 | 89.4 | 89.1 | 89.8 |
| 8 | 88.8 | 88.1 | 87.9 | 87.9 | 87.9 | 87.5 | 87.9 | 88.4 | 88.7 | 90.7 | 90.2 | 91.1 | 92.1 | 91.6 | 91.8 | 92.5 | 91.8 | 91.8 | 91.3 | 90.4 | 90.3 | 90.9 | 90.5 | 90.3 | 90.0 |
| 9 | 90.3 | 90.2 | 90.3 | 90.0 | 89.4 | 89.0 | 88.8 | 89.0 | 89.1 | 89.7 | 90.0 | 90.2 | 90.3 | 90.3 | 90.0 | 90.0 | 89.9 | 89.3 | 88.5 | 88.1 | 87.0 | 86.6 | 86.7 | 86.0 | 89.2 |
| 10 | 85.9 | 85.6 | 85.1 | 85.4 | 85.3 | 85.6 | 87.5 | 89.0 | 89.5 | 89.8 | 90.3 | 91.0 | 91.3 | 91.7 | 92.3 | 92.0 | 91.8 | 90.9 | 90.8 | 89.0 | 88.5 | 88.5 | 87.9 | 87.4 | 88.9 |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | | |

Readings in degrees absolute at exact hours, Greenwich Mean Time.

366. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: h_t (height of thermometer bulbs above ground) = 1.3 metres.

SEPTEMBER, 1933.

| Hour G. M. T. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Day | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A |
| 1 | 89.6 | 89.7 | 89.8 | 89.8 | 89.9 | 90.0 | 89.9 | 89.9 | 90.0 | 90.0 | 90.4 | 90.4 | 90.2 | 90.3 | 90.2 | 90.2 | 90.1 | 90.1 | 90.0 | 90.0 | 89.9 | 89.9 | 89.9 | 89.8 | 90.0 |
| 2 | 89.9 | 89.9 | 89.8 | 89.7 | 89.8 | 89.6 | 89.9 | 90.7 | 91.8 | 92.3 | 92.8 | 92.9 | 92.5 | 92.2 | 91.9 | 92.0 | 91.4 | 91.0 | 90.2 | 88.6 | 87.4 | 86.8 | 85.5 | 85.0 | 90.3 |
| 3 | 84.6 | 84.1 | 84.4 | 83.8 | 83.4 | 83.3 | 83.7 | 86.9 | 88.4 | 90.3 | 91.6 | 92.5 | 92.0 | 92.0 | 91.9 | 91.4 | 90.9 | 90.4 | 90.0 | 89.9 | 89.8 | 89.5 | 89.6 | 88.6 | 88.6 |
| 4 | 89.3 | 89.1 | 89.1 | 89.3 | 89.3 | 89.4 | 90.1 | 90.9 | 91.6 | 92.0 | 92.7 | 93.4 | 94.0 | 93.4 | 93.0 | 92.6 | 92.4 | 92.0 | 90.7 | 89.9 | 90.5 | 90.9 | 90.9 | 90.4 | 91.1 |
| 5 | 90.1 | 89.5 | 89.2 | 88.6 | 89.5 | 89.9 | 90.0 | 91.1 | 92.0 | 92.9 | 93.9 | 94.0 | 94.1 | 94.3 | 93.9 | 93.2 | 92.7 | 92.4 | 91.8 | 90.4 | 90.0 | 89.4 | 88.3 | 88.2 | 91.3 |
| 6 | 88.3 | 88.1 | 87.5 | 87.3 | 87.4 | 87.7 | 87.7 | 88.1 | 88.0 | 88.4 | 88.8 | 89.0 | 88.1 | 88.4 | 89.2 | 90.0 | 89.6 | 89.0 | 88.4 | 88.5 | 88.4 | 87.9 | 87.3 | 86.9 | 88.3 |
| 7 | 86.8 | 86.7 | 86.4 | 86.0 | 85.8 | 85.3 | 85.4 | 86.3 | 87.5 | 88.4 | 89.1 | 90.0 | 90.2 | 90.9 | 91.4 | 92.0 | 91.5 | 91.1 | 90.1 | 89.4 | 89.5 | 89.0 | 87.8 | 86.2 | 88.6 |
| 8 | 86.0 | 85.1 | 84.7 | 83.6 | 83.4 | 86.8 | 88.5 | 89.6 | 89.8 | 90.4 | 90.6 | 91.3 | 91.9 | 92.4 | 92.6 | 92.7 | 92.6 | 92.0 | 91.0 | 89.1 | 88.3 | 87.5 | 87.7 | 86.4 | 88.9 |
| 9 | 85.2 | 84.8 | 84.7 | 84.0 | 87.8 | 87.6 | 87.7 | 88.9 | 89.5 | 90.2 | 90.6 | 91.2 | 91.8 | 92.5 | 92.9 | 92.9 | 92.6 | 92.0 | 90.8 | 89.2 | 88.0 | 88.2 | 88.8 | 88.2 | 89.1 |
| 10 | 87.2 | 86.5 | 86.0 | 87.5 | 88.9 | 88.7 | 88.3 | 88.5 | 89.8 | 90.7 | 91.0 | 92.1 | 93.1 | 93.3 | 93.4 | 93.1 | 93.0 | 92.4 | 91.3 | 90.2 | 88.4 | 87.7 | 87.8 | 87.8 | 89.9 |
| 11 | 88.2 | 87.0 | 87.0 | 86.4 | 86.4 | 85.5 | 88.4 | 87.8 | 90.0 | 90.4 | 91.4 | 91.8 | 92.1 | 92.5 | 92.4 | 92.2 | 92.0 | 91.5 | 90.1 | 89.0 | 88.0 | 87.9 | 86.9 | 86.7 | 89.3 |
| 12 | 85.5 | 85.4 | 84.4 | 84.0 | 84.3 | 84.6 | 85.3 | 86.2 | 87.8 | 89.6 | 91.0 | 91.9 | 92.0 | 92.8 | 92.4 | 92.0 | 91.8 | 90.6 | 89.5 | 88.4 | 88.0 | 87.4 | 87.2 | 86.9 | 88.3 |
| 13 | 85.9 | 85.0 | 83.9 | 82.5 | 83.3 | 83.8 | 84.4 | 85.3 | 87.0 | 88.6 | 89.2 | 89.5 | 89.7 | 90.0 | 89.8 | 90.0 | 89.0 | 88.7 | 87.7 | 87.3 | 87.1 | 86.4 | 85.4 | 84.2 | 86.9 |
| 14 | 83.6 | 83.0 | 82.4 | 81.7 | 80.9 | 79.5 | 79.0 | 80.9 | 83.3 | 85.4 | 86.1 | 86.6 | 87.4 | 88.4 | 87.9 | 87.4 | 87.4 | 86.5 | 84.7 | 83.0 | 81.9 | 81.0 | 80.7 | 80.8 | 83.2 |
| 15 | 81.0 | 83.4 | 84.0 | 84.6 | 84.9 | 83.5 | 83.9 | 86.3 | 87.5 | 88.1 | 88.8 | 89.4 | 89.9 | 90.0 | 89.9 | 89.1 | 89.1 | 88.7 | 87.9 | 87.2 | 87.8 | 88.0 | 88.3 | 88.2 | 86.9 |
| 16 | 88.1 | 88.2 | 88.6 | 88.8 | 88.9 | 89.0 | 89.1 | 89.7 | 89.7 | 89.6 | 90.9 | 91.0 | 91.9 | 91.9 | 91.5 | 91.3 | 91.0 | 90.6 | 90.3 | 90.4 | 90.4 | 90.4 | 90.5 | 90.3 | 90.0 |
| 17 | 90.4 | 90.5 | 90.5 | 90.8 | 90.9 | 90.4 | 90.4 | 90.8 | 90.9 | 90.4 | 90.6 | 90.8 | 91.4 | 91.0 | 90.5 | 91.1 | 91.1 | 91.1 | 90.8 | 89.9 | 89.5 | 89.3 | 89.1 | 88.9 | 90.5 |
| 18 | 88.9 | 89.0 | 88.4 | 87.9 | 87.1 | 86.4 | 86.1 | 87.0 | 88.6 | 89.0 | 89.3 | 90.4 | 90.7 | 90.9 | 90.5 | 90.0 | 89.6 | 89.2 | 89.2 | 89.1 | 88.8 | 87.9 | 87.9 | 88.0 | 88.8 |
| 19 | 88.2 | 88.1 | 88.0 | 88.0 | 87.9 | 88.1 | 87.0 | 87.4 | 88.3 | 88.9 | 89.3 | 87.8 | 89.3 | 89.7 | 89.0 | 88.8 | 86.5 | 86.0 | 84.4 | 84.1 | 83.2 | 84.0 | 83.9 | 84.3 | 87.0 |
| 20 | 85.8 | 83.9 | 83.0 | 82.9 | 81.9 | 82.0 | 82.1 | 82.7 | 82.9 | 83.9 | 84.4 | 85.5 | 86.0 | 86.0 | 86.0 | 86.7 | 86.2 | 86.0 | 85.5 | 85.9 | 85.4 | 86.0 | 86.0 | 86.0 | 84.7 |
| 21 | 86.0 | 86.1 | 86.0 | 86.9 | 86.0 | 86.4 | 86.3 | 86.6 | 86.4 | 86.4 | 87.0 | 88.2 | 88.7 | 89.5 | 89.4 | 89.2 | 89.5 | 88.2 | 87.0 | 86.9 | 85.8 | 84.5 | 84.9 | 84.0 | 87.0 |
| 22 | 83.6 | 84.0 | 83.5 | 83.3 | 84.0 | 85.5 | 85.8 | 86.8 | 87.5 | 88.2 | 88.7 | 88.8 | 88.5 | 88.3 | 88.1 | 87.5 | 87.4 | 87.3 | 87.5 | 87.4 | 87.8 | 87.9 | 87.9 | 87.2 | 86.7 |
| 23 | 87.1 | 87.1 | 87.0 | 87.0 | 86.5 | 86.4 | 87.0 | 87.1 | 87.6 | 87.4 | 88.0 | 87.9 | 87.4 | 88.9 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.0 | 86.1 |
| 24 | 86.2 | 86.1 | 86.6 | 86.5 | 86.4 | 86.2 | 86.1 | 86.1 | 86.9 | 87.4 | 87.5 | 87.9 | 87.9 | 88.3 | 88.9 | 88.3 | 88.0 | 87.9 | 87.4 | 87.4 | 87.4 | 87.1 | 87.1 | 86.9 | 87.2 |
| 25 | 86.9 | 86.6 | 86.4 | 86.9 | 87.0 | 87.2 | 87.5 | 87.9 | 87.9 | 87.9 | 88.8 | 88.6 | 89.0 | 90.0 | 90.0 | 89.9 | 90.0 | 89.3 | 88.5 | 88.4 | 88.8 | 89.0 | 88.3 | 87.6 | 88.3 |
| 26 | 87.4 | 87.1 | 86.6 | 86.4 | 86.5 | 86.3 | 86.0 | 86.9 | 88.0 | 88.0 | 88.0 | 89.0 | 89.0 | 89.2 | 89.1 | 89.2 | 88.7 | 88.0 | 87.5 | 86.9 | 86.9 | 87.0 | 86.9 | 86.4 | 87.6 |
| 27 | 85.1 | 85.5 | 84.6 | 84.2 | 83.7 | 83.2 | 82.9 | 83.9 | 86.0 | 87.9 | 88.4 | 89.1 | 89.3 | 89.5 | 89.9 | 89.4 | 89.3 | 88.2 | 86.8 | 85.9 | 85.1 | 85.1 | 85.9 | 85.1 | 86.4 |
| 28 | 84.0 | 84.8 | 83.4 | 83.3 | 82.3 | 82.5 | 82.1 | 82.3 | 84.4 | 87.8 | 88.7 | 89.4 | 89.9 | 90.1 | 90.3 | 89.4 | 89.0 | 88.0 | 87.0 | 87.0 | 85.9 | 85.8 | 85.5 | 84.3 | 86.1 |
| 29 | 83.0 | 82.5 | 82.9 | 81.8 | 82.1 | 83.0 | 82.2 | 83.0 | 85.5 | 87.0 | 88.1 | 89.4 | 89.6 | 90.8 | 90.4 | 89.9 | 90.2 | 89.1 | 88.6 | 87.5 | 88.4 | 87.2 | 87.5 | 87.5 | 86.5 |
| 30 | 87.1 | 87.0 | 87.0 | 87.2 | 87.0 | 86.3 | 86.0 | 86.5 | 87.4 | 88.3 | 89.4 | 90.1 | 90.9 | 90.4 | 90.3 | 90.5 | 90.0 | 89.0 | 88.3 | 88.2 | 87.2 | 86.3 | 85.2 | 84.5 | 88.0 |
| Mean | 86.6 | 86.5 | 86.2 | 86.0 | 86.1 | 86.1 | 86.3 | 87.1 | 88.1 | 88.8 | 89.5 | 90.0 | 90.3 | 90.5 | 90.4 | 90.2 | 90.0 | 89.4 | 88.6 | 88.0 | 87.7 | 87.4 | 87.1 | 86.7 | 88.1 |

367. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: h_t = 1.3 metres.

OCTOBER, 1933.

| Day | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 84.2 | 85.3 | 86.7 | 86.4 | 86.6 | 86.1 | 85.9 | 86.0 | 86.1 | 87.1 | 88.4 | 88.7 | 89.5 | 89.3 | 89.1 | 89.5 | 89.1 | 88.7 | 88.9 | 88.9 | 88.8 | 88.5 | 88.5 | 88.1 | 87.6 |
| 2 | 88.0 | 87.9 | 87.4 | 87.4 | 87.7 | 87.5 | 87.1 | 87.1 | 87.5 | 88.1 | 89.1 | 89.8 | 90.1 | 90.2 | 89.1 | 88.8 | 88.6 | 88.4 | 88.2 | 88.0 | 87.9 | 86.9 | 86.8 | 85.7 | 86.1 |
| 3 | 84.6 | 83.4 | 83.5 | 83.0 | 82.6 | 82.8 | 84.0 | 85.4 | 86.0 | 87.0 | 87.9 | 88.2 | 88.8 | 88.9 | 88.8 | 88.7 | 87.7 | 87.4 | 85.9 | 84.5 | 84.7 | 83.7 | 82.8 | 83.0 | 85.6 |
| 4 | 82.4 | 81.3 | 80.9 | 80.1 | 79.5 | 79.3 | 79.1 | 80.0 | 82.1 | 85.7 | 87.0 | 88.0 | 88.3 | 88.6 | 88.1 | 88.0 | 87.8 | 86.6 | 86.2 | 85.9 | 84.0 | 84.0 | 83.2 | 83.4 | 84.1 |
| 5 | 83.6 | 83.3 | 85.9 | 86.4 | 86.8 | 87.0 | 86.4 | 86.1 | 87.0 | 87.9 | 88.4 | 89.1 | 89.5 | 88.9 | 88.5 | 88.9 | 88.3 | 87.9 | 87.1 | 87.2 | 87.2 | 86.1 | 86.1 | 84.6 | 87.0 |
| 6 | 86.1 | 85.3 | 85.4 | 85.9 | 86.0 | 86.1 | 86.0 | 86.0 | 87.0 | 87.9 | 88.1 | 88.1 | 88.1 | 88.5 | 88.9 | 88.9 | 88.5 | 88.1 | 87.7 | 87.5 | 87.0 | 86.9 | 87.1 | 87.1 | 87.1 |
| 7 | 87.1 | 87.0 | 87.0 | 86.9 | 86.9 | 86.0 | 86.1 | 86.4 | 87.0 | 87.8 | 87.9 | 87.8 | 88.4 | 89.0 | 89.2 | 89.0 | 88.0 | 87.9 | 87.7 | 87.4 | 87.1 | 87.0 | 86.2 | 86.1 | 87.4 |
| 8 | 86.4 | 86.1 | 85.5 | 85.9 | 85.5 | 85.1 | 85.1 | 85.5 | 86.6 | 87.1 | 88.4 | 88.9 | 89.0 | 88.9 | 89.2 | 88.8 | 88.2 | 87.4 | 86.2 | 86.3 | 86.4 | 86.9 | 87.0 | 87.0 | 87.0 |
| 9 | 87.4 | 87.7 | 88.0 | 88.1 | 88.0 | 87.7 | 87.6 | 87.8 | 87.8 | 87.9 | 86.9 | 86.6 | 87.2 | 86.0 | 86.2 | 86.8 | 86.8 | 84.5 | 84.4 | 85.1 | 84.7 | 84.5 | 84.1 | 84.6 | 86.6 |
| 10 | 85.0 | 85.0 | 85.0 | 85.2 | 85.2 | 85.0 | 85.0 | 85.1 | 85.3 | 85.5 | 85.5 | 84.9 | 85.0 | 85.4 | 85.1 | 85.0 | 84.4 | 84.0 | 84.0 | 84.1 | 83.9 | 84.0 | 85.7 | 85.7 | 84.9 |
| 11 | 85.1 | 85.2 | 85.4 | 85.4 | 85.0 | 84.6 | 85.0 | 84.0 | 85.5 | 85.7 | 85.4 | 86.1 | 86.5 | 85.0 | 86.0 | 86.0 | 85.6 | 85.4 | 84.8 | 84.4 | 83.0 | 84.8 | 84.5 | 84.5 | 85.1 |
| 12 | 84.8 | 84.5 | 82.9 | 83.6 | 83.7 | 84.0 | 84.4 | 84.6 | 84.3 | 85.7 | 86.4 | 87.0 | 87.1 | 86.4 | 86.4 | 87.0 | 86.6 | 86.2 | | | | | | | |

TEMPERATURE

Readings in degrees absolute at exact hours, Greenwich Mean Time.

368. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: h_t (height of thermometer bulbs above ground) = 1.3 metres.

NOVEMBER, 1933.

| Hour G. M. T. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean | |
|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Day 1 | 84.3 | 83.3 | 83.6 | 83.6 | 83.7 | 82.9 | 84.0 | 84.0 | 84.3 | 85.0 | 85.7 | 85.7 | 85.5 | 85.5 | 85.4 | 85.4 | 85.1 | 85.0 | 85.2 | 85.1 | 84.9 | 84.8 | 84.8 | 84.8 | 84.6 | 83.9 |
| 2 | 85.0 | 85.0 | 85.2 | 85.3 | 85.2 | 85.0 | 83.8 | 84.2 | 83.9 | 84.4 | 84.6 | 84.6 | 84.9 | 84.6 | 84.0 | 83.9 | 83.5 | 83.4 | 83.1 | 83.0 | 82.0 | 82.0 | 80.5 | 80.5 | 80.5 | 81.7 |
| 3 | 80.1 | 81.2 | 80.1 | 81.4 | 81.8 | 82.0 | 82.0 | 81.8 | 82.0 | 82.2 | 82.6 | 82.9 | 83.0 | 83.0 | 83.0 | 82.9 | 81.7 | 81.5 | 81.6 | 81.9 | 81.2 | 81.2 | 80.4 | 80.6 | 80.6 | 81.7 |
| 4 | 80.3 | 80.0 | 79.5 | 79.1 | 79.4 | 80.0 | 80.0 | 80.0 | 79.9 | 81.3 | 81.8 | 82.0 | 81.8 | 81.9 | 82.1 | 82.0 | 81.9 | 81.8 | 81.2 | 82.0 | 82.4 | 82.4 | 82.1 | 82.2 | 81.2 | 81.1 |
| 5 | 82.0 | 81.9 | 82.0 | 81.9 | 82.0 | 81.7 | 81.5 | 82.0 | 82.7 | 85.0 | 84.3 | 84.4 | 84.9 | 84.4 | 84.4 | 83.9 | 83.6 | 83.7 | 83.6 | 84.0 | 83.9 | 83.9 | 83.4 | 83.9 | 83.3 | 83.3 |
| 6 | 84.1 | 84.5 | 84.6 | 85.0 | 84.6 | 84.4 | 84.2 | 84.0 | 83.9 | 84.1 | 84.9 | 85.0 | 85.2 | 85.5 | 85.8 | 85.2 | 84.7 | 83.8 | 83.1 | 82.9 | 83.8 | 83.1 | 83.8 | 83.1 | 84.3 | 84.3 |
| 7 | 83.3 | 83.0 | 82.8 | 83.0 | 83.0 | 82.4 | 82.0 | 82.1 | 83.0 | 83.5 | 84.1 | 84.0 | 84.1 | 84.1 | 84.0 | 83.7 | 83.0 | 82.5 | 81.9 | 82.0 | 82.4 | 81.9 | 81.0 | 82.0 | 82.9 | 82.9 |
| 8 | 81.7 | 81.0 | 81.0 | 81.5 | 81.7 | 81.5 | 81.5 | 81.2 | 81.5 | 82.1 | 82.7 | 83.2 | 83.6 | 83.9 | 83.5 | 83.1 | 82.8 | 82.5 | 82.6 | 82.6 | 82.8 | 82.5 | 82.7 | 83.0 | 82.3 | 82.3 |
| 9 | 83.1 | 83.2 | 83.9 | 84.0 | 84.0 | 84.0 | 83.9 | 83.9 | 83.8 | 84.0 | 84.1 | 84.5 | 84.5 | 84.4 | 83.9 | 84.0 | 83.4 | 83.0 | 83.1 | 83.2 | 83.3 | 83.0 | 82.6 | 82.5 | 83.6 | 83.6 |
| 10 | 83.0 | 82.8 | 82.9 | 82.9 | 82.5 | 81.6 | 81.8 | 81.7 | 81.2 | 82.4 | 83.6 | 83.3 | 83.7 | 83.4 | 83.4 | 83.0 | 82.7 | 82.2 | 81.4 | 81.3 | 81.2 | 80.4 | 80.4 | 80.0 | 82.3 | 82.3 |
| 11 | 79.1 | 78.5 | 78.9 | 78.6 | 79.5 | 79.4 | 79.9 | 80.1 | 81.0 | 81.2 | 82.9 | 82.9 | 83.6 | 83.1 | 81.9 | 82.6 | 82.3 | 82.2 | 81.5 | 82.0 | 81.0 | 81.4 | 81.3 | 81.6 | 81.1 | 81.1 |
| 12 | 81.1 | 81.1 | 81.6 | 81.3 | 81.9 | 81.9 | 82.4 | 82.3 | 82.4 | 82.6 | 83.1 | 83.0 | 83.8 | 84.0 | 83.1 | 82.7 | 82.5 | 82.9 | 83.0 | 83.1 | 82.7 | 82.4 | 82.1 | 82.1 | 82.5 | 82.5 |
| 13 | 82.1 | 82.0 | 81.8 | 81.6 | 82.0 | 82.0 | 82.5 | 84.3 | 83.3 | 84.1 | 84.1 | 84.1 | 84.6 | 84.1 | 84.1 | 83.6 | 83.7 | 82.7 | 82.3 | 82.8 | 83.0 | 82.9 | 82.9 | 82.7 | 83.0 | 83.0 |
| 14 | 82.9 | 83.0 | 82.6 | 82.2 | 82.7 | 81.7 | 82.0 | 82.0 | 82.7 | 82.9 | 83.0 | 83.1 | 83.0 | 83.1 | 83.6 | 83.9 | 84.0 | 82.8 | 82.1 | 82.2 | 82.1 | 82.2 | 82.0 | 81.3 | 82.7 | 82.7 |
| 15 | 81.0 | 81.1 | 82.1 | 82.1 | 81.5 | 81.1 | 81.3 | 82.4 | 82.0 | 81.9 | 82.0 | 82.4 | 82.4 | 82.0 | 82.0 | 82.0 | 80.3 | 79.5 | 80.0 | 81.0 | 80.9 | 81.2 | 80.9 | 80.4 | 81.4 | 81.4 |
| 16 | 80.0 | 80.0 | 80.0 | 80.9 | 81.2 | 81.4 | 81.2 | 81.0 | 80.6 | 80.7 | 80.6 | 81.0 | 81.2 | 81.5 | 81.7 | 81.2 | 81.2 | 81.0 | 81.0 | 80.0 | 79.3 | 79.1 | 79.2 | 78.5 | 80.6 | 80.6 |
| 17 | 78.0 | 78.0 | 77.5 | 77.3 | 77.0 | 76.8 | 77.1 | 76.9 | 78.0 | 78.0 | 78.7 | 79.0 | 80.0 | 80.0 | 80.0 | 79.9 | 79.4 | 79.0 | 78.8 | 77.9 | 77.1 | 77.2 | 77.0 | 76.9 | 78.2 | 78.2 |
| 18 | 76.6 | 76.9 | 76.0 | 76.3 | 76.0 | 75.2 | 75.2 | 75.6 | 76.7 | 77.0 | 77.6 | 77.9 | 78.4 | 78.9 | 79.4 | 79.0 | 78.8 | 79.0 | 79.0 | 79.0 | 79.9 | 79.9 | 80.0 | 79.6 | 77.7 | 77.7 |
| 19 | 79.9 | 79.2 | 79.4 | 80.0 | 80.2 | 79.8 | 79.8 | 79.0 | 78.4 | 78.0 | 79.6 | 80.8 | 81.1 | 82.0 | 82.6 | 82.1 | 81.2 | 81.2 | 81.4 | 81.0 | 80.2 | 80.2 | 80.9 | 81.2 | 80.3 | 80.3 |
| 20 | 81.4 | 81.8 | 82.0 | 82.2 | 82.5 | 82.4 | 82.0 | 82.2 | 82.1 | 82.2 | 82.5 | 82.5 | 82.7 | 82.5 | 82.6 | 82.4 | 82.3 | 82.5 | 82.2 | 82.0 | 81.3 | 81.8 | 80.4 | 80.9 | 82.1 | 82.1 |
| 21 | 80.9 | 80.9 | 79.5 | 79.0 | 78.9 | 79.0 | 77.0 | 76.0 | 74.6 | 75.7 | 78.2 | 80.1 | 81.9 | 82.0 | 82.0 | 81.4 | 80.4 | 77.5 | 76.0 | 75.0 | 75.0 | 73.4 | 73.7 | 74.8 | 78.2 | 78.2 |
| 22 | 74.0 | 73.1 | 73.7 | 74.0 | 73.4 | 74.1 | 74.2 | 74.1 | 74.9 | 75.8 | 78.1 | 80.9 | 81.6 | 81.4 | 81.5 | 81.4 | 81.2 | 81.3 | 81.4 | 81.4 | 81.4 | 81.7 | 81.9 | 81.9 | 81.9 | 78.1 |
| 23 | 81.9 | 81.8 | 81.7 | 81.9 | 82.0 | 82.0 | 82.0 | 82.1 | 82.4 | 83.0 | 83.1 | 83.3 | 83.5 | 83.4 | 83.4 | 83.2 | 83.0 | 83.0 | 83.0 | 83.0 | 82.5 | 82.0 | 82.2 | 81.0 | 82.5 | 82.5 |
| 24 | 82.6 | 81.6 | 81.6 | 82.0 | 81.4 | 81.6 | 81.5 | 81.4 | 79.7 | 79.5 | 81.2 | 82.9 | 83.1 | 84.0 | 84.0 | 83.0 | 81.4 | 81.1 | 81.2 | 80.3 | 80.9 | 80.6 | 80.4 | 81.0 | 81.6 | 81.6 |
| 25 | 80.9 | 79.3 | 78.4 | 78.1 | 77.0 | 76.7 | 76.0 | 76.5 | 77.0 | 77.0 | 78.0 | 79.0 | 80.0 | 80.5 | 80.3 | 79.2 | 78.1 | 78.1 | 76.6 | 76.3 | 78.9 | 79.0 | 78.0 | 78.7 | 78.2 | 78.2 |
| 26 | 78.5 | 79.1 | 78.8 | 79.0 | 79.0 | 79.4 | 79.3 | 79.2 | 79.0 | 79.1 | 80.3 | 80.9 | 81.0 | 81.1 | 81.0 | 81.1 | 80.9 | 80.1 | 80.0 | 80.1 | 80.5 | 80.6 | 80.9 | 81.0 | 79.9 | 79.9 |
| 27 | 81.0 | 80.8 | 81.0 | 81.0 | 81.2 | 81.4 | 81.7 | 81.4 | 81.4 | 81.9 | 82.0 | 82.0 | 82.1 | 82.4 | 82.4 | 82.4 | 82.4 | 82.5 | 82.7 | 82.7 | 82.7 | 82.7 | 82.7 | 82.3 | 81.9 | 81.9 |
| 28 | 82.3 | 82.1 | 82.1 | 82.0 | 82.2 | 82.0 | 82.4 | 82.1 | 82.3 | 82.5 | 82.7 | 83.0 | 83.0 | 82.9 | 82.8 | 82.7 | 82.8 | 82.2 | 82.3 | 82.3 | 82.3 | 82.1 | 82.2 | 82.4 | 82.4 | 82.4 |
| 29 | 82.5 | 82.9 | 83.0 | 82.9 | 83.0 | 83.2 | 83.4 | 83.4 | 83.4 | 83.7 | 83.9 | 84.0 | 84.0 | 84.0 | 84.0 | 84.0 | 83.9 | 83.9 | 83.7 | 83.7 | 83.8 | 83.7 | 83.8 | 83.4 | 83.5 | 83.5 |
| 30 | 83.4 | 83.3 | 83.4 | 83.6 | 83.6 | 83.9 | 84.0 | 84.1 | 84.2 | 84.6 | 84.4 | 84.3 | 84.4 | 84.5 | 84.5 | 84.5 | 84.4 | 84.8 | 84.9 | 84.8 | 84.7 | 84.7 | 84.7 | 84.7 | 84.2 | 84.2 |
| Mean | 81.2 | 81.1 | 81.0 | 81.1 | 81.1 | 81.0 | 81.0 | 81.0 | 81.1 | 81.5 | 82.1 | 82.6 | 82.9 | 82.9 | 82.9 | 82.6 | 82.2 | 81.9 | 81.6 | 81.6 | 81.6 | 81.5 | 81.3 | 81.3 | 81.7 | 81.7 |

369. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: h_t = 1.3 metres.

DECEMBER, 1933.

| Day | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 84.8 | 84.4 | 84.4 | 84.7 | 84.9 | 84.0 | 83.0 | 82.8 | 83.0 | 83.0 | 83.2 | 83.0 | 83.4 | 83.4 | 83.0 | 82.6 | 82.5 | 82.0 | 81.7 | 80.3 | 80.8 | 80.3 | 79.2 | 78.9 | 82.8 |
| 2 | 76.2 | 76.0 | 74.9 | 75.4 | 74.1 | 73.6 | 73.9 | 74.0 | 74.2 | 74.4 | 76.4 | 78.6 | 81.3 | 81.4 | 81.4 | 80.4 | 79.6 | 79.1 | 78.4 | 77.4 | 77.3 | 77.6 | 77.0 | 77.6 | 77.1 |
| 3 | 76.2 | 76.2 | 78.9 | 79.0 | 78.9 | 78.5 | 78.6 | 78.4 | 78.1 | 78.4 | 78.6 | 78.8 | 78.7 | 78.6 | 78.1 | 77.4 | 77.1 | 76.7 | 76.3 | 75.5 | 75.7 | 74.9 | 76.3 | 75.7 | 77.6 |
| 4 | 77.0 | 76.7 | 76.3 | 76.3 | 76.2 | 76.3 | 76.0 | 75.7 | 76.7 | 76.6 | 77.4 | 77.6 | 77.5 | 77.4 | 77.1 | 76.4 | 76.3 | 75.9 | 75.4 | 75.4 | 75.3 | 75.4 | 75.4 | 76.0 | 76.4 |
| 5 | 76.1 | 76.0 | 75.9 | 75.4 | 76.4 | 76.7 | 76.7 | 77.2 | 77.4 | 77.8 | 78.2 | 78.5 | 79.0 | 79.3 | 79.3 | 79.0 | 78.3 | 78.0 | 77.4 | 78.1 | 77.2 | 76.4 | 75.8 | 77.1 | 77.4 |
| 6 | 79.1 | 79.5 | 79.6 | 79.3 | 79.0 | 79.3 | 79.4 | 79.3 | 79.3 | 80.0 | 80.9 | 81.4 | 81.7 | 81.7 | 82.2 | 82.0 | 81.6 | 81.7 | 81.6 | 81.5 | 81.7 | 81.7 | 81.5 | 81.4 | 80.6 |
| 7 | 81.0 | 81.2 | 81.5 | 81.4 | 80.9 | 80.7 | 81.0 | 81.1 | 80.4 | 80.6 | 81.0 | 81.2 | 81.3 | 81.5 | 81.2 | 80.1 | 79.1 | 78.2 | 77.2 | 76.9 | 76.4 | 75.0 | 76.2 | 77.0 | 79.8 |
| 8 | 77.6 | 79.0 | 79.1 | 78.7 | 78.5 | 78.2 | 78.4 | 78.0 | 77.9 | 78.0 | 78.4 | 77.9 | 77.6 | 77.7 | 77.2 | 76.6 | 76.0 | 75.9 | 76.0 | 75.9 | 75.5 | 75.8 | 75.7 | 75.8 | 77.3 |
| 9 | 75.8 | 75.9 | 75.9 | 75.9 | 75.7 | 76.0 | 75.7 | 75.5 | 75.4 | 75.5 | 75.9 | 76.0 | 76.3 | 76.3 | 76.3 | 75.8 | 75.2 | 75.0 | 75.5 | 74.6 | 74.4 | 74.2 | 74.0 | 73.0 | 75.5 |
| 10 | 73.8 | 74.0 | 73.4 | 72.7 | 72.9 | 72.7 | 72.2 | 72.5 | 72.8 | 72.6 | 73.8 | 74.2 | 74.7 | 74.8 | 74.9 | 74.5 | 74.2 | 73.4 | 74.4 | 74.5 | 74.7 | 75.0 | 75.0 | 74.9 | 73.8 |
| 11 | 74.9 | 74.9 | 75.1 | 75.1 | 75.3 | 75.7 | 75.0 | 74.7 | 74.5 | 75.6 | 75.6 | 76.8 | 77.5 | 78.5 | 78.1 | 77.2 | 75.2 | 73.5 | 73.1 | 73.9 | 74.3 | 75.7 | 79.9 | 80.5 | 75.7 |
| 12 | 80.3 | 80.3 | 80.1 | 80.0 | 79.0 | 78.8 | 79.3 | 79.0 | | | | | | | | | | | | | | | | | |

TEMPERATURE: ANNUAL MEANS OF HOURLY VALUES. From readings in degrees absolute at exact hours, Greenwich Mean Time.

370. CAHIRCIVEEN (VALENTIA OBSERVATORY): North Wall Screen: h_t = 1.3 metres.

1933.

Table with 24 columns (1-24) and 2 rows of temperature data for each hour of the day.

TEMPERATURE: MONTHLY MEANS AND DIURNAL INEQUALITIES. The departures from the mean of the day are adjusted for non-cyclic change.†

371. CAHIRCIVEEN (VALENTIA OBSERVATORY): North Wall Screen: h_t = 1.3 metres.

1933.

Table with 25 columns (Month, Mean, Hour 1-24) showing monthly means and diurnal inequalities for each month from Jan to Dec.

ABSOLUTE EXTREMES OF TEMPERATURE FOR EACH DAY. Maximum and minimum for the interval 0 h. to 24 h., Greenwich Mean Time.

372. CAHIRCIVEEN (VALENTIA OBSERVATORY): North Wall Screen: h_t = 1.3 metres.

1933.

Large table with 24 columns (Day, Max, Min) for each month (Jan-Dec), showing absolute extremes of temperature for each day.

NOTE:- The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is printed 75.0 † see page 21.

RELATIVE HUMIDITY

Percentages at exact hours, Greenwich Mean Time.

375. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: h_t (height of thermometer bulbs above ground) = 1.3 metres.

JANUARY, 1933.

| Hour G. M. T. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean | Vapour Pressure* |
|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------------|
| Day | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % | mb. |
| 1 | 81 | 81 | 81 | 83 | 77 | 84 | 82 | 81 | 76 | 91 | 78 | 76 | 77 | 75 | 78 | 86 | 89 | 94 | 88 | 88 | 93 | 94 | 88 | 83 | 83.4 | 8.6 |
| 2 | 76 | 78 | 73 | 76 | 84 | 92 | 88 | 92 | 93 | 92 | 91 | 95 | 95 | 98 | 94 | 93 | 93 | 94 | 87 | 80 | 77 | 76 | 63 | 73 | 85.7 | 10.6 |
| 3 | 73 | 71 | 68 | 64 | 64 | 72 | 69 | 65 | 64 | 71 | 68 | 65 | 70 | 72 | 67 | 69 | 57 | 65 | 81 | 76 | 79 | 73 | 81 | 79 | 70.0 | 7.2 |
| 4 | 85 | 84 | 83 | 84 | 84 | 85 | 87 | 86 | 86 | 82 | 82 | 82 | 77 | 85 | 93 | 94 | 88 | 93 | 90 | 77 | 72 | 78 | 74 | 65 | 83.5 | 8.3 |
| 5 | 72 | 57 | 71 | 69 | 77 | 60 | 59 | 80 | 70 | 76 | 80 | 87 | 83 | 70 | 68 | 77 | 90 | 88 | 84 | 78 | 73 | 73 | 68 | 76 | 74.2 | 7.1 |
| 6 | 69 | 77 | 72 | 79 | 72 | 75 | 77 | 84 | 88 | 85 | 85 | 79 | 78 | 76 | 77 | 88 | 89 | 89 | 90 | 93 | 88 | 90 | 90 | 88 | 82.2 | 8.5 |
| 7 | 91 | 88 | 88 | 92 | 92 | 91 | 89 | 87 | 88 | 88 | 87 | 85 | 87 | 85 | 89 | 94 | 92 | 93 | 93 | 94 | 97 | 96 | 95 | 96 | 90.5 | 11.3 |
| 8 | 96 | 95 | 95 | 95 | 93 | 93 | 93 | 96 | 95 | 97 | 92 | 91 | 89 | 87 | 87 | 87 | 89 | 91 | 96 | 97 | 97 | 96 | 96 | 89 | 93.1 | 12.5 |
| 9 | 88 | 86 | 80 | 84 | 86 | 81 | 82 | 84 | 77 | 91 | 87 | 85 | 74 | 74 | 76 | 76 | 86 | 86 | 87 | 87 | 88 | 88 | 88 | 91 | 83.8 | 9.4 |
| 10 | 93 | 93 | 89 | 92 | 89 | 92 | 93 | 89 | 89 | 92 | 93 | 91 | 91 | 88 | 84 | 84 | 87 | 93 | 91 | 88 | 92 | 91 | 89 | 91 | 90.2 | 10.5 |
| 11 | 74 | 79 | 72 | 72 | 70 | 72 | 78 | 74 | 72 | 74 | 79 | 76 | 69 | 70 | 74 | 71 | 78 | 83 | 89 | 87 | 84 | 87 | 87 | 82 | 77.4 | 6.9 |
| 12 | 89 | 84 | 80 | 82 | 82 | 75 | 73 | 83 | 84 | 87 | 86 | 79 | 81 | 91 | 93 | 91 | 91 | 77 | 79 | 82 | 84 | 78 | 77 | 81 | 82.9 | 7.7 |
| 13 | 71 | 72 | 79 | 73 | 78 | 82 | 73 | 79 | 85 | 81 | 88 | 81 | 80 | 76 | 75 | 82 | 91 | 90 | 89 | 91 | 94 | 93 | 91 | 93 | 82.5 | 8.7 |
| 14 | 95 | 97 | 96 | 89 | 90 | 92 | 89 | 88 | 81 | 84 | 82 | 80 | 79 | 79 | 80 | 82 | 87 | 88 | 84 | 88 | 88 | 91 | 93 | 87 | 87.2 | 9.8 |
| 15 | 86 | 74 | 71 | 66 | 71 | 78 | 71 | 76 | 85 | 82 | 78 | 85 | 84 | 77 | 68 | 66 | 71 | 58 | 69 | 82 | 89 | 87 | 86 | 89 | 77.0 | 6.5 |
| 16 | 88 | 90 | 85 | 91 | 94 | 85 | 80 | 83 | 91 | 94 | 86 | 91 | 86 | 88 | 87 | 88 | 82 | 87 | 89 | 87 | 83 | 84 | 96 | 96 | 87.8 | 6.3 |
| 17 | 95 | 95 | 95 | 95 | 95 | 96 | 96 | 95 | 96 | 95 | 96 | 87 | 65 | 79 | 78 | 85 | 84 | 84 | 90 | 93 | 93 | 84 | 87 | 84 | 89.5 | 5.5 |
| 18 | 81 | 78 | 82 | 92 | 90 | 87 | 80 | 87 | 80 | 74 | 70 | 59 | 57 | 58 | 56 | 59 | 74 | 56 | 60 | 70 | 79 | 78 | 83 | 83 | 73.9 | 6.4 |
| 19 | 87 | 84 | 91 | 85 | 84 | 84 | 82 | 84 | 77 | 74 | 79 | 79 | 78 | 83 | 84 | 84 | 81 | 78 | 77 | 78 | 81 | 80 | 80 | 82 | 81.5 | 7.0 |
| 20 | 83 | 85 | 83 | 80 | 83 | 85 | 79 | 84 | 84 | 80 | 79 | 78 | 79 | 78 | 78 | 79 | 81 | 76 | 83 | 78 | 81 | 81 | 83 | 82 | 80.9 | 8.4 |
| 21 | 81 | 79 | 81 | 82 | 81 | 81 | 79 | 78 | 77 | 78 | 77 | 78 | 78 | 81 | 81 | 78 | 83 | 81 | 86 | 85 | 85 | 81 | 74 | 69 | 80.0 | 8.8 |
| 22 | 70 | 67 | 70 | 69 | 68 | 65 | 66 | 69 | 65 | 69 | 69 | 67 | 64 | 67 | 65 | 67 | 71 | 68 | 67 | 67 | 68 | 67 | 68 | 66 | 67.5 | 7.3 |
| 23 | 68 | 65 | 66 | 66 | 66 | 66 | 63 | 65 | 62 | 64 | 65 | 64 | 64 | 64 | 66 | 66 | 63 | 65 | 66 | 69 | 66 | 65 | 64 | 64 | 65.1 | 6.5 |
| 24 | 63 | 65 | 63 | 63 | 63 | 66 | 68 | 68 | 66 | 62 | 59 | 60 | 62 | 61 | 60 | 60 | 57 | 59 | 64 | 56 | 69 | 68 | 64 | 65 | 63.4 | 5.7 |
| 25 | 84 | 85 | 78 | 79 | 86 | 92 | 87 | 81 | 80 | 77 | 79 | 66 | 64 | 66 | 66 | 68 | 73 | 84 | 86 | 92 | 93 | 94 | 94 | 96 | 80.6 | 5.2 |
| 26 | 94 | 94 | 95 | 95 | 95 | 94 | 94 | 95 | 96 | 94 | 95 | 90 | 77 | 73 | 63 | 61 | 63 | 66 | 61 | 66 | 72 | 76 | 71 | 74 | 81.9 | 4.9 |
| 27 | 79 | 68 | 68 | 76 | 67 | 69 | 69 | 64 | 64 | 64 | 57 | 54 | 54 | 61 | 61 | 63 | 67 | 60 | 60 | 60 | 62 | 65 | 69 | 69 | 64.7 | 4.7 |
| 28 | 84 | 62 | 66 | 64 | 64 | 72 | 65 | 71 | 71 | 66 | 69 | 66 | 62 | 62 | 63 | 54 | 53 | 52 | 48 | 48 | 55 | 53 | 52 | 52 | 61.1 | 4.6 |
| 29 | 52 | 52 | 54 | 58 | 61 | 58 | 55 | 57 | 63 | 67 | 77 | 79 | 76 | 76 | 76 | 81 | 82 | 82 | 85 | 87 | 85 | 85 | 89 | 82 | 71.0 | 5.9 |
| 30 | 81 | 82 | 88 | 83 | 76 | 77 | 71 | 74 | 81 | 80 | 75 | 73 | 72 | 62 | 70 | 70 | 71 | 77 | 73 | 80 | 75 | 80 | 83 | 76 | 76.4 | 7.3 |
| 31 | 75 | 82 | 79 | 79 | 80 | 85 | 86 | 82 | 87 | 85 | 83 | 79 | 79 | 86 | 92 | 88 | 93 | 89 | 91 | 88 | 89 | 92 | 94 | 96 | 85.4 | 9.7 |
| Mean | 80.1 | 79.0 | 78.8 | 79.3 | 79.4 | 80.2 | 78.2 | 80.0 | 79.8 | 80.5 | 79.7 | 77.7 | 75.2 | 75.7 | 75.8 | 77.1 | 79.2 | 78.9 | 80.1 | 80.7 | 81.7 | 81.5 | 81.2 | 80.7 | 79.2 | 79.7 |
| Vapour Pressure * | mb. 7.2 | mb. 7.2 | mb. 7.1 | mb. 7.2 | mb. 7.2 | mb. 7.2 | mb. 7.2 | mb. 7.3 | mb. 7.4 | mb. 7.5 | mb. 7.7 | mb. 7.7 | mb. 7.6 | mb. 7.7 | mb. 7.8 | mb. 7.8 | mb. 7.8 | mb. 7.6 | mb. 7.6 | mb. 7.6 | mb. 7.6 | mb. 7.6 | mb. 7.5 | mb. 7.5 | mb. 7.5 | mb. 7.5 |

374. CAHIRCIVEEN (Valentia Observatory): North Wall Screen h_t = 1.3 metres.

FEBRUARY, 1933.

| Day | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | Noon | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | Mean | Vapour Pressure* | |
|-----|----|----|----|----|----|----|----|----|----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------------------|------|
| 1 | 95 | 93 | 94 | 97 | 96 | 96 | 94 | 95 | 96 | 94 | 94 | 92 | 96 | 92 | 91 | 88 | 86 | 88 | 78 | 77 | 72 | 70 | 61 | 76 | 88.4 | 10.4 | |
| 2 | 67 | 70 | 62 | 56 | 61 | 63 | 61 | 64 | 76 | 66 | 65 | 65 | 71 | 64 | 61 | 63 | 72 | 75 | 83 | 82 | 80 | 82 | 70 | 68 | 68.8 | 6.5 | |
| 3 | 65 | 70 | 76 | 74 | 78 | 79 | 76 | 78 | 76 | 76 | 87 | 92 | 92 | 96 | 98 | 97 | 98 | 98 | 98 | 98 | 94 | 94 | 94 | 94 | 94 | 86.1 | 10.1 |
| 4 | 95 | 97 | 98 | 98 | 98 | 97 | 96 | 98 | 98 | 97 | 96 | 96 | 96 | 95 | 93 | 93 | 91 | 94 | 95 | 93 | 93 | 93 | 89 | 89 | 95.0 | 12.8 | |
| 5 | 89 | 93 | 89 | 89 | 87 | 89 | 88 | 81 | 82 | 83 | 88 | 89 | 90 | 90 | 94 | 93 | 91 | 91 | 90 | 90 | 90 | 92 | 94 | 93 | 89.3 | 12.3 | |
| 6 | 93 | 90 | 94 | 91 | 89 | 87 | 84 | 86 | 86 | 82 | 87 | 87 | 87 | 87 | 89 | 87 | 87 | 90 | 86 | 87 | 94 | 93 | 93 | 89 | 88.6 | 11.3 | |
| 7 | 86 | 82 | 83 | 77 | 77 | 82 | 79 | 76 | 75 | 86 | 79 | 80 | 85 | 83 | 87 | 85 | 89 | 90 | 96 | 94 | 94 | 94 | 94 | 94 | 94 | 85.2 | 11.1 |
| 8 | 95 | 94 | 94 | 94 | 94 | 94 | 93 | 90 | 89 | 89 | 93 | 94 | 90 | 90 | 88 | 89 | 88 | 87 | 87 | 86 | 89 | 88 | 89 | 89 | 89 | 90.6 | 13.0 |
| 9 | 91 | 91 | 93 | 90 | 93 | 89 | 86 | 81 | 80 | 82 | 76 | 76 | 76 | 76 | 68 | 75 | 81 | 83 | 76 | 84 | 83 | 80 | 79 | 79 | 82.2 | 10.9 | |
| 10 | 79 | 83 | 80 | 76 | 76 | 83 | 77 | 86 | 81 | 74 | 79 | 78 | 83 | 73 | 71 | 63 | 72 | 72 | 72 | 70 | 70 | 74 | 71 | 70 | 75.7 | 8.2 | |
| 11 | 68 | 68 | 68 | 72 | 64 | 60 | 58 | 49 | 48 | 50 | 52 | 54 | 54 | 56 | 56 | 59 | 63 | 69 | 78 | 79 | 77 | 80 | 81 | 83 | 64.1 | 4.9 | |
| 12 | 92 | 96 | 95 | 95 | 95 | 95 | 96 | 96 | 96 | 96 | 96 | 96 | 84 | 82 | 73 | 70 | 73 | 73 | 74 | 79 | 81 | 82 | 79 | 86 | 86.1 | 6.5 | |
| 13 | 86 | 91 | 91 | 85 | 87 | 83 | 77 | 74 | 79 | 72 | 70 | 63 | 65 | 65 | 64 | 58 | 64 | 68 | 66 | 67 | 72 | 68 | 68 | 73 | 73.3 | 6.9 | |
| 14 | 66 | 68 | 66 | 68 | 68 | 68 | 68 | 74 | 73 | 62 | 57 | 56 | 53 | 56 | 59 | 64 | 59 | 60 | 60 | 59 | 68 | 69 | 67 | 73 | 64.0 | 5.5 | |
| 15 | 74 | 74 | 74 | 74 | 75 | 74 | 75 | 80 | 77 | 82 | 77 | 71 | 67 | 70 | 67 | 69 | 79 | 78 | 78 | 76 | 72 | 72 | 79 | 76 | 74.5 | 6.4 | |
| 16 | 79 | 83 | 83 | 91 | 91 | 89 | 89 | 89 | 89 | 87 | 91 | 87 | 84 | 75 | 81 | 79 | 73 | 83 | 86 | 87 | 93 | 88 | 93 | 95 | 85.6 | 7.2 | |
| 17 | 92 | 92 | 90 | 96 | 98 | 88 | 94 | 93 | 90 | | | | | | | | | | | | | | | | | | |

RELATIVE HUMIDITY

Percentages at exact hours, Greenwich Mean Time.

375. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: ht (height of thermometer bulbs above ground) = 1.3 metres.

MARCH, 1933.

Table for March 1933 showing relative humidity percentages at 1-hour intervals from 1 AM to 11 PM. Includes columns for hour, temperature (G.M.T.), and vapour pressure (mb.).

376. CAHIRCIVEEN (Valentia Observatory): North Wall Screen ht = 1.3 metres.

APRIL, 1933.

Table for April 1933 showing relative humidity percentages at 1-hour intervals from 1 AM to 11 PM. Includes columns for hour, temperature (G.M.T.), and vapour pressure (mb.).

* Computed from the mean temperatures and the mean relative humidity.

† Mean of the column.

‡ Mean of the row.

RELATIVE HUMIDITY

Percentages at exact hours, Greenwich Mean Time.

377. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: ht (height of thermometer bulbs above ground) = 1.3 metres.

MAY, 1933.

Table with columns for Hour G. M. T., 1-24, Mean, and Vapour Pressure*. Rows show percentage data for each hour of the day from Day 1 to Day 31. Includes a summary row for Mean and Vapour Pressure*.

JUNE, 1933.

378. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: ht = 1.3 metres.

Table with columns for Day, 1-31, Mean, and Vapour Pressure*. Rows show percentage data for each hour of the day from Day 1 to Day 31. Includes a summary row for Mean and Vapour Pressure*.

* Computed from the mean temperatures and the mean relative humidity.

† Mean of the column.

‡ Mean of the row.

385. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: $h_t = 1.3$ metres.

1933.

| Hour G. M. T. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Noon. | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Mean. |
|--------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
| Relative Humidity. | % 82.9 | % 82.9 | % 83.0 | % 83.0 | % 83.3 | % 83.5 | % 83.0 | % 81.9 | % 80.1 | % 78.7 | % 77.5 | % 76.6 | % 75.7 | % 75.4 | % 75.6 | % 76.5 | % 77.5 | % 78.8 | % 79.9 | % 80.7 | % 81.8 | % 82.1 | % 82.4 | % 82.8 | % 80.2 |
| Vapour Pressure in Millibars.* | mb 10.3 | mb 10.2 | mb 10.2 | mb 10.2 | mb 10.2 | mb 10.2 | mb 10.4 | mb 10.5 | mb 10.5 | mb 10.7 | mb 10.8 | mb 10.9 | mb 11.0 | mb 11.0 | mb 11.1 | mb 11.0 | mb 10.9 | mb 10.8 | mb 10.8 | mb 10.6 | mb 10.6 | mb 10.5 | mb 10.4 | mb 10.4 | mb. 10.6 |

* Computed from the mean temperature and mean relative humidity.

RELATIVE HUMIDITY: MONTHLY MEANS AND DIURNAL INEQUALITIES.
The departures from the mean of the day are adjusted for non-cyclic change.†

386. CAHIRCIVEEN (Valentia Observatory): North Wall Screen: $h_t = 1.3$ metres.

1933.

| MONTH. | Mean. | Hour | G.M.T. | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|-------|------|--------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Noon. | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24. | |
| January | 79.2 | +1.2 | +0.1 | -0.2 | +0.3 | +0.4 | +1.2 | -0.9 | +0.9 | +0.7 | +1.4 | +0.5 | -1.5 | -4.0 | -3.5 | -3.5 | -2.1 | -0.1 | -0.4 | +0.8 | +1.3 | +2.3 | +2.1 | +1.8 | +1.2 | |
| February | 78.3 | +2.0 | +2.9 | +2.5 | +2.5 | +2.4 | +2.5 | +1.4 | +2.1 | +0.7 | -1.0 | -0.8 | -3.8 | -4.1 | -4.7 | -5.4 | -5.1 | -2.5 | -0.2 | +1.1 | +0.4 | +1.5 | +1.4 | +1.9 | +2.3 | |
| March | 80.6 | +3.3 | +2.4 | +2.6 | +2.4 | +3.3 | +3.3 | +2.5 | +1.0 | 0.0 | -0.4 | -4.0 | -4.0 | -3.6 | -5.8 | -5.0 | -3.6 | -2.7 | -0.4 | +1.3 | +0.3 | +0.7 | +1.6 | +1.7 | +3.1 | |
| April | 77.2 | +4.1 | +3.5 | +3.9 | +3.2 | +3.4 | +3.6 | +3.7 | +0.6 | -1.8 | -3.5 | -4.4 | -5.1 | -5.6 | -5.5 | -5.3 | -4.2 | -4.0 | -2.2 | -0.3 | +1.6 | +3.4 | +3.8 | +3.4 | +3.7 | |
| May | 84.0 | +4.1 | +4.3 | +3.7 | +3.9 | +4.7 | +4.1 | +2.8 | +0.6 | -1.9 | -3.6 | -4.6 | -4.8 | -4.3 | -4.5 | -5.0 | -3.8 | -3.5 | -2.4 | -1.9 | +0.4 | +2.5 | +2.6 | +2.8 | +3.8 | |
| June | 83.0 | +3.2 | +3.2 | +2.4 | +3.2 | +2.9 | +2.0 | +1.6 | 0.0 | -2.6 | -2.7 | -3.1 | -3.4 | -3.3 | -3.7 | -3.0 | -2.3 | -2.5 | -1.4 | -1.4 | 0.0 | +1.9 | +2.5 | +3.2 | +3.3 | |
| July | 83.7 | +4.3 | +4.5 | +4.4 | +4.6 | +3.9 | +3.8 | +2.3 | +0.8 | -1.8 | -3.1 | -3.6 | -2.9 | -4.4 | -4.5 | -5.6 | -4.6 | -3.9 | -2.4 | -2.0 | -0.2 | +1.7 | +2.0 | +2.7 | +3.8 | |
| August | 83.6 | +4.1 | +4.5 | +5.2 | +4.9 | +5.8 | +6.8 | +5.4 | +2.4 | -1.5 | -3.4 | -5.2 | -5.9 | -7.1 | -6.2 | -6.1 | -5.6 | -5.0 | -3.1 | -1.6 | +0.4 | +1.2 | +2.7 | +3.3 | +4.0 | |
| September | 79.5 | +3.5 | +3.3 | +3.7 | +4.0 | +4.5 | +5.4 | +4.4 | +3.8 | +1.6 | -2.0 | -4.5 | -6.0 | -7.3 | -7.5 | -6.9 | -5.7 | -4.8 | -1.9 | +0.9 | +1.9 | +2.2 | +2.2 | +2.0 | +3.2 | |
| October | 78.1 | +1.2 | +1.7 | +2.0 | +2.0 | +3.1 | +3.6 | +4.0 | +3.9 | +2.1 | -0.9 | -2.5 | -3.5 | -5.6 | -4.5 | -2.2 | -3.8 | -2.0 | -1.6 | +0.1 | -0.5 | 0.0 | +0.1 | +1.2 | +2.2 | |
| November | 78.1 | +0.4 | +1.0 | +2.6 | +1.7 | +2.6 | +3.2 | +4.3 | +3.6 | +3.4 | +1.2 | -1.3 | -2.2 | -4.3 | -4.9 | -3.9 | -3.4 | -2.4 | -0.7 | -0.5 | -1.4 | -0.1 | +0.7 | +0.6 | -0.1 | |
| December | 77.5 | +0.3 | +0.4 | +1.1 | +0.8 | +0.3 | +0.9 | +1.3 | 0.0 | 0.0 | -0.1 | +0.3 | -0.3 | -0.5 | -2.4 | -2.1 | -1.3 | -0.4 | -0.6 | 0.0 | +0.5 | +0.2 | +1.2 | +0.6 | -0.2 | |
| Year | 80.2 | +2.6 | +2.7 | +2.8 | +2.8 | +3.1 | +3.4 | +2.7 | +1.7 | -0.1 | -1.5 | -2.8 | -3.6 | -4.5 | -4.8 | -4.5 | -3.8 | -2.8 | -1.4 | -0.3 | +0.4 | +1.5 | +1.9 | +2.1 | +2.5 | |

† See page 21.

RAINFALL: ANNUAL TOTALS OF HOURLY VALUES.

Amounts, in millimetres; durations in hours for periods of sixty minutes between the exact hours, Greenwich Mean Time.

387. CAHIRCIVEEN (Valentia Observatory): H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 9.1 metres + 0.5 metre.

1933.

| Hour G. M. T. | 0 to 1 | 1 to 2 | 2 to 3 | 3 to 4 | 4 to 5 | 5 to 6 | 6 to 7 | 7 to 8 | 8 to 9 | 9 to 10 | 10 to 11 | 11 to Noon | Noon. 13 to 14 | 14 to 15 | 15 to 16 | 16 to 17 | 17 to 18 | 18 to 19 | 19 to 20 | 20 to 21 | 21 to 22 | 22 to 23 | 23 to 24 | 24 to 0 | |
|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| Amount. | mm 41.7 | mm 45.1 | mm 54.2 | mm 48.8 | mm 48.7 | mm 57.9 | mm 49.2 | mm 56.5 | mm 49.2 | mm 52.4 | mm 53.4 | mm 52.2 | mm 40.8 | mm 45.2 | mm 57.3 | mm 50.8 | mm 54.8 | mm 48.5 | mm 38.7 | mm 41.3 | mm 41.6 | mm 39.0 | mm 41.1 | mm 38.2 | mm 1146.6 |
| Duration | hr 26.4 | hr 29.8 | hr 29.7 | hr 32.3 | hr 30.3 | hr 30.3 | hr 35.8 | hr 33.2 | hr 30.7 | hr 27.2 | hr 28.8 | hr 22.9 | hr 20.8 | hr 26.8 | hr 34.3 | hr 32.5 | hr 30.7 | hr 28.1 | hr 24.4 | hr 22.1 | hr 26.0 | hr 22.2 | hr 25.8 | hr 23.7 | hr 674.8 |

NOTES ON RAINFALL.

388. CAHIRCIVEEN (Valentia Observatory):

1933.

Notable Falls of the Year:-

Details of the greatest continuous falls are as follows:-

| Date. | Amount. | Duration. |
|------------|---------|-----------|
| | mm. | hrs. |
| March 8 | 21 | 8.2 |
| March 23 | 27 | 14.9 |
| April 22 | 24 | 8.0 |
| August 25 | 20 | 3.9 |
| December 1 | 28 | 4.5 |

There were no "noteworthy" falls in short periods.
The greatest fall in the year between one exact hour and the next was 8.0 mm. between 2h and 3h on December 1st.

Dry Periods:-

The longest period without rain was the 15 days from September 24th. to October 8th. (absolute drought). Other long periods without rain were as follows:- April 12th to 21st., June 25th to July 6th., and September 2nd. to 15th.

Wet Periods:-

There was a period of 19 days from January 1st to 19th on all of which rain fell and on only 4 days was the amount less than 1 mm.

Rain fell on all of the 15 days August 13th to 27th and on only 2 days was the amount less than 1 mm.

RAINFALL.

Amounts in millimetres, for periods of sixty minutes between the exact hours, Greenwich Mean Time.

389. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_r = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 9.1 metres + 0.5 metre.

JANUARY, 1933.

Table for January 1933 showing rainfall data for CAHIRCIVEEN (VALENTIA OBSERVATORY). Columns include Hour G. M. T., rainfall amounts in mm. for each hour, and Duration in hr. for each hour. Summary rows for Sum., Total, and Duration are provided at the bottom.

390. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_r = 9.1 metres + 0.5 metre.

FEBRUARY, 1933.

Table for February 1933 showing rainfall data for CAHIRCIVEEN (VALENTIA OBSERVATORY). Columns include Day, Hour G. M. T., rainfall amounts in mm. for each hour, and Duration in hr. for each hour. Summary rows for Sum., Total, and Duration are provided at the bottom.

RAINFALL.

Amounts in millimetres, for periods of sixty minutes between the exact hours, Greenwich Mean Time. 391. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 9.1 metres + 0.5 metre.

MARCH, 1933.

Table for March 1933 showing rainfall data (mm) and duration (hr) for each hour from 0-1 to 24-0. Includes columns for Hour G. M. T., Day, and Summary (Sum., Total Duration).

392. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_r = 9.1 metres + 0.5 metre.

APRIL, 1933.

Table for April 1933 showing rainfall data (mm) and duration (hr) for each hour from 0-1 to 24-0. Includes columns for Day, Hour, and Summary (Sum., Total Duration, Hour G. M. T.).

RAINFALL

Amounts in millimetres, for periods of sixty minutes between the exact hours, Greenwich Mean Time. 393. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 9.1 metres + 0.5 metre.

MAY, 1933.

Table for station 393, CAHIRCIVEEN, May 1933. Columns include Hour G. M. T., rainfall amounts (mm.) for each hour, and Total Duration (hr.). Rows are numbered 1 to 31. Summary row shows totals for rainfall and duration.

394. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_r = 9.1 metres + 0.5 metre.

JUNE, 1933.

Table for station 394, CAHIRCIVEEN, June 1933. Columns include Day, rainfall amounts (mm.) for each hour, and Total Duration (hr.). Rows are numbered 1 to 30. Summary row shows totals for rainfall and duration.

RAINFALL

Amounts in millimetres, for periods of sixty minutes between the exact hours, Greenwich Mean Time.
399. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r
(height of receiving surface above ground) = 9.1 metres + 0.5 metre.

NOVEMBER, 1933.

Table with 25 columns (Hour G. M. T., 0-1, 1-2, ..., 23-24, 0-24, Duration 0-24) and 31 rows (Day 1 to 30, Sum., Total Duration). Contains rainfall data for November 1933.

400. CAHIRCIVEEN (VALENTIA OBSERVATORY): H_r = 9.1 metres + 0.5 metre

DECEMBER, 1933.

Table with 25 columns (Day, 1, 2, ..., 31, Sum., Total Duration, Hour G. M. T.) and 31 rows (Day 1 to 31, Sum., Total Duration). Contains rainfall data for December 1933, including wind speed and direction indicators.

DURATION OF BRIGHT SUNSHINE.

For periods of sixty minutes, between the exact hours of Local Apparent Time.

409. CAHIRCIVEEM (VALENTIA OBSERVATORY): H_s (height of recorder above ground) = 12.8 metres.

SEPTEMBER, 1933.

| Hour L. A. T. | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | Total for Day | Per cent. of Possible | |
|------------------|-----|-----|-----|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------|-----------------------------|-----|
| Day 1 | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | % |
| 2 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30 | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Sum | --- | --- | ... | 7.1 | 16.0 | 17.9 | 18.2 | 20.8 | 20.4 | 20.1 | 18.9 | 20.3 | 20.2 | 17.7 | 7.4 | 0.2 | --- | --- | 205.2 | --- | |
| Mean | --- | --- | ... | 0.24 | 0.53 | 0.60 | 0.61 | 0.69 | 0.68 | 0.67 | 0.63 | 0.68 | 0.67 | 0.59 | 0.25 | 0.01 | --- | --- | 6.84 | 54 | |

410. CAHIRCIVEEM (VALENTIA OBSERVATORY): H_s = 12.8 metres.

OCTOBER, 1933.

| Day | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | % | |
|------------------|-----|-----|-----|-----|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------|-----------------------------|-----|-----|
| 1 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31 | --- | --- | --- | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Sum | --- | --- | --- | ... | 1.4 | 7.9 | 11.8 | 10.0 | 13.4 | 12.5 | 8.6 | 9.2 | 6.7 | 1.9 | ... | --- | --- | --- | --- | --- | --- | --- |
| Mean | --- | --- | --- | ... | 0.05 | 0.25 | 0.38 | 0.32 | 0.43 | 0.40 | 0.28 | 0.30 | 0.22 | 0.06 | ... | --- | --- | --- | --- | --- | --- | --- |
| Hour L. A. T. | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | Total for Day | Per cent. of Possible | | |

413. CAHIRCIVEEN (Valentia Observatory):
Dines Anemograph from Jan., 1926.

H_a (height of anemograph above M.S.L.) = Height of ground above

Table with columns: Hour G. M. T., Day, and wind speed measurements (0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12) in degrees and m/s.

414. CAHIRCIVEEN (Valentia Observatory): H_a = 17 metres + 13 metres.

Table with columns: Day, Hour G. M. T., and wind speed measurements (0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12) in degrees and m/s.

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 17 metres + 13 metres.

JANUARY, 1933.

Table with columns for time intervals (12-13 to 23-24), wind speed (m/s), and day numbers (1-30). Includes mean values and a final day column.

FEBRUARY, 1933.

Table with columns for time intervals (12-13 to 23-24), wind speed (m/s), and day numbers (1-28). Includes mean values and a final day column.

415. CAHIRCIVEEN (Valentia Observatory): Dines Anemograph from Jan., 1926.

H_a (height of anemograph above M.S.L.) = Height of ground above.

Table with columns for Hour G. M. T., Day, and wind speed/direction for intervals 0-1 to 11-12. Includes a Mean row at the bottom.

416. CAHIRCIVEEN (Valentia Observatory): H_a = 17 metres + 13 metres.

Table with columns for Day, Hour G. M. T., and wind speed/direction for intervals 0-1 to 11-12. Includes a Mean row at the bottom.

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 17 metres + 13 metres.

MARCH, 1933.

Table for March 1933 with columns for date ranges (12-13 to 23-24), wind speed in m/s, and Day. Includes data for various days and a summary row at the bottom.

APRIL, 1933.

Table for April 1933 with columns for date ranges (12-13 to 23-24), wind speed in m/s, and Day. Includes data for various days and a summary row at the bottom.

Direction expressed in degrees from North (E = 90°, S = 180°, W = 270°, N = 360°): Speed in Metres per second.

417. CAHIRCIVEEN (Valentia Observatory): Dines Anemograph from Jan., 1926.

H_a (height of anemograph above M.S.L.) = Height of ground above

Table with 25 columns (Hour G.M.T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12) and 32 rows (Day 1-31, Mean). Each cell contains two values: direction (degrees) and speed (m/s).

418. CAHIRCIVEEN (Valentia Observatory): H_a = 17 metres + 13 metres.

Table with 25 columns (Hour G.M.T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12) and 32 rows (Day 1-31, Mean). Each cell contains two values: direction (degrees) and speed (m/s).

WIND: DIRECTION AND SPEED.

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 17 metres + 13 metres.

MAY, 1933.

Table with 25 columns (12-13 to 23-24, Mean, Day) and 31 rows of wind speed data (m/s) for May 1933. Includes values for periods 12-13 through 23-24, a mean column, and a day column. Values range from 4.0 to 11.4 m/s.

JUNE, 1933.

Table with 25 columns (12-13 to 23-24, Mean, Day) and 31 rows of wind speed data (m/s) for June 1933. Includes values for periods 12-13 through 23-24, a mean column, and a day column. Values range from 4.0 to 12.6 m/s.

419. CAHIRCIVEEN (Valentia Observatory):
Dines Anemograph from Jan., 1926.

H_a (height of anemograph above M.S.L.) = Height of ground above

| Hour G. M. T. | 0 - 1 | | 1 - 2 | | 2 - 3 | | 3 - 4 | | 4 - 5 | | 5 - 6 | | 6 - 7 | | 7 - 8 | | 8 - 9 | | 9 - 10 | | 10 - 11 | | 11 - 12 | |
|------------------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|---------|-------|---------|-------|
| Day | ° | 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 | --- | --- | --- | --- | --- | --- | 65 | 1.0 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 310 | 2.2 | 270 | 2.4 |
| 2 | --- | --- | --- | --- | 55 | 2.0 | 70 | 2.7 | 25 | 1.4 | --- | --- | --- | --- | 50 | 2.0 | 55 | 3.6 | 30 | 3.7 | 45 | 5.0 | 26 | 4.6 |
| 3 | 200 | 1.7 | 185 | 2.6 | 190 | 1.5 | --- | --- | --- | --- | 60 | 1.4 | 65 | 1.0 | --- | --- | --- | --- | --- | --- | 270 | 2.0 | 260 | 2.5 |
| 4 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 350 | 1.4 | 290 | 1.3 | 275 | 1.4 | 275 | 2.4 |
| 5 | --- | --- | --- | --- | --- | --- | 75 | 1.3 | --- | --- | 190 | 1.4 | 90 | 3.8 | 105 | 7.8 | 105 | 7.2 | 100 | 6.1 | 90 | 5.3 | 120 | 7.5 |
| 6 | 100 | 3.9 | 120 | 3.1 | 100 | 4.5 | 105 | 4.8 | 110 | 5.1 | 100 | 5.7 | 105 | 6.8 | 115 | 8.0 | 105 | 5.1 | 110 | 3.6 | 125 | 5.5 | 115 | 7.0 |
| 7 | 135 | 6.9 | 120 | 7.6 | 120 | 6.7 | 100 | 5.5 | 105 | 3.5 | 105 | 4.0 | 140 | 3.0 | 190 | 2.4 | 180 | 2.1 | 180 | 1.8 | --- | --- | --- | --- |
| 8 | 205 | 7.4 | 205 | 7.8 | 195 | 8.0 | 190 | 7.4 | 185 | 6.0 | 180 | 4.8 | 180 | 4.9 | 180 | 2.7 | 70 | 1.6 | 270 | 1.7 | 275 | 3.0 | 240 | 5.3 |
| 9 | 230 | 4.6 | 230 | 4.3 | 220 | 4.7 | 210 | 4.7 | 210 | 6.1 | 210 | 6.0 | 210 | 6.9 | 195 | 5.9 | 195 | 7.3 | 190 | 8.6 | 190 | 8.0 | 215 | (9.0) |
| 10 | 230 | 7.3 | 225 | 8.5 | 235 | 8.1 | 235 | 7.4 | 240 | 8.4 | 245 | 7.4 | 240 | 6.6 | 245 | 7.1 | 245 | 7.2 | 240 | 7.4 | 235 | 8.0 | 235 | 8.6 |
| 11 | 240 | 5.7 | 240 | 5.4 | 240 | 5.7 | 250 | 6.6 | 255 | 6.9 | 260 | 7.1 | 270 | 6.6 | 275 | 5.4 | 270 | 6.5 | 265 | 6.7 | 265 | 6.7 | 265 | 7.0 |
| 12 | 275 | 5.1 | 280 | 4.6 | 270 | 5.6 | 275 | 5.6 | 275 | 5.0 | 290 | 5.1 | 335 | 4.5 | 275 | (3.5) | 280 | (5.2) | 300 | (5.0) | 275 | 3.9 | 280 | 5.0 |
| 13 | 180 | 10.2 | 170 | 9.8 | 190 | (8.6) | 235 | (8.0) | 235 | (7.8) | 230 | (6.6) | 250 | 6.1 | 245 | 5.9 | 235 | 5.8 | 230 | 5.5 | 245 | 7.6 | 260 | 8.3 |
| 14 | 305 | 8.4 | 305 | 8.5 | 300 | 7.1 | 305 | 7.8 | 305 | 7.5 | 300 | 7.8 | 300 | 6.2 | 290 | 5.1 | 280 | 5.6 | 275 | 6.5 | 270 | 6.4 | 270 | 7.4 |
| 15 | 175 | 3.5 | 170 | 4.0 | 155 | 2.2 | --- | --- | 95 | 1.2 | 65 | 1.2 | --- | --- | --- | --- | 5 | 3.0 | 335 | 4.6 | 325 | 5.8 | 340 | 5.6 |
| 16 | 355 | 4.9 | 355 | 3.4 | 350 | 4.4 | 360 | 3.0 | 30 | 1.3 | 335 | 4.2 | 340 | 4.0 | 335 | 4.2 | 330 | 4.4 | 335 | 4.5 | 325 | 3.4 | 280 | 4.4 |
| 17 | 170 | 7.1 | 175 | 5.7 | 180 | 4.0 | 230 | 3.1 | 245 | 4.1 | 235 | 4.2 | 240 | 4.0 | 250 | 3.5 | 270 | 1.8 | 250 | 4.2 | 255 | 4.3 | 250 | 4.2 |
| 18 | 185 | 5.1 | 180 | 4.3 | 185 | 8.6 | 185 | 6.5 | 180 | 6.6 | 175 | 7.1 | 175 | 6.2 | 180 | 6.1 | 185 | 6.4 | 185 | 7.0 | 185 | 8.1 | 185 | 8.6 |
| 19 | 185 | 8.1 | 180 | 8.9 | 180 | 8.4 | 215 | 4.1 | 200 | 4.5 | 215 | 6.0 | 230 | 5.4 | 230 | 5.8 | 230 | 5.8 | 245 | 6.0 | 230 | 7.2 | 240 | 7.7 |
| 20 | 275 | 4.5 | 265 | 2.9 | 285 | 2.8 | 280 | 1.3 | 270 | (4.0) | 270 | (5.0) | 290 | (3.8) | 270 | (5.0) | 280 | 5.2 | 275 | 3.4 | 280 | 4.1 | 280 | 4.9 |
| 21 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 180 | 2.1 | 170 | 2.9 | 185 | 4.3 | 180 | 4.7 | 180 | 5.1 |
| 22 | 145 | 2.0 | 150 | 1.2 | 170 | 1.4 | 170 | 1.6 | 175 | 1.8 | --- | --- | 185 | 1.6 | 200 | 2.0 | 220 | 1.3 | 265 | 1.7 | 275 | 3.0 | 275 | 3.2 |
| 23 | --- | --- | 320 | 1.0 | 330 | 1.2 | --- | --- | 325 | 1.1 | 330 | 1.0 | --- | --- | 300 | 1.3 | 270 | 1.9 | 275 | 2.0 | 275 | 3.1 | 275 | 3.5 |
| 24 | 215 | 2.6 | 255 | 3.5 | 265 | 2.3 | --- | --- | 260 | 1.8 | 260 | 1.7 | --- | --- | 190 | 1.8 | 180 | 3.8 | 190 | 3.8 | 175 | 4.7 | 190 | 5.3 |
| 25 | 205 | 6.0 | 195 | 4.4 | 200 | 4.0 | 195 | 6.1 | 185 | 4.1 | 195 | 3.9 | 190 | 4.7 | 185 | 5.9 | 185 | 7.0 | 175 | 7.0 | 175 | 7.4 | 180 | 7.5 |
| 26 | 190 | 5.9 | 190 | 7.4 | 200 | 7.1 | 240 | 4.7 | 245 | 3.7 | 245 | 4.0 | 270 | 5.5 | 270 | 4.7 | 275 | 4.2 | 285 | 3.6 | 280 | 3.1 | 275 | 3.9 |
| 27 | --- | --- | --- | --- | --- | --- | 30 | 1.2 | 75 | 3.6 | 120 | 1.3 | 130 | 1.2 | 45 | 2.3 | 70 | 3.6 | 350 | 3.2 | 360 | (4.4) | 355 | (5.0) |
| 28 | 165 | 3.9 | 180 | 5.7 | 190 | 6.8 | 195 | 7.2 | 195 | 8.1 | 195 | 9.2 | 210 | 10.0 | 235 | 8.4 | 255 | 7.5 | 260 | 8.6 | 260 | 8.7 | 270 | 8.0 |
| 29 | 275 | 7.1 | 270 | 7.8 | 275 | 8.6 | 275 | 8.5 | 270 | 9.0 | 275 | 9.8 | 275 | 9.6 | 275 | 10.0 | 280 | 9.5 | 290 | 8.7 | 305 | 8.6 | 310 | 9.3 |
| 30 | 160 | 1.6 | 110 | 1.3 | 65 | 1.2 | 65 | 1.3 | 165 | 3.5 | 160 | 5.0 | 170 | 6.4 | 175 | 8.5 | 180 | 9.9 | 180 | 10.0 | 175 | 10.9 | 175 | 11.6 |
| 31 | 300 | 10.4 | 300 | 12.0 | 300 | 11.6 | 300 | 11.0 | 310 | 10.8 | 310 | 11.2 | 315 | 12.0 | 320 | 10.7 | 335 | 9.7 | 330 | 10.1 | 330 | 12.0 | 330 | 11.1 |
| Mean | --- | 4.4 | --- | 4.5 | --- | 4.5 | --- | 4.0 | --- | 4.1 | --- | 4.3 | --- | 4.3 | --- | 4.5 | --- | 4.8 | --- | 4.9 | --- | 5.5 | --- | 6.0 |

420. CAHIRCIVEEN (Valentia Observatory): H_a = 17 metres + 13 metres.

| Day | ° | 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 | 300 | 2.7 | 300 | 2.8 | 285 | 2.8 | 270 | 1.4 | 265 | 1.1 | 250 | 2.2 | 245 | 1.0 | 250 | 2.4 | 230 | 2.6 | 225 | 2.6 | 240 | 4.1 | 240 | 4.5 |
| 2 | 185 | 6.6 | 185 | 7.0 | 200 | 6.4 | 190 | 6.0 | 200 | 4.9 | 190 | 5.3 | 205 | 4.6 | 210 | 4.5 | 220 | 4.5 | 215 | 4.4 | 220 | 6.4 | 225 | 6.2 |
| 3 | 245 | 2.0 | 245 | 2.1 | 245 | 1.7 | --- | --- | --- | --- | 245 | 1.0 | --- | --- | --- | --- | --- | --- | 330 | 2.1 | 315 | 2.8 | 305 | 3.0 |
| 4 | --- | --- | 50 | 2.1 | 45 | 1.4 | 45 | 1.4 | 60 | 1.5 | 65 | 1.2 | --- | --- | 60 | 1.0 | 65 | 2.7 | 110 | 2.7 | 165 | 3.2 | 215 | 5.2 |
| 5 | --- | --- | --- | --- | --- | --- | 80 | 1.0 | --- | --- | --- | --- | --- | --- | --- | --- | 200 | 2.1 | 210 | 3.0 | 170 | 5.0 | 190 | 5.9 |
| 6 | 215 | 2.6 | 165 | 2.4 | 160 | 3.6 | 165 | 4.2 | 175 | 4.4 | 210 | 3.8 | 275 | 1.8 | --- | --- | 285 | 1.3 | 290 | 1.5 | 270 | 2.8 | 295 | 3.8 |
| 7 | 65 | 5.4 | 60 | 1.1 | 45 | 1.9 | --- | --- | --- | --- | 140 | 1.2 | --- | --- | 20 | 1.6 | 270 | 1.9 | 285 | 3.9 | 280 | 4.2 | 270 | 4.3 |
| 8 | 315 | 4.4 | 315 | 4.4 | 305 | 4.1 | 320 | 4.1 | 320 | 2.5 | 295 | 3.4 | 325 | 2.9 | 320 | 2.1 | 285 | 2.7 | 280 | 2.9 | 280 | 3.3 | 280 | 3.2 |
| 9 | 225 | 4.0 | 230 | 4.7 | 260 | 4.8 | 270 | 4.0 | 280 | 3.0 | 310 | 1.8 | 305 | 2.6 | 320 | 2.9 | 350 | 3.8 | 345 | 4.0 | 340 | 3.8 | 340 | 4.5 |
| 10 | 80 | 2.9 | 90 | 2.7 | 75 | 3.8 | 80 | 3.0 | 65 | 3.3 | 70 | 3.0 | 60 | 2.6 | 70 | 4.1 | 70 | 5.1 | 60 | 5.0 | 65 | 4.9 | 40 | 3.9 |
| 11 | --- | --- | --- | --- | --- | --- | 100 | 1.0 | 55 | 1.7 | 60 | 1.2 | 70 | 1.2 | 300 | 1.0 | 340 | 1.3 | 65 | 4.4 | 60 | 4.3 | 60 | 4.1 |
| 12 | 170 | 1.9 | --- | --- | --- | --- | 50 | 1.0 | 70 | 1.4 | 60 | 2.5 | --- | --- | --- | --- | --- | --- | 275 | 1.5 | 130 | 1.5 | 150 | 3.7 |
| 13 | 95 | 3.0 | 120 | 4.8 | 140 | 4.5 | 155 | 3.9 | 155 | 4.7 | 140 | 3.4 | 155 | 3.9 | 155 | 4.0 | 165 | 4.8 | 155 | 5.1 | 160 | 4.8 | 170 | 5.3 |
| 14 | --- | --- | 55 | 1.0 | --- | --- | --- | --- | --- | --- | 340 | 2.5 | 325 | 3.0 | 325 | 2.4 | 320 | 3.4 | 335 | 4.0 | 290 | 3.5 | 280 | 3.9 |
| 15 | 195 | 9.8 | 200 | 10.0 | 205 | 11.7 | 225 | 9.9 | 240 | 8.6 | 255 | 9.1 | 270 | 8.1 | 275 | 8.1 | 290 | 6.7 | 305 | 7.1 | 305 | 6.5 | 305 | 6.6 |
| 16 | 305 | 3.8 | 305 | 4.2 | 295 | 3.1 | 295 | 3.1 | 300 | 2.7 | 315 | 2.1 | 40 | 1.3 | 275 | 1.6 | 310 | 2.8 | 330 | 2.5 | 275 | 2.5 | 270 | 3.5 |
| 17 | 205 | 9.6 | 210 | 10.4 | 210 | 11.6 | 210 | 10.7 | 215 | 10.6 | 220 | 10.6 | 225 | 9.9 | 240 | 7.5 | 235 | 7.4 | 245 | 8.3 | 250 | 8.4 | 240 | 8.6 |
| 18 | 255 | 5.8 | 260 | 5.9 | 245 | 5.1 | 245 | 5.2 | 240 | 5.4 | 230 | 4.6 | 235 | 5.4 | 240 | 5.4 | 240 | 7.2 | 240 | 8.0 | 235 | 7.8 | 235 | 9.4 |
| 19 | 250 | 3.9 | 270 | 5.3 | 260 | 4.9 | 265 | 5.9 | 270 | 6.0 | 270 | 5.3 | 275 | 4.5 | 260 | 4.6 | 270 | 5.7 | 270 | 5.5 | 270 | 5.0 | 280 | 5.6 |
| 20 | 245 | 7.0 | 265 | 8.9 | 290 | 6.5 | 300 | 7.1 | 300 | 7.0 | 300 | 6.2 | 300 | 6.5 | 300 | 5.6 | 300 | 6.2 | 290 | 6.1 | 280 | 6.8 | 275 | 7.7 |
| 21 | 315 | 6.2 | 315 | 6.5 | 315 | 5.3 | 325 | 5.4 | 330 | 6.2 | 325 | 5.8 | 330 | 6.5 | 325 | 7.4 | 330 | 7.9 | 335 | 9.7 | 340 | 9.0 | 345 | 8.2 |
| 22 | --- | --- | 175 | 1.4 | 180 | 2.8 | 60 | 1.1 | 55 | 1.0 | --- | --- | 175 | 1.9 | 175 | 2.5 | 180 | 3.0 | 185 | 5.1 | 220 | 5.3 | 265 | 7.0 |
| 23 | 325 | 6.5 | 320 | 6.1 | 310 | 6.9 | 305 | 7.1 | 300 | 6.0 | 310 | 5.8 | 315 | 6.3 | 310 | 6.7 | 325 | 6.2 | 320 | 5.9 | 305 | 5.1 | 300 | 5.8 |
| 24 | 180 | 3.5 | 130 | 2.0 | 175 | 3.6 | 175 | 4.3 | 170 | 2.6 | 180 | 3.9 | 180 | 4.9 | 190 | 5.6 | 190 | 5.6 | 195 | 6.7 | 200 | 6.0 | 195 | 7.3 |
| 25 | 175 | 8.6 | 175 | 8.0 | 180 | 7.5 | 185 | 8.6 | 190 | 8.6 | 195 | 9.7 | 190 | 8.6 | 190 | 9.6 | 190 | 8.4 | 190 | 7.5 | 180 | 8.0 | 180 | 9.0 |
| 26 | 170 | 7.3 | 165 | 7.9 | 165 | 8.5 | 155 | 10.2 | 160 | 9.9 | 160 | 9.2 | 165 | 9.0 | 165 | 9.6 | 165 | 9.3 | 170 | 8.5 | 170 | 8.2 | 175 | 8.9 |
| 27 | 185 | 7.5 | 190 | 7.5 | 190 | 7.3 | 185 | 6.3 | 185 | 6.0 | 185 | 4.9 | 180 | 4.3 | 175 | 5.2 | 175 | | | | | | | |

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 17 metres + 13 metres.

JULY, 1933.

Table with columns for time intervals (12-13 to 23-24), wind speed (m/s), and day numbers (1-31). Includes a 'Mean' column and a 'Day' column.

AUGUST, 1933.

Table with columns for time intervals (12-13 to 23-24), wind speed (m/s), and day numbers (1-31). Includes a 'Mean' column and a 'Day' column.

421. CAHIRCIVEEN (Valentia Observatory):
Dines Anemograph from Jan., 1926.

H_a (height of anemograph above M.S.L.) = Height of ground above

| Hour G. M. T. | 0 - 1 | | 1 - 2 | | 2 - 3 | | 3 - 4 | | 4 - 5 | | 5 - 6 | | 6 - 7 | | 7 - 8 | | 8 - 9 | | 9 - 10 | | 10 - 11 | | 11 - 12 | |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|---------|-------|---------|-------|
| | ° | 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 | 220 | 5.0 | 220 | 5.0 | 220 | 5.0 | 225 | 4.8 | 220 | 4.1 | 225 | 4.9 | 230 | 5.1 | 230 | 5.5 | 225 | 5.4 | 240 | 5.8 | 255 | (5.6) | 260 | (6.0) |
| 2 | 270 | 1.1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 295 | 1.0 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | 55 | 1.2 | 60 | 2.6 | 65 | 2.3 | 65 | 1.6 | 60 | 2.1 | 55 | 2.0 | 60 | 1.0 | --- | --- | 70 | 1.1 | --- | --- | --- | --- | --- | --- |
| 4 | --- | --- | --- | --- | --- | --- | 160 | 3.7 | 175 | 4.4 | 185 | 2.9 | 140 | 3.0 | 140 | 3.4 | 150 | 3.5 | 150 | 2.6 | 160 | 2.1 | 210 | 1.5 |
| 5 | 105 | 7.0 | 90 | 5.0 | 90 | 4.4 | 90 | 5.0 | 100 | 5.0 | 120 | 5.5 | 140 | 5.0 | 145 | 4.3 | 135 | 4.1 | 120 | 4.8 | 130 | 4.9 | 170 | 6.4 |
| 6 | 345 | 7.7 | 355 | 7.7 | 355 | 8.5 | 355 | 8.0 | 355 | 7.8 | 5 | 7.4 | 15 | 6.7 | 15 | 6.3 | 15 | 8.1 | 20 | 7.7 | 25 | 7.7 | 20 | 8.8 |
| 7 | 50 | 5.0 | 50 | 7.3 | 60 | 7.5 | 60 | 7.9 | 60 | 9.1 | 55 | 9.4 | 65 | 9.7 | 70 | 9.2 | 65 | 10.2 | 75 | 10.8 | 70 | 7.9 | 70 | 7.7 |
| 8 | 140 | 1.2 | --- | --- | --- | --- | --- | 35 | 1.0 | --- | --- | --- | 30 | 3.3 | 85 | 6.1 | 90 | 4.9 | 80 | 2.3 | 55 | 3.7 | 65 | 6.0 |
| 9 | 50 | 1.0 | 70 | 1.2 | --- | --- | --- | 150 | 1.1 | 85 | 5.7 | 75 | 6.6 | 80 | 5.7 | 90 | 4.8 | 100 | 3.7 | 105 | 2.9 | 60 | 3.3 | |
| 10 | 65 | 3.3 | 40 | 1.1 | --- | --- | --- | 40 | 1.5 | 80 | 5.5 | 95 | 2.6 | 105 | 2.5 | 50 | 1.6 | 350 | 1.0 | 85 | 2.7 | 65 | 4.1 | |
| 11 | 75 | 4.6 | 60 | 3.5 | 50 | 3.8 | 60 | 4.1 | 95 | 1.9 | --- | --- | 95 | 5.1 | 90 | 5.6 | 85 | 3.4 | 75 | 3.2 | 75 | 3.2 | 55 | 4.7 |
| 12 | --- | --- | --- | --- | 45 | 1.0 | 50 | 1.0 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 55 | 2.9 | |
| 13 | 80 | 1.7 | 90 | 1.0 | --- | --- | --- | 50 | 1.0 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 360 | 3.0 | 15 | 3.6 |
| 14 | 40 | 2.6 | 40 | 2.6 | 60 | 2.4 | 55 | 2.3 | 75 | 2.9 | 50 | 1.9 | 50 | 2.4 | 50 | 1.4 | 45 | 1.4 | 45 | 2.9 | 65 | 3.7 | | |
| 15 | 140 | 2.0 | 130 | 4.5 | 140 | 4.5 | 145 | 5.5 | 140 | 6.0 | 145 | 5.1 | 210 | 1.1 | 150 | 4.7 | 150 | 5.7 | 155 | 7.0 | 165 | 7.7 | | |
| 16 | 135 | 3.5 | 140 | 6.9 | 150 | 7.1 | 140 | 5.9 | 140 | 8.0 | 145 | 5.2 | 150 | 9.1 | 135 | 7.7 | 135 | 7.3 | 145 | 7.2 | 165 | 7.9 | | |
| 17 | 165 | 7.9 | 160 | 8.9 | 165 | 8.9 | 150 | 10.0 | 155 | 9.6 | 165 | 9.8 | 170 | 9.4 | 170 | 9.2 | 170 | 9.9 | 165 | 10.0 | 170 | 10.9 | | |
| 18 | 260 | 6.5 | 265 | 7.3 | 265 | 7.2 | 260 | 5.5 | 230 | 4.5 | 230 | 4.1 | 190 | 3.4 | 185 | 3.5 | 190 | 4.3 | 200 | 5.5 | 205 | 6.8 | | |
| 19 | 180 | 9.3 | 185 | 7.7 | 195 | 9.1 | 195 | 7.2 | 195 | 6.5 | 190 | 6.1 | 220 | 7.0 | 200 | 5.0 | 205 | 5.1 | 220 | 7.4 | 215 | 6.7 | | |
| 20 | 230 | 5.4 | 235 | 4.7 | 175 | 5.0 | 155 | 2.9 | 50 | 3.2 | 60 | 3.1 | 60 | 2.3 | 50 | 2.3 | 115 | 2.4 | 100 | 1.1 | --- | --- | | |
| 21 | 360 | 5.7 | 350 | 7.4 | 360 | 4.4 | 5 | 4.9 | 360 | 6.7 | 15 | 5.9 | 20 | 6.0 | 20 | 7.2 | 35 | 5.5 | 40 | 6.2 | 40 | 6.5 | | |
| 22 | --- | --- | --- | --- | --- | --- | 60 | 1.0 | 45 | 1.7 | 95 | 2.1 | 145 | 2.9 | 145 | 4.3 | 145 | 5.2 | 145 | 6.2 | 150 | 6.8 | | |
| 23 | 290 | 4.5 | 295 | 5.5 | 300 | 4.6 | 295 | 4.7 | 300 | 4.3 | 300 | 4.1 | 295 | 4.5 | 285 | 4.5 | 290 | 4.6 | 295 | 5.0 | 290 | 5.7 | | |
| 24 | 20 | 6.8 | 30 | 6.9 | 15 | 9.4 | 15 | 10.1 | 15 | 8.5 | 20 | 8.3 | 25 | 8.4 | 35 | 7.6 | 55 | 4.9 | 35 | 6.7 | 20 | 7.0 | | |
| 25 | 5 | 9.0 | 10 | 6.8 | 360 | 6.7 | 360 | 10.8 | 360 | 11.7 | 360 | 9.5 | 360 | 7.9 | 360 | 8.0 | 25 | 6.5 | 20 | 6.5 | 35 | 6.6 | | |
| 26 | 65 | 1.4 | --- | --- | 40 | 1.3 | 50 | 2.7 | 35 | 4.2 | 40 | 3.6 | 70 | 1.8 | 30 | 3.0 | 40 | 5.3 | 40 | 5.4 | 50 | 4.9 | | |
| 27 | 55 | (3.2) | 55 | (3.2) | 45 | (2.6) | 40 | (1.0) | 360 | (1.3) | 15 | (1.0) | --- | (...) | --- | (...) | 90 | (1.6) | 50 | (1.6) | 50 | 3.2 | | |
| 28 | --- | --- | 105 | 1.4 | --- | --- | --- | --- | 140 | 1.1 | 35 | 1.0 | --- | --- | --- | --- | 55 | 1.1 | 360 | 2.0 | 50 | 5.2 | | |
| 29 | 50 | 1.0 | 60 | 1.0 | 65 | 1.7 | 60 | 1.2 | 55 | 1.6 | 60 | 1.0 | 55 | 1.8 | 60 | 1.2 | --- | --- | 45 | 1.5 | 25 | 1.2 | | |
| 30 | 70 | 4.6 | 40 | 3.0 | 65 | 4.8 | 60 | 3.8 | 55 | 6.7 | 65 | 7.7 | 70 | 6.4 | 70 | 5.9 | 75 | 7.2 | 75 | 6.3 | 75 | 4.2 | | |
| Mean | --- | 3.8 | --- | 3.8 | --- | 3.9 | --- | 4.0 | --- | 4.5 | --- | 4.2 | --- | 4.2 | --- | 4.1 | --- | 4.1 | --- | 4.6 | --- | 5.0 | --- | 5.5 |

422. CAHIRCIVEEN (Valentia Observatory): H_a = 17 metres + 13 metres.

| Day | ° | 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 | 50 | 1.4 | 20 | 2.0 | 60 | 2.9 | 60 | 3.1 | 10 | 1.5 | 80 | 2.0 | --- | --- | 70 | 5.7 | 65 | 5.3 | 60 | 6.0 | 60 | 5.4 | 60 | 5.2 | |
| 2 | 80 | 4.3 | 60 | 3.8 | 65 | 6.4 | 65 | 6.8 | 75 | 4.9 | 350 | 1.5 | 65 | 4.0 | 70 | 6.0 | 70 | 5.1 | 340 | 1.7 | 300 | 1.6 | 45 | 1.9 | |
| 3 | 60 | (2.1) | 60 | (2.5) | 70 | (2.7) | 85 | 3.0 | 75 | 2.8 | 75 | 2.9 | 70 | 2.3 | 70 | 4.4 | 75 | 6.1 | 75 | 6.0 | 85 | 5.8 | 90 | 4.4 | |
| 4 | 70 | 2.1 | --- | --- | --- | --- | 40 | 1.0 | 60 | 1.7 | 50 | 2.1 | 50 | 2.3 | 45 | 1.4 | --- | --- | 40 | 2.0 | 50 | 2.4 | 50 | 2.4 | |
| 5 | --- | --- | --- | --- | 80 | 3.4 | 80 | 5.4 | 80 | 4.8 | 80 | 5.2 | 80 | 2.9 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |
| 6 | 85 | 5.5 | 85 | 4.8 | 85 | 5.6 | 85 | 5.5 | 85 | 4.4 | 85 | 5.1 | 85 | 5.0 | 85 | 4.8 | 85 | 5.5 | 90 | 5.2 | 90 | 5.2 | 90 | 5.1 | |
| 7 | --- | --- | 10 | 1.5 | 35 | 1.5 | 60 | 1.5 | 50 | 2.2 | 70 | 1.5 | 35 | 2.6 | 10 | 2.5 | 30 | 1.1 | 75 | 3.2 | 80 | 2.0 | 65 | 2.3 | |
| 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 60 | 1.5 | 60 | 1.0 | 50 | 1.2 | 160 | 2.0 | 195 | 2.7 | 230 | 4.6 | 215 | 5.8 |
| 9 | 195 | 8.8 | 195 | 9.5 | 195 | 11.4 | 200 | 11.2 | 195 | 13.1 | 195 | 13.3 | 205 | 13.9 | 200 | 14.2 | 190 | 16.8 | 195 | 17.0 | 225 | 14.1 | 260 | 10.7 | |
| 10 | 235 | 7.4 | 240 | 7.6 | 235 | 7.7 | 235 | 7.9 | 235 | 6.9 | 235 | 7.2 | 235 | 7.2 | 235 | 7.2 | 230 | 6.0 | 220 | 6.2 | 230 | 7.0 | 205 | 7.4 | |
| 11 | 310 | 5.9 | 335 | 6.2 | 335 | 6.2 | 345 | 5.7 | 310 | 5.5 | 330 | 3.5 | 310 | 5.8 | 325 | 4.8 | 300 | 7.1 | 295 | 7.1 | 290 | 7.4 | 290 | 7.2 | |
| 12 | 295 | 5.4 | 300 | 4.8 | 325 | 3.0 | 10 | 1.0 | 300 | (3.8) | 290 | (4.8) | 300 | 5.2 | 295 | 5.5 | 310 | 4.5 | 305 | (3.3) | 300 | 4.2 | 300 | 4.3 | |
| 13 | 185 | 3.2 | 190 | 4.4 | 220 | 4.6 | 220 | 5.2 | 215 | 5.2 | 200 | 6.0 | 190 | 6.4 | 205 | 7.0 | 205 | 7.6 | 210 | 9.0 | 210 | 9.9 | 210 | 9.7 | |
| 14 | 280 | 4.2 | 280 | 4.6 | 290 | 5.6 | 295 | 5.2 | 300 | 4.6 | 290 | 3.0 | 290 | 4.4 | 330 | 4.5 | 320 | 3.4 | 320 | 4.5 | 300 | 4.0 | 315 | 3.6 | |
| 15 | 210 | 4.5 | 225 | 6.2 | 220 | 6.3 | 220 | 6.1 | 225 | 6.0 | 235 | 6.7 | 230 | 6.2 | 220 | 6.6 | 235 | 7.1 | 240 | 8.4 | 235 | 9.4 | 255 | 9.1 | |
| 16 | 295 | 9.0 | 300 | 8.9 | 300 | 9.8 | 300 | 9.4 | 295 | 9.1 | 305 | 8.4 | 305 | 8.1 | 315 | 8.7 | 315 | 8.2 | 310 | 7.5 | 305 | 7.9 | 310 | 9.1 | |
| 17 | 310 | 3.7 | 315 | 1.8 | 300 | 1.5 | 290 | 2.4 | 260 | 2.0 | 200 | 2.5 | 180 | 1.5 | 110 | 1.1 | 120 | 1.2 | 170 | 4.0 | 215 | 5.6 | 200 | 5.2 | |
| 18 | 175 | 9.0 | 170 | 8.7 | 175 | 9.1 | 175 | 10.4 | 170 | 11.2 | 170 | 10.2 | 170 | 11.0 | 165 | 11.0 | 160 | 12.2 | 160 | 12.3 | 150 | 13.8 | 150 | 14.7 | |
| 19 | 205 | 2.0 | 205 | 2.9 | 180 | 1.7 | --- | --- | 50 | 2.0 | 50 | 1.9 | 50 | 1.9 | 55 | 1.8 | 50 | 2.4 | 50 | 1.7 | 50 | 1.5 | --- | --- | |
| 20 | 360 | 5.2 | 345 | 5.1 | 340 | 7.3 | 5 | 4.1 | 10 | 2.7 | 70 | 4.5 | 60 | 5.5 | 65 | 7.5 | 60 | 7.5 | 55 | 8.4 | 55 | 8.6 | 60 | 8.4 | |
| 21 | 60 | 3.6 | 85 | 3.5 | 50 | 2.4 | 130 | 2.0 | 70 | 2.3 | 80 | 4.7 | --- | --- | 75 | 3.6 | 20 | (1.8) | 70 | 4.6 | 85 | 4.0 | 65 | 3.1 | |
| 22 | 55 | 3.0 | 60 | 2.3 | 65 | (3.2) | 70 | (2.4) | 90 | (3.2) | 75 | (2.1) | 55 | (3.6) | 40 | (3.8) | 50 | 1.2 | 50 | 2.3 | 60 | 4.8 | 30 | (5.0) | |
| 23 | 35 | 4.4 | 30 | 5.2 | 20 | 5.7 | 30 | 6.1 | 45 | 4.0 | 40 | (4.4) | 40 | (4.6) | 45 | (4.6) | 45 | (4.7) | 55 | 5.6 | 50 | 6.2 | 55 | 5.9 | |
| 24 | 15 | 5.9 | 25 | 4.7 | 45 | 2.6 | 40 | 2.1 | 75 | 2.4 | 45 | 1.0 | --- | --- | --- | --- | 40 | 2.6 | 40 | 4.0 | 50 | 4.3 | 35 | 4.1 | |
| 25 | 30 | 7.5 | 40 | 8.3 | 35 | 9.2 | 35 | 9.0 | 40 | 9.2 | 45 | 8.4 | 50 | 8.4 | 50 | 9.3 | 45 | 10.9 | 50 | 9.6 | 50 | 8.7 | 50 | 9.5 | |
| 26 | 50 | 5.0 | 45 | 6.4 | 45 | 6.3 | 40 | 6.7 | 40 | 6.1 | 40 | 4.8 | 45 | 5.9 | 45 | 4.9 | 45 | 4.8 | 55 | 4.4 | 45 | 4.9 | 40 | 5.5 | |
| 27 | 320 | 8.0 | 325 | 9.6 | 310 | 8.2 | 305 | 8.4 | 300 | 9.7 | 305 | 9.8 | 325 | 10.8 | 345 | 11.0 | 340 | 11.8 | 350 | 10.7 | 350 | 11.0 | 360 | 10.2 | |
| 28 | 5 | 10.8 | 10 | 9.2 | 355 | 11.0 | 360 | 12.2 | 355 | 11.9 | 5 | 10.6 | 360 | 8.9 | 10 | 9.0 | 360 | 9.5 | 360 | 11.5 | 360 | 12.5 | 355 | 12.8 | |
| 29 | 5 | 10.4 | 5 | 10.3 | 360 | 11.2 | 360 | 10.7 | 360 | 9.9 | 360 | 11.1 | 10 | 10.3 | 15 | 8.9 | 10 | 9.8 | 5 | 9.1 | 360 | 9.4 | 5 | 8.5 | |
| 30 | 5 | 7.7 | 15 | 5.5 | 360 | 6.6 | 355 | 7.5 | 360 | 5.8 | 5 | 5.5 | 360 | 4.5 | 360 | 4.0 | 360 | 4.0 | 350 | 4.4 | 365 | 3.7 | 310 | 3.6 | |
| 31 | 255 | 6.1 | 290 | 5 | | | | | | | | | | | | | | | | | | | | | |

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 17 metres + 13 metres.

SEPTEMBER, 1933.

Table with columns for time intervals (12-13 to 23-24), Mean, and Day. Rows contain numerical data for each interval and day.

OCTOBER, 1933.

Table with columns for time intervals (12-13 to 23-24), Mean, and Day. Rows contain numerical data for each interval and day, including wind speed in m/s.

Direction expressed in degrees from North (E = 90°, S = 180°, W = 270°, N = 360°): Speed in metres per second.

423. CAHRCIVEEN (Valentia Observatory):
Dines Anemograph from Jan., 1926.H_a (height of anemograph above M.S.L.) = Height of ground above

| Hour G. M. T. | 0 - 1 | | 1 - 2 | | 2 - 3 | | 3 - 4 | | 4 - 5 | | 5 - 6 | | 6 - 7 | | 7 - 8 | | 8 - 9 | | 9 - 10 | | 10 - 11 | | 11 - 12 | |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|------|--------|------|---------|------|---------|------|
| | ° | 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 | 335 | 8.4 | 345 | 7.9 | 340 | 7.3 | 350 | 6.0 | 340 | 6.0 | 350 | 6.0 | 345 | 5.9 | 350 | 5.7 | 345 | 5.2 | 320 | 6.4 | 315 | 5.6 | 300 | 5.4 |
| 2 | 310 | 6.9 | 315 | 7.3 | 320 | 8.7 | 320 | 9.0 | 315 | 9.1 | 315 | 8.9 | 345 | 8.3 | 350 | 9.8 | 355 | 9.4 | 355 | 10.1 | 350 | 10.2 | 345 | 9.2 |
| 3 | 70 | 1.9 | 30 | 4.1 | 55 | 1.9 | 15 | 6.0 | 10 | 6.6 | 5 | 8.5 | 5 | 7.6 | 15 | 6.3 | 25 | 5.1 | 30 | 5.4 | 30 | 5.3 | 20 | 5.2 |
| 4 | 35 | 6.2 | 30 | 6.3 | 125 | 2.1 | 5 | 1.6 | 165 | 2.3 | 105 | 1.0 | 90 | 1.0 | 100 | 1.2 | --- | --- | 50 | 2.6 | 20 | 4.9 | 40 | 5.6 |
| 5 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 50 | 1.6 | 55 | 1.8 | 55 | 2.0 | 35 | 3.4 | 20 | 7.6 | 10 | 5.8 |
| 6 | 25 | 5.5 | 360 | 2.6 | 15 | 5.0 | 15 | 3.8 | 360 | 4.0 | 345 | 3.2 | 350 | 3.8 | 345 | 5.2 | 350 | 5.9 | 355 | 5.3 | 360 | 3.6 | 355 | 3.1 |
| 7 | 40 | 3.4 | 55 | 2.0 | 60 | 3.6 | 50 | 3.2 | 50 | 3.4 | 55 | 2.6 | 40 | 1.8 | 50 | 4.9 | 40 | 4.1 | 40 | 4.7 | 45 | 4.7 | 35 | 4.1 |
| 8 | 70 | 1.7 | 70 | 2.4 | 55 | 2.4 | 70 | 2.6 | 60 | 1.2 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 120 | 1.2 | 170 | 3.1 |
| 9 | 165 | 6.4 | 160 | 6.4 | 165 | 8.0 | 205 | 6.2 | 230 | 3.9 | 295 | 4.1 | 300 | 6.8 | (315) | 6.9 | (330) | 7.3 | 340 | 6.3 | 335 | 7.5 | 325 | 7.7 |
| 10 | 325 | 3.5 | 345 | 4.8 | 350 | 3.5 | 335 | 5.0 | 335 | 3.7 | 355 | 3.2 | 10 | 2.9 | 20 | 2.5 | 35 | 1.9 | --- | --- | 330 | 3.1 | 15 | 3.2 |
| 11 | 65 | 1.1 | 70 | 1.1 | 60 | 1.3 | 60 | 1.2 | --- | --- | --- | --- | 55 | 1.0 | 120 | 1.2 | 155 | 2.6 | 160 | 3.9 | 250 | 6.0 | 325 | 9.0 |
| 12 | 355 | 8.4 | 360 | 7.1 | 360 | 7.2 | 360 | 6.6 | 350 | 7.0 | 345 | 5.9 | 325 | 6.7 | 325 | 5.4 | 320 | 5.0 | 310 | 5.5 | 310 | 5.0 | 300 | 4.0 |
| 13 | 200 | (3.0) | 210 | (3.3) | 160 | (3.0) | 175 | (3.9) | 195 | (4.2) | 180 | (4.2) | 185 | (3.8) | 325 | 5.2 | 335 | 8.7 | 335 | 9.4 | 335 | 10.0 | 330 | 9.8 |
| 14 | 300 | 4.3 | 280 | 3.4 | 260 | 4.4 | 190 | 3.2 | 210 | 3.0 | 175 | 5.0 | 175 | 3.4 | 180 | 2.7 | 185 | 5.2 | 180 | 5.8 | 180 | 8.3 | 180 | 8.4 |
| 15 | 285 | 5.9 | 265 | 6.8 | 255 | 4.6 | 260 | 9.5 | 240 | 6.2 | 230 | 7.2 | 225 | 6.8 | 250 | 9.3 | 245 | 9.3 | 250 | 8.5 | 265 | 5.6 | 265 | 4.5 |
| 16 | 70 | 6.2 | 80 | 5.4 | 30 | 5.2 | 45 | 9.1 | 35 | 10.5 | 50 | 6.9 | 40 | 7.5 | 30 | 7.8 | 35 | 8.8 | 40 | 6.8 | 40 | 6.8 | 30 | 10.2 |
| 17 | 65 | 8.8 | 70 | 8.9 | 75 | 8.3 | 65 | 7.3 | 55 | 7.7 | 65 | 8.0 | 50 | 7.9 | 40 | 9.0 | 60 | 8.9 | 60 | 7.8 | 70 | 9.1 | 65 | 8.0 |
| 18 | 60 | 3.5 | 70 | 4.8 | 70 | 4.0 | 60 | 3.4 | 60 | 4.0 | 35 | 2.4 | 65 | 3.3 | 70 | 3.1 | 80 | 5.6 | 75 | 5.3 | 80 | 5.0 | 70 | 1.7 |
| 19 | --- | --- | 80 | 1.7 | 150 | 1.0 | 95 | 2.1 | 90 | 3.2 | 85 | 4.1 | 65 | 2.1 | 45 | 1.0 | 65 | 1.2 | 50 | 1.0 | 60 | 1.8 | 140 | 1.1 |
| 20 | 125 | 3.9 | 135 | 4.5 | 130 | 4.2 | 130 | 4.9 | 140 | 5.2 | 145 | 6.3 | 180 | 4.5 | 215 | 4.6 | 285 | 4.4 | 300 | 5.4 | 305 | 6.1 | 325 | 6.9 |
| 21 | 5 | 2.7 | 5 | 2.7 | 15 | 2.0 | 40 | 2.0 | 45 | 1.3 | 40 | 2.1 | 45 | 2.3 | 55 | 1.5 | 55 | 1.0 | --- | --- | --- | --- | --- | --- |
| 22 | 60 | 2.3 | --- | --- | 60 | 1.3 | 65 | 1.5 | 60 | 1.3 | 60 | 1.7 | --- | --- | 55 | 2.4 | 70 | 1.6 | 55 | 1.7 | 70 | 1.4 | 165 | 4.0 |
| 23 | 145 | 5.5 | 145 | 4.8 | 140 | 5.1 | 140 | 5.7 | 145 | 6.0 | 145 | 5.6 | 140 | 6.0 | 140 | 5.7 | 145 | 5.1 | 145 | 5.2 | 140 | 5.5 | 145 | 5.5 |
| 24 | 90 | 3.4 | 65 | 1.5 | 55 | 1.2 | 115 | 2.5 | 50 | 1.4 | 45 | 1.7 | 50 | 1.6 | --- | --- | 60 | 1.3 | 65 | 1.1 | 55 | 2.0 | 50 | 1.7 |
| 25 | --- | --- | --- | --- | --- | --- | 45 | 1.1 | 65 | 2.3 | 85 | 1.5 | 65 | 1.4 | 40 | 1.4 | 65 | 1.1 | 105 | 1.0 | 50 | 3.2 | --- | --- |
| 26 | 105 | 5.0 | 110 | 4.7 | 105 | 4.9 | 115 | 5.1 | 110 | 5.2 | 120 | 5.4 | 135 | 7.1 | 140 | 6.5 | 140 | 5.7 | 150 | 5.2 | 150 | 7.3 | 150 | 7.1 |
| 27 | 130 | 8.0 | 100 | 7.9 | 120 | 8.0 | 130 | 10.0 | 130 | 9.8 | 130 | 10.6 | 130 | 11.1 | 125 | 9.8 | 115 | 9.9 | 120 | 7.5 | 120 | 8.2 | 135 | 9.5 |
| 28 | 110 | 12.2 | 110 | 13.1 | 110 | 11.2 | 105 | 12.6 | 95 | 11.0 | 90 | 8.1 | 110 | 10.2 | 105 | 9.1 | 105 | 9.3 | 105 | 9.7 | 100 | 10.0 | 105 | 10.3 |
| 29 | 105 | 10.1 | 105 | 10.7 | 105 | 10.4 | 110 | 9.0 | 110 | 8.4 | 130 | 7.6 | 135 | 7.7 | 140 | 7.1 | 150 | 8.9 | 145 | 9.0 | 140 | 9.5 | 145 | 8.6 |
| 30 | 145 | 9.8 | 145 | 10.1 | 150 | 11.4 | 150 | 10.6 | 150 | 11.3 | 150 | 13.1 | 150 | 13.0 | 160 | 13.0 | 150 | 14.2 | 150 | 13.3 | 155 | 12.6 | 170 | 11.1 |
| Mean | --- | 5.0 | --- | 4.9 | --- | 4.7 | --- | 5.2 | --- | 5.0 | --- | 4.9 | --- | 4.9 | --- | 5.0 | --- | 5.3 | --- | 6.3 | --- | 5.9 | --- | 5.8 |

424. CAHRCIVEEN (Valentia Observatory): H_a = 17 metres + 13 metres.

| Day | ° | | 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 | 135 | 16.7 | 140 | 15.4 | 140 | 15.1 | 135 | 15.8 | 140 | 14.8 | 170 | 12.2 | 225 | 8.6 | 245 | 7.8 | 270 | 6.0 | 275 | 5.3 | 280 | 4.6 | 275 | 4.4 | | | | |
| 2 | --- | --- | --- | --- | 60 | 1.1 | --- | --- | 55 | 2.1 | --- | --- | 65 | 1.5 | --- | --- | --- | --- | 55 | 1.4 | 55 | 1.7 | --- | --- | | | | |
| 3 | 70 | 2.2 | 90 | 3.8 | 85 | 4.8 | 90 | 4.9 | 95 | 4.4 | 105 | 3.9 | 95 | 1.9 | 95 | 2.6 | 80 | 2.2 | 90 | 2.3 | 70 | 2.2 | 70 | 2.5 | | | | |
| 4 | 75 | 3.9 | 80 | 6.0 | 80 | 2.6 | 80 | 3.1 | 90 | 5.5 | 80 | 5.6 | 85 | 5.9 | 70 | 5.7 | 80 | 6.2 | 70 | 6.1 | 75 | 8.6 | 80 | 9.1 | | | | |
| 5 | 70 | 5.0 | 65 | 4.0 | 70 | 5.1 | 70 | 7.5 | 80 | 7.5 | 90 | 9.1 | 85 | 9.2 | 90 | 9.0 | 90 | 10.0 | 90 | 10.0 | 65 | 8.0 | 45 | 5.3 | | | | |
| 6 | 100 | 7.3 | 85 | 4.7 | 55 | 4.0 | 70 | 2.6 | 115 | 2.6 | 105 | 6.4 | 90 | 5.5 | 70 | 5.1 | 80 | 8.2 | 60 | 5.3 | 45 | 4.5 | 15 | 4.8 | | | | |
| 7 | 80 | 5.3 | 85 | 6.0 | 95 | 6.1 | 90 | 6.5 | 80 | 5.8 | 90 | 6.1 | 90 | 6.4 | 90 | 6.2 | 90 | 5.5 | 85 | 5.4 | 80 | 4.7 | 90 | 6.3 | | | | |
| 8 | 70 | 3.8 | 75 | 6.7 | 85 | 6.9 | 85 | 5.8 | 70 | 6.6 | 70 | 6.0 | 65 | 6.8 | 75 | 8.4 | 80 | 9.0 | 80 | 7.8 | 95 | 10.9 | 100 | 8.1 | | | | |
| 9 | 65 | 3.7 | 75 | 2.6 | 65 | 3.0 | 65 | 2.8 | 70 | 4.0 | 65 | 4.3 | 50 | 4.7 | 60 | 4.6 | 60 | 4.0 | 80 | 3.1 | 75 | 4.9 | 65 | 5.0 | | | | |
| 10 | 75 | 3.3 | 95 | 4.2 | 95 | 4.1 | 85 | 4.7 | 80 | 5.9 | 80 | 5.7 | 75 | 4.9 | 80 | 3.9 | 70 | 2.6 | 75 | 3.4 | 80 | 4.0 | 50 | 2.2 | | | | |
| 11 | 50 | 4.4 | 40 | 4.9 | 60 | 4.4 | 65 | 3.7 | 80 | 1.5 | 55 | 3.0 | 65 | 2.2 | 70 | 2.0 | 60 | 2.6 | 60 | 2.7 | 220 | 1.6 | --- | --- | | | | |
| 12 | 335 | 5.4 | 335 | 7.5 | 350 | 7.5 | 360 | 5.4 | 360 | 8.1 | 5 | 7.5 | 5 | 7.1 | 10 | 7.1 | 15 | 7.6 | 360 | 6.4 | 355 | 8.0 | 360 | 6.2 | | | | |
| 13 | 85 | 4.5 | 50 | 6.3 | 40 | 6.0 | 50 | 5.8 | 45 | 5.9 | 55 | 3.3 | 60 | 6.1 | 60 | 8.5 | 70 | 8.0 | 45 | 9.8 | 55 | 7.6 | 65 | 7.9 | | | | |
| 14 | 85 | 5.3 | 70 | 3.3 | 120 | 2.4 | 120 | 2.4 | 80 | 4.6 | 80 | 5.3 | 145 | 3.1 | 135 | 3.6 | 70 | 7.5 | 60 | 10.2 | 75 | 8.0 | 60 | 6.1 | | | | |
| 15 | --- | --- | 65 | 1.4 | 100 | 1.0 | --- | --- | --- | --- | 80 | 1.5 | 20 | (5.0) | 20 | (4.6) | 20 | (3.4) | 25 | (3.7) | 30 | 4.4 | 20 | 4.5 | | | | |
| 16 | --- | --- | 55 | 1.0 | 60 | 1.3 | --- | --- | --- | --- | 55 | 1.5 | --- | --- | 55 | 1.1 | 60 | 1.7 | --- | --- | --- | --- | --- | --- | | | | |
| 17 | (45) | 2.2 | (55) | 1.3 | --- | --- | --- | --- | --- | --- | (50) | 1.7 | (60) | 1.7 | (60) | 1.2 | --- | (---) | --- | (---) | --- | (---) | --- | (---) | (---) | | | |
| 18 | 155 | 5.7 | 170 | 4.8 | 170 | 3.5 | 185 | 2.6 | 150 | 5.6 | 155 | 7.0 | 155 | 6.2 | 165 | 5.5 | 150 | 5.8 | 150 | 4.5 | 155 | 5.0 | 160 | 5.0 | | | | |
| 19 | 140 | 4.5 | 135 | 3.5 | 140 | 2.4 | 155 | 1.8 | 155 | 4.7 | 140 | 4.1 | 135 | 4.0 | 140 | 4.3 | 140 | 4.5 | 140 | 4.5 | 140 | 4.4 | 145 | 5.0 | | | | |
| 20 | 160 | 6.9 | 155 | 6.3 | 170 | 8.1 | 170 | 7.6 | 170 | 7.6 | 170 | 7.4 | 160 | 7.7 | 145 | 8.1 | 150 | 8.2 | 155 | 7.6 | 175 | 7.6 | 170 | 7.7 | | | | |
| 21 | 165 | 11.6 | 165 | 12.4 | 165 | 12.0 | 170 | 12.5 | 170 | 12.2 | 170 | 12.3 | 165 | 11.9 | 170 | 11.6 | 170 | 10.5 | 170 | 11.0 | 170 | 11.5 | 170 | 10.8 | | | | |
| 22 | 165 | 10.6 | 165 | 10.3 | 170 | 10.0 | 170 | 9.5 | 165 | 10.4 | 170 | 10.0 | 170 | 10.4 | 165 | 10.3 | 170 | 9.9 | 170 | 10.4 | 175 | 10.0 | 175 | 9.2 | | | | |
| 23 | 150 | 9.5 | 150 | 9.0 | 155 | 9.0 | 150 | 8.6 | 155 | 7.9 | 150 | 8.4 | 160 | 8.0 | 150 | 7.6 | 145 | 8.1 | 160 | 8.1 | 155 | 9.2 | 150 | 7.3 | | | | |
| 24 | 155 | 9.0 | 170 | 8.1 | 165 | 9.0 | 175 | 8.2 | 175 | 7.6 | 175 | 8.5 | 175 | 8.3 | 180 | 8.1 | 180 | 8.3 | 180 | 8.6 | 190 | 9.4 | 185 | 9.2 | | | | |
| 25 | 190 | 10.9 | 185 | 10.3 | 185 | 8.8 | 180 | 9.7 | 175 | 10.5 | 175 | 10.3 | 175 | 10.1 | 170 | 10.2 | 175 | 10.3 | 200 | 5.8 | 180 | 3.0 | 195 | 6.2 | | | | |
| 26 | 310 | (4.5) | 240 | (4.0) | 250 | (2.5) | 55 | 1.3 | --- | (---) | 45 | (1.5) | 55 | (1.7) | 160 | (1.7) | 50 | (2.7) | 60 | (1.6) | 60 | (1.3) | 55 | (1.3) | | | | |
| 27 | 60 | (1.2) | 45 | (1.4) | 145 | 4.2 | 150 | 7.0 | 150 | 8.9 | 170 | 8.6 | 180 | 8.5 | 185 | 8.9 | 180 | 9.8 | 165 | 10.5 | 160 | 10.7 | 175 | 8.6 | | | | |
| 28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

WIND: DIRECTION AND SPEED.

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 17 metres + 13 metres.

NOVEMBER, 1933.

Table with 14 columns for time periods (12-13 to 23-24), Mean, and Day. Each period has two columns for wind speed in degrees and m/s. Data includes values for 11 days from Nov 1 to Nov 11.

DECEMBER AND YEAR, 1933.

Table with 14 columns for time periods (260 to 310), Mean, and Day. Each period has two columns for wind speed in degrees and m/s. Data includes values for 11 days from Dec 1 to Dec 11.

425. CAHIRCIVEEN (Valentia Observatory): $H_a = 17$ metres + 13 metres.

1933.

| Day. | Jan. | | Feb. | | Mar. | | Apr. | | May | | June | | July | | Aug. | | Sept. | | Oct. | | Nov. | | Dec. | |
|------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|
| | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. |
| 1 | m/s 22 | h. m. 17 00 | m/s 22 | h. m. 5 45 | m/s 13 | h. m. 20 05 | m/s 10 | h. m. 11 30 | m/s 12 | h. m. 11 35 | m/s 23 | h. m. 14 15 | m/s 8 | h. m. 17 50 | m/s 13 | h. m. 23 45 | m/s 11 | h. m. 9 40 | m/s 13 | h. m. 19 15 | m/s 15 | h. m. 13 50 | m/s 32 | h. m. 4 25 |
| 2 | 30 | 16 20 | 15 | 2 00 | 15 | 11 55 | 9 | 14 40 | 25 | 17 15 | 18 | 11 40 | 11 | 18 55 | 11 | 0 35 | 7 | 15 15 | 11 | 7 50 | 17 | 7 10 | 9 | 20 20 |
| 3 | 28 | 5 35 | 19 | 19 00 | 12 | 21 55 | 11 | 1 25 | 22 | 11 30 | 7 | 0 25 | 6 | 13 45 | 6 | 14 25 | 5 | 15 25 | 10 | 8 15 | 14 | 20 35 | 11 | 17 00 |
| 4 | 22 | 13 30 | 23 | 20 05 | 15 | 19 40 | 12 | 15 10 | 23 | 3 25 | 14 | 12 55 | 6 | 11 25 | 9 | 11 15 | 12 | 23 40 | 11 | 19 25 | 13 | 1 35 | 15 | 13 00 |
| 5 | 20 | 3 00 | 25 | 2 35 | 27 | 14 30 | 11 | 18 10 | 22 | 3 30 | 13 | 10 35 | 15 | 20 15 | 11 | 13 15 | 12 | 11 45 | 8 | 4 55 | 13 | 20 20 | 17 | 8 45 |
| 6 | 20 | 1 50 | 22 | 11 50 | 26 | 15 55 | 13 | 10 30 | 10 | 23 50 | 16 | 12 40 | 15 | 6 55 | 11 | 21 25 | 15 | 18 15 | 9 | 10 10 | 11 | 22 50 | 15 | 0 30 |
| 7 | 23 | 12 10 | 18 | 3 55 | 17 | 4 50 | 17 | 13 15 | 16 | 7 55 | 15 | 1 10 | 16 | 20 35 | 12 | 18 35 | 17 | 6 55 | 6 | 16 35 | 11 | 7 10 | 14 | 4 05 |
| 8 | 23 | 10 25 | 21 | 14 10 | 23 | 23 20 | 14 | 13 40 | 20 | 21 10 | 13 | 17 50 | 14 | 2 15 | 9 | 0 15 | 11 | 14 25 | 17 | 14 20 | 10 | 18 30 | 21 | 10 15 |
| 9 | 12 | 13 30 | 22 | 6 35 | 23 | 0 10 | 14 | 11 50 | 17 | 1 40 | 18 | 7 50 | 20 | 19 30 | 11 | 17 10 | 11 | 5 10 | 31 | 8 55 | 14 | 8 05 | 10 | 5 40 |
| 10 | 13 | 15 40 | 19 | 18 55 | 22 | 1 35 | 17 | 14 15 | 10 | 2 50 | 14 | 1 45 | 16 | 5 00 | 12 | 17 20 | 13 | 13 40 | 14 | 12 20 | 9 | 1 15 | 13 | 22 00 |
| 11 | 14 | 6 45 | 15 | 2 20 | 13 | 6 05 | 10 | 13 15 | 13 | 3 15 | 13 | 9 10 | 13 | 5 30 | 11 | 16 00 | 10 | 6 45 | 19 | 19 30 | 21 | 14 45 | 14 | 23 40 |
| 12 | 13 | 11 40 | 6 | 13 35 | 9 | 15 35 | 14 | 9 40 | 9 | 9 00 | 12 | 20 30 | 22 | 23 30 | 7 | 11 40 | 9 | 19 10 | 13 | 4 05 | 18 | 15 20 | 24 | 14 00 |
| 13 | 10 | 1 15 | 9 | 8 30 | 9 | 15 40 | 11 | 20 10 | 13 | 12 20 | 9 | 0 05 | 19 | 0 15 | 10 | 10 00 | 12 | 22 40 | 18 | 12 15 | 17 | 8 35 | 25 | 19 25 |
| 14 | 22 | 18 15 | 12 | 16 40 | 20 | 14 45 | 13 | 16 10 | 9 | 14 25 | 7 | 15 30 | 15 | 0 40 | 15 | 23 45 | 8 | 10 45 | 14 | 16 40 | 24 | 23 35 | 20 | 9 00 |
| 15 | 18 | 5 00 | 9 | 13 15 | 24 | 19 30 | 11 | 10 05 | 12 | 16 30 | 9 | 21 20 | 16 | 16 05 | 18 | 2 20 | 15 | 14 40 | 25 | 11 15 | 20 | 3 55 | 10 | 13 10 |
| 16 | 12 | 7 30 | 6 | 14 45 | 21 | 1 45 | 11 | 15 05 | 12 | 1 05 | 17 | 16 55 | 12 | 23 25 | 15 | 23 20 | 15 | 6 10 | 19 | 5 30 | 21 | 13 30 | 4 | 15 15 |
| 17 | 8 | 23 50 | 11 | 22 15 | 15 | 2 20 | 14 | 21 45 | 10 | 15 45 | 20 | 13 25 | 11 | 0 50 | 19 | 2 10 | 21 | 15 30 | 17 | 23 50 | 16 | 9 05 | 9 | 21 50 |
| 18 | 19 | 12 10 | 20 | 6 35 | 16 | 20 30 | 15 | 9 10 | 17 | 14 20 | 21 | 5 40 | 16 | 21 40 | 15 | 13 30 | 22 | 23 20 | 27 | 11 55 | 13 | 16 55 | 11 | 5 10 |
| 19 | 22 | 19 10 | 18 | 3 55 | 25 | 14 20 | 16 | 18 25 | 18 | 18 40 | 13 | 9 25 | 15 | 2 20 | 12 | 3 00 | 19 | 15 30 | 12 | 23 05 | 8 | 5 25 | 14 | 22 50 |
| 20 | 21 | 23 10 | 11 | 23 45 | 20 | 22 45 | 13 | 10 50 | 15 | 14 20 | 14 | 23 50 | 10 | 0 30 | 16 | 2 00 | 13 | 13 45 | 17 | 15 30 | 13 | 10 25 | 19 | 23 55 |
| 21 | 23 | 1 40 | 19 | 21 00 | 25 | 12 05 | 10 | 23 10 | 9 | 13 50 | 17 | 16 20 | 11 | 15 45 | 17 | 12 10 | 14 | 4 05 | 11 | 15 05 | 5 | 12 25 | 22 | 5 25 |
| 22 | 24 | 11 10 | 16 | 0 45 | 30 | 12 15 | 25 | 16 55 | 10 | 14 05 | 14 | 9 50 | 7 | 17 45 | 19 | 19 10 | 15 | 16 25 | 11 | 20 40 | 11 | 18 00 | 18 | 1 10 |
| 23 | 19 | 10 45 | 17 | 20 20 | 22 | 1 10 | 16 | 23 35 | 9 | 15 05 | 12 | 23 45 | 7 | 12 50 | 15 | 6 40 | 15 | 14 50 | 13 | 19 45 | 11 | 11 40 | 18 | 9 50 |
| 24 | 14 | 1 15 | 25 | 17 00 | 17 | 22 25 | 24 | 14 40 | 14 | 18 55 | 12 | 13 40 | 10 | 23 30 | 15 | 17 55 | 17 | 23 30 | 16 | 18 25 | 8 | 0 35 | 17 | 23 50 |
| 25 | 9 | 9 00 | 23 | 1 00 | 19 | 8 30 | 20 | 10 10 | 17 | 16 25 | 16 | 7 00 | 15 | 21 10 | 17 | 16 15 | 18 | 3 30 | 18 | 8 20 | 9 | 23 30 | 19 | 0 45 |
| 26 | 10 | 22 10 | 17 | 5 40 | 7 | 13 00 | 17 | 0 30 | 13 | 2 55 | 14 | 16 30 | 11 | 1 45 | 19 | 16 40 | 10 | 9 00 | 14 | 3 10 | 17 | 21 55 | 13 | 0 05 |
| 27 | 15 | 19 20 | 25 | 9 00 | 6 | 16 00 | 21 | 11 35 | 10 | 7 20 | 15 | 14 40 | 10 | 15 50 | 24 | 20 00 | 10 | 14 35 | 26 | 10 25 | 25 | 20 20 | 20 | 20 00 |
| 28 | 17 | 22 15 | 15 | 14 00 | 13 | 11 45 | 11 | 12 30 | 9 | 11 55 | 13 | 13 00 | 17 | 5 55 | 9 | 1 20 | 10 | 11 10 | 25 | 13 55 | 23 | 1 20 | 25 | 6 40 |
| 29 | 15 | 1 45 | - | - | 15 | 23 30 | 10 | 14 55 | 9 | 13 50 | 13 | 12 25 | 20 | 3 55 | 10 | 12 50 | 9 | 20 40 | 21 | 5 05 | 19 | 22 05 | 16 | 19 05 |
| 30 | 17 | 9 35 | - | - | 21 | 4 55 | 13 | 17 20 | 19 | 15 35 | 6 | 15 00 | 24 | 23 55 | 11 | 0 40 | 14 | 9 10 | 14 | 1 55 | 27 | 22 40 | 23 | 13 10 |
| 31 | 27 | 20 10 | - | - | 14 | 7 25 | - | - | 14 | 22 50 | - | - | 24 | 4 45 | 12 | 17 10 | - | - | 18 | 17 45 | - | - | 15 | 13 40 |

DISTRIBUTION OF WIND SPEED: EXTREME VELOCITIES AS RECORDED BY THE DINES TUBE ANEMOGRAPH.

426. CAHIRCIVEEN (Valentia Observatory): $H_a = 17$ metres + 13 metres.

1933.

| Month. | DISTRIBUTION OF WIND SPEED. | | | | | | | | EXTREME VELOCITIES. | | | | | |
|-----------|-----------------------------|-----------|-------------------|-----------|------------------|-----------------|--------------------|------------|----------------------|---------|---------------|---------------|-------------------|--|
| | More than 17.1 m/s. | | 10.8 to 17.1 m/s. | | 5.5 to 10.7 m/s. | 1.6 to 5.4 m/s. | Less than 1.6 m/s. | No Record. | Highest Hourly Wind. | | | Highest Gust. | | |
| | Dates of Occurrence. | Duration. | No. of Days. | Duration. | Duration. | Duration. | Duration. | Duration. | Year from N. | Speed. | Mid Time. | Speed. | Dates. | |
| Jan. ... | 2nd., 31st. | hr. 2 | 15 | hr. 136 | 290 | 242 | 74 | 0 | 210 | m/s. 17 | day. h. 31 21 | m/s. 30 | day h. m. 2 16 20 | |
| Feb. ... | --- | - | 14 | 83 | 306 | 205 | 78 | 0 | 215 | 17 | 1 2 | 29 | 1 5 45 | |
| Mar. ... | --- | - | 13 | 115 | 307 | 246 | 76 | 0 | 180 | 17 | 22 14 | 30 | 22 12 15 | |
| Apr. ... | --- | - | 5 | 23 | 358 | 286 | 53 | 0 | 185 | 13 | 24 16 | 25 | 22 16 55 | |
| May. ... | --- | - | 6 | 30 | 320 | 300 | 94 | 0 | 80 | 12 | 3 8 | 25 | 2 17 15 | |
| June. ... | --- | - | 3 | 7 | 322 | 340 | 51 | 0 | 180 | 13 | 1 15 | 23 | 1 14 15 | |
| July. ... | --- | - | 3 | 22 | 326 | 290 | 106 | 0 | 230 | 14 | 30 17 | 24 | 30 23 55 | |
| Aug. ... | --- | - | 4 | 10 | 287 | 341 | 106 | 0 | 200 | 14 | 27 23 | 24 | 27 20 00 | |
| Sept. ... | --- | - | 4 | 10 | 244 | 336 | 130 | 0 | 5 | 12 | 24 24 | 22 | 18 23 20 | |
| Oct. ... | --- | - | 6 | 47 | 326 | 309 | 62 | 0 | 195 | 17 | 9 10 | 31 | 9 8 55 | |
| Nov. ... | --- | - | 6 | 34 | 299 | 300 | 87 | 0 | 140 | 15 | 30 24 | 27 | 30 23 00 | |
| Dec. ... | --- | - | 9 | 46 | 304 | 298 | 96 | 0 | 135 | 17 | 1 1 | 32 | 1 4 25 | |
| Year. ... | 2 Days. | 2 | 88 | 563 | 3689 | 3493 | 1013 | 0 | 210 | 17 | Jan. 31 21 | 32 | Dec. 1 4 25 | |

427. CAHIRCIVEEN (Valentia Observatory).

Readings in degrees absolute, at 9h Greenwich Mean Time.

1933.

| Day. | Jan. | | Feb. | | Mar. | | Apr. | | May | | June | | July | | Aug. | | Sept. | | Oct. | | Nov. | | Dec. | |
|------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|-------|-------|------|-------|------|-------|------|-------|
| | 30cm | 122cm | 30cm | 122cm | 30cm | 122cm | 30cm | 122cm | 30cm | 122cm | 30cm | 122cm | 30cm | 122cm | 30cm | 122cm | 30cm | 122cm | 30cm | 122cm | 30cm | 122cm | 30cm | 122cm |
| 1 | 80.2 | 82.2 | 79.1 | 79.4 | 78.1 | 80.0 | 81.9 | 82.0 | 84.0 | 83.2 | 88.5 | 85.9 | 88.9 | 86.9 | 89.7 | 88.6 | 90.0 | 88.9 | 87.5 | 87.6 | 83.0 | 85.0 | 82.1 | 82.5 |
| 2 | 80.2 | 82.0 | 79.2 | 79.5 | 78.9 | 80.0 | 82.0 | 82.0 | 84.1 | 83.3 | 88.0 | 86.0 | 90.3 | 86.9 | 90.0 | 88.6 | 90.0 | 88.9 | 87.6 | 87.4 | 83.4 | 85.0 | 80.6 | 82.6 |
| 3 | 80.8 | 82.0 | 78.5 | 79.6 | 79.6 | 80.0 | 82.0 | 82.0 | 83.6 | 83.3 | 88.8 | 86.0 | 91.0 | 87.0 | 90.1 | 88.6 | 90.2 | 88.8 | 87.3 | 87.4 | 82.7 | 85.0 | 79.4 | 82.8 |
| 4 | 79.9 | 82.0 | 80.1 | 79.9 | 80.0 | 80.0 | 82.1 | 82.0 | 84.5 | 83.5 | 88.4 | 86.1 | 92.0 | 87.1 | 91.0 | 88.6 | 90.8 | 88.8 | 86.6 | 87.4 | 82.0 | 84.9 | 78.3 | 82.6 |
| 5 | 79.5 | 82.0 | 81.2 | 79.8 | 79.9 | 80.0 | 82.8 | 82.1 | 85.1 | 83.5 | 88.9 | 86.2 | 92.5 | 87.4 | 92.0 | 88.6 | 91.0 | 88.9 | 86.5 | 87.4 | 82.1 | 84.8 | 77.5 | 82.5 |
| 6 | 79.2 | 81.9 | 81.6 | 80.0 | 79.6 | 80.1 | 83.0 | 82.0 | 85.0 | 83.6 | 89.3 | 86.4 | 92.4 | 87.7 | 92.2 | 88.7 | 91.0 | 88.9 | 86.7 | 87.3 | 82.9 | 84.5 | 77.0 | 82.2 |
| 7 | 79.2 | 81.7 | 81.5 | 80.1 | 79.7 | 80.2 | 83.0 | 82.2 | 85.5 | 83.6 | 89.4 | 86.4 | 91.9 | 87.9 | 92.0 | 88.8 | 89.7 | 89.0 | 86.9 | 87.3 | 82.8 | 84.5 | 78.7 | 82.0 |
| 8 | 81.0 | 81.4 | 82.0 | 80.5 | 80.0 | 80.2 | 83.6 | 82.2 | 85.7 | 83.9 | 88.3 | 86.6 | 91.1 | 88.0 | 91.4 | 89.0 | 89.1 | 89.0 | 87.0 | 87.2 | 82.6 | 84.6 | 78.1 | 81.9 |
| 9 | 81.3 | 81.6 | 82.5 | 80.6 | 81.0 | 80.4 | 84.0 | 82.3 | 85.2 | 84.0 | 88.5 | 86.7 | 90.8 | 88.0 | 91.5 | 89.0 | 89.1 | 88.9 | 87.0 | 87.2 | 83.0 | 84.5 | 77.6 | 81.9 |
| 10 | 81.0 | 81.6 | 81.9 | 80.9 | 81.2 | 80.6 | 84.0 | 82.5 | 84.9 | 84.0 | 88.4 | 86.6 | 89.8 | 88.1 | 90.6 | 89.1 | 89.0 | 89.2 | 86.1 | 87.1 | 82.9 | 84.5 | 76.9 | 81.7 |
| 11 | 81.0 | 81.6 | 80.5 | 81.0 | 81.6 | 80.7 | 84.0 | 82.6 | 86.0 | 84.0 | 88.0 | 86.7 | 89.5 | 88.1 | 90.8 | 89.1 | 89.4 | 89.0 | 85.6 | 87.1 | 82.3 | 84.5 | 78.0 | 81.6 |
| 12 | 79.4 | 81.6 | 78.9 | 81.0 | 81.1 | 80.9 | 84.2 | 82.8 | 86.0 | 84.1 | 88.0 | 86.7 | 89.2 | 88.1 | 90.9 | 89.0 | 89.1 | 88.8 | 85.2 | 87.1 | 82.0 | 84.3 | 74.0 | 81.3 |
| 13 | 79.4 | 81.6 | 79.0 | 81.0 | 81.0 | 81.0 | 83.5 | 83.0 | 86.2 | 84.2 | 88.3 | 86.6 | 89.4 | 88.0 | 91.4 | 89.0 | 89.0 | 88.7 | 85.5 | 87.0 | 82.2 | 84.4 | 76.4 | 81.1 |
| 14 | 79.1 | 81.3 | 78.4 | 81.0 | 81.1 | 81.0 | 83.6 | 82.9 | 86.1 | 84.4 | 88.5 | 86.6 | 89.1 | 88.0 | 91.0 | 89.1 | 88.2 | 88.7 | 85.8 | 86.9 | 82.1 | 84.2 | 78.1 | 81.0 |
| 15 | 80.0 | 81.4 | 77.9 | 80.9 | 81.3 | 81.0 | 83.8 | 82.9 | 86.4 | 84.5 | 89.2 | 86.7 | 89.0 | 88.0 | 90.7 | 89.0 | 87.9 | 88.7 | 85.7 | 86.7 | 81.9 | 84.1 | 75.8 | 80.9 |
| 16 | 78.5 | 81.3 | 77.9 | 80.8 | 81.2 | 81.0 | 84.0 | 83.0 | 86.6 | 84.5 | 88.9 | 86.7 | 89.2 | 88.0 | 90.3 | 89.0 | 88.0 | 88.2 | 85.0 | 86.6 | 81.5 | 84.0 | 76.2 | 80.6 |
| 17 | 78.5 | 81.3 | 78.4 | 80.6 | 80.6 | 81.2 | 84.4 | 83.0 | 86.9 | 84.7 | 88.0 | 86.8 | 89.8 | 88.0 | 90.3 | 89.0 | 89.0 | 88.2 | 84.6 | 86.6 | 80.8 | 84.5 | 77.5 | 80.5 |
| 18 | 76.6 | 81.1 | 79.0 | 80.6 | 80.6 | 81.2 | 84.9 | 83.0 | 87.3 | 84.7 | 87.0 | 86.8 | 89.9 | 88.0 | 90.2 | 89.0 | 88.8 | 88.3 | 85.0 | 86.5 | 79.6 | 84.0 | 78.3 | 80.5 |
| 19 | 76.9 | 80.9 | 78.0 | 80.4 | 80.5 | 81.1 | 84.2 | 83.2 | 87.0 | 84.0 | 86.7 | 86.7 | 90.0 | 88.0 | 90.0 | 89.0 | 88.7 | 88.3 | 85.0 | 86.4 | 79.6 | 83.8 | 78.8 | 80.5 |
| 20 | 77.5 | 80.7 | 77.5 | 80.4 | 80.0 | 81.2 | 82.8 | 83.3 | 87.2 | 85.0 | 86.6 | 86.6 | 89.8 | 88.0 | 89.6 | 89.0 | 87.7 | 88.1 | 85.0 | 86.2 | 80.0 | 83.6 | 78.5 | 80.5 |
| 21 | 78.4 | 80.5 | 78.3 | 80.3 | 81.0 | 81.1 | 82.0 | 83.3 | 87.0 | 85.1 | 87.5 | 86.5 | 89.9 | 88.0 | 89.0 | 89.0 | 87.1 | 88.1 | 84.2 | 86.2 | 80.1 | 83.4 | 79.1 | 80.6 |
| 22 | 79.0 | 80.2 | 78.3 | 80.2 | 81.6 | 81.1 | 82.0 | 83.0 | 87.3 | 85.2 | 87.0 | 86.5 | 90.5 | 88.3 | 88.9 | 88.9 | 87.2 | 88.0 | 84.3 | 86.1 | 79.0 | 83.3 | 80.1 | 80.7 |
| 23 | 78.9 | 80.2 | 78.0 | 80.2 | 82.1 | 81.1 | 82.0 | 83.0 | 87.6 | 85.3 | 86.9 | 86.4 | 91.0 | 88.0 | 88.8 | 88.8 | 87.6 | 88.0 | 84.7 | 86.1 | 79.6 | 83.9 | 80.8 | 80.8 |
| 24 | 78.4 | 80.4 | 78.1 | 80.1 | 82.1 | 81.2 | 83.6 | 83.0 | 87.9 | 85.4 | 87.0 | 86.4 | 91.5 | 88.1 | 89.4 | 88.6 | 87.3 | 88.0 | 85.0 | 86.0 | 80.5 | 83.0 | 80.8 | 81.0 |
| 25 | 77.5 | 80.3 | 77.3 | 80.0 | 82.1 | 81.4 | 83.8 | 83.0 | 87.0 | 85.5 | 87.8 | 86.4 | 91.2 | 88.2 | 90.0 | 88.6 | 87.0 | 87.9 | 85.0 | 86.0 | 80.2 | 83.0 | 81.4 | 81.0 |
| 26 | 76.4 | 80.3 | 77.1 | 80.0 | 82.2 | 81.4 | 84.0 | 83.0 | 86.7 | 85.5 | 88.1 | 86.5 | 91.1 | 88.5 | 90.0 | 88.6 | 87.4 | 87.8 | 83.7 | 86.0 | 79.0 | 82.9 | 80.5 | 81.2 |
| 27 | 76.0 | 80.0 | 77.7 | 80.0 | 82.7 | 81.8 | 84.0 | 83.0 | 86.5 | 85.6 | 88.5 | 86.5 | 91.0 | 88.5 | 90.1 | 88.8 | 87.2 | 87.8 | 83.5 | 85.8 | 79.1 | 82.8 | 78.9 | 81.3 |
| 28 | 75.5 | 80.0 | 77.8 | 80.0 | 82.6 | 81.8 | 83.8 | 83.1 | 87.1 | 85.6 | 88.5 | 86.5 | 91.0 | 88.6 | 90.4 | 88.7 | 87.0 | 87.8 | 82.0 | 85.6 | 79.8 | 82.7 | 78.8 | 81.3 |
| 29 | 75.5 | 79.8 | - | - | 82.7 | 82.0 | 83.6 | 83.2 | 88.0 | 85.5 | 87.9 | 86.9 | 90.3 | 88.6 | 90.2 | 88.8 | 87.0 | 87.7 | 82.3 | 85.6 | 80.5 | 82.5 | 78.0 | 81.2 |
| 30 | 76.0 | 79.6 | - | - | 82.2 | 82.0 | 84.2 | 83.2 | 88.2 | 85.6 | 88.5 | 86.8 | 90.0 | 88.7 | 90.2 | 88.9 | 87.3 | 87.6 | 82.2 | 85.3 | 81.5 | 82.5 | 78.5 | 81.1 |
| 31 | 76.1 | 79.5 | - | - | 82.1 | 82.0 | - | - | 87.5 | 85.9 | - | - | 89.5 | 88.6 | 89.9 | 88.9 | - | - | 82.8 | 85.1 | - | - | 78.1 | 81.0 |
| Mean | 78.6 | 81.0 | 79.1 | 80.3 | 81.0 | 80.9 | 83.4 | 82.7 | 86.3 | 84.5 | 88.1 | 86.5 | 90.4 | 88.0 | 90.4 | 88.9 | 88.6 | 88.4 | 85.2 | 86.6 | 81.3 | 84.0 | 78.3 | 81.4 |

The initial 2 or 3 of the readings is omitted, i.e. 275.0 degrees absolute is written 75.0.

Year 84.3 84.5

MINIMUM TEMPERATURE "ON THE GRASS" DURING THE INTERVAL 18h. to 7h. G.M.T.

428. CAHIRCIVEEN (Valentia Observatory).

Readings in degrees absolute.

1933.

| Month. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|--------|------|------|------|------|------|------|------|------|-------|------|------|------|
| 1 | 74.1 | 81.3 | 74.1 | 76.3 | 79.7 | 84.3 | 77.6 | 86.2 | 87.5 | 81.6 | 81.0 | 82.1 |
| 2 | 77.0 | 84.7 | 77.7 | 73.6 | 80.3 | 82.8 | 84.2 | 86.9 | 87.3 | 86.5 | 82.4 | 71.2 |
| 3 | 74.7 | 72.3 | 78.0 | 81.4 | 81.6 | 79.0 | 84.6 | 87.8 | 80.4 | 79.6 | 76.7 | 73.1 |
| 4 | 74.2 | 83.4 | 78.7 | 79.7 | 82.1 | 79.6 | - | - | 86.8 | 76.5 | 75.7 | 70.2 |
| 5 | 73.0 | 82.7 | 76.4 | 82.1 | 82.1 | 83.2 | 84.8 | 85.1 | 86.6 | 80.2 | 80.2 | 71.3 |
| 6 | 75.8 | 81.1 | 76.0 | 80.6 | 80.5 | 84.4 | 84.5 | 87.4 | 86.7 | 81.9 | 81.8 | 72.9 |
| 7 | 74.1 | 80.9 | 77.7 | 76.8 | 81.9 | 85.6 | 87.0 | 82.8 | 83.5 | 83.6 | 77.8 | 78.2 |
| 8 | 82.9 | 83.0 | 77.4 | 82.0 | 80.8 | 78.0 | 85.9 | 86.3 | 79.3 | 83.1 | 79.7 | 70.3 |
| 9 | 76.9 | 84.0 | 82.6 | 83.1 | 79.1 | 79.6 | 83.9 | 88.0 | 80.2 | 84.1 | 80.8 | 73.6 |
| 10 | 79.7 | 79.7 | 81.3 | 81.9 | 79.7 | 79.6 | 85.8 | 79.1 | 81.4 | 80.3 | 77.8 | 69.8 |
| 11 | 77.1 | 71.5 | 79.0 | 82.4 | 80.8 | 80.2 | 85.7 | 81.3 | 81.2 | 80.4 | 74.8 | 69.8 |
| 12 | 70.8 | 88.8 | 72.9 | 80.3 | 81.3 | 84.1 | 85.2 | 80.2 | 81.3 | 78.1 | 78.2 | 71.2 |
| 13 | 74.1 | 77.3 | 75.8 | 71.9 | 82.9 | 85.3 | 85.2 | 83.4 | 79.1 | 82.6 | 80.3 | 73.4 |
| 14 | 74.6 | 71.3 | 75.7 | 78.0 | 83.5 | 81.0 | 85.2 | 82.4 | 74.8 | 81.1 | 79.1 | 72.2 |
| 15 | 74.6 | - | 77.4 | 81.8 | 77.3 | 84.6 | 80.8 | 85.3 | 77.4 | 80.2 | 77.9 | 70.1 |
| 16 | 72.6 | 70.8 | 75.7 | 79.1 | 84.1 | 80.6 | 81.8 | 84.1 | 83.7 | 79.2 | 76.1 | 72.4 |
| 17 | 69.0 | 72.9 | 75.2 | 74.6 | 83.8 | 81.3 | 86.4 | 86.4 | 89.1 | 80.7 | 75.1 | 78.2 |
| 18 | 70.4 | 76.6 | 73.3 | 81.3 | 82.3 | 81.0 | 87.3 | 85.9 | 81.8 | 84.1 | 71.6 | 78.4 |
| 19 | 71.4 | 73.6 | 76.7 | 78.6 | 85.1 | 80.6 | 86.1 | 85.4 | 84.7 | 78.0 | 76.8 | 74.6 |
| 20 | 75.7 | 70.1 | 75.7 | 72.9 | 84.7 | 80.8 | 85.3 | 83.6 | 78.7 | 80.2 | 77.3 | 78.1 |
| 21 | 79.6 | 76.9 | 80.0 | 70.8 | 80.9 | 82.6 | 82.0 | 84.1 | 83.0 | 76.9 | 73.6 | 80.6 |
| 22 | 79.2 | 76.2 | 82.1 | 74.2 | 77.6 | 83.6 | 88.2 | 83.6 | 80.6 | 80.6 | 70.8 | 81.9 |
| 23 | 77.6 | 73.0 | 81.8 | 79.9 | 77.4 | 81.1 | 86.3 | 85.7 | 83.9 | 82.0 | 80.1 | 80.4 |
| 24 | 76.3 | 73.1 | 80.8 | 82.4 | 78.0 | 82.9 | 87.4 | 84.7 | 83.6 | 81.3 | 79.6 | 80.7 |
| 25 | 68.9 | 73.0 | 79.9 | 81.8 | 79.7 | 84.5 | 88.0 | 87.9 | 84.6 | 82.3 | 73.1 | 82.3 |
| 26 | 87.1 | 73.4 | 78.9 | 80.9 | 81.8 | 79.7 | 85.2 | 88.5 | 82.8 | 77.1 | 71.2 | 73.7 |
| 27 | 70.7 | 75.9 | 73.6 | 79.7 | 78.9 | 80.9 | 83.6 | 89.4 | 79.2 | 80.7 | 77.2 | 70.8 |
| 28 | 70.6 | 75.7 | 73.5 | 77.1 | 80.9 | 82.0 | 84.4 | 85.8 | 78.0 | 74.5 | 80.1 | 76.9 |
| 29 | 74.4 | - | 77.8 | 75.8 | 83.2 | 79.9 | 84.7 | 83.0 | 79.1 | 80.4 | 80.9 | 71.6 |
| 30 | 71.7 | - | 77.1 | 76.5 | 82.7 | 78.8 | 82.0 | 82.6 | 82.6 | 78.1 | 82.1 | 78.0 |
| 31 | 77.1 | - | 78.9 | - | 77.4 | - | 85.9 | 80.3 | - | 80.3 | - | 74.6 |
| Mean | 74.4 | 76.0 | 77.5 | 78.6 | 81.0 | 81.7 | 84.8 | 84.8 | 82.3 | 80.5 | 77.7 | 74.9 |

Annual Mean 278.9.

Mean for February is for 27 days only.

Means for July and August are for 30 days only.

429. CAHIRCIVEEM (VALENTIA OBSERVATORY).

Table for January 1933 with columns for Day, Cloud Forms, Cloud Amount, Visibility, Precipitation, and Remarks on the Weather of the Day.

430. CAHIRCIVEEM (VALENTIA OBSERVATORY).

FEBRUARY, 1933.

Table for February 1933 with columns for Day, Cloud Forms, Cloud Amount, Visibility, Precipitation, and Remarks on the Weather of the Day.

NOTE.—Visibility in these tables refers to a landwards direction; visibility seawards, when it differs from visibility landwards, is given on p. 285.

431. CAHRCIVEEN (VALENTIA OBSERVATORY).

MARCH, 1933.

Table for March 1933 with columns for Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Includes data for days 1-31 and a Mean Cloud Am't. row.

432. CAHRCIVEEN (VALENTIA OBSERVATORY).

APRIL, 1933.

Table for April 1933 with columns for Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Includes data for days 1-30 and a Mean Cloud Am't. row.

NOTE.—Visibility in these tables refers to a landwards direction; visibility seawards, when it differs from visibility landwards, is given on p. 285.

455. CAHRCIVEEN (VALENTIA OBSERVATORY).

JULY, 1933.

Table for July 1933 at Cahrciveen (Valentia Observatory). Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Includes a Mean Cloud Am't. row at the bottom.

456. CAHRCIVEEN (VALENTIA OBSERVATORY).

AUGUST, 1933.

Table for August 1933 at Cahrciveen (Valentia Observatory). Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Includes a Mean Cloud Am't. row at the bottom.

NOTE.—Visibility in these tables refers to a landwards direction; visibility seawards, when it differs from visibility landwards, is given on p. 285.

437. CAHIRCIVEEM (VALENTIA OBSERVATORY).

SEPTEMBER, 1933.

Table for 437. CAHIRCIVEEM (VALENTIA OBSERVATORY). Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day.

438. CAHIRCIVEEM (VALENTIA OBSERVATORY).

OCTOBER, 1933.

Table for 438. CAHIRCIVEEM (VALENTIA OBSERVATORY). Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day.

NOTE.—Visibility in these tables refers to a landwards direction; visibility seawards, when it differs from visibility landwards, is given on p. 285.

Table for November 1933 with columns for Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Includes data for days 1 through 30.

Table for December 1933 with columns for Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Includes data for days 1 through 31.

NOTE.—Visibility in these tables refers to a landwards direction; visibility seawards, when it differs from visibility landwards, is given on p. 285.



M.O. 370
(Richmond)

Air Ministry
METEOROLOGICAL OFFICE

THE
OBSERVATORIES' YEAR BOOK
1933

Comprising the meteorological and geophysical results obtained from autographic records and eye observations at the observatories at Lerwick, Aberdeen, Eskdalemuir, Cahirciveen (Valentia Observatory), and Richmond (Kew Observatory), and the results of soundings of the upper atmosphere by means of registering balloons.

RICHMOND (KEW OBSERVATORY)

Published by the authority of the
METEOROLOGICAL COMMITTEE



LONDON
HIS MAJESTY'S STATIONERY OFFICE
1935

RICHMOND (KEW OBSERVATORY).

| | | | | | | | | |
|---------------------------|----|----|----|----|----|----|--------|-----|
| Latitude | .. | .. | .. | .. | .. | .. | 51° 28 | N. |
| Longitude | .. | .. | .. | .. | .. | .. | 0° 19 | W. |
| G.M.T. of Local Mean Noon | .. | .. | .. | .. | .. | .. | 12h | lm. |

"Heights in Metres above Sea Level".

| | | | | | | | |
|-----------------------|----|----|----|----|----|----|------|
| Barometer | .. | .. | .. | .. | .. | .. | 10·4 |
| Raingauge Site | .. | .. | .. | .. | .. | .. | 5·5 |
| Dines Tube Anemograph | .. | .. | .. | .. | .. | .. | 28 |

"Heights in Metres above Ground"

| | | | | | | | |
|-----------------------|----|----|----|----|----|----|------|
| Thermometer Bulbs | .. | .. | .. | .. | .. | .. | 3·0 |
| Sunshine Recorder | .. | .. | .. | .. | .. | .. | 13·3 |
| Dines Tube Anemograph | .. | .. | .. | .. | .. | .. | 23 |
| Beckley Raingauge Rim | .. | .. | .. | .. | .. | .. | 0·53 |

INTRODUCTION.

The Observatory was built in 1769 as the private observatory of King George III. Since 1842 it has been devoted to physics and meteorology. The meteorological records are continuous from 1854. The Observatory is in the Old Deer Park, Richmond (Surrey), about 10 miles (16 km.) to the west of the City of London. The Observatory stands on a low artificial mound whose level is about $1\frac{1}{2}$ metres higher than that of the surrounding park. Round the Observatory a golf course has been laid out. The river Thames is distant about 300 metres on the north and west. Kew Gardens, which are extensively wooded, lie to the east-north-east, the nearest point of the Gardens being about 600 metres away. The town of Richmond, to the south-east, is about 1,100 metres distant. On the east side of the Park is the main road from Richmond to Kew; on the south side the railway from Richmond to Twickenham. An open area partly wooded, Syon Park, lies to the north-north-east across the river. Richmond Park is about $1\frac{1}{2}$ miles ($2\frac{1}{2}$ km.) to the south-east. General views of the Observatory building and the exposure lawn are to be found in the 1928 volume. The photographs were taken in 1925, but the only changes (before the end of 1933) which need be noted are the substitution of other experimental screens for the small marine screens which were being tested in 1925, the removal in 1929 of the hedge near the North Wall Screen and the

erection in place of the Robinson anemometer of the New Dines Anemometer with its vane 5.3 metres above the dome. For the early history of the Observatory reference may be made to papers by S.P. Rigaud*, R.H. Scott †, C. Chree‡, R.S. Whipple†† and O.J.R. Howarth‡‡.

METEOROLOGY.

The elements dealt with in the following tables are: atmospheric pressure, temperature, humidity, rainfall, sunshine, solar radiation, wind speed and direction, earth temperature, minimum temperature on the grass, level of underground water; there is also a diary of cloud and weather.

For brief descriptions of most of the instruments from which values of the above elements have been obtained and of the methods of tabulating the records, reference should be made to the General Introduction. The following notes supplement, where necessary, the information contained therein.

Notes on Instruments.

"Pressure".-The barograph is mounted in the basement of the Observatory, where the diurnal variation of temperature is very small. The normal position of the instrument has been in the north room occupied by the magnetographs. When the magnetographs were removed and the preparations for the installation of the seismographs were commenced, the barograph was placed in the photographic darkroom (June 16th, 1925). The instrument remained in that position until May 21st, 1928, when it was restored to its original site and electric lighting installed. The barograph magnifies barometric changes in the ratio 1.553: 1, i.e., the change of ordinate equivalent to a change of 1 mm. in the height of the barometer is 1.553 mm. "Residual corrections," obtained from the control observations taken daily with the Newman barometer at 9h, 15h and 21h, are applied to the hourly measurements. The same correction is applied to all the readings on the same photographic sheet, i.e., generally for forty-eight hours. The individual entries published for the hours of the control observations may differ by .3mb from those observations. The Newman barometer is compared from time to time with the two large mercury barometers, which were set up in 1855 and 1860 respectively, the accuracy of which has been confirmed by indirect comparisons with the new standard of the N.P.L.** A zero correction for the Newman barometer is based on these comparisons. The correction + 0.2 mb. (+.006 mercury inch) which has been applied for many years, remained in use. Comparisons are made on the assumption that the value of the acceleration due to gravity is $g = 981.199 \text{ cm/sec}^2$. This is the value given by pendulum observations.†††

* The Observatory 1882, p.279

‡The Record of the R. Soc., 1897.

† R. Soc. Proc., Vol. 39 (1885) pp. 37-86 ††Proc. of the Optical Convention, 1926

‡‡History of the British Association, 1922.

††† A comparison between the values of "g" at Cambridge and Kew Observatory was made during the year 1925 by Sir. G.P. Lenox-Conyngham with the assistance of Mr. G. Manley. A similar comparison between Potsdam and Cambridge was made by Prof. Meinesz earlier in the year. These observations are in accord with those made at Kew and Potsdam by Putnam in 1900, from which the value stated above was derived. The value for Potsdam, $g=981.274$, based on the observations of Kühnen and Fürtwangler, is adopted as the standard of reference. For the latitude of Kew Observatory, $51^{\circ}, 28'$, the formula in the General Introduction gives $g=981.185$.

** Met. Mag. June 1933.

The departure from the value given for the latitude by the formula quoted in the General Introduction is insignificant. On occasions when a loss of trace occurred, the missing hourly values were derived from the Dines Float Barograph.* There were 13 hours in the year for which this was necessary.

"Temperature and Humidity."-The thermograph is mounted in the West Room on the first floor of the Observatory, the thermometer bulbs being exposed in the screen attached to the north wall of the building. This screen has single louvres and the bottom is open. There is an additional flat louvred screen which shields the main screen from direct sunshine when the sun is in the West and not too low. The height of the bottom of the bulbs of the recording thermometers above the bottom of the sides of the screen containing them is 30 cm. in summer, 33 cm. in winter. The height of the bulbs above the top of the artificial mound on which the Observatory stands is approximately 3 metres; the height above the lawn where the rain-gauge is situated is approximately 5 metres. The scale values of the photographic records are not identical for the dry- and wet-bulb curves. For the dry-bulb, tube No. 4 II was in use and the scale value was 1 mm.=0.3336°A; for the wet-bulb, the old Falmouth wet-bulb tube (no number) was in use and the scale value was 1 mm.=0.290°A

Up to the year 1916 thermometers graduated on the Fahrenheit scale were in use in the North Wall Screen for controlling the thermograph readings. Then thermometers graduated in the absolute scale were introduced. Of these two absolute thermometers one was broken in June, 1933 and one of the old Fahrenheit thermometers took its place. Readings of the control thermometers are used for the daily weather service and for that purpose readings on the absolute scale have to be converted to Fahrenheit. It was decided that it would be more convenient to make the alternative conversion from Fahrenheit to Absolute and accordingly the use of thermometers with the absolute graduation terminated with the year under review. Before the Fahrenheit thermometers which had been in use up to 1916 were put back in the screen they were tested at the National Physical Laboratory. It is satisfactory to note that the two thermometers are correct within 0.1°F. The close agreement of the scale of the Kew standards with the scale of the hydrogen thermometers was demonstrated by Harker in 1905**. The recent tests indicate that these thermometers with large bulbs keep their zeros well.

The water for the wet-bulb thermometers is supplied from a tank fitted outside the screen. A large bottle is inverted over the tank and water flowing from this bottle keeps the level constant in the tank and in the cups from which wicks are taken to the wet-bulbs. The height of the apparatus is adjusted so that the water drips steadily from the wet-bulbs. A bottleful of water lasts at least a week. It is found that the bottle survives severe frost.

Control eye-readings of the standard thermometers are taken daily at 9h, 15h and 21h. Residual corrections obtained from the control observations are applied to the hourly measurements of the curves. The same correction is applied to all the readings on the same photographic sheet, i.e., generally for forty-eight hours. The individual entries published for the hours of the control observations may differ by 0.3°A. from these observations. The larger departures refer to occasions when temperature is oscillating or changing rapidly.

*For descriptions of this instrument see "Observatories' Year Book," 1923 p. 94, and "London, Q. J. R. Meteor. Soc.," 55, 1929, p. 37.

**Proc. R. Soc. A 78, p.225, 1907. and N.P.L Coll. Res. II, p.215 n.d.

In cases of loss of the dry-bulb record owing to the failure of the electric light or any other cause the readings of a mercury in steel thermograph are adopted. There were 25 hours in the year for which this was necessary. The auxiliary thermograph which had been in a second North Wall Screen was moved in November to the screen containing the bulbs of the photo-thermograph.

When the wet-bulb trace is missing or defective, the missing values are derived from the dry-bulb trace and the records of a hair hygograph. The same procedure is always adopted when the wet-bulb reading is below 273°A. 663 hours had thus to be dealt with during the year. Humidity was determined from the dry and wet-bulb readings by the procedure described in the General Introduction to this volume*.

It may be noted that during 1933, as in previous years, the temperatures published for Kew Observatory in the Daily Weather Report and elsewhere also refer to the North Wall Screen. For the daily and weekly reports the readings of maximum and minimum thermometers exposed in that screen are utilised.

"Rainfall".-As from January, 1921, the standard raingauge for the Observatory has been an 8 - inch gauge with the deep "Snowden" funnel. The site is level and protected from wind, principally by hedges about 1½m. high and distant 11 metres to East and 17 metres to West. The readings of this standard gauge are at 7h and 18h. The hourly readings of the Beckley gauge are adjusted to give totals in agreement with the standard gauge.

"Sunshine".-The sunshine recorder is mounted on the south parapet of the roof. The same frame has been in use since 1880 and it is believed that the ball has not been changed. The ball is now somewhat yellow. The exposure is satisfactory. The greatest elevations of the sky line in the azimuths in which the sun can rise and set are 1° and 3° respectively.

"Solar Radiation".-Observations are made with an Ångström pyrheliometer, which measures the intensity of the direct radiation received from the sun by a surface which is normal to the sun's rays. The observations are made within half an hour of noon on all days except Sundays, provided that the sun is visible and not too much obscured by cloud, fog or thick haze. The conditions of the intervening atmosphere are indicated in Tables 499-510 in the column "sky". The amount of radiation is given in milliwatts per square centimetre in the column headed "total". For conversion to the unit more ordinarily employed abroad, the following relation may be used, lmw. per sq. cm. = 0.01435 gramme-calorie per sq. cm. per minute. The vertical component, i.e., the direct radiation received per square centimetre of a horizontal surface, is also given.

The Ångström instruments in use are by Rose, Stockholm. No. 24 was in use throughout the year. The ammeter is No. 68956, which was certified at the National Physical Laboratory in 1919.† The readings are evaluated according to Ångström's original instructions.†† To bring the readings into accordance with the scale adopted by the Smithsonian Institution, a correction of + 3.5 per cent. would be required.‡

*Prior to 1926 the tables, based on Glaisher's factors, published in "The Computer's Handbook," M.O. 223, Sec. 1, 1916, were used.

†In view of the discovery by Marten ("Berlin. Ber. Meteor. Inst.," 1928, p.64) that errors are likely to be caused by temperature changes produced in a microammeter when sunshine falls on it, it may be noted that the instrument used at Kew is always in shadow.

††Report of the International Meteorological Committee, St. Petersburg, 1899, p. 57.

‡R. E. Watson, "Geophysical Memoirs," No. 21, 1923.

"Wind Speed and Direction".-A new chapter in the record of the wind opened with the year 1931. From 1869 to the end of 1925 the velocity of the wind was estimated by means of the Robinson-Beckley cup anemograph mounted above the observatory dome. From the beginning of 1926 the Dines anemograph, already in use for some purposes, was adopted for the hourly tabulations. This anemograph, now known as the "Old Dines anemograph," had its head at the same height as the Robinson cups. In 1929 the cup-anemograph was dismantled and a new Dines instrument was erected with the vane over the middle of the dome. This vane is three metres higher than that of the old Dines anemograph. There are other differences* between the two instruments, the new one having larger tubes between the vane and the receiver and having below the head a shield designed to eliminate the effects of any lack of symmetry in the attachment of the tubes to the head. After comparisons lasting a year the new anemograph was brought into regular use on January 1st 1931. The following details refer to the two instruments.

| | New. | Old. |
|---------------------------------|---|---|
| Pattern | Mark II | |
| Suction holes .. | 80 holes in 4 rows of 20. Diameter 2 mm. | 80 holes in 4 rows of 20. Diameter 3 mm. |
| Connecting tubes.. | Length 8 m. Internal diameter 24 mm. | Length 17 m. Internal diameter 12 mm. |
| Height of vane above lawn .. | 23 m. | 20 m. |

There is a continuous belt of trees along the river about 300 metres away and other tall trees at shorter distances, but few of the trees have their summits above the level of the new vane.

As was anticipated, the mean velocity of the wind as recorded by the new anemometer at 23 metres above the ground is in excess of that recorded at 20 metres. The difference is about 9 per cent. Winds from various quarters are however affected differently as may be seen from a table published in the Introduction to the Year Book 1931.

"Earth Temperature".-The two thermometers in use were at 30 cm. and 122 cm. The ground in which the tubes for the thermometers are sunk is under grass. The soil is gravel. The site is well exposed. There are, however, three fruit trees about 9 metres to the east and 6 metres high. The bulb of the lower thermometer is 430 cm. above sea level. In some years the underground water surpasses this level.

"Minimum Temperature on the Grass".-The grass minimum thermometer is set at 18h and read at 7h on the succeeding day, the reading being assigned to

*The anemometer of the new type is described in the "Geophysical Memoirs" (No. 54, 1932) devoted to the Cardington researches on wind structure.

the day of reading.* The thermometer is placed with the bulb about 25 mm. above the turf. The exposure is good there being no obstruction within 76° from the zenith. The thermometer in use was M.O. 23007. This thermometer has a spherical bulb, diameter 17 mm.

Identification Numbers of Instruments in use in 1933.

| | | |
|---|---------|--------------------------|
| Control barometer | .. .. . | Newman 34 |
| Control Dry Bulb Thermometer | .. .. . | Negretti & Zambra 173971 |
| Control Wet Bulb Thermometer | .. .. . | Negretti & Zambra 173969 |
| Control Raingauge (8-inch) | .. .. . | M.O. 1271 |
| Measuring Glass for the Control Raingauge | .. .. . | M.O. 1615 & 1693 |
| Campbell-Stokes Sunshine Recorder | .. .. . | M.O. 12 |
| Dines Tube Anemograph Head | .. .. . | M.O. 1057 |
| Dines Tube Anemograph Recorder | .. .. . | M.O. 1057 |
| Earth Thermometer 1 ft. | .. .. . | M.O. 5 |
| Earth Thermometer 4 ft. | .. .. . | M.O. 10 |
| Grass Minimum Thermometer | .. .. . | M.O. 23007 |
| Photo-thermograph (Dry Bulb | .. .. . | 4 11 |
| Photo-thermograph (Wet Bulb (Old Falmouth Wet Bulb) | .. .. . | No number |
| Photo barograph | .. .. . | " |

Thermometer Corrections, 1933.

| | | 173971 N.P.L. 1915 | | | | 173969. N.P.L. 1915 | | | | MO 5 N.P.L. 1913 | | MO 10 N.P.L. 1913 | | MO 23007 N.P.L. 1918 | |
|------------|--------|-----------------------|-----|--------|--------|------------------------|-----|-------|------|---------------------|------|----------------------|--------|-------------------------|--|
| Certified. | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | °A | | |
| | 255 | +0.20 | 285 | -0.10 | 255 | +0.15 | 285 | -0.10 | 260 | +0.1 | 260 | +0.3 | 253 | -0.1 | |
| | 260 | + .15 | 290 | - .10 | 260 | + .15 | 290 | - .10 | 273 | .0 | 273 | + .1 | 263 | - .1 | |
| | 265 | + .10 | 295 | - .05 | 265 | + .10 | 295 | - .05 | 280 | .0 | 280 | + .2 | 273 | .0 | |
| | 270 | + .05 | 300 | - .10 | 270 | + .10 | 300 | - .05 | 290 | .0 | 290 | + .1 | 283 | .0 | |
| | 273 | - .05 | 305 | - .05 | 273 | .00 | 305 | - .05 | 300 | .0 | 300 | .0 | 293 | .0 | |
| | 275 | .00 | 310 | - .05 | 275 | .00 | 310 | - .05 | 310 | .0 | 316 | + .1 | 303 | .0 | |
| | 280 | - .05 | - | - | 280 | - .05 | - | - | - | - | - | - | - | - | |
| Applied. | 260) | +0.1 | - | - | 260) | +0.1 | - | - | - | - | - | - | 255) | -0.1 | |
| | 270) | | | | 270) | | | | | | | | 268) | | |
| | 270-1) | 0.0 | - | - | 270-1) | 0.0 | - | - | 260) | 0.0 | 275) | +0.1 | 268-1) | 0.0 | |
| | 283-0) | | | | 283-0) | | | | 310) | | 295) | | 303) | | |
| 283-1) | -0.1 | - | - | 283-1) | -0.1 | - | - | - | - | - | - | - | - | | |
| 310-0) | | | | 310-0) | | | | | | | | | | | |

*The hour of the readings to be published in the "Observatories' Year Book" was changed from 9h. to 7h. as from January 1st, 1924.

Notes on Meteorological Tables.

The year was notably warm and sunny, especially in the summer months.

The lowest reading of the "grass minimum" thermometer was 262.2°A (12.6°F) on Feb. 20th.

The lowest temperature in the North Wall Screen, 267.8°A (22.6°F) was recorded between 6h. and 7h. on Jan. 23rd.

Jan. 24th. was an "ice day" the maximum temperature in the North Wall Screen being 272.8°A (31.6°F).

The maximum temperature in the same screen was 304.9°A (89.4°F) on Aug. 6th.

There were 20 days on which the maximum temperature exceeded 300°A (80.6°F).

The rainfall for the year was nearly 24% below the normal. The deficiency occurred in the second half of the year, the first six months being normal.

The heaviest fall occurred on Feb. 10th, 22 mm.

There were only four days of precipitation in August; this is the lowest number for that month since 1871.

The sunshine for the year, 1758 hours was 285 hours in excess of the normal. This is the second highest total since 1880, the record being 1765 hours in 1899.

The excess was greatest in March and in the summer months, June to September.

The highest wind velocity recorded in a gust was 26 m/s (58mi/hr) on Dec. 13th.

"Diurnal Variation of Pressure and Temperature".-Harmonic Analysis. The first four harmonic components computed for each month are tabulated in Tables A and B.

The inequality is supposed to be given by the expression,

$$c_1 \sin (15 t^{\circ} + a_1) + c_2 \sin (30 t^{\circ} + a_2) + \dots,$$
 t being the time in hours since midnight. The angles a are the phases of the several sine-waves at midnight. The curves are tabulated according to Greenwich mean time but the phases in Table A have been reduced to local mean time. The difference in Longitude between Kew and Greenwich being only 19' the correction is hardly appreciable in the figures, which are rounded to the nearest degree.

TABLE A.

Diurnal Variation of Barometric Pressure. Fourier Coefficients. $\Sigma c \sin (nt + \alpha)$.
 Richmond (Kew Observatory), Longitude 0° 19' W. Local Mean Time.

| 1933 | c_1 | α_1 | c_2 | α_2 | c_3 | α_3 | c_4 | α_4 |
|--------------------|-------|------------|-------|------------|-------|------------|-------|------------|
| | mb. | ° | mb. | ° | mb. | ° | mb. | ° |
| January | ·309 | 213 | ·394 | 156 | ·177 | 349 | ·094 | 211 |
| February . . . | ·287 | 126 | ·376 | 147 | ·147 | 331 | ·046 | 88 |
| March | ·295 | 310 | ·501 | 159 | ·056 | 349 | ·053 | 39 |
| April | ·410 | 14 | ·408 | 141 | ·038 | 192 | ·040 | 320 |
| May | ·269 | 23 | ·334 | 149 | ·071 | 160 | ·043 | 338 |
| June | ·389 | 19 | ·321 | 138 | ·080 | 172 | ·012 | 285 |
| July | ·351 | 10 | ·314 | 142 | ·103 | 147 | ·017 | 299 |
| August | ·436 | 343 | ·374 | 148 | ·070 | 164 | ·032 | 341 |
| September .. . | ·211 | 22 | ·450 | 145 | ·019 | 48 | ·034 | 309 |
| October .. . | ·061 | 109 | ·408 | 149 | ·105 | 353 | ·005 | 308 |
| November.. . | ·146 | 292 | ·301 | 149 | ·103 | 359 | ·034 | 233 |
| December.. . | ·067 | 219 | ·343 | 146 | ·131 | 352 | ·077 | 191 |
| Arithmetic Mean .. | ·269 | - | ·377 | - | ·092 | - | ·041 | - |
| Year | ·129 | 360 | ·374 | 148 | ·031 | 355 | ·010 | 272 |
| Winter | ·131 | 200 | ·352 | 150 | ·137 | 347 | ·045 | 194 |
| Equinox | ·166 | 1 | ·438 | 149 | ·034 | 352 | ·025 | 347 |
| Summer | ·347 | 7 | ·335 | 145 | ·080 | 160 | ·024 | 326 |

Note:—"Winter" comprises the four months, January, February, November, December, "Equinox" the months March, April, September, October, and "Summer" May to August.

TABLE B.

Diurnal Variation of Temperature. Fourier Coefficients. $\Sigma c \sin (nt + \alpha)$.
 Richmond (Kew Observatory), Longitude 0° 19' W. Local Mean Time.

| 1933 | c_1 | α_1 | c_2 | α_2 | c_3 | α_3 | c_4 | α_4 |
|--------------------|-------|------------|-------|------------|-------|------------|-------|------------|
| | °A | ° | °A | ° | °A | ° | °A | ° |
| January | ·917 | 225 | ·420 | 28 | ·102 | 211 | ·004 | 5 |
| February . . . | 1·520 | 223 | ·609 | 30 | ·110 | 201 | ·080 | 150 |
| March | 3·369 | 220 | 1·005 | 40 | ·131 | 336 | ·118 | 199 |
| April | 3·789 | 222 | ·437 | 50 | ·340 | 18 | ·129 | 213 |
| May | 3·754 | 227 | ·378 | 50 | ·287 | 43 | ·039 | 157 |
| June | 4·104 | 227 | ·122 | 141 | ·374 | 48 | ·106 | 27 |
| July | 4·016 | 223 | ·041 | 290 | ·333 | 27 | ·107 | 62 |
| August | 4·517 | 222 | ·477 | 55 | ·376 | 27 | ·032 | 222 |
| September .. . | 3·404 | 229 | ·697 | 47 | ·207 | 8 | ·167 | 210 |
| October .. . | 2·197 | 227 | ·709 | 52 | ·143 | 267 | ·079 | 204 |
| November.. . | 1·261 | 225 | ·544 | 41 | ·137 | 251 | ·034 | 136 |
| December.. . | ·789 | 222 | ·336 | 41 | ·140 | 213 | ·036 | 348 |
| Arithmetic Mean .. | 2·803 | - | ·481 | - | ·223 | - | ·078 | - |
| Year | 2·800 | 225 | ·460 | 44 | ·121 | 17 | ·034 | 185 |
| Winter | 1·122 | 224 | ·475 | 35 | ·115 | 220 | ·020 | 132 |
| Equinox | 3·184 | 224 | ·709 | 46 | ·161 | 354 | ·122 | 207 |
| Summer | 4·095 | 225 | ·210 | 58 | ·338 | 36 | ·040 | 58 |

Note:—"Winter" comprises the four months, January, February, November, December, "Equinox" the months March, April, September, October, and "Summer" May to August.

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"Level of Underground Water".--In Table 527 there is given for each day the height, above sea-level of the surface of the underground water. Up to August 1932 the level recorded was that of the surface of the water in a pipe passing through the floor of the basement. From August 17th the float rested on the bottom of this 'well', the water being lower than at any previous time since the installation of the apparatus in 1914. In November 1933 measurements were commenced on the site of a pump in the garden about 25 metres west of the well in the basement. The water was then 32 cm below the lowest level which could be recorded in the well. On Dec. 29th. the water went down to 114 cm. above Mean Sea Level.

The persistent lowness of the water is due in part to the drought but there are special local circumstances, the effect of which cannot be estimated, such as the pumping by the Corporation of Richmond of water from a well about 500 metres south of the Observatory.

"Cloud Amount".--The mean cloud amounts for the six hours of observations are given month by month in the diary of cloud and weather. The following means are derived from these data:-

"Mean Amount of Cloud from Six Observation Hours."

| Month | Jan. | Feb. | Mar. | Apl. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Year |
|-------|------|------|------|------|-----|------|------|------|-------|------|------|------|------|
| Cloud | 6.5 | 7.0 | 5.1 | 6.1 | 7.5 | 5.6 | 6.0 | 5.4 | 5.3 | 6.5 | 7.6 | 7.8 | 6.4 |

"Mean Amount of Cloud for the Year at the Six Observation Hours".

| Hour | .. | 7h | 9h | 13h | 15h | 18h | 21h |
|-------|----|-----|-----|-----|-----|-----|-----|
| Cloud | .. | 6.4 | 6.5 | 7.0 | 6.9 | 6.1 | 5.3 |

"Visibility".--The objects used for the classification of visibility are enumerated below. The Observatory is on very low ground. The view is bounded on the south-east by Richmond Hill and on the west by the trees near the river. For object H a church tower seen through trees and with high ground behind it has to be used. There is no conspicuous object at the appropriate distance to serve as I, and interpolation is necessary. The object J is in London and is therefore more affected by atmospheric pollution than the other objects.

LIST OF OBJECTS.

| Identification Letter. | Object | View Point | Bearing | Actual Distance | Standard Distance |
|------------------------|--|----------------------------------|---------|-----------------|-------------------|
| X | (A not visible) | - | - | - | - |
| A | Verification House | S.W. Corner of Observatory Bldg. | S.W. | 25 | 25 |
| B | 17ft. Stevenson Screen.. .. | S.E. Corner of Observatory Bldg. | S.W. | 50 | 50 |
| C | New Magnetic Hut | S.W. Corner of Observatory Bldg. | S. | 110 | 100 |
| D | S.W. Tree | " " | S.W. | 200 | 200 |
| E | Golf Club House | Observatory | S.E. | 500 | 500 |
| F | Orange Tree Hotel.. .. | " " | S.E. | 970 | 1,000 |
| G | St. Matthias's Church | " " | S.E. | 1,900 | 2,000 |
| H | South Ealing Church | " " | N. | 4,000 | 4,000 |
| i | Mortlake Chimney well visible | " " | E. | 3,500 | 7,000 |
| | Chelsea Chimneys not visible | " " | E. | 9,300 | |
| J | Chelsea Chimneys | " " | E. | 9,300 | 10,000 |
| K | Surrey Hills | " " | S. | 20,000 | 20,000 |
| l | Surrey Hills well visible .. | " " | S. | 20,000 | 30,000 |
| m | Surrey Hills, exceptionally visible. | " " | S. | 20,000 | 50,000 |

ATMOSPHERIC ELECTRICITY.

In Atmospheric Electricity the systematic observations reported in the Year Book are devoted to potential gradient, air-earth current and conductivity. These three elements are observed each afternoon when conditions are favourable. In the case of potential gradient the continuous autographic records are also utilised.

"Potential Gradient, Conductivity and Air-Earth Current".-Since 1909 the current flowing from air to earth has been estimated by the method developed by C.T.R. Wilson.* Until the end of 1930 the observations incorporated in the Year Book were made with an electrometer set up on a tripod. The current received by a small plate mounted on the electrometer was measured, as well as the strength of the electric field over this plate. From these measurements the effective conductivity of the air was deduced and hence the strength of the current in the natural electric field.

It was always realised this scheme was not entirely satisfactory. The construction of an underground laboratory has facilitated an improvement. The current which is now measured is that flowing into a plate which is flush with the roof of the laboratory and nearly at ground level. The plate is supported from below on a stand which carries a Lindemann electrometer and a variable condenser or "compensator". The cover for the plate is mounted on a long handle which can be manipulated from below. A detailed description of the installation has been published in a Geophysical Memoir† prepared by Mr. F.J. Scrase. The electrometer is calibrated once a month by means of Weston standard cells. Since the beginning of 1932 absolute measurements on fine afternoons at 14h 30m of potential gradient, air-earth current and conductivity have all been made with this apparatus.

The potential gradient, F , is given in volts per centimetre by the formula,

$$F = 4\pi (9 \times 10^{11}) C v / A,$$

where C is the capacity, in farads, of the system (when shielded), v the voltage acquired by the test plate after being exposed to the field, earthed and then shielded, and A is the area of the plate. A minor alteration was made to the apparatus on 11th October 1933 when a shutter was fitted to the electrometer system so that the latter can be completely screened from the compensator whilst readings are being made. This involved a slight change in the capacity from 6.00 to 5.91×10^{11} farads. The diameter of the test plate is 20.8 cm. The mean strength of the electric field is derived from five observations made at intervals of about 6 minutes.

The air-earth current is given in amperes per square centimetre by the formula

$$i = C \delta v / A t$$

where v is the voltage acquired by the plate in t seconds. For obtaining the mean value of the current four observations, each lasting five minutes, are averaged. The observations of the current are sandwiched between the observations of the field strength and from the two mean values i and F the conductivity λ_+ is deduced. No observations are made during rain nor

* Cambridge Proc. Phil. Soc., 13, 1906, p. 184

† London Meteor. Off., Geophys. Mem. No. 60, 1934.

when the potential gradient is negative.

The use of the test plate at ground level introduced a discontinuity in the series of observations. Revised mean values for the period up to 1931 have been published in Mr. Scrase's memoir. In 1933 the mean value of the current for the year, allowing equal weight to each month is 106×10^{-18} amp. cm^{-2} . This is somewhat higher than the corresponding values for other years, the mean value for the period 1912 to 1932 being 98×10^{-11} amp. cm^{-2} . The mean value of the conductivity for the year is 39×10^{-20} ohm $^{-1}$ cm^{-1} whilst the mean of corresponding values for the period 1912 to 1932 is 37×10^{-16} ohm $^{-1}$ cm^{-1} .

"Potential Gradient".-Two changes in the system by which potential gradient is estimated were made in 1932.

The Kelvin electrograph, which has been housed since 1915 in a low building known as the Clinical House, provides a record of the electrical potential at a point not far from the wall of the building. By the application of a factor the potential gradient at a specified site is deduced.

Up to Feb. 10th., 1932 the point at which the potential was measured was where the jet from a water dropper broke into spray. On that date a radio-active collector was substituted for the water dropper. The collector is 1.2m from the window and 1.87m above ground level. A collector freshly coated with polonium is now installed every six months. The adoption of the radio-active collector in place of the water dropper eliminates the risk of failure of the apparatus owing to frost.

The second change of practice was in the system adopted for standardization. Previously the absolute observations were made at a site in the Observatory garden, the potential at points one metre and two metres above the ground being determined with the aid of a lighted fuse carried by a long insulated rod and connected to an electrostatic voltmeter.

As from the beginning of 1932 the electrograph has been standardized by means of the observations of the field strength over the test plate of the Wilson apparatus at the underground laboratory. Experiments have shown that the potential gradient found in this way is, to a very close approximation, equal to that found by measuring the potential at a height of one metre in the open part of the grounds.

Owing to this change of practice there is a discontinuity in the published record of potential gradient. Amended values of the monthly and annual means of potential gradient for earlier years have been published in Mr. Scrase's memoir. The amended figures represent more closely the potential gradient in the open. The correction to be applied is 12 per cent.

The control observations are now taken at 14h 30m. From the observations the factor is derived by which the potential gradient recorded by the electrograph must be multiplied to obtain the potential gradient in the open.

The mean factor for the year was 2.65. The equivalent height of the collector of the electrograph may be estimated by dividing one metre by this factor, i.e., the collector was on the average at the same potential as a point 37.7 cm. above ground in the paddock.

On the few occasions when the electrograph in the Clinical House was out of action the values of potential gradient were derived from a subsidiary electrograph in the New Magnetic Hut.

The data appearing in Table 541 include the electrical character figure assigned to each day from the consideration of the electrograms. Of the character figures, 0 denotes the absence of negative potential, 1 implies the existence of negative potential at one or more times during the day but with a total duration of less than 3 hours, while 2 implies the existence of negative potential with a total duration of 3 hours or more. As a negative potential gradient hardly ever occurs except when rain is in the neighbourhood, character 0 occurs on dry days and character 2 on days with continuous rainfall. The present criteria for character figures were adopted as from the beginning of 1914. Correcting for missing days, the average frequency of character figures 0, 1, and 2 during the years 1914-1932 inclusive were 188: 137: 40. The corresponding figures for 1933 are 187: 140: 38.

In accordance with a resolution of the International Union for Geodesy and Geophysics (Section for Terrestrial Magnetism and Atmospheric Electricity: Prague Meeting 1927) tabulations of the duration of negative potential gradient have been included in the Year Book since 1928. The total duration of negative gradient is given for each day for which the electrographic record is satisfactory.

Table 542 contains daily data derived from measurements of the electrograms. They represent means for the 60-minute intervals ending at 3h, 9h, 15h and 21h G.M.T. respectively. On occasions when the trace was defective, either through failure of insulation or some other cause, values of potential gradient have been omitted. The electrograph is intended to record the potential gradient of fine weather and the limits are approximately -1500 and +2000 volts per metre. In showers and thunderstorms gradients of 10000 volts per metre or more may occur. These are, of course, beyond the range of the instrument. Even when the curve does not go beyond the limits of the chart the changes may be so rapid that no satisfactory estimate is possible of the mean value of the ordinate. All such occurrences are indicated by the letter z. If there is no doubt as to the sign of the hourly mean value, though a numerical measure is unobtainable, the sign is indicated by a + or a - attached to the z. The symbol $z\pm$ indicates that there were oscillations on both sides of the zero line, and that the sign of the mean value was uncertain.

The extreme hourly values in Table 542 are 1635 v/m at 9h on Jan 10th and -1055 at 9h on March 19th. The former value is representative of foggy conditions; on this occasion fog developed after 21h on the 9th after a fine evening and continued until about 20h on the 10th, the potential gradient exceeding 1000 v/m from 2h to 12h on the 10th. The extreme negative gradient was associated with moderate rain.

At the foot of each section of Table 542 there are two sets of mean values. These are obtained according to different rules. The (a) mean is the arithmetic mean of all the positive potential gradients in the column. The (b) mean is the algebraic mean of all the entries which remain in the column after those have been eliminated which refer to days in which at least one of the four hourly values is indeterminate. The last line gives the mean value for each month as derived from the (a) and (b) means for the four hours.

The diurnal inequalities and the mean monthly and annual values in Table 543 are based on the curves of certain quiet days selected from those entirely free from negative potential gradient. Other objects aimed at in the selection of the days are freedom from large irregular movements, absence of indications of inferior insulation in the electrograph and the avoidance, so far as possible, of large non-cyclic changes. The quiet days numbered 10 in each month. The noncyclic change is given explicitly in Table 543, so that anyone who may desire to reproduce the figures as they were before the non-cyclic correction was applied can easily do so.

All the inequalities shew a well marked double oscillation with minima in the early morning and early afternoon, maxima in the late morning as well as in the evening. The diurnal inequalities for the whole year shew the higher maximum at 9h., the lower minimum at 3h. This is not the case in every year. The following list gives the annual mean potential gradient for selected quiet days together with the hours of the extremes and the range of the inequality for each year from 1910. The correction of 12 per cent has been applied to the means and ranges of all years from 1910 to 1931.

KEW OBSERVATORY POTENTIAL GRADIENT (REFERRED TO PADDOCK) 1910-1933.

| Year | Mean v/m | Range v/m | Max. hr. | Min. hr. | Year | Mean v/m | Range v/m | Max. hr. | Min. hr. | Year | Mean v/m | Range v/m | Max. hr. | Min. hr. |
|------|-------------|--------------|-------------|-------------|------|-------------|--------------|-------------|-------------|------|-------------|--------------|-------------|-------------|
| 1910 | 347 | 155 | 20 | 4 | 1918 | 388 | 156 | 20 | 2 | 1926 | 313 | 132 | 20 | 4 |
| 1911 | 337 | 172 | 9 | 4 | 1919 | 371 | 139 | 8 | 4 | 1927 | 353 | 144 | 19 | 3 |
| 1912 | 336 | 167 | 9 | 4 | 1920 | 353 | 137 | 9 | 3 | 1928 | 334 | 139 | 9 | 3 |
| 1913 | 375 | 179 | 19 | 3,4 | 1921 | 315 | 148 | 20 | 3,4 | 1929 | 379 | 153 | 9 | 4 |
| 1914 | 386 | 189 | 20 | 3 | 1922 | 356 | 161 | 20 | 4 | 1930 | 373 | 183 | 9 | 3 |
| 1915 | 397 | 194 | 19 | 5 | 1923 | 356 | 179 | 9 | 4 | 1931 | 379 | 171 | 20 | 4 |
| 1916 | 411 | 169 | 20 | 4 | 1924 | 368 | 149 | 20 | 4 | 1932 | 391 | 173 | 21 | 4 |
| 1917 | 397 | 172 | 20 | 4 | 1925 | 365 | 144 | 19 | 3 | 1933 | 363 | 183 | 9 | 3 |

ATMOSPHERIC POLLUTION.

The Owens atmospheric pollution recorder or air filter No. 1* is situated in the Clinical House, and the level of the intake is about 1½m. above that of the adjacent ground. The weight of the pollution is not obtained directly but is deduced from shade numbers 0, 1, 2, etc., assigned to the deposit left on the filter paper through which the air is drawn. The equivalents of the shade numbers are allotted in accordance with the results of an invest-

* A description of the instrument is given in the "Report of the Advisory Committee for Atmospheric Pollution", 4th Report, 1917-1918, p. 20.

igation carried out for the Atmospheric Pollution Committee by Mr. J.G. Clark.† When the normal volume of air, 2 litres, is aspirated (it is drawn through a hole 3.2 mm. in diameter) shade number 1 answers to 0.32 milligrams per cubic metre. The Owens apparatus was designed in the first place for dealing with the air of cities, and the amount of pollution at the Observatory is usually so small that the shade recorded when the 2 litres are aspirated is either 0 or 1.

Preliminary experiments with a spare recorder having justified the assumption that increasing the volume of air would increase the shade number in proportion, an auxiliary tank was brought into use at the beginning of July, 1928. With this tank in operation each spot on the filter paper corresponds with 6.4 litre of air. The unit shade is therefore equivalent to $0.1\text{mg}/\text{m}^3$. When fog prevails the auxiliary tank is put out of action and the unit shade reverts to the value $0.32\text{ mg}/\text{m}^3$.

Special attention is now paid to the maintenance of consistency in the standard of shades. Each new scale of shades is compared directly with the standard preserved by Dr. Owens. New scales of shades were taken into use on the following dates:-

June 7, 1925; July 1, 1926; (retrospectively) January 1, 1928; August 1, 1930; January 1, 1931; June 1, 1931; and March 1, 1933.

| | days | hours |
|---|-------------|---------------|
| During 1933 the highest estimate of pollution was $3.2\text{ mg}/\text{m}^3$, this value occurring on December 18th from 21h to 23h. There were 52 days on which the pollution reached $1.0\text{ mg}/\text{m}^3$; the number of hours credited with $1.0\text{ mg}/\text{m}^3$ or more being 261. The months in which these days and hours occurred are given in the accompanying table. | Jan. 11 | 37 |
| | Feb. 3 | 7 |
| | Mar. 5 | 13 |
| | Sept. 1 | 7 |
| | Oct. 7 | 43 |
| | Nov. 12 | 70 |
| | Dec. 13 | 84 |
| | Year | 52 261 |

Table 544 gives for each month mean hourly values derived from all the days for which complete records were obtained. There were 351 such days in the year. The highest and lowest of these hourly values are in heavy type.

Table 545 gives diurnal inequalities derived from the data in Table 544 after the application of non-cyclic corrections. The principal reason for computing the diurnal inequalities was to facilitate comparisons with the corresponding diurnal variations in barometric pressure and in the potential gradient of atmospheric electricity.

The mean values computed for recent years are given in the following table, together with the means for successive pairs of months. The unit is $1\text{ mg}/\text{m}^3$.

†"Report of the Advisory Committee for Atmospheric Pollution," 3rd Report, 1916-1917, p. 20.

| | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 |
|---------------|------|------|------|------|------|------|------|------|
| Jan.-Feb. .. | .29 | .25 | .22 | .40 | .18 | .24 | .32 | .25 |
| Mar.-Apr. .. | .30 | .10 | .18 | .27 | .13 | .15 | .26 | .17 |
| May-June .. | .08 | .07 | .09 | .05 | .05 | .06 | .09 | .10 |
| July-Aug. .. | .07 | .05 | .05 | .06 | .07 | .07 | .05 | .08 |
| Sept.-Oct. .. | .19 | .17 | .15 | .10 | .13 | .25 | .15 | .21 |
| Nov.-Dec. .. | .26 | .21 | .25 | .21 | .29 | .33 | .29 | .43 |
| Year | .20 | .14 | .15 | .18 | .14 | .18 | .19 | .21 |

The nature of the diurnal variation is most easily recognised in Table 545. There is always a well defined minimum during the night and another in the early afternoon. The first maximum of the day usually occurs about 9h and the second one follows about 12 hours later. This double oscillation is apparently due to two causes, the variation in human activity in producing pollution and the variation in the wind which disperses it. In 1933 the principal maximum was in the evening from January to May and from October to December; in the forenoon in the remaining months. The principal minimum occurred in the afternoon from March to September; in the early morning in the remaining months. Curves illustrating the diurnal variation of atmospheric pollution will be found in the Annual Reports of the Advisory Committee on Atmospheric Pollution and in a paper† by Dr. Whipple on the relation between Atmospheric Pollution and Potential Gradient.

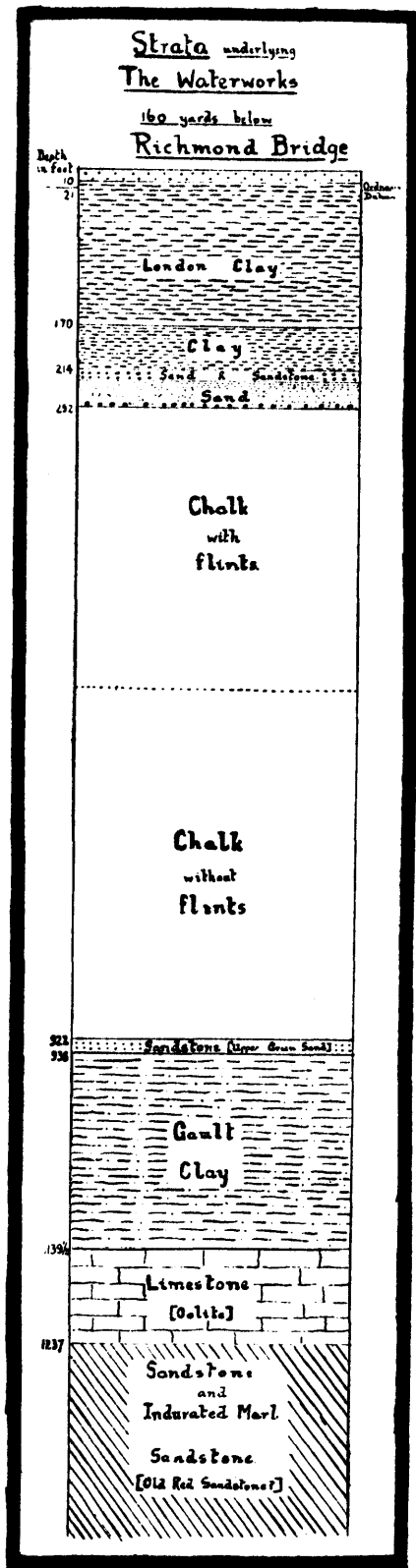
SEISMOLOGY

Notes on Instruments.- The seismographs, three Galitzin pendulums with galvanometric registration, were transferred from Eskdalemuir Observatory during the latter part of 1925 and have been in regular operation since the beginning of 1926. Earth movements in the north, east and vertical directions are recorded. The pendulums, which are in the old magnetograph room, are mounted on a massive concrete pillar, separated from the floor. The galvanometers and recording apparatus are accommodated on slate slabs in the old seismograph room, which housed the Milne instrument until it was put out of action on June 17th, 1925. To eliminate temperature variation as far as possible, the windows of the pendulum room are provided with triple glass and also shielded by louvred screens from direct sunshine which might fall on them morning and evening. The annual range of temperature variation is about 10°C and the mean daily range about 0.2°C. To diminish the sensitivity of the vertical pendulum to temperature changes the steel controlling spring was replaced in May, 1928, by one made of elinvar, an alloy which has a temperature coefficient of elasticity about one-tenth that of steel*. A detailed report on the behaviour of the spring has been published in a paper† by F.J. Scrase. The difficulties usually associated with the operation of the vertical pendulum have been greatly diminished.

‡ "London, Roy. Met. Soc., Q.J.," Vol. 55 (1929) No. 231.

* Y. Dammann. "Contribution à l'étude des propriétés élastiques de l'élinvar. Son utilisation dans les séismographes," Publ. Bur. Cent. Seis. Int., Strasbourg, Ser. A, Fasc. No. 5, 1927, pp. 122-129.

† "London, Inst. Physics, J. Sci. Instr.," 6, 1929, p.385



The concrete pillar rests on gravel. The underlying geological strata are shown in the diagram on this page. The diagram is based on the results obtained*in sinking a well near Richmond Bridge. The Richmond boring terminated at a depth of 440 metres in Old Red Sandstone. At Stonebridge Park, 8 km. to the north, a boring was carried down† to a depth of 600 metres, the last 280 metres being in Old Red Sandstone. There is no information as to deeper strata near Richmond. It may be noted, however, that the sandstone beds dip at about 30° and that a boring at Little Missenden, Bucks, entered Silurian rocks at a depth of 370 metres with no evidence of the presence of Old Red Sandstone.

For detailed description of the Galitzin seismograph and for particulars of interpretation of the records, reference may be made to Fürst B Galitzin's "Vorlesungen über Seismometrie (Leipzig, 1914), or to G.W. Walker's "Modern Seismology" (London, 1913).††

Timing is controlled by a half-seconds clock (Morrison 8587) which is rated daily by comparison with the Greenwich wireless time-signal relayed from Daventry. Time breaks are made electro-magnetically every minute and seismometric readings can be determined to the nearest second.

The free periods of the Galvanometers (T_1), were determined in November, 1925, and were found to have suffered very little change since the original determinations at Eskdalemuir were made. The lengths of the simple equivalent pendulums (l) are assumed to have remained unaltered.

The values of the other constants which are used for deriving the scale values were re-determined in October, 1933. In the case of the horizontal instruments it was found that the magnifications agreed closely with those obtained from the previous tests in September, 1932. The pendulums were adjusted on January, 30th, May 30th and December 6th, to counter slight tilting of the pillar.

In the following table are summarised the values of the constants. T is the Free period of the pendulum, μ is a damping coefficient which varies

* "London. J. Geol. Soc.", 40, 1884, 41, 1885, p. 523.

† Records of London Wells, "Mem. Geol. Surv. Eng., London", 1913.

†† The graphical method adopted at Kew for determining the constants of the pendulums is explained in a memoir by F.J. Scrase, "Geophysical Memoirs" No. 49, 1930.

ishes when the free movement of the pendulum is just aperiodic, A is the length of the beam of light from the galvanometer mirror to the recording drum (usually about 1100 mm), and k is the "transmission" factor. The factor $\frac{kAT}{4\pi l}$ determines the magnification for regular earth movements with a period equal to that of the pendulum.

| Component | l | T_1 | 1933 | T | μ^2 | $\frac{kA}{\pi l}$ | $\frac{kAT}{4\pi l}$ |
|-----------|-----|-------|-------------------|------|---------|--------------------|----------------------|
| | mm. | sec. | | sec. | | sec. ⁻¹ | |
| N | 118 | 24.68 | Jan. 1 to Oct. 3 | 25.1 | 0.00 | 47.2 | 296 |
| | | | Oct. 3 to Dec. 31 | 24.9 | -0.04 | 47.1 | 293 |
| E | 118 | 24.80 | Jan. 1 to Oct. 3 | 25.1 | +0.01 | 43.4 | 272 |
| | | | Oct. 3 to Dec. 31 | 24.8 | -0.04 | 43.3 | 269 |
| Z | 360 | 13.04 | Jan. 1 to Oct. 4 | 12.8 | +0.07 | 109 | 349 |
| | | | Oct. 4 to Dec. 31 | 12.3 | +0.13 | 109 | 335 |

In windy weather the seismographs, especially the horizontal components, are affected by slow oscillations, which are attributed to the tilting of the ground, the movement being conveyed through the foundations of the Observatory. On occasions the reading of an earthquake record is rendered very difficult, if not impossible, by these irregular disturbances.

Notes on Tables.—The "Seismological Diary", Table 546, contains the particulars of the earthquake recorded at the Observatory. The notation employed is as follows*—

In the second column of the diary the entries N, E, Z, refer to the records from the north-south, east-west and vertical seismographs respectively.

P is the normal first phase (longitudinal waves). Other types of longitudinal vibrations occur when the waves are reflected from (R_cP) or penetrate (PKP) the earth's central core.

PP, PPP... are longitudinal waves reflected once, twice ... near the earth's surface.

S is the normal second phase (transverse waves). The waves which penetrate the central core and pass through it as longitudinal vibrations are designated by the symbol SKS.

PS and PPS are waves which suffer a change or changes from longitudinal to transverse oscillation or vice versa, on reflection near the surface.

SS, SSS... are transverse waves reflected once, twice... near the surface

For the supplementary reflected waves from deep focus earthquakes the notation used is that introduced by F.J. Scrase, London. Proc. Roy. Soc., A. 132 (1931).

L indicates long waves (surface waves).

i is the sudden commencement of a phase. e means a gradual or indistinct commencement. These letters are used as prefixes to the phase symbols, but where the character of the phase is not assignable the letters are used as independent symbols. When the commencement of a phase is moderately clear the prefixes are not used.

*The notation was amended from the beginning of 1933, the most important change being the adoption of a special letter, K, for the compressional waves through the core. This symbol has been taken from the Georgetown bulletins, and is now being introduced in the International Seismological Summary, 1930. Previously a pulse which started and finished as a transverse wave but passed through the core as a compressional wave was denoted by ScPcS. In the new notation such a pulse is denoted by SKS.

All times entered against the above phases are the times of arrival of the phases at the station. The phases denoted by M are successive prominent maxima occurring during the principal or surface phase. The period is the duration of a double oscillation (to and fro movement).

The entries under A are the amplitudes, in microns (=0.001 mm.), of the components of the true displacement of the ground from the position of rest. Displacements to the north, east and upwards are regarded as being positive. When successive positive and negative displacements have the same magnitude the time of occurrence is given for the positive one.

The following formulæ, due to Galitzin, are employed for computing the times of the maxima and the amplitudes of sinusoidal waves:-

(1) Lag of the displacement shown by the galvanometer after the maximum displacement of the ground

$$= \frac{T_p}{2\pi} \left[\left(\frac{\pi}{2} + \text{Arctan} \frac{2u_1}{u_1^2 - 1} \right) + \text{Arctan} \frac{2u(1-\mu^2)^{\frac{1}{2}}}{u^2 - 1} \right]$$

each inverse tangent being taken as between 0 and π

(2) Magnification of record=

$$u = \frac{kA T_p}{\pi \ell} \frac{1}{(1 + u^2)(1 + u_1^2) \{1 - \mu f(u)\}^{\frac{1}{2}}}$$

in these formulæ T_p is the period of the earth wave considered, T , T_1 , and μ are as defined on p.363

$$u = \frac{T_p}{T}, \quad u_1 = \frac{T_p}{T_1} \quad \text{and} \quad f(u) = \left[\frac{2u}{1 + u^2} \right]^2$$

Δ is the distance in kilometres of the epicentre measured along the arc of a great circle. For earthquakes located within 10,000 km. of Kew the distance is generally derived from the interval between P. and S. by the tables, due to Zeissig, given in Klotz's "Seismological Tables" (Publication of the Dominion Observatory, Ottawa, Vol. III, No. 2). For greater distances other phases are considered and Δ is obtained from the travel curves given by Gutenberg.* The azimuth of the epicentre (0° to 360°) is measured from north through east. When an estimation of the azimuth is possible, it is used, together with Δ , for provisional determination of the co-ordinates of the epicentre. The co-ordinates given in the Diary have generally been received at a later date; the authorities for these determinations are inserted in brackets. Here the letters J.S.A. signify the Jesuit Seismological Association of America, U.S.C.G.S., the United States Coast and Geodetic Survey., and U.R.S.S. the bulletins issued by the United Soviet States.

Brackets enclosing figures of phase symbols indicate that the information is uncertain.

The total number of shocks recorded during the year was 263. The phases being sufficiently well defined, estimates of the epicentral distances were obtained for 71 shocks, whilst in 8 cases the records of the initial impulses were sufficiently sharp to allow of computations of azimuth and so of estimates of the co-ordinates of the epicentres. There were 8 earthquakes which produced a disturbance at the observatory with an amplitude exceeding 0.1mm. in a horizontal component. These earthquakes originated, in the Pacific Ocean off Northern Chili (February 23rd), in Japan (March 2nd and June 18th) in Alaska (April 27th), in Sumatra (June 24th), in China (August 25th) in the S. Atlantic, Sandwich Group (August 28th), and in Baffin Bay (November 20th).

For comparison the statistics for all the years in which the Galitzin seismographs have been in operation at Kew Observatory are given:-

| YEAR | Shocks recorded. | Epicentral distances. | Azimuths estimated. | Shock exceeding 0.1 mm. |
|------|------------------|-----------------------|---------------------|-------------------------|
| 1926 | 306 | 55 | - | 10 |
| 1927 | 314 | 76 | 6 | 9 |
| 1928 | 339 | 97 | 19 | 18 |
| 1929 | 320 | 74 | 6 | 12 |
| 1930 | 301 | 56 | 6 | 8 |
| 1931 | 274 | 53 | 11 | 16 |
| 1932 | 246 | 57 | 8 | 8 |
| 1933 | 263 | 71 | 8 | 8 |

* Handbuch der Geophysik, Berlin, 1929, p. 212.

"Microseisms".--In Table 547 are given the amplitude (A) and period (T_p) of the microseisms shown by the north component seismograph on each day at 0h, 6h, 12h, and 18h. On a few occasions (less than 2 per cent, of the total number) when the north component record was not available measurements of the east component record have been included. The group of waves of greatest amplitude occurring in the 30 minutes centring at the hour in question is selected, and the amplitude tabulated in the mean obtained from the three largest complete waves in that group. The period is derived from a measurement made on the same group*. The total time, to the nearest second, for a number of complete consecutive waves is measured, the number of waves being chosen so that the time is between 23 and 30 seconds. The period is then derived from the following division table:-

| Number of Waves | Time interval in seconds. | | | | | | | |
|-----------------|---------------------------|-----|-----|-----|-----|-----|-----|-----|
| | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 |
| 3 | 10.0 | 9.7 | 9.3 | 9.0 | 8.7 | 8.3 | 8.0 | 7.7 |
| 4 | 7.5 | 7.3 | 7.0 | 6.7 | 6.5 | 6.3 | | |
| 5 | 6.0 | 5.8 | 5.6 | 5.4 | 5.2 | | | |
| 6 | 5.0 | 4.8 | 4.7 | 4.5 | | | | |
| 7 | 4.3 | 4.1 | 4.0 | 3.9 | | | | |
| 8 | 3.7 | 3.6 | 3.5 | | | | | |
| 9 | 3.3 | 3.2 | 3.1 | | | | | |
| 10 | 3.0 | 2.9 | 2.8 | | | | | |
| 11 | 2.7 | 2.6 | | | | | | |
| 12 | 2.5 | | | | | | | |

In computing the mean period occasions of zero amplitude are omitted. The mean values of amplitude and period of each month of 1933 and for the year, together with the corresponding mean values for the period 1926 to 1932, are given below:-

MICROSEISMS-MONTHLY AND ANNUAL MEANS

| 1926 to 1932 | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Year |
|---------------------------|------|------|------|------|-----|------|------|------|-------|------|------|------|------|
| Amplitude (μ) | 2.3 | 1.6 | 1.4 | 0.9 | 0.5 | 0.5 | 0.4 | 0.5 | 0.7 | 1.1 | 1.8 | 2.1 | 1.1 |
| Period (sec.) | 6.5 | 6.2 | 5.8 | 5.5 | 4.8 | 4.6 | 4.4 | 4.6 | 5.0 | 5.4 | 6.0 | 6.4 | 5.4 |
| 1933 | | | | | | | | | | | | | |
| Amplitude (μ) | 2.1 | 1.7 | 1.2 | 0.7 | 0.4 | 0.1 | 0.1 | 0.2 | 0.2 | 0.8 | 0.7 | 1.4 | 0.8 |
| Period (sec.) | 6.7 | 5.7 | 5.7 | 5.3 | 5.3 | 5.2 | 4.9 | 4.5 | 4.8 | 5.1 | 5.8 | 6.4 | 5.5 |

The means for the several hours are as follows:-

MICROSEISMS-MEANS AT SPECIFIED HOURS.

| 1926 to 1932 | 0h. | 6h. | 12h. | 18h. |
|---------------------------|-----|------|------|------|
| Amplitude (μ) | | 1.16 | 1.16 | 1.12 |
| Period (sec.) | | 5.43 | 5.44 | 5.40 |
| 1933 | | | | |
| Amplitude (μ) | | 0.84 | 0.79 | 0.79 |
| Period (sec.) | | 5.46 | 5.46 | 5.42 |

These figures indicate that there is no regular diurnal variation in amplitude or period of the microseisms recorded at Kew Observatory.†

* F.J.W. Whipple and F.J. Scrase, "On the Frequency of Microseisms of Different Periods at Eskdalemuir and at Kew," "London, Mon. Not. R. Astr. Soc. Geophys. Supp." 2, No. 2, 1928.

† F.J. W. Whipple and A.W. Lee, "Studies in Microseisms," "London, Mon. Not. R. Astr. Soc. Geophys. Supp." 2, No. 7, 1931.

443. RICHMOND (Kew Observatory): H_b (height of barometer cistern above M.S.L.) = 10.4 metres.

MARCH, 1933.

Table with 26 columns (1-24, Mean) and 31 rows (Day 1-31). Columns 1-24 represent hourly readings at station level. Includes mean values for station and sea level.

444. RICHMOND (Kew Observatory): H_b = 10.4 metres.

APRIL, 1933.

Table with 26 columns (1-24, Mean) and 30 rows (Day 1-30). Columns 1-24 represent hourly readings at station level. Includes mean values for station and sea level.

NOTE.—When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

PRESSURE. Readings in millibars at exact hours, Greenwich Mean Time.

447. RICHMOND (Kew Observatory): Hb (height of barometer cistern above M.S.L.) = 10.4 metres.

JULY, 1933.

Table with 25 columns (1-24, Mean) and 31 rows (Day 1-31). Includes 'Station Level' and 'Sea Level' mean values.

448. RICHMOND (Kew Observatory): Hb = 10.4 metres.

AUGUST, 1933.

Table with 25 columns (1-24, Mean) and 31 rows (Day 1-31). Includes 'Station Level' and 'Sea Level' mean values.

NOTE.--When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

451. RICHMOND (Kew Observatory): H_b (height of barometer cistern above M.S.L.) = 10.4 metres.

NOVEMBER, 1933.

Table with 25 columns (1-24 hours + Mean) and 31 rows (Day 1-30 + Mean). Includes 'Station Level' and 'Mean (Sea Level)' rows. Data values are in millibars.

452. RICHMOND (Kew Observatory): H_b = 10.4 metres.

DECEMBER, 1933.

Table with 25 columns (1-24 hours + Mean) and 31 rows (Day 1-30 + Mean). Includes 'Station Level' and 'Mean (Sea Level)' rows. Data values are in millibars.

NOTE.-When pressure exceeds 1000 mb. the leading figure 1 is not printed, i.e., 1005.6 mb. is written 005.6. This rule does not, however, apply to monthly means.

Table with 25 columns for hours (1-24) and Mean, and 31 rows for days (1-31). Each cell contains a temperature reading in degrees absolute.

Table with 25 columns for hours (1-24) and Mean, and 28 rows for days (1-28). Each cell contains a temperature reading in degrees absolute.

NOTE. - The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is written 75.0.

TEMPERATURE.

Readings in degrees absolute at exact hours, Greenwich Mean Time.

460. RICHMOND (Kew Observatory): North Wall Screen:ht (height of thermometer bulb above the ground) = 3.0 metres.

MAY, 1933.

Table with 24 columns (1-24) and 31 rows (Day 1-31). Columns 1-11 are labeled 'Hour G. M. T.', column 12 is 'Noon', column 25 is 'Mean'. Each cell contains a temperature reading in degrees absolute.

461. RICHMOND (Kew Observatory): North Wall Screen:ht = 3.0 metres.

JUNE, 1933.

Table with 24 columns (1-24) and 31 rows (Day 1-31). Columns 1-11 are labeled 'Hour G. M. T.', column 12 is 'Noon', column 25 is 'Mean'. Each cell contains a temperature reading in degrees absolute.

NOTE. - The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is written 75.0.

TEMPERATURE

Readings in degrees absolute at exact hours, Greenwich Mean Time.

464. RICHMOND (Kew Observatory): North Wall Screen:ht (height of thermometer bulb above the ground) = 3.0 metres.

SEPTEMBER, 1933.

Table with 25 columns (Hour G. M. T., 1-24, Mean) and 31 rows (Day 1-30, Mean). Contains temperature readings in degrees absolute for Richmond (Kew Observatory) in September 1933.

465. RICHMOND (Kew Observatory): North Wall Screen:ht = 3.0 metres.

OCTOBER, 1933.

Table with 25 columns (Day, Hour G. M. T., 1-24, Mean) and 31 rows (Day 1-30, Mean). Contains temperature readings in degrees absolute for Richmond (Kew Observatory) in October 1933.

NOTE. - The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is written 75.0.

TEMPERATURE.

466. RICHMOND (Kew Observatory): North Wall Screen:ht (height of thermometer bulb above the ground = 3.0 metres.

NOVEMBER, 1933.

Table with 25 columns (Hour G. M. T., 1-24, Mean) and 31 rows (Day 1-31). Data represents temperature readings in degrees absolute.

467. RICHMOND (Kew Observatory): North Wall Screen:ht = 3.0 metres.

DECEMBER, 1933.

Table with 25 columns (Hour G. M. T., 1-24, Mean) and 31 rows (Day 1-31). Data represents temperature readings in degrees absolute.

NOTE. - The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is written 75.0.

TEMPERATURE: ANNUAL MEANS OF HOURLY VALUES.
From readings in degrees absolute at exact hours, Greenwich Mean Time.

468. RICHMOND (KEW OBSERVATORY): North Wall Screen: h_t = 3.0 metres.

1933

Hour G.M.T. 1 2 3 4 5 6 7 8 9 10 11 Noon 13 14 15 16 17 18 19 20 21 22 23 24 Mean
81.87 81.61 81.38 81.17 81.11 81.31 81.80 82.57 83.49 84.46 85.31 86.00 86.50 86.76 86.84 86.64 86.25 85.61 84.78 83.97 83.36 82.89 82.46 82.14 83.76

TEMPERATURE: MONTHLY MEANS AND DIURNAL INEQUALITIES
The departures from the mean of the day are adjusted for non-periodic change.†

469. RICHMOND (KEW OBSERVATORY): North Wall Screen: h_t = 3.0 metres.

1933

Month Mean Hour 1 G.M.T. 2 3 4 5 6 7 8 9 10 11 Noon 13 14 15 16 17 18 19 20 21 22 23 24
Jan. 276.21 -0.49 -0.52 -0.58 -0.65 -0.70 -0.75 -0.71 -0.72 -0.55 -0.11 +0.51 +0.91 +1.16 +1.38 +1.38 +1.03 +0.69 +0.44 0.00 -0.15 -0.23 -0.32 -0.53 -0.65
Feb. 278.02 -0.87 -0.96 -1.12 -1.09 -1.22 -1.18 -1.31 -1.23 -0.70 -0.04 +0.77 +1.42 +1.89 +2.04 +2.07 +1.82 +1.31 +0.77 +0.19 -0.25 -0.36 -0.47 -0.63 -0.77
Mar. 280.68 -1.87 -2.07 -2.52 -2.52 -3.09 -3.39 -3.22 -2.26 -0.90 +0.46 +1.68 +2.83 +3.67 +3.89 +4.01 +3.71 +3.06 +2.06 +0.92 +0.16 -0.50 -0.86 -1.37 -1.82
Apr. 282.62 -2.63 -2.99 -3.19 -3.54 -3.79 -3.65 -2.73 -1.48 -0.14 +1.15 +2.03 +2.68 +3.28 +3.66 +3.86 +3.97 +3.66 +2.81 +1.61 +0.53 -0.34 -1.00 -1.70 -2.17
May 286.10 -2.81 -3.11 -3.41 -3.88 -3.64 -3.08 -2.19 -0.98 +0.16 +1.16 +2.11 +2.94 +3.40 +3.69 +3.97 +3.88 +3.36 +2.53 +1.47 +0.15 -0.69 -1.31 -1.76 -2.24
June 289.56 -3.20 -3.76 -4.08 -4.53 -4.10 -3.02 -1.88 -0.58 +0.54 +1.48 +2.18 +2.78 +3.39 +3.79 +3.96 +4.02 +3.51 +3.19 +2.11 +0.64 -0.51 -1.31 -2.06 -2.59
July 292.26 -3.03 -3.56 -3.88 -4.17 -3.85 -3.10 -2.17 -1.04 +0.03 +1.09 +1.90 +2.60 +3.10 +3.63 +3.86 +3.86 +3.28 +2.57 +0.94 -0.34 -1.19 -1.92 -2.58
Aug. 292.00 -3.07 -3.59 -4.01 -4.34 -4.65 -4.23 -3.08 -1.56 -0.11 +1.25 +2.26 +3.15 +4.05 +4.45 +4.68 +4.38 +4.32 +3.54 +2.03 +0.59 -0.37 -1.19 -1.87 -2.52
Sept. 289.02 -2.32 -2.56 -2.73 -2.94 -3.06 -3.03 -2.52 -1.40 +0.07 +1.27 +2.22 +3.04 +3.45 +3.67 +3.79 +3.57 +3.00 +1.86 +0.64 -0.04 -0.68 -1.35 -1.77 -2.10
Oct. 284.04 -1.35 -1.56 -1.73 -1.78 -1.94 -2.07 -1.97 -1.39 -0.53 +0.65 +1.57 +2.25 +2.56 +2.80 +2.54 +2.27 +1.49 +0.82 +0.39 +0.06 -0.34 -0.71 -1.00 -1.13
Nov. 279.26 -0.72 -0.70 -0.83 -0.91 -1.07 -1.19 -1.15 -1.01 -0.68 +0.09 +0.89 +1.38 +1.69 +1.71 +1.64 +1.29 +0.91 +0.50 +0.17 -0.10 -0.32 -0.41 -0.57 -0.68
Dec. 274.98 -0.40 -0.49 -0.57 -0.61 -0.69 -0.66 -0.68 -0.65 -0.44 -0.10 +0.38 +0.80 +1.14 +1.20 +1.12 +0.77 +0.53 +0.22 +0.09 +0.05 -0.01 -0.18 -0.33 -0.39
Year 283.76 -1.90 -2.16 -2.39 -2.59 -2.65 -2.45 -1.97 -1.19 -0.27 +0.70 +1.54 +2.23 +2.73 +2.99 +3.07 +2.88 +2.49 +1.84 +1.02 +0.21 -0.39 -0.86 -1.29 -1.61

ABSOLUTE EXTREMES OF TEMPERATURE FOR EACH DAY.
Maximum and Minimum for the interval 0h. to 24h., Greenwich Mean Time.

470. RICHMOND (KEW OBSERVATORY): North Wall Screen: h_t = 3.0 metres.

1933

Month. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
Day. Max. Min. Max. Min. Max. Min. Max. Min. Max. Min. Max. Min. Max. Min. Max. Min. Max. Min. Max. Min. Max. Min.
1 82.8 78.9 84.8 80.7 82.6 74.7 85.2 78.4 88.3 77.7 85.1 83.2 97.5 84.1 95.7 87.3 95.1 86.9 90.5 88.1 84.5 79.1 77.2 73.5
2 83.9 81.8 82.8 75.0 83.1 78.3 87.2 75.4 84.4 81.6 97.0 83.6 96.7 88.9 00.2 84.6 97.1 88.3 88.6 85.8 84.1 78.7 77.5 73.9
3 84.7 79.5 81.1 71.3 84.1 82.5 88.1 79.1 91.0 81.7 99.1 86.4 02.0 86.9 99.3 92.0 98.9 85.1 88.2 81.5 82.0 77.2 77.4 73.9
4 82.9 79.0 85.1 81.1 85.1 79.9 88.2 77.0 93.2 79.7 01.3 87.4 02.2 88.0 01.2 90.4 92.1 88.9 89.1 79.8 82.3 77.2 74.7 72.1
5 83.3 75.5 86.3 82.6 85.0 77.5 85.9 77.0 91.4 83.4 02.7 86.5 94.5 87.6 00.7 90.0 96.4 87.8 89.6 79.9 82.5 74.6 74.8 72.1
6 81.1 74.3 84.6 81.4 85.0 78.2 90.3 77.1 92.7 81.2 01.1 86.7 99.0 88.9 04.9 89.7 97.0 88.2 92.6 82.6 83.1 74.7 73.6 70.4
7 81.6 72.0 84.0 80.0 85.0 75.3 92.2 81.6 87.2 81.9 99.6 86.4 99.8 88.6 02.0 91.0 95.9 88.0 92.9 86.5 86.2 82.6 77.7 68.9
8 83.7 81.5 85.7 79.4 84.7 74.4 92.9 79.5 91.1 83.0 99.4 87.6 96.9 88.6 00.0 89.5 94.8 87.2 92.3 86.3 82.9 75.2 75.4 73.7
9 83.3 72.9 85.3 82.3 84.3 78.8 88.1 80.1 88.7 81.1 95.0 85.2 95.6 88.0 00.1 87.3 95.2 87.3 91.0 81.9 82.9 73.6 73.9 72.0
10 77.2 70.5 84.1 76.0 87.5 76.0 92.0 82.6 87.2 81.9 88.8 83.8 94.8 87.4 97.0 89.3 94.9 87.6 92.4 89.1 82.3 78.3 74.7 70.7
11 79.6 76.9 78.6 74.2 86.6 77.9 84.2 80.3 88.6 80.6 89.0 83.8 92.4 87.7 93.3 88.8 95.7 86.7 91.1 83.0 78.7 74.8 77.0 73.5
12 78.4 71.0 79.3 72.7 87.0 73.2 87.8 80.9 90.3 80.1 91.6 81.0 95.3 86.5 95.2 87.7 91.7 86.2 88.2 79.4 81.6 74.4 76.3 72.2
13 77.1 71.1 80.3 74.2 89.1 72.4 85.6 78.2 89.4 80.8 90.1 84.1 90.7 86.3 97.5 85.8 91.1 84.6 88.8 76.5 80.9 72.6 76.6 71.6
14 76.9 71.3 80.1 71.5 86.9 78.2 87.3 74.9 87.4 79.7 96.7 82.9 94.6 87.1 96.6 87.2 90.4 80.6 88.6 82.9 81.4 74.6 73.1 70.3
15 77.9 72.9 77.9 73.5 84.6 78.6 89.1 75.5 89.2 76.7 98.0 85.2 93.4 84.2 94.8 88.4 92.3 87.0 78.9 83.0 82.0 72.8 78.7 73.0
16 76.7 74.6 79.6 74.2 84.1 80.6 90.0 77.9 92.2 80.1 97.1 88.1 93.1 85.5 95.1 85.6 94.4 79.9 86.3 79.9 80.7 72.5 76.3 72.2
17 76.1 73.0 79.8 74.6 83.4 79.0 83.3 77.7 92.3 83.0 90.7 83.6 93.7 85.4 93.0 84.0 95.2 84.9 84.4 77.0 81.4 78.8 76.3 72.9
18 74.9 72.1 76.6 72.4 83.7 78.0 82.0 74.7 91.0 82.2 88.3 82.2 98.7 88.9 97.1 88.1 94.2 85.8 87.0 73.9 82.0 78.3 77.2 72.9
19 77.1 74.1 76.0 71.2 86.0 79.5 80.6 73.0 94.6 80.7 90.6 84.1 00.7 88.1 95.9 86.8 94.0 84.0 86.7 80.7 85.1 81.2 76.3 71.0
20 76.7 74.1 76.1 69.1 81.1 74.3 80.0 73.6 94.8 83.7 92.3 82.2 99.7 87.4 93.9 85.7 92.0 85.7 86.6 80.9 84.2 78.6 77.1 73.3
21 75.2 72.8 79.4 72.5 85.0 71.1 82.0 75.6 95.0 83.9 92.5 82.9 98.7 87.7 92.6 84.6 88.9 83.7 86.3 82.6 81.2 80.2 75.0 73.4
22 74.2 69.5 77.1 72.1 86.9 74.5 82.4 74.6 98.2 83.8 93.0 80.0 99.0 87.3 92.1 83.0 91.2 83.4 86.5 83.6 81.1 79.9 79.6 74.6
23 74.1 87.6 76.5 69.9 85.0 77.5 85.0 73.3 97.3 84.0 95.4 84.1 00.1 88.1 92.7 84.7 87.6 82.7 89.2 85.2 81.8 78.6 78.8 75.3
24 72.8 71.6 76.5 68.9 84.1 75.0 85.2 80.3 92.7 84.1 92.1 85.5 02.0 88.1 95.2 81.8 88.3 83.7 86.7 84.5 81.3 77.9 76.0 74.2
25 74.0 71.0 77.7 74.6 86.0 75.0 86.4 81.6 88.3 82.6 93.4 86.2 02.0 89.2 97.9 83.7 89.2 83.9 85.0 77.6 79.1 75.2 77.1 73.2
26 74.3 70.1 79.5 76.0 86.9 70.8 88.8 80.3 88.7 81.9 94.1 86.2 04.3 87.1 99.6 84.5 93.0 84.4 81.4 75.5 77.9 76.0 77.6 76.1
27 74.2 69.8 82.4 78.3 88.7 74.7 89.7 80.6 88.9 80.3 94.4 85.2 03.7 91.9 01.9 85.3 90.9 86.8 80.2 73.7 78.2 75.5 74.2
28 76.0 70.1 83.4 75.5 90.1 72.9 88.5 79.7 92.2 79.9 91.7 84.6 96.3 86.3 02.1 86.4 93.7 84.4 80.7 73.1 78.3 76.2 77.3 75.2
29 78.1 74.8 -- -- 88.3 74.3 88.5 79.5 90.2 83.2 92.9 82.5 94.3 87.5 01.2 86.6 93.5 84.9 82.8 78.2 78.3 74.9 78.6 75.7
30 77.4 73.6 -- -- 84.8 77.0 89.8 80.7 89.7 82.2 94.1 85.3 96.7 86.1 96.5 87.4 92.2 86.3 83.2 77.9 77.6 75.6 78.1 74.5
31 81.6 74.0 -- -- 85.2 75.2 -- -- 92.0 82.8 -- -- 92.0 89.2 96.1 84.6 -- -- 84.4 77.3 -- -- 78.3 72.7
Year ... 78.3 73.6 80.7 75.2 85.5 76.3 87.2 78.0 90.9 81.6 94.6 84.5 97.4 87.5 97.5 86.8 93.5 85.1 87.4 80.7 81.6 76.7 76.6 73.0

Note.- The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is written 75.0.

† See page 21

RELATIVE HUMIDITY

Percentages at exact hours, Greenwich Mean Time.

475. RICHMOND (Kew Observatory): North Wall Screen h_t (height of thermometer bulbs above the ground) = 3.0 metres.

MAY, 1933.

Table with 25 columns (1-24) and 25 rows (1-25) showing temperature and vapour pressure data for Richmond (Kew Observatory) in May 1933. Includes a 'Mean' row and a 'Vapour* Pressure' row.

476. RICHMOND (Kew Observatory): North Wall Screen h_t = 3.0 metres.

JUNE, 1933.

Table with 25 columns (1-24) and 25 rows (1-25) showing temperature and vapour pressure data for Richmond (Kew Observatory) in June 1933. Includes a 'Mean' row and a 'Vapour* Pressure' row.

* Computed from the mean temperature and mean relative humidity. † Mean of the column. ‡ Mean of the row.

Table with columns for Hour G. M. T., 1-24, Mean, and Vapour* Pressure. Rows show percentage data for each hour of the month, with mean values at the bottom.

478. RICHMOND (Kew Observatory): North Wall Screen: h_t = 3.0 metres.

Table with columns for Hour G. M. T., 1-24, Mean, and Vapour* Pressure. Rows show percentage data for each hour of the month, with mean values at the bottom.

* Computed from the mean temperature and mean relative humidity. † Mean of the column. ‡ Mean of the row.

Table with 24 columns for hours (1-24), Mean, and Vapour * Pressure. Rows represent days of the month from 1 to 30. Each cell contains a percentage value.

Table with 24 columns for hours (1-24), Mean, and Vapour * Pressure. Rows represent days of the month from 1 to 31. Each cell contains a percentage value.

* Computed from the mean temperature and mean relative humidity. † Mean of the column. ‡ Mean of the row.

483. RICHMOND (Kew Observatory): North Wall Screen: $h_t = 3.0$ metres.

1933.

| Hour | G. M. T. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Noon | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Mean |
|--------------------------------|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Relative Humidity. | % | 85.0 | 86.0 | 87.0 | 87.5 | 87.6 | 86.5 | 84.4 | 81.0 | 77.0 | 72.4 | 68.4 | 65.2 | 62.9 | 61.8 | 61.5 | 62.8 | 65.0 | 68.2 | 72.0 | 75.4 | 78.3 | 80.6 | 82.5 | 83.8 | 76.0 |
| Vapour Pressure in Millibars.* | mb | 9.7 | 9.6 | 9.6 | 9.5 | 9.5 | 9.5 | 9.6 | 9.7 | 9.8 | 9.8 | 9.8 | 9.8 | 9.7 | 9.6 | 9.7 | 9.8 | 9.9 | 10.0 | 10.0 | 9.9 | 9.9 | 9.8 | 9.8 | 9.7 | 9.8 |

* Computed from the mean temperature and mean relative humidity.

RELATIVE HUMIDITY: MONTHLY MEANS AND DIURNAL INEQUALITIES.
The departures from the mean of the day are adjusted for non-cyclic change†

484. RICHMOND (Kew Observatory): North Wall Screen: $h_t = 3.0$ metres.

1933.

| MONTH. | Mean. | Hour 1 | G.M.T. 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Noon | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|-----------|-------|--------|----------|-------|-------|-------|-------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|-------|-------|
| January | 85.2 | +2.4 | +2.4 | +2.8 | +3.3 | +3.7 | +3.4 | +3.1 | +2.9 | +2.1 | +1.0 | -1.4 | -2.9 | -5.3 | -6.5 | -7.5 | -4.9 | -3.0 | -2.1 | -0.7 | +0.8 | +1.5 | +1.3 | +1.7 | +2.2 |
| February | 79.7 | +4.7 | +5.8 | +7.2 | +5.8 | +6.4 | +6.2 | +5.9 | +6.6 | +4.5 | +1.0 | -3.7 | -7.3 | -10.5 | -11.6 | -12.4 | -10.3 | -5.9 | -3.3 | -0.5 | +1.0 | +0.7 | +2.3 | +3.4 | +4.1 |
| March | 76.3 | +9.8 | +10.9 | +12.4 | +12.3 | +12.3 | +11.8 | +11.6 | +8.7 | +4.1 | -1.0 | -6.6 | -13.1 | -16.6 | -17.6 | -18.3 | -17.7 | -15.7 | -9.6 | -3.7 | +0.7 | +3.3 | +5.9 | +7.5 | +8.6 |
| April | 71.9 | +12.3 | +14.1 | +14.7 | +15.9 | +16.9 | +15.8 | +13.0 | +7.8 | +1.1 | -5.5 | -11.3 | -14.1 | -15.7 | -15.9 | -16.9 | -18.3 | -15.8 | -11.7 | -6.6 | -3.5 | +0.9 | +4.9 | +8.1 | +9.8 |
| May | 72.4 | +13.6 | +13.9 | +14.0 | +14.6 | +14.9 | +12.0 | +8.4 | +2.4 | -3.1 | -7.1 | -10.7 | -13.9 | -15.9 | -16.9 | -17.7 | -16.2 | -14.2 | -9.8 | -5.3 | +1.1 | +5.3 | +8.6 | +10.1 | +11.5 |
| June | 66.7 | +13.7 | +16.5 | +18.3 | +21.3 | +18.9 | +12.9 | +7.8 | +1.1 | -3.6 | -8.9 | -10.8 | -13.1 | -15.8 | -17.9 | -17.1 | -16.2 | -13.9 | -11.8 | -8.4 | -2.6 | +2.5 | +6.3 | +9.3 | +11.3 |
| July | 71.5 | +13.7 | +15.9 | +16.7 | +16.9 | +15.6 | +13.2 | +8.8 | +3.2 | -1.7 | -6.1 | -9.8 | -13.0 | -14.2 | -16.9 | -16.6 | -16.4 | -16.0 | -13.0 | -9.4 | -3.2 | +3.0 | +6.6 | +9.8 | +13.0 |
| August | 68.0 | +14.6 | +16.3 | +17.7 | +18.3 | +19.6 | +18.5 | +13.8 | +6.4 | -0.4 | -7.8 | -12.5 | -15.7 | -19.5 | -20.7 | -21.5 | -18.8 | -17.8 | -14.7 | -8.2 | -1.3 | +3.6 | +7.3 | +10.3 | +12.6 |
| September | 76.2 | +12.1 | +13.0 | +14.2 | +15.1 | +15.1 | +14.9 | +12.6 | +7.5 | +0.5 | -7.6 | -12.6 | -15.9 | -18.3 | -18.3 | -18.7 | -17.5 | -14.6 | -9.5 | -2.7 | +0.5 | +3.7 | +6.9 | +9.2 | +10.5 |
| October | 80.7 | +6.0 | +6.6 | +7.3 | +7.8 | +8.6 | +9.2 | +8.3 | +6.5 | +3.7 | -1.8 | -6.4 | -11.0 | -12.2 | -13.9 | -12.7 | -10.7 | -6.3 | -3.0 | -1.5 | -0.5 | +1.7 | +3.6 | +4.9 | +5.7 |
| November | 83.9 | +3.3 | +3.3 | +4.5 | +4.9 | +4.9 | +5.2 | +5.3 | +4.2 | +3.4 | 0.0 | -4.0 | -6.7 | -8.8 | -9.1 | -8.5 | -6.6 | -4.7 | -1.9 | 0.0 | +1.1 | +1.9 | +2.2 | +2.9 | +3.3 |
| December | 79.1 | +1.9 | +1.9 | +2.7 | +2.3 | +2.6 | +2.8 | +2.7 | +3.2 | +2.1 | +1.0 | -1.1 | -2.3 | -4.2 | -4.7 | -5.1 | -3.8 | -3.0 | -1.7 | -0.3 | -0.2 | -0.1 | +0.2 | +0.8 | +2.1 |
| Year | 76.0 | +9.0 | +10.1 | +11.0 | +11.5 | +11.6 | +10.5 | +8.4 | +5.0 | +1.1 | -3.6 | -7.6 | -10.7 | -13.1 | -14.2 | -14.4 | -13.1 | -10.9 | -7.7 | -3.9 | -0.5 | +2.3 | +4.7 | +6.5 | +7.9 |

† See page 21

RAINFALL: ANNUAL TOTALS OF HOURLY VALUES.

Amounts, in millimetres; durations, in hours for periods of sixty minutes between the exact hours, Greenwich Mean Time.
485. RICHMOND (Kew Observatory): H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 5.5 metres + 0.55 metres.

1933.

| Hour | G. M. T. | 0 to 1 | 1 to 2 | 2 to 3 | 3 to 4 | 4 to 5 | 5 to 6 | 6 to 7 | 7 to 8 | 8 to 9 | 9 to 10 | 10 to 11 | 11 to Noon | Noon to 13 | 13 to 14 | 14 to 15 | 15 to 16 | 16 to 17 | 17 to 18 | 18 to 19 | 19 to 20 | 20 to 21 | 21 to 22 | 22 to 23 | 23 to 24 | 0 to 24 |
|----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|----------|------------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------|
| Amount. | mm | 16.4 | 14.3 | 17.7 | 16.7 | 25.6 | 22.2 | 23.2 | 15.2 | 20.4 | 10.4 | 13.1 | 15.2 | 30.1 | 26.8 | 21.2 | 18.3 | 38.2 | 22.7 | 22.6 | 21.6 | 14.0 | 10.4 | 16.1 | 11.0 | 463.4 |
| Duration | hr | 15.0 | 16.8 | 19.3 | 15.5 | 21.4 | 19.2 | 16.7 | 14.3 | 15.0 | 11.9 | 11.8 | 16.2 | 15.6 | 19.6 | 20.1 | 16.9 | 15.4 | 13.4 | 12.9 | 14.4 | 10.4 | 9.3 | 10.1 | 10.3 | 361.5 |

NOTES ON RAINFALL.

486. RICHMOND (Kew Observatory).

1933.

Dry Periods.

The following definitions are adopted by "The British Rainfall Organisation".

An "absolute drought" is a period of at least 15 consecutive days to none of which is credited 0.2 mm. of rain or more.

A "partial drought" is a period of at least 29 consecutive days, the mean daily rainfall of which does not exceed 0.2 mm.

A "dry spell" is a period of at least 15 consecutive days to none of which is credited 1.0 mm. or more.

In 1933 no "absolute droughts" occurred.

"Partial droughts" March 20th. - April 23rd. and Nov. 18th. - Dec. 29th.

"Dry Spells" March 21st. - April 11th. and Nov. 18th. - Dec. 25th.

Wet Periods.

The following definitions are adopted by "The British Rainfall Organisation".

A "Rain Spell" is a period of at least 15 consecutive days to each of which is credited 0.2 mm. of rain or more.

A "Wet Spell" is a period of at least 15 consecutive days to each of which is credited 1.0 mm. or more.

No "Rain Spells" or "Wet Spells" occurred in 1933.

Rainfall Duration.

| Hours | 0.1-1.0 | 1.1-2.0 | 2.1-6.0 | 6.1-12 | >12 |
|----------------|---------|---------|---------|--------|-----|
| Number of Days | 50 | 35 | 45 | 12 | 1 |

Continuous Falls.

The fall of the longest duration was 8mm. in 8h. 30m. on March 16th.

Heavy Falls in Short Periods.

The only noteworthy fall of the year occurred on July 16th., when 5mm. fell in 3 minutes.

RAINFALL

Amounts, in millimetres, for periods of sixty minutes between the exact hours, Greenwich Mean Time.

487. RICHMOND (Kew Observatory): H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 5.5 metres + 0.53 metres.

JANUARY, 1933.

Table for Richmond (Kew Observatory) in January 1933. Columns include Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, 0-24, and Duration 0-24. Rows list days from 1 to 31 and a summary row.

488. RICHMOND (Kew Observatory): H_r = 5.5 metres + 0.53 metres.

FEBRUARY, 1933.

Table for Richmond (Kew Observatory) in February 1933. Columns include Day, Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, 0-24, and Duration. Rows list days from 1 to 28 and a summary row.

RAINFALL

Amounts, in millimetres, for periods of sixty minutes between the exact hours, Greenwich Mean Time. 489. RICHMOND (Kew Observatory): H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 5.5 metres + 0.53 metres.

MARCH, 1933.

Table for Richmond (Kew Observatory) in March 1933. Columns include Hour G. M. T., 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, 0-24, and Duration 0-24. Rows list days 1 through 31, with a summary row and a total duration row.

490. RICHMOND (Kew Observatory): H_r = 5.5 metres + 0.53 metres.

APRIL, 1933.

Table for Richmond (Kew Observatory) in April 1933. Columns include Day, 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12, 12-13, 13-14, 14-15, 15-16, 16-17, 17-18, 18-19, 19-20, 20-21, 21-22, 22-23, 23-24, 0-24, and Duration. Rows list days 1 through 30, with a summary row and a total duration row.

RAINFALL

Amounts, in millimetres, for periods of sixty minutes between the exact hours, Greenwich Mean Time.

491. RICHMOND (Kew Observatory): H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 5.5 metres + 0.53 metres.

MAY, 1933.

| Hour G. M. T. | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 | 0-24 | Duration 0-24 |
|----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|---------|----------|---------------|
| Day | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | hr. |
| 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | 2.0 | 0.5 |
| 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4 | 5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.0 | 3.5 |
| 3 | 2.9 | ... | ... | ... | ... | ... | ... | 5 | 3.9 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 7.3 | 1.5 |
| 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5 | ... | ... | ... | ... | ... | 2 | 1.6 | 1.0 | 2.4 | 7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5.9 | 3.9 |
| 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2 | ... | ... | ... | ... | ... | 1.0 | 1.5 |
| 7 | 8 | 7 | 1.2 | 1.7 | 2.5 | 1.4 | 1.7 | 8 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 10.9 | 8.1 |
| 8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9 | ... | ... | ... | ... | 5 | 2 | 1 | ... | ... | ... | ... | ... | 2 | 1.2 | 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.8 | 0.9 |
| 10 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4 | 1 | ... | ... | 7 | ... | ... | ... | ... | 1.2 | 1.3 |
| 12 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.4 |
| 13 | ... | ... | ... | ... | ... | ... | ... | ... | 2 | 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.8 | 1.4 |
| 14 | 1 | 3 | 1 | ... | 2 | 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.1 | 2.5 |
| 15 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22 | (p) | (p) | (.1) | (p) | (p) | (p) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.7 | ... | ... | ... | ... | (p) | 1.7 | 0.4 |
| 23 | (p) | (p) | (.1) | (p) | (p) | (p) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4.2 | 1 | ... | ... | ... | 4.4 | 0.7 |
| 24 | (p) | (p) | (.1) | (p) | (p) | (p) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 | ... | ... | 0.1 | 0.5 |
| 25 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3 | ... | ... | 0.3 | 0.3 |
| 27 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.2 | 5 | 1.0 | ... | ... | ... | ... | ... | 2.7 | 2.0 |
| 28 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Sum. | 3.8 | 1.0 | 1.4 | 1.7 | 3.2 | 2.2 | 3.4 | 2.3 | 6.6 | 1.3 | ... | 0.2 | 1.2 | 1.0 | 0.5 | 2.8 | 2.0 | 1.1 | 4.0 | 4.9 | 0.1 | 0.4 | ... | 1.5 | 46.6 | 29.0 |
| Total Duration | hr. 1.9 | hr. 2.0 | hr. 1.2 | hr. 1.0 | hr. 1.6 | hr. 2.2 | hr. 2.1 | hr. 2.1 | hr. 2.5 | hr. 1.4 | ... | hr. 0.1 | hr. 0.1 | hr. 0.7 | hr. 0.9 | hr. 1.5 | hr. 1.2 | hr. 1.4 | hr. 1.8 | hr. 1.1 | hr. 0.3 | hr. 0.8 | ... | hr. 1.1 | hr. 29.0 | hr. |

492. RICHMOND (Kew Observatory): H_r = 5.5 metres + 0.53 metres.

JUNE, 1933.

| Day | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 | 0-24 | Duration |
|----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|
| 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | hr. |
| 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11 | ... | 4 | 1 | ... | ... | ... | ... | ... | ... | 9 | ... | 1.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.4 | 1.6 |
| 12 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.6 |
| 13 | ... | ... | ... | ... | 1.1 | 1.1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.3 | 1.4 |
| 14 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.7 | 3.3 | 7 | 4.8 | 2.2 | 12.7 | 4.0 |
| 16 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17 | 1.1 | 1.5 | 2.5 | 1.0 | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 6 | ... | ... | ... | ... | ... | ... | 7.0 | 4.3 |
| 18 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3.0 | 1.9 |
| 19 | ... | ... | ... | 1 | 3 | 1 | ... | 2 | 8 | ... | ... | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.3 | 1.9 |
| 20 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3.6 | ... | ... | ... | ... | ... | ... | ... | ... | 3.6 | 0.6 |
| 21 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.0 | 1.4 | 1 | ... | ... | 2 | 7.3 | 1.0 | 1 | ... | ... | ... | ... | ... | 12.1 | 3.5 |
| 22 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.9 | 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.6 | 1.2 |
| 25 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.0 | 0.5 |
| 27 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Sum. | 1.1 | 1.9 | 2.6 | 1.1 | 1.7 | 1.2 | 0.2 | 0.2 | 0.8 | 0.9 | 2.0 | 3.1 | 0.4 | 1.9 | 2.5 | 0.5 | 10.9 | 1.8 | 1.1 | 1.7 | 3.7 | 0.7 | 4.8 | 2.2 | 49.0 | 20.9 |
| Total Duration | hr. 0.8 | hr. 1.9 | hr. 1.2 | hr. 0.8 | hr. 1.3 | hr. 0.7 | hr. 0.6 | hr. 0.2 | hr. 0.2 | hr. 0.3 | hr. 0.8 | hr. 1.7 | hr. 0.8 | hr. 0.7 | hr. 0.9 | hr. 0.6 | hr. 1.5 | hr. 1.1 | hr. 0.5 | hr. 0.7 | hr. 1.3 | hr. 0.5 | hr. 0.9 | hr. 0.9 | hr. 20.9 | hr. |

RAINFALL

Amounts, in millimetres, for periods of sixty minutes between the exact hours, Greenwich Mean Time.

495. RICHMOND (Kew Observatory): H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 5.5 metres + 0.53 metres.

SEPTEMBER, 1933.

| Hour G. M. T. | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 | 0-24 | Duration 0-24 | |
|------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|------------------|-----|
| Day 1 | ... | ... | ... | 1.1 | 1.5 | .6 | .2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3.4 | 3.5 | |
| Day 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 9 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 10 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 11 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 12 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.0 | 1.0 | .9 | .5 | ... | .1 | .4 | .7 | .9 | .7 | .4 | .1 | 7.0 | 9.3 | |
| Day 13 | .1 | .9 | .2 | .4 | 1.9 | 3.0 | 2.2 | 1.2 | .6 | .3 | .5 | .2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 11.5 | 10.0 | |
| Day 14 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 15 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 16 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 17 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.7 | 0.6 |
| Day 18 | ... | .1 | 1.2 | .1 | .2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.6 | 1.4 |
| Day 19 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Day 20 | ... | ... | ... | ... | 2.7 | 2.3 | 3.6 | 2.2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 10.8 | 1.7 |
| Day 21 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | .7 | 2.7 | 1.8 | .8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 6.0 | 3.5 |
| Day 22 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Day 23 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5 | 3 | .4 | .3 | 2.4 | 1.5 | 3.6 | ... | ... | 1 | ... | ... | ... | ... | 9.1 | 5.9 |
| Day 24 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.1 | 1.1 |
| Day 25 | ... | ... | .9 | 1.6 | 1.4 | 2.1 | .1 | ... | ... | ... | 2.0 | .3 | ... | 4.0 | .5 | 1.2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 14.1 | 5.6 |
| Day 26 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.7 | .3 | ... | ... | 2.0 | 1.4 |
| Day 27 | .1 | .2 | .3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.6 | 1.1 |
| Day 28 | (...) | (...) | (...) | (.1) | (...) | (...) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | (...) | (...) | (.1) | ... | 0.1 | ... | |
| Day 29 | (...) | (...) | (...) | (.1) | (...) | (...) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.1 | ... |
| Day 30 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Day 31 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Sum. | 0.2 | 1.2 | 3.2 | 3.3 | 7.7 | 8.0 | 6.2 | 3.4 | 0.6 | 0.3 | 3.0 | 1.1 | 2.1 | 8.0 | 5.8 | 4.1 | 5.3 | 0.2 | 0.4 | 0.8 | 0.9 | 2.4 | 0.7 | 0.2 | 69.1 | 45.1 | |
| Total Duration | hr. 0.4 | hr. 1.7 | hr. 3.6 | hr. 2.5 | hr. 3.8 | hr. 3.6 | hr. 1.8 | hr. 1.6 | hr. 1.0 | hr. 1.0 | hr. 1.7 | hr. 2.0 | hr. 2.0 | hr. 3.3 | hr. 3.4 | hr. 3.1 | hr. 1.6 | hr. 0.5 | hr. 0.6 | hr. 1.1 | hr. 1.0 | hr. 1.5 | hr. 1.8 | hr. 0.5 | hr. 45.1 | | |

496. RICHMOND (Kew Observatory): H_r = 5.5 metres + 0.53 metres.

OCTOBER, 1933.

| Day | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | hr. | |
|----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|------|-----|-----|
| Day 1 | ... | ... | 1.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.1 | 1.1 | |
| Day 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 7 | ... | ... | ... | 1 | 1.5 | .4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.4 | 2.6 | |
| Day 8 | 1.5 | .9 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.5 | 1.7 | |
| Day 9 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.8 | 0.6 |
| Day 10 | ... | ... | ... | ... | (...) | (.1) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.9 | 0.9 |
| Day 11 | ... | .1 | ... | ... | .9 | .2 | .5 | .9 | ... | .1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.7 | 2.6 |
| Day 12 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 13 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 14 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4.2 | 2.1 |
| Day 15 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 16 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.2 | 0.1 |
| Day 17 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 18 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 19 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 20 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 21 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 22 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5.2 | .1 | ... | .1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5.4 | 1.1 |
| Day 23 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 24 | ... | ... | ... | 3 | 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.7 | 0.5 |
| Day 25 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 26 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| Day 27 | ... | ... | ... | ... | ... | ... | ... | ... | 3 | .8 | 1.7 | 1.3 | 1.4 | .8 | ... | .2 | .1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 8.6 | 8.0 |
| Day 28 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5.9 | 3.0 |
| Day 29 | ... | ... | ... | ... | 2 | .1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.7 | 2.1 | ... | ... | 6 | .6 | .7 | ... | ... | 1.1 | 1.8 |
| Day 30 | ... | ... | ... | ... | ... | ... | ... | ... | 1.6 | .2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.8 | 1.4 |
| Day 31 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | (...) | (.1) | (...) | (.1) | .1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.3 | 0.9 |
| Sum. | 1.5 | 1.1 | 1.3 | 0.5 | 2.6 | 0.8 | 0.5 | 1.2 | 2.5 | 2.0 | 1.3 | 2.1 | 8.1 | 2.6 | 1.7 | 0.4 | 2.7 | 2.8 | ... | 0.6 | ... | 0.6 | 0.6 | 1.1 | 36.6 | 26.3 | | |
| Total Duration | hr. 1.0 | hr. 1.2 | hr. 1.2 | hr. 0.4 | hr. 2.2 | hr. 1.9 | hr. 0.5 | hr. 1.3 | hr. 2.1 | hr. 1.6 | hr. 1.0 | hr. 1.8 | hr. 1.6 | hr. 1.4 | hr. 1.2 | hr. 0.7 | hr. 1.9 | hr. 1.1 | hr. ... | hr. 0.5 | hr. ... | hr. 0.3 | hr. 0.7 | hr. 0.7 | hr. 26.3 | | | |
| Hour G. M. T. | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 | 0-24 | | | |

RAINFALL

Amounts. in millimetres, for periods of sixty minutes between the exact hours, Greenwich Mean Time.
 497. RICHMOND (Kew Observatory): H_r (height of receiving surface above M.S.L.) = H (height of station above M.S.L.) + h_r (height of receiving surface above ground) = 5·5 metres + 0·53 metres.

NOVEMBER, 1933.

| Hour G. M. T. | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 | 0-24 | Duration 0-24 | |
|----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|---------------|-----|
| Day | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | hr. | |
| 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 2 | ... | ... | ... | 0·6 | 1·3 | 1·1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3·1 | 1·9 | |
| 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2·1 | 3·9 | |
| 7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 9 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 10 | ... | ... | 0·4 | 0·5 | 0·7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·2 | ... | ... | ... | 1·8 | 2·5 | |
| 11 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 12 | ... | ... | ... | ... | ... | ... | ... | ... | 0·1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·1 | 0·2 |
| 13 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2·0 | 0·8 | 0·1 | ... | ... | 2·9 | 1·4 |
| 14 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15 | ... | 0·1 | ... | ... | 0·2 | 1·3 | 3·3 | 2·2 | 2·6 | 0·5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 10·2 | 4·8 |
| 16 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17 | ... | ... | ... | ... | ... | ... | ... | ... | 0·2 | 1·7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1·9 | 0·7 |
| 18 | ... | ... | ... | ... | ... | (...) | (0·1) | (...) | (0·1) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·2 | 0·4 |
| 19 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·4 | 0·1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·5 | 0·7 |
| 20 | ... | ... | ... | ... | ... | ... | ... | ... | (...) | (...) | (...) | (...) | (...) | (...) | (0·1) | (...) | (...) | (...) | (...) | (...) | (...) | (...) | (...) | (...) | (...) | 0·1 | ... |
| 21 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23 | (...) | (0·1) | 0·5 | ... | ... | (0·1) | (...) | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·8 | 1·3 |
| 24 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·2 | 0·4 |
| 27 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Sum. | 0·1 | 0·1 | 0·9 | 1·3 | 3·3 | 4·5 | 2·3 | 2·6 | 0·9 | 1·7 | ... | ... | ... | 0·6 | 0·6 | 0·4 | 0·5 | 0·4 | 0·2 | 2·4 | 0·8 | 0·1 | ... | 0·2 | 23·9 | 18·2 | |
| Total Duration | hr. 0·3 | hr. 0·2 | hr. 1·3 | hr. 1·8 | hr. 2·2 | hr. 1·6 | hr. 1·2 | hr. 1·1 | hr. 0·8 | hr. 0·6 | hr. ... | hr. ... | hr. ... | hr. 0·9 | hr. 1·1 | hr. 0·8 | hr. 0·9 | hr. 0·7 | hr. 0·4 | hr. 1·4 | hr. 0·4 | hr. 0·1 | hr. ... | hr. 0·4 | hr. 18·2 | ... | |

498. RICHMOND (Kew Observatory): H_r = 5·5 metres + 0·53 metres.

DECEMBER, 1933.

| Hour | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | hr. | |
|----------------|---------|---------|---------|---------|---------|---------|---------|-----|-----|------|---------|---------|---------|---------|---------|-------|-------|-------|---------|---------|---------|---------|---------|---------|----------|-----|------|
| 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·5 | 1·8 |
| 8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·1 | 0·1 |
| 16 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·1 | 0·2 |
| 20 | ... | ... | 0·3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·3 | 0·6 |
| 21 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26 | ... | (...) | (0·1) | 0·4 | 0·2 | ... | 0·1 | ... | ... | ... | 0·2 | 0·9 | 0·4 | 0·3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2·6 | 3·4 |
| 27 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28 | ... | 0·5 | ... | (...) | (0·1) | 0·1 | 0·1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·8 | 1·4 |
| 29 | ... | ... | ... | ... | ... | ... | 0·1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0·1 | 0·1 |
| 30 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Sum. | 0·5 | 0·3 | 0·1 | 0·4 | 0·4 | 0·2 | 0·2 | ... | ... | ... | 0·7 | 1·2 | 0·4 | 0·4 | 0·1 | ... | ... | ... | 2·2 | 1·0 | 0·1 | ... | ... | ... | ... | 8·2 | 10·1 |
| Total Duration | hr. 0·7 | hr. 0·6 | hr. 0·2 | hr. 0·9 | hr. 0·5 | hr. 0·5 | hr. 0·3 | ... | ... | ... | hr. 1·3 | hr. 1·8 | hr. 0·3 | hr. 1·2 | hr. 0·1 | ... | ... | ... | hr. 0·7 | hr. 1·0 | hr. 0·2 | hr. ... | hr. ... | hr. ... | hr. 10·1 | ... | |
| Hour G. M. T. | 0-1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 | 0-24 | ... | |

Note.—For Annual Totals, see table 485.

DURATION OF BRIGHT SUNSHINE.
For periods of sixty minutes, between the exact hours of Local Apparent Time.
499. RICHMOND (Kew Observatory): h_s (height of recorder above ground) = 15.3 metres,

JANUARY, 1933.

| Hour L. A. T. | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | Total for Day. | Per cent. of Possible. | Radiation at Noon. Ångström Pyrheliometer. | | |
|------------------|-----|-----|-----|-----|-----|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------------|------------------------------|---|----|-----|
| | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | | | hr. | % | Sky | Total mw/cm^{2} | Vertical mw/cm^{2} |
| Day 1 | .. | .. | .. | .. | .. | .. | 0.5 | .3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 0.8 | 10 | .. | .. | .. |
| 2 | .. | .. | .. | .. | .. | .. | .. | .. | .2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 0.2 | 3 | .. | .. | .. |
| 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 4 | .. | .. | .. | .. | .. | .. | .1 | .3 | .3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 0.9 | 11 | .. | .. | .. |
| 5 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 6 | .. | .. | .. | .. | .. | .3 | 1.0 | 1.0 | .7 | .5 | 1.0 | 1.0 | .. | .. | .. | .. | .. | .. | 5.5 | 69 | .. | .. | .. |
| 7 | .. | .. | .. | .. | .. | .. | .. | .1 | .2 | .2 | .3 | .7 | .. | .. | .. | .. | .. | .. | 1.5 | 19 | .. | .. | .. |
| 8 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 9 | .. | .. | .. | .. | .. | .1 | .6 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | .2 | .. | .. | .. | .. | .. | 6.1 | 76 | Clear | 36 | 10 |
| 10 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 11 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 12 | .. | .. | .. | .. | .. | .. | .1 | .8 | 1.0 | 1.0 | .9 | .5 | .. | .. | .. | .. | .. | .. | 4.3 | 53 | .. | .. | .. |
| 13 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 14 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1.0 | 1.0 | .1 | .. | .. | .. | .. | .. | .. | 2.1 | 26 | .. | .. | .. |
| 15 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 16 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 17 | .. | .. | .. | .. | .. | .. | .8 | .7 | .1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1.6 | 19 | .. | .. | .. |
| 18 | .. | .. | .. | .. | .. | .. | .. | .5 | 1.0 | 1.0 | 1.0 | .5 | .. | .. | .. | .. | .. | .. | 4.0 | 48 | .. | .. | .. |
| 19 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 20 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 21 | .. | .. | .. | .. | .. | .. | .. | .5 | .9 | .6 | .6 | .7 | .. | .. | .. | .. | .. | .. | 3.3 | 39 | .. | .. | .. |
| 22 | .. | .. | .. | .. | .. | .. | .. | .. | .1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 0.1 | 1 | .. | .. | .. |
| 23 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 24 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 25 | .. | .. | .. | .. | .. | .. | .. | .6 | .9 | 1.0 | 1.0 | .6 | .. | .. | .. | .. | .. | .. | 4.1 | 47 | .. | .. | .. |
| 26 | .. | .. | .. | .. | .. | .. | .. | .3 | .. | .1 | .2 | .2 | .. | .. | .. | .. | .. | .. | 0.8 | 9 | .. | .. | .. |
| 27 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .1 | .. | .. | .. | .. | .. | .. | .. | .. | 0.1 | 1 | .. | .. | .. |
| 28 | .. | .. | .. | .. | .. | .. | .. | .. | .3 | .5 | .. | .. | .. | .. | .. | .. | .. | .. | 0.8 | 9 | Hazy | 16 | 6 |
| 29 | .. | .. | .. | .. | .. | .. | .. | .1 | .2 | .5 | .1 | .. | .. | .. | .. | .. | .. | .. | 0.9 | 10 | .. | .. | .. |
| 30 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 31 | .. | .. | .. | .. | .. | .. | .7 | .4 | .. | .1 | .4 | .. | .. | .. | .. | .. | .. | .. | 1.6 | 18 | .. | .. | .. |
| Sum. | .. | .. | .. | .. | .. | 0.4 | 4.0 | 6.6 | 6.9 | 7.6 | 7.5 | 5.5 | 0.2 | .. | .. | .. | .. | .. | 38.7 | .. | .. | .. | .. |
| Mean | .. | .. | .. | .. | .. | .01 | .13 | .21 | .22 | .25 | .24 | .18 | .01 | .. | .. | .. | .. | .. | 1.25 | 15 | .. | .. | .. |

500. RICHMOND (Kew Observatory): h_s = 15.3 metres.

FEBRUARY, 1933.

| Day | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | % | Sky | Total mw/cm ² | Vertical mw/cm ² |
|------------------|-----|-----|-----|-----|-----|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------------|----------------------------|---|-----------------------------|--------------------------------|
| 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 2 | .. | .. | .. | .. | .. | .7 | 1.0 | 1.0 | .7 | 1.0 | 1.0 | 1.0 | .7 | .. | .. | .. | .. | .. | 7.1 | 77 | .. | .. | .. |
| 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .6 | .3 | .. | .. | .. | .. | .. | .. | .. | 0.9 | 10 | .. | .. | .. |
| 4 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 5 | .. | .. | .. | .. | .. | .1 | .1 | .. | .5 | .4 | .2 | .1 | .. | .. | .. | .. | .. | .. | 1.4 | 16 | .. | .. | .. |
| 6 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .1 | .. | .. | .. | .. | .. | .. | .. | .. | 0.1 | 1 | .. | .. | .. |
| 7 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .1 | .2 | .. | .. | .. | .. | .. | .. | .. | 0.5 | 5 | .. | .. | .. |
| 8 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 9 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .1 | .. | .. | .. | .. | .. | .. | 0.1 | 1 | .. | .. | .. |
| 10 | .. | .. | .. | .. | .. | .. | .2 | .5 | .6 | .8 | .2 | .. | .. | .. | .. | .. | .. | .. | 2.3 | 24 | .. | .. | .. |
| 11 | .. | .. | .. | .. | .. | 1.0 | .9 | 1.0 | .9 | .8 | .9 | .5 | .5 | .. | .. | .. | .. | .. | 6.5 | 67 | .. | .. | .. |
| 12 | .. | .. | .. | .. | .. | .6 | 1.0 | 1.0 | 1.0 | 1.0 | .3 | .5 | .3 | .. | .. | .. | .. | .. | 5.7 | 59 | .. | .. | .. |
| 13 | .. | .. | .. | .. | .. | .. | .5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | .. | .. | .. | .. | .. | 5.5 | 56 | Hazy | 53 | 22 |
| 14 | .. | .. | .. | .. | .. | .. | .8 | 1.0 | 1.0 | 1.0 | .6 | .2 | .5 | .. | .. | .. | .. | .. | 4.9 | 50 | Hazy | 56 | 24 |
| 15 | .. | .. | .. | .. | .. | .. | .. | .1 | .7 | .8 | .6 | .5 | .1 | .. | .. | .. | .. | .. | 2.8 | 28 | .. | .. | .. |
| 16 | .. | .. | .. | .. | .. | .. | .1 | .7 | .9 | .5 | .3 | .5 | .. | .. | .. | .. | .. | .. | 3.0 | 30 | .. | .. | .. |
| 17 | .. | .. | .. | .. | .. | .. | .. | .. | .1 | .9 | .9 | .8 | .9 | .. | .. | .. | .. | .. | 3.6 | 36 | .. | .. | .. |
| 18 | .. | .. | .. | .. | .. | .. | .. | .. | .1 | .2 | .6 | .6 | .4 | .. | .. | .. | .. | .. | 1.9 | 19 | .. | .. | .. |
| 19 | .. | .. | .. | .. | .. | .. | .. | .. | .6 | .2 | .. | .. | .. | .. | .. | .. | .. | .. | 0.8 | 8 | .. | .. | .. |
| 20 | .. | .. | .. | .. | .. | .. | .. | .. | 1.0 | 1.0 | 1.0 | .4 | .. | .. | .. | .. | .. | .. | 3.4 | 33 | .. | .. | .. |
| 21 | .. | .. | .. | .. | .. | .4 | .4 | .8 | .9 | 1.0 | 1.0 | .9 | .7 | .. | .. | .. | .. | .. | 6.1 | 59 | .. | .. | .. |
| 22 | .. | .. | .. | .. | .. | .4 | 1.0 | 1.0 | 1.0 | .3 | .4 | .. | .1 | .6 | .1 | .. | .. | .. | 4.9 | 47 | .. | .. | .. |
| 23 | .. | .. | .. | .. | .. | .3 | 1.0 | 1.0 | 1.0 | 1.0 | .6 | .4 | .9 | .. | .. | .. | .. | .. | 7.2 | 69 | .. | .. | .. |
| 24 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 25 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 26 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 27 | .. | .. | .. | .. | .. | .. | .. | .1 | .7 | 1.0 | .8 | .8 | .9 | .. | .. | .. | .. | .. | 5.1 | 48 | .. | .. | .. |
| 28 | .. | .. | .. | .. | .. | .. | .. | .1 | .. | .3 | .5 | .6 | .4 | .4 | .. | .. | .. | .. | 2.3 | 21 | .. | .. | .. |
| Sum. | .. | .. | .. | .. | 0.7 | 4.8 | 6.3 | 9.4 | 11.7 | 14.0 | 11.1 | 8.9 | 7.9 | 1.3 | .. | .. | .. | .. | 76.1 | .. | .. | .. | .. |
| Mean | .. | .. | .. | .. | .03 | .17 | .23 | .34 | .42 | .50 | .40 | .32 | .28 | .05 | .. | .. | .. | .. | 2.72 | 28 | .. | .. | .. |
| Hour L. A. T. | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | Total for Day. | Per cent of Possible | Sky | Total | Vertical |
| | | | | | | | | | | | | | | | | | | | | | Radiation at Noon. Ångström Pyrheliometer. | | |

For periods of sixty minutes, between the exact hours of Local Apparent Time.
 501. RICHMOND (Kew Observatory): h_g (Height of recorder above ground) = 13.3 metres.

MARCH, 1933.

| Hour L. A. T. | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | Total for Day | Per cent of Possible | Radiation at Noon. Ångström Pyrheliometer. | | |
|------------------|-----|-----|-----|-----|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------|----------------------------|---|--------------------|----------|
| | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | | | Sky | Total | Vertical |
| Day | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | % | mw/cm ² | mw/cm ² | |
| 1 | | | | ... | ... | ... | ... | ... | ... | ... | ... | 5 | 1 | ... | ... | ... | ... | ... | 0.6 | 6 | ... | ... | |
| 2 | | | | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 3 | | | | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 4 | | | | ... | ... | ... | ... | ... | 3 | 1.0 | 1.0 | 1.0 | 1.0 | 7 | ... | ... | ... | 5.0 | 45 | ... | ... | | |
| 5 | | | | ... | 8 | 1.0 | 1.0 | 1.0 | 9 | 9 | 1.0 | 2 | ... | ... | ... | ... | ... | 8.8 | 61 | ... | ... | | |
| 6 | | | | ... | ... | ... | ... | ... | 1 | 1.0 | 6 | 9 | 8 | 1 | ... | ... | ... | 3.5 | 31 | Clear | 73 | 39 | |
| 7 | | | | ... | 4 | 1.0 | 4 | 4 | 4 | 3 | 8 | 1.0 | 1.0 | 7 | ... | ... | ... | 6.4 | 57 | ... | ... | ... | |
| 8 | | | | ... | 8 | 1.0 | 1.0 | 1.0 | 1.0 | 9 | 9 | 9 | 4 | ... | ... | ... | ... | 7.9 | 70 | Clear | 69 | 38 | |
| 9 | | | | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 10 | | | | ... | 3 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 8 | ... | ... | ... | ... | 8.1 | 71 | Hazy | 56 | 31 | |
| 11 | | | | ... | 4 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 9 | 9 | 1.0 | 3 | ... | ... | ... | 8.5 | 74 | Hazy | 40 | 22 | |
| 12 | | | | ... | ... | ... | ... | ... | 5 | 8 | 1.0 | 1.0 | 1.0 | 2 | ... | ... | ... | 5.5 | 48 | ... | ... | ... | |
| 13 | | | | ... | ... | ... | ... | 7 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 6 | ... | ... | ... | 7.2 | 62 | ... | ... | ... | |
| 14 | | | | ... | ... | 1 | 9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 4 | ... | ... | ... | 7.4 | 63 | ... | ... | ... | |
| 15 | | | | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 16 | | | | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 17 | | | | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 18 | | | | ... | ... | ... | 1 | 8 | 4 | 4 | 8 | 9 | 7 | 8 | ... | ... | ... | 4.9 | 41 | ... | ... | ... | |
| 19 | | | | ... | ... | ... | 8 | 6 | 7 | 4 | 1 | 1 | 8 | 1 | ... | ... | ... | 3.5 | 29 | ... | ... | ... | |
| 20 | | | | 1 | 7 | 5 | 3 | 7 | 1 | 4 | 5 | 8 | 8 | ... | ... | ... | ... | 4.9 | 41 | ... | ... | ... | |
| 21 | | | | ... | ... | 8 | 1.0 | 1.0 | 8 | 5 | 1.0 | 6 | 1 | ... | ... | ... | ... | 5.8 | 48 | ... | ... | ... | |
| 22 | | | | 6 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 6 | ... | ... | ... | 10.2 | 83 | ... | ... | ... | |
| 23 | | | | 4 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 8 | ... | ... | ... | 10.2 | 83 | ... | ... | ... | |
| 24 | | | | 6 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 9 | ... | ... | ... | 10.5 | 85 | Clear | 75 | 48 | |
| 25 | | | | 4 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ... | ... | ... | ... | 10.4 | 84 | ... | ... | ... | |
| 26 | | | | ... | ... | 2 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 9 | 1.0 | 1.0 | 3 | ... | ... | 8.4 | 67 | ... | ... | ... | |
| 27 | | | | 5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2 | ... | ... | ... | 10.7 | 85 | Clear | 65 | 42 | |
| 28 | | | | 7 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 4 | ... | ... | ... | 9.8 | 78 | ... | ... | ... | |
| 29 | | | | ... | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2 | ... | ... | ... | 10.2 | 80 | Clear | 66 | 44 | |
| 30 | | | | 6 | 5 | 5 | 8 | 6 | 8 | 6 | 3 | 4 | ... | 4 | 2 | ... | ... | 5.7 | 45 | ... | ... | ... | |
| 31 | | | | 4 | 1.0 | 1.0 | 1.0 | 1.0 | 9 | 5 | 4 | ... | ... | ... | ... | ... | ... | 6.2 | 48 | ... | ... | ... | |
| Sum | | | ... | 3.6 | 11.6 | 15.1 | 18.0 | 19.2 | 19.2 | 19.9 | 20.6 | 19.7 | 18.4 | 11.6 | 1.3 | ... | ... | 178.3 | -- | -- | -- | -- | |
| Mean | | | ... | .12 | .37 | .49 | .58 | .62 | .62 | .64 | .67 | .64 | .69 | .37 | .04 | ... | ... | 5.75 | 49 | -- | -- | -- | |

502. RICHMOND (Kew Observatory): h_g = 13.3 metres.

APRIL, 1933.

| Day | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | % | Sky | mw/cm ² | mw/cm ² |
|------|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-------|-----|-------|--------------------|--------------------|
| | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | | | | | | |
| 1 | | | | ... | ... | ... | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.3 | 2 | ... | ... | ... |
| 2 | | | | 2 | 9 | 1.0 | 1.0 | 1.0 | 2 | 9 | 6 | 9 | 8 | 2 | ... | ... | ... | ... | 7.7 | 60 | ... | ... | ... |
| 3 | | | | 3 | 4 | 6 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 6 | 6 | ... | ... | 9.9 | 76 | ... | ... | ... |
| 4 | | | | ... | 1 | 2 | 3 | 4 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 8 | 5 | ... | ... | ... | 7.3 | 56 | Clear | 83 | 57 |
| 5 | | | | 1 | 1.0 | 1.0 | 9 | 3 | 4 | 8 | 1.0 | 1.0 | 1.0 | 1.0 | 5 | ... | ... | ... | 9.0 | 69 | ... | ... | ... |
| 6 | | | | ... | 7 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 9 | 5 | 3 | 3 | ... | ... | ... | ... | 7.7 | 58 | Hazy | 54 | 38 |
| 7 | | | | ... | 7 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 7 | ... | ... | ... | ... | 10.4 | 78 | Clear | 64 | 46 |
| 8 | | | | 1 | 9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 8 | ... | ... | ... | ... | 11.8 | 89 | ... | ... | ... |
| 9 | | | | 1 | 9 | 3 | 6 | 5 | 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.6 | 19 | ... | ... | ... |
| 10 | | | | ... | ... | ... | ... | 5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2 | ... | ... | ... | ... | 6.7 | 50 | ... | ... | ... |
| 11 | | | | 2 | 5 | 3 | 5 | 7 | 3 | 4 | 1 | ... | ... | ... | ... | ... | ... | ... | 3.0 | 22 | ... | ... | ... |
| 12 | | | | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13 | | | | 2 | 9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 9 | 1.0 | 1.0 | ... | ... | ... | 11.0 | 81 | ... | ... | ... |
| 14 | | | | 1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ... | ... | ... | 11.1 | 81 | ... | ... | ... |
| 15 | | | | 7 | 1.0 | 1.0 | 1.0 | 1.0 | 4 | 8 | 7 | 3 | 1 | 7 | ... | ... | ... | ... | 8.4 | 61 | ... | ... | ... |
| 16 | | | | 6 | 1.0 | 1.0 | 9 | 7 | 9 | 9 | 6 | 7 | 7 | 1.0 | 7 | ... | ... | ... | 9.7 | 70 | ... | ... | ... |
| 17 | | | | ... | ... | ... | ... | ... | 5 | 6 | 6 | 3 | 2 | 6 | 2 | ... | ... | ... | 3.0 | 22 | ... | ... | ... |
| 18 | | | | ... | ... | 1 | 1 | 8 | 3 | 1 | 1 | 1 | 4 | 2 | 2 | 2 | ... | ... | 2.6 | 19 | ... | ... | ... |
| 19 | | | | 3 | 1.0 | 1.0 | 1.0 | 8 | 8 | 9 | 5 | ... | 9 | 4 | 6 | ... | ... | ... | 9.2 | 66 | ... | ... | ... |
| 20 | | | | 4 | 5 | 6 | 2 | 1 | 3 | 2 | 6 | 4 | 2 | 3 | ... | ... | ... | ... | 3.8 | 27 | ... | ... | ... |
| 21 | | | | 5 | 1.0 | 9 | 8 | 3 | 4 | 4 | 3 | 2 | 5 | 7 | 3 | 8 | 6 | ... | 7.7 | 54 | ... | ... | ... |
| 22 | | | | ... | ... | ... | 2 | ... | ... | ... | ... | ... | 2 | 1 | 1.0 | 1 | ... | ... | 1.6 | 11 | ... | ... | ... |
| 23 | | | | ... | 5 | 3 | 8 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.7 | 12 | ... | ... | ... |
| 24 | | | | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25 | | | | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5 | 7 | ... | ... | ... | 1.2 | 8 | ... | ... | ... |
| 26 | | | | 2 | 9 | 6 | 4 | 3 | 1 | ... | 1 | 3 | 8 | 1 | ... | ... | ... | ... | 3.6 | 26 | ... | ... | ... |
| 27 | | | | ... | ... | ... | ... | 3 | 7 | 9 | 7 | 9 | 8 | 4 | 2 | ... | ... | ... | 4.9 | 34 | ... | ... | ... |
| 28 | | | | 4 | 7 | 9 | 9 | 9 | 8 | 9 | 8 | ... | ... | ... | ... | ... | ... | ... | 6.3 | 43 | ... | ... | ... |
| 29 | | | | ... | 2 | 4 | 4 | 2 | ... | 2 | 8 | ... | 1 | 5 | ... | 1 | ... | ... | 2.9 | 20 | ... | ... | ... |
| 30 | | | | ... | 5 | 9 | 1.0 | 1.0 | 9 | 1.0 | 1.0 | 1.0 | 7 | 3 | 9 | 1 | ... | ... | 9.3 | 63 | ... | ... | ... |
| Sum | | | 1.1 | 7.1 | 15.0 | 16.8 | 16.7 | 15.7 | 15.2 | 16.9 | 16.3 | 13.9 | 14.8 | 13.2 | 11.1 | 1.8 | ... | ... | 174.6 | -- | -- | -- | -- |
| Mean | | | .04 | .24 | .50 | .53 | .56 | .52 | .51 | .55 | .54 | .46 | .49 | .44 | .37 | .06 | ... | ... | 5.82 | 42 | -- | -- | -- |

DURATION OF BRIGHT SUNSHINE

For periods of sixty minutes, between the exact hours of Local Apparent Time.

505. RICHMOND (Kew Observatory): H_s (Height of recorder above ground) = 13.3 metres.

JULY, 1933.

Table with 24 columns (Hour L. A. T. to Total for Day) and 4 rows of data (Day 1-31, Sum, Mean). Includes sub-columns for Radiation at Noon (Sky, Total, Vertical) and Per cent of Possible.

506. RICHMOND (Kew Observatory): h_s = 13.3 metres.

AUGUST, 1933.

Table with 24 columns (Day to Total for Day) and 4 rows of data (Day 1-31, Sum, Mean). Includes sub-columns for Radiation at Noon (Sky, Total, Vertical) and Per cent of Possible.

DURATION OF BRIGHT SUNSHINE

For periods of sixty minutes, between the exact hours of Local Apparent Time.

507. RICHMOND (Kew Observatory): h_g (Height of recorder above ground) = 13.3 metres,

SEPTEMBER, 1933.

| Hour L. A. T. | | | | | | | | | | | | | | | | | | | | | Total for Day. | Per cent of Possible. | Radiation at Noon. Ångström Pyrheliometer. | | |
|------------------|-----|-----|-----|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------------|-----------------------------|---|--|--|
| | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | Sky | Total | | | Vertical | | |
| Day | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | % | mm/cm ² | mm/cm ² | | |
| 1 | .. | .. | ... | ... | ... | .. | ..5 | ..6 | ..1 | ..5 | ... | ..1 | ..1 | ... | ... | ... | ... | ... | ... | 1.9 | 14 | ... | ... | | |
| 2 | .. | .. | ... | ... | ...2 | ...5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 9.5 | 70 | Clear | 84 | | |
| 3 | .. | .. | ... | ... | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..9 | ..1 | ..5 | ..6 | ..8 | ..1 | ... | ... | ... | 8.0 | 60 | ... | ... | | |
| 4 | .. | .. | ... | ...4 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..9 | ..7 | ..9 | ..8 | 1.0 | ..8 | ... | ... | ... | 10.5 | 79 | Hazy | 55 | | |
| 5 | .. | .. | ... | ...4 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ... | ... | ... | 11.4 | 86 | Hazy | 61 | | | |
| 6 | .. | .. | ... | ...7 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..9 | 1.0 | 1.0 | ..5 | ... | ... | ... | 11.1 | 84 | Clear | 66 | | | |
| 7 | .. | .. | ... | ... | ... | ..7 | 1.0 | 1.0 | 1.0 | 1.0 | ..8 | 1.0 | 1.0 | ..8 | ..5 | ..2 | ... | ... | ... | 8.0 | 61 | ... | ... | | |
| 8 | .. | .. | ... | ...5 | ..9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..8 | ... | ... | ... | 11.2 | 85 | Clear | 75 | | |
| 9 | .. | .. | ... | ...5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..8 | ... | ... | ... | 11.3 | 87 | Clear | 75 | | |
| 10 | .. | .. | ... | ...8 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..8 | ... | ... | ... | 11.6 | 89 | ... | ... | | |
| 11 | .. | .. | ... | ...5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..9 | ..2 | ... | ... | ... | 10.6 | 82 | Clear | 73 | | | |
| 12 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| 13 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ...2 | ...5 | ...3 | ... | ... | ... | ... | ... | ... | 1.5 | 12 | ... | ... | | |
| 14 | .. | .. | ... | ...8 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..9 | ..9 | ..8 | ..9 | ..3 | ... | ... | ... | 10.6 | 83 | Clear | 76 | | | |
| 15 | .. | .. | ... | ... | ..9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..9 | 1.0 | ..6 | ... | ... | ... | 10.4 | 82 | Hazy | 62 | | |
| 16 | .. | .. | ... | ..1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..7 | ..2 | ... | ... | ... | 10.0 | 79 | Clear | 76 | | | |
| 17 | .. | .. | ... | ... | ... | ..7 | ..9 | 1.0 | 1.0 | 1.0 | ..3 | ..6 | ..9 | 1.0 | ..6 | ... | ... | ... | 8.0 | 64 | ... | ... | | | |
| 18 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ...6 | ...3 | ... | ... | ... | ... | ... | ... | 0.8 | 6 | ... | ... | | | |
| 19 | .. | .. | ... | ... | ... | ...5 | ..9 | ..9 | ..6 | 1.0 | ..9 | ..8 | ..9 | ..9 | ..7 | ... | ... | ... | 8.1 | 65 | Clear | 74 | | | |
| 20 | .. | .. | ... | ... | ... | ...8 | 1.0 | ..9 | ..9 | 1.0 | 1.0 | ..9 | ..9 | ..7 | ... | ... | ... | ... | 8.1 | 66 | Clear | 79 | | | |
| 21 | .. | .. | ... | ... | ...5 | ..4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0.9 | 7 | ... | ... | | | |
| 22 | .. | .. | ... | ...1 | ..8 | 1.0 | ..9 | ..9 | ..4 | ..6 | 1.0 | ..4 | ..3 | ... | ... | ... | ... | ... | 6.4 | 53 | ... | ... | | | |
| 23 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| 24 | .. | .. | ... | ...1 | ..7 | ..2 | ...5 | ..3 | ..1 | ... | ..1 | ... | ..1 | ... | ..1 | ... | ... | ... | 2.1 | 17 | ... | ... | | | |
| 25 | .. | .. | ... | ... | ... | ...1 | ... | ... | ...1 | ..3 | ..2 | ..3 | ..5 | ..4 | ... | ... | ... | ... | 1.9 | 16 | ... | ... | | | |
| 26 | .. | .. | ... | ... | ... | ... | ...2 | ..8 | 1.0 | ..5 | ..4 | ..6 | ..1 | ... | ... | ... | ... | ... | 3.6 | 30 | ... | ... | | | |
| 27 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| 28 | .. | .. | ... | ... | ... | ... | ... | ...6 | ..4 | ..3 | ..4 | ..9 | ... | ... | ... | ... | ... | ... | 2.6 | 22 | ... | ... | | | |
| 29 | .. | .. | ... | ... | ... | ... | ...6 | 1.0 | ..8 | 1.0 | ..5 | ..3 | ... | ... | ... | ... | ... | ... | 5.2 | 44 | ... | ... | | | |
| 30 | .. | .. | ... | ... | ... | ... | ...4 | ..9 | ..5 | ..9 | ..9 | ..9 | ... | ... | ... | ... | ... | ... | 4.5 | 39 | ... | ... | | | |
| Sum. | .. | .. | ... | 4.8 | 11.9 | 16.4 | 17.9 | 19.0 | 19.6 | 19.6 | 18.4 | 18.5 | 18.7 | 16.2 | 8.8 | ... | ... | ... | 189.8 | -- | -- | -- | -- | | |
| Mean | .. | .. | ... | .16 | .40 | .55 | .60 | .63 | .65 | .65 | .61 | .62 | .62 | .54 | .29 | ... | ... | ... | 6.33 | 50 | -- | -- | -- | | |

508. RICHMOND (Kew Observatory): h_g = 13.3 metres.

OCTOBER, 1933.

| Day | | | | | | | | | | | | | | | | | | | | | Total for Day. | Per cent of Possible. | Radiation at Noon. Ångström Pyrheliometer. | | |
|------------------|-----|-----|-----|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------------|-----------------------------|---|-----------------------------|---|--|--|
| | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | Sky | Total | | | Vertical | | |
| Day | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | hr. | % | mm/cm ² | mm/cm ² | | |
| 1 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| 2 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| 3 | .. | .. | ... | ... | ...9 | 1.0 | ..9 | ..1 | ..8 | ..2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3.9 | 34 | ... | ... | | |
| 4 | .. | .. | ... | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..9 | ... | ... | ... | ... | ... | ... | ... | ... | 9.9 | 87 | Clear | 66 | | |
| 5 | .. | .. | ... | ... | ... | ... | ...1 | 1.0 | 1.0 | 1.0 | 1.0 | ..6 | ..2 | ... | ... | ... | ... | ... | ... | 3.9 | 34 | ... | ... | | |
| 6 | .. | .. | ... | ... | ... | ...3 | 1.0 | 1.0 | ..8 | 1.0 | ..6 | ..6 | ..9 | ... | ... | ... | ... | ... | ... | 6.2 | 55 | ... | ... | | |
| 7 | .. | .. | ... | ... | ... | ... | ...1 | ..3 | ..3 | ..1 | ..7 | ... | ... | ... | ... | ... | ... | ... | ... | 1.5 | 13 | ... | ... | | |
| 8 | .. | .. | ... | ...1 | ..4 | ..2 | ..6 | ..1 | ..5 | ... | ..4 | ... | ... | ... | ... | ... | ... | ... | ... | 2.3 | 21 | ... | ... | | |
| 9 | .. | .. | ... | ...2 | ..9 | 1.0 | ..8 | ..3 | ..7 | ..1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4.0 | 36 | ... | ... | | |
| 10 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ...5 | ..7 | ..2 | ... | ... | ... | ... | ... | ... | ... | 1.4 | 13 | ... | ... | | |
| 11 | .. | .. | ... | ... | ...1 | ..5 | 1.0 | ..9 | ..9 | ..7 | ..7 | ..8 | 1.0 | ... | ... | ... | ... | ... | ... | 6.6 | 60 | ... | ... | | |
| 12 | .. | .. | ... | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..2 | ..7 | ... | ... | ... | ... | ... | ... | 8.9 | 82 | Clear | 79 | | |
| 13 | .. | .. | ... | ...1 | ..3 | ..9 | ..6 | ..8 | ..8 | ..9 | ..2 | ... | ... | ... | ... | ... | ... | ... | ... | 4.6 | 42 | ... | ... | | |
| 14 | .. | .. | ... | ... | ...1 | ... | ... | ... | ... | ... | ...1 | ..1 | ... | ... | ... | ... | ... | ... | ... | 0.3 | 3 | ... | ... | | |
| 15 | .. | .. | ... | ...8 | 1.0 | 1.0 | 1.0 | ..5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4.1 | 38 | ... | ... | | |
| 16 | .. | .. | ... | ...8 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..8 | ..6 | ..9 | ... | ... | ... | ... | ... | ... | 8.3 | 78 | ... | ... | | |
| 17 | .. | .. | ... | ...9 | 1.0 | 1.0 | ..8 | ..9 | ..8 | ..2 | ... | ...3 | ..3 | ... | ... | ... | ... | ... | ... | 5.2 | 49 | ... | ... | | |
| 18 | .. | .. | ... | ... | ...1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..9 | 1.0 | ..1 | ... | ... | ... | ... | ... | ... | 7.0 | 67 | Clear | 71 | | |
| 19 | .. | .. | ... | ...4 | 1.0 | ..4 | ... | ..2 | ..9 | 1.0 | ..8 | 1.0 | ..2 | ... | ... | ... | ... | ... | ... | 5.9 | 56 | ... | ... | | |
| 20 | .. | .. | ... | ... | ...1 | ..9 | ..9 | 1.0 | ..8 | 1.0 | 1.0 | ..2 | ... | ... | ... | ... | ... | ... | ... | 5.9 | 57 | ... | ... | | |
| 21 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| 22 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| 23 | .. | .. | ... | ... | ...2 | ... | ...7 | ..5 | ..1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.6 | 15 | ... | ... | | |
| 24 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| 25 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| 26 | .. | .. | ... | ...5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | ..7 | ..6 | ..1 | ... | ... | ... | ... | ... | 7.9 | 79 | ... | ... | | |
| 27 | .. | .. | ... | ... | ...1 | 1.0 | ..3 | ..2 | 1.0 | ..6 | ..1 | ... | ... | ... | ... | ... | ... | ... | ... | 0.3 | 3 | ... | ... | | |
| 28 | .. | .. | ... | ... | ...1 | ... | ..1 | ..2 | ..5 | ..7 | ..7 | ..9 | ..4 | ... | ... | ... | ... | ... | ... | 3.3 | 33 | ... | ... | | |
| 29 | .. | .. | ... | ... | ... | ... | ... | ...2 | ..5 | ..7 | ..7 | ..9 | ..4 | ... | ... | ... | ... | ... | ... | 3.5 | 36 | ... | ... | | |
| 30 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ...2 | ... | ... | ... | ... | ... | ... | ... | 0.2 | 2 | ... | ... | | |
| 31 | .. | .. | ... | ... | ... | ... | ... | ... | ... | ...3 | ..4 | ..4 | ... | ... | ... | ... | ... | ... | ... | 1.1 | 11 | ... | ... | | |
| Sum. | .. | .. | ... | 5.7 | 10.7 | 12.7 | 13.2 | 14.0 | 14.5 | 12.7 | 10.2 | 9.4 | 4.6 | ... | ... | ... | ... | ... | 107.7 | -- | -- | -- | -- | | |
| Mean | .. | .. | ... | .18 | .36 | .41 | .43 | .45 | .47 | .41 | .33 | .30 | .15 | ... | ... | ... | ... | ... | 3.47 | 32 | -- | -- | -- | | |
| Hour L. A. T. | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | Total for Day. | Per cent of Possible. | Radiation at Noon. Ångström Pyrheliometer. | | | | |
| | | | | | | | | | | | | | | | | | | | | | Sky | Total | Vertical | | |

Direction expressed in degrees from North (E = 90°, S = 180°, W = 270°, N = 360°). Speed in metres per second

511. RICHMOND (Kew Observatory):
Dines Anemograph from Jan., 1926.

H_a (height of vane of anemograph above M.S.L.) = Height of ground above

Table with 13 columns for hour intervals (0-1 to 11-12) and 24 rows for days (1-25). Each cell contains wind speed values in degrees and m/s. A Mean row is at the bottom.

512. RICHMOND (Kew Observatory): H_a = 5 metres + 23 metres.

Table with 13 columns for hour intervals (0-1 to 11-12) and 28 rows for days (1-28). Each cell contains wind speed values in degrees and m/s. A Mean row is at the bottom.

WIND: DIRECTION AND SPEED.

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 5 metres + 23 metres.

JANUARY, 1933.

Table with 14 columns for time periods (12-13 to 23-24), Mean, and Day. Each time period has two sub-columns for wind speed in degrees and m/s. Data rows include values for 175, 195, 230, 200, 270, 265, 235, 245, 15, 280, 285, 240, 225, 185, 285, 240, 245, 310, 75, 85, 115, 255, 55, 40, 55, 60, 75, 70, 290, 225, and a final row with dashes for missing data.

FEBRUARY, 1933.

Table with 14 columns for time periods (12-13 to 23-24), Mean, and Day. Each time period has two sub-columns for wind speed in degrees and m/s. Data rows include values for 230, 285, 180, 240, 250, 230, 250, 235, 230, 260, 30, 360, 10, 360, 5, 5, 330, 5, 360, 205, 330, 335, 335, 150, 125, 135, 210, 180, and a final row with dashes for missing data.

513. RICHMOND (Kew Observatory):
Dines Anemograph from Jan., 1926.

H_a (height of vane of anemograph above M.S.L.) = Height of ground above

Table with 24 columns (Hour G.M.T., 0-1 to 11-12) and 31 rows (Day 1 to 31). Each cell contains wind speed data in degrees and m/s.

514. RICHMOND (Kew Observatory): H_a = 5 metres + 23 metres.

Table with 24 columns (Day, 0-1 to 11-12) and 31 rows (Day 1 to 30). Each cell contains wind speed data in degrees and m/s. Includes a Mean row and an Hour G.M.T. row at the bottom.

WIND: DIRECTION AND SPEED.

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 5 metres + 25 metres.

MARCH, 1953.

| 12 - 13 | | 13 - 14 | | 14 - 15 | | 15 - 16 | | 16 - 17 | | 17 - 18 | | 18 - 19 | | 19 - 20 | | 20 - 21 | | 21 - 22 | | 22 - 23 | | 23 - 24 | | Mean | Day |
|---------|-----|---------|-----|---------|------|---------|------|---------|------|---------|-----|---------|-----|---------|------|---------|------|---------|------|---------|------|---------|-----|------|-----|
| ° | 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 | |
| 115 | 5.9 | 115 | 6.6 | 120 | 6.5 | 120 | 5.8 | 115 | 6.5 | 105 | 6.0 | 115 | 5.0 | 115 | 3.9 | 110 | 3.7 | 115 | 1.6 | 115 | 1.7 | 90 | 2.0 | 3.7 | 1 |
| 155 | 5.6 | 140 | 5.6 | 120 | 5.7 | 118 | 4.8 | 110 | 5.0 | 115 | 4.1 | 135 | 4.3 | 160 | 4.0 | 175 | 2.8 | 180 | 2.4 | 175 | 3.5 | 165 | 3.7 | 3.9 | 2 |
| 210 | 8.5 | 210 | 9.0 | 215 | 8.6 | 215 | 8.2 | 210 | 7.6 | 205 | 7.8 | 205 | 6.9 | 205 | 5.7 | 195 | 5.6 | 200 | 6.2 | 200 | 5.6 | 200 | 6.3 | 7.0 | 3 |
| 265 | 8.5 | 260 | 8.8 | 260 | 6.4 | 250 | 6.4 | 255 | 5.6 | 240 | 3.7 | 220 | 6.0 | 225 | 5.8 | 225 | 6.2 | 220 | 5.7 | 220 | 5.8 | 225 | 4.7 | 5.9 | 4 |
| 230 | 6.5 | 220 | 8.6 | 220 | 8.2 | 215 | 7.7 | 205 | 6.2 | 200 | 5.9 | 195 | 5.5 | 185 | 5.9 | 190 | 7.6 | 190 | 6.8 | 190 | 7.7 | 190 | 7.4 | 5.8 | 5 |
| 210 | 7.0 | 215 | 8.3 | 215 | 8.0 | 220 | 6.6 | 215 | 7.6 | 215 | 5.7 | 205 | 4.1 | 190 | 3.2 | 195 | 2.9 | 190 | 2.5 | 195 | 1.7 | 210 | 1.7 | 6.8 | 6 |
| 245 | 5.1 | 240 | 4.8 | 265 | 5.7 | 265 | 5.6 | 270 | 4.8 | 275 | 6.1 | 280 | 2.6 | 300 | 2.6 | 255 | 1.0 | 245 | 2.5 | 260 | 1.8 | 240 | 1.0 | 3.1 | 7 |
| 225 | 3.8 | 235 | 3.4 | 225 | 4.4 | 230 | 4.6 | 215 | 4.1 | 205 | 4.4 | 195 | 3.5 | 195 | 3.2 | 190 | 2.6 | 190 | 3.2 | 190 | 3.4 | 190 | 3.6 | 2.6 | 8 |
| 205 | 5.5 | 205 | 6.4 | 205 | 5.9 | 210 | 5.5 | 210 | 4.3 | 190 | 3.9 | 180 | 2.3 | 165 | 1.5 | 130 | 1.2 | 105 | 1.3 | 110 | 1.6 | 125 | 1.5 | 3.5 | 9 |
| 115 | 7.6 | 110 | 6.3 | 105 | 7.2 | 90 | 7.3 | 95 | 7.7 | 90 | 6.3 | 85 | 5.5 | 90 | 5.0 | 90 | 4.4 | 85 | 4.0 | 85 | 4.0 | 80 | 3.7 | 4.2 | 10 |
| 75 | 4.8 | 85 | 5.9 | 75 | 5.9 | 85 | 6.6 | 80 | 5.6 | 80 | 6.8 | 80 | 4.8 | 70 | 3.8 | 75 | 2.8 | 70 | 1.7 | 60 | 1.8 | 55 | 2.0 | 3.9 | 11 |
| 65 | 3.5 | 70 | 4.0 | 70 | 4.4 | 75 | 5.1 | 85 | 5.0 | 90 | 3.5 | 85 | 2.2 | 85 | 1.8 | 85 | 1.8 | 90 | 0.3 | --- | 0.0 | --- | 0.0 | 1.6 | 12 |
| 215 | 1.2 | 230 | 1.2 | 295 | 2.4 | 315 | 2.5 | 320 | 2.3 | 315 | 1.4 | 255 | 0.6 | 195 | 0.2 | 205 | 0.4 | 210 | 1.3 | 215 | 1.2 | 215 | 1.1 | 0.9 | 13 |
| 280 | 5.0 | 275 | 5.2 | 275 | 3.7 | 275 | 4.8 | 275 | 4.2 | 260 | 2.8 | 245 | 3.8 | 240 | 3.1 | 230 | 2.8 | 225 | 3.1 | 215 | 3.1 | 225 | 3.2 | 3.5 | 14 |
| 215 | 7.2 | 200 | 6.8 | 200 | 5.6 | 195 | 5.6 | 200 | 6.7 | 200 | 5.4 | 190 | 4.5 | 190 | 4.6 | 190 | 5.6 | 175 | 6.3 | 180 | 6.5 | 180 | 6.2 | 5.0 | 15 |
| 210 | 9.5 | 205 | 7.6 | 205 | 10.0 | 210 | 10.2 | 215 | 11.6 | 220 | 9.7 | 215 | 8.0 | 215 | 8.0 | 210 | 7.5 | 190 | 3.9 | 175 | 4.5 | 185 | 6.6 | 7.5 | 16 |
| 150 | 5.0 | 180 | 4.1 | 210 | 6.9 | 235 | 7.1 | 205 | 4.5 | 200 | 6.5 | 200 | 6.8 | 205 | 6.2 | 205 | 4.9 | 215 | 4.5 | 230 | 3.5 | 235 | 4.2 | 6.7 | 17 |
| 260 | 4.8 | 245 | 5.7 | 250 | 5.5 | 245 | 5.5 | 245 | 5.0 | 235 | 3.3 | 215 | 5.5 | 210 | 4.5 | 215 | 4.6 | 205 | 5.0 | 205 | 4.8 | 210 | 6.0 | 4.6 | 18 |
| 220 | 7.4 | 210 | 8.7 | 205 | 10.0 | 210 | 12.3 | 215 | 11.7 | 215 | 9.6 | 210 | 9.4 | 205 | 10.0 | 215 | 11.2 | 215 | 11.4 | 225 | 10.8 | 235 | 8.6 | 7.7 | 19 |
| 280 | 6.0 | 280 | 4.7 | 330 | 3.0 | 330 | 4.9 | 325 | 5.1 | 320 | 4.5 | 295 | 2.6 | 250 | 1.6 | 265 | 1.0 | 275 | 0.9 | 240 | 0.5 | 190 | 1.2 | 5.5 | 20 |
| 205 | 4.0 | 205 | 4.4 | 215 | 4.2 | 215 | 4.7 | 190 | 3.9 | 175 | 4.0 | 175 | 3.3 | 180 | 3.4 | 185 | 2.1 | 135 | 0.4 | 145 | 1.3 | 150 | 0.5 | 2.2 | 21 |
| 160 | 5.8 | 160 | 6.5 | 145 | 7.2 | 140 | 7.5 | 140 | 7.4 | 130 | 5.7 | 120 | 4.5 | 115 | 5.7 | 125 | 5.4 | 115 | 5.9 | 105 | 4.2 | 115 | 3.5 | 4.4 | 22 |
| 110 | 7.7 | 105 | 9.1 | 85 | 9.2 | 85 | 9.4 | 85 | 9.0 | 85 | 8.9 | 85 | 9.1 | 85 | 6.2 | 90 | 6.5 | 90 | 6.5 | 95 | 5.8 | 100 | 4.4 | 6.5 | 23 |
| 90 | 5.3 | 90 | 6.1 | 75 | 7.4 | 80 | 8.0 | 80 | 7.6 | 90 | 6.8 | 85 | 5.7 | 90 | 3.5 | 80 | 2.9 | 80 | 2.6 | 70 | 1.5 | 60 | 1.5 | 4.9 | 24 |
| 60 | 3.0 | 75 | 5.2 | 70 | 6.1 | 70 | 5.5 | 75 | 6.0 | 80 | 5.3 | 90 | 4.6 | 90 | 5.8 | 85 | 3.9 | 80 | 3.4 | 75 | 2.1 | 75 | 2.5 | 3.2 | 25 |
| 85 | 3.5 | 70 | 1.6 | 45 | 0.7 | 10 | 2.4 | 25 | 3.4 | 30 | 2.7 | 80 | 0.8 | 40 | 1.4 | 80 | 1.8 | 60 | 1.7 | 10 | 1.8 | 5 | 2.4 | 1.4 | 26 |
| 35 | 4.7 | 30 | 4.7 | 50 | 4.7 | 55 | 5.1 | 50 | 4.4 | 40 | 3.5 | 65 | 2.0 | 105 | 1.4 | 100 | 1.8 | 50 | 1.0 | 15 | 0.5 | 20 | 1.3 | 3.2 | 27 |
| 90 | 3.4 | 105 | 3.0 | 105 | 2.4 | 95 | 3.0 | 105 | 3.4 | 95 | 3.5 | 100 | 3.0 | 110 | 1.8 | 100 | 1.2 | 160 | 0.3 | 260 | 0.1 | 320 | 0.2 | 1.4 | 28 |
| 235 | 4.7 | 245 | 5.1 | 240 | 5.5 | 230 | 5.6 | 225 | 5.3 | 235 | 4.4 | 245 | 3.0 | 230 | 3.3 | 230 | 3.2 | 225 | 2.4 | 225 | 2.2 | 220 | 1.0 | 2.3 | 29 |
| 245 | 5.1 | 265 | 7.8 | 240 | 6.0 | 240 | 5.9 | 255 | 5.0 | 240 | 3.9 | 260 | 3.5 | 265 | 2.0 | 225 | 2.7 | 240 | 2.7 | 235 | 3.2 | 245 | 2.0 | 3.7 | 30 |
| 240 | 4.4 | 230 | 6.2 | 245 | 5.4 | 225 | 5.3 | 235 | 4.4 | 230 | 4.6 | 220 | 5.4 | 220 | 5.0 | 215 | 4.2 | 210 | 4.3 | 220 | 4.7 | 220 | 4.0 | 3.9 | 31 |
| --- | 5.5 | --- | 5.9 | --- | 5.9 | --- | 6.1 | --- | 5.8 | --- | 5.1 | --- | 4.5 | --- | 4.0 | --- | 3.8 | --- | 3.4 | --- | 3.3 | --- | 3.2 | 4.2 | |

APRIL, 1953.

| 12 - 13 | | 13 - 14 | | 14 - 15 | | 15 - 16 | | 16 - 17 | | 17 - 18 | | 18 - 19 | | 19 - 20 | | 20 - 21 | | 21 - 22 | | 22 - 23 | | 23 - 24 | | Mean | Day |
|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|------|-----|
| ° | 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 | |
| 270 | 3.5 | 285 | 3.5 | 300 | 5.1 | 295 | 4.5 | 315 | 3.9 | 325 | 3.5 | 325 | 4.7 | 320 | 4.0 | 300 | 2.4 | 300 | 1.4 | 285 | 1.9 | 275 | 1.4 | 3.3 | 1 |
| 265 | 5.5 | 270 | 5.7 | 260 | 5.6 | 260 | 6.9 | 265 | 5.9 | 265 | 6.5 | 255 | 5.5 | 260 | 5.6 | 265 | 5.2 | 265 | 4.8 | 265 | 6.0 | 260 | 4.3 | 3.8 | 2 |
| 260 | 5.3 | 270 | 5.8 | 265 | 6.3 | 270 | 6.0 | 265 | 5.0 | 260 | 5.0 | 255 | 4.8 | 260 | 3.8 | 265 | 3.8 | 260 | 3.6 | 260 | 3.3 | 265 | 3.4 | 4.4 | 3 |
| 265 | 4.0 | 275 | 4.1 | 275 | 3.5 | 265 | 4.3 | 270 | 3.9 | 265 | 3.1 | 265 | 2.9 | 275 | 3.1 | 280 | 2.9 | 275 | 3.6 | 245 | 2.0 | 245 | 1.7 | 3.0 | 4 |
| 340 | 3.0 | 315 | 2.5 | 320 | 2.7 | 340 | 2.9 | 325 | 2.9 | 330 | 3.3 | 325 | 1.3 | 310 | 0.5 | 320 | 0.2 | 335 | 0.5 | 285 | 0.1 | 220 | 0.2 | 1.6 | 5 |
| 285 | 2.0 | 255 | 1.8 | 165 | 0.9 | 250 | 1.2 | 235 | 1.4 | 220 | 3.6 | 200 | 2.9 | 215 | 0.9 | 205 | 0.7 | 210 | 0.9 | 225 | 1.4 | 205 | 0.6 | 0.9 | 6 |
| 250 | 1.7 | 235 | 2.5 | 235 | 2.7 | 260 | 3.1 | 260 | 2.9 | 255 | 2.8 | 220 | 3.0 | 215 | 2.5 | 220 | 3.0 | 230 | 2.0 | 220 | 2.5 | 215 | 1.8 | 1.5 | 7 |
| 275 | 3.0 | 260 | 2.4 | 230 | 4.8 | 275 | 3.6 | 280 | 4.3 | 285 | 4.0 | 285 | 2.5 | 245 | 1.9 | 275 | 1.4 | 275 | 2.4 | 260 | 1.4 | 245 | 1.2 | 2.0 | 8 |
| 255 | 4.7 | 255 | 6.0 | 250 | 5.0 | 260 | 4.7 | 270 | 5.2 | 270 | 4.5 | 270 | 3.3 | 280 | 3.7 | 280 | 4.5 | 285 | 3.6 | 300 | 4.0 | 280 | 3.3 | 3.5 | 9 |
| 235 | 3.6 | 245 | 4.3 | 230 | 4.6 | 230 | 4.6 | 225 | 3.6 | 235 | 2.8 | 225 | 2.6 | 205 | 3.5 | 190 | 2.9 | 205 | 0.5 | 210 | 1.1 | 200 | 1.6 | 2.8 | 10 |
| 220 | 5.8 | 225 | 7.0 | 230 | 5.8 | 225 | 5.1 | 230 | 4.6 | 240 | 4.6 | 225 | 4.0 | 225 | 4.4 | 230 | 3.2 | 240 | 2.5 | 245 | 3.2 | 245 | 2.0 | 2.8 | 11 |
| 335 | 1.7 | 305 | 0.7 | 285 | 1.0 | 300 | 1.0 | 275 | 1.0 | 270 | 0.9 | 50 | 2.8 | 355 | 5.3 | 355 | 4.8 | 350 | 5.2 | 350 | 4.9 | 350 | 4.4 | 2.2 | 12 |
| 20 | 4.0 | 10 | 3.3 | 15 | 4.0 | 15 | 3.9 | 15 | 3.7 | 15 | 4.4 | 50 | 3.7 | 85 | 5.0 | 105 | 3.2 | 100 | 3.0 | 100 | 2.8 | 110 | 1.2 | 4.0 | 13 |
| 100 | 2.8 | 95 | 3.0 | 95 | 2.0 | 95 | 2.4 | 110 | 1.8 | 130 | 1.2 | 140 | 3.5 | 190 | 2.9 | 180 | 1.8 | 175 | 0.9 | 185 | 1.2 | 220 | 0.8 | 1.4 | 14 |
| 245 | 4.4 | 260 | 4.4 | 250 | 3.7 | 265 | 3.7 | 265 | 4.1 | 270 | 3.3 | 265 | 2.2 | 275 | 2.7 | 215 | 0.9 | 210 | 2.2 | 220 | 2.5 | 210 | 2.0 | 2.5 | 15 |
| 320 | 2.6 | 340 | 4.0 | 350 | 3.5 | 355 | 3.2 | 355 | 3.4 | 15 | 3.9 | 10 | 2.4 | 5 | 1.5 | 5 | 1.1 | 50 | 3.9 | 90 | 3.3 | 80 | 4.9 | 2.3 | 16 |
| 70 | 7.0 | 75 | 6.3 | 75 | 6.3 | 75 | 5.7 | 65 | 6.0 | 70 | 5.7 | 75 | 5.2 | 80 | 5.4 | 80 | 4.9 | 70 | 6.5 | 65 | 4.9 | 70 | 4.8 | 5.2 | 17 |
| 40 | 6.5 | 90 | 6.3 | 75 | 4.7 | 45 | 6.2 | 40 | 6.2 | 30 | 7.9 | 20 | 6.5 | 15 | 1.8 | 10 | 4.4 | 10 | 3.6 | 10 | 3.6 | 5 | 4.2 | 5.6 | 18 |
| 5 | 4.3 | 20 | 6.2 | 30 | 6.4 | 55 | 6.1 | 30 | 7.4 | 85 | 3.1 | 60 | 1.4 | 45 | 1.8 | 15 | 2.8 | 30 | 4.0 | 20 | 3.3 | 15 | 3.0 | 4.3 | 19 |
| 35 | 3.3 | 25 | 4.5 | 30 | 3.4 | 20 | 3.7 | 20 | 3.8 | 40 | 4.1 | 40 | 3.9 | 50 | 3.1 | 35 | 2.0 | 30 | 3.0 | 15 | 2.0 | 15 | 1.8 | 3.7 | 20 |
| 20 | 4.5 | 15 | 6.3 | 15 | 6.1 | 15 | 5.5 | 15 | 4.9 | 15 | 5.0 | 30 | 5.2 | 25 | 3.0 | 15 | 2.3 | 355 | 1.6 | 345 | 1.3 | 330 | 0.9 | 4.0 | 21 |
| 345 | 2.7 | 325 | 2.0 | 340 | 1.7 | 330 | 2.3 | 335 | 2.5 | 355 | 2.5 | 10 | 1.0 | 105 | 0.3 | 210 | 0.5 | 200 | 0.7 | 105 | 0.4 | 120 | 0.4 | 1.4 | 22 |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

515. RICHMOND (Kew Observatory): Dines Anemograph from Jan., 1926.

H_a (height of vane of anemograph above M.S.L.) = Height of ground above

Table with columns for Hour G. M. T., Day, and wind speed ranges from 0-1 to 11-12. Each range includes two columns for direction and speed in m/s.

516. RICHMOND (Kew Observatory): H_a = 5 metres + 23 metres.

Table with columns for Day and wind speed ranges from 0-1 to 11-12. Each range includes two columns for direction and speed in m/s.

WIND: DIRECTION AND SPEED.

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 5 metres + 23 metres.

MAY, 1933.

Table with columns for days (12-13 to 23-24), Mean, and Day. Each day column contains wind speed data in degrees and m/s. Includes a summary row at the bottom.

JUNE, 1933.

Table with columns for days (12-13 to 23-24), Mean, and Day. Each day column contains wind speed data in degrees and m/s. Includes a summary row at the bottom.

517. RICHMOND (Kew Observatory):
Dines Anemograph from Jan., 1926.

H_a (height of vane of anemograph above M.S.L.) = Height of ground above

| Hour G. M. T. | 0 - 1 | | 1 - 2 | | 2 - 3 | | 3 - 4 | | 4 - 5 | | 5 - 6 | | 6 - 7 | | 7 - 8 | | 8 - 9 | | 9 - 10 | | 10 - 11 | | 11 - 12 | |
|------------------|-------|-----|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|-----|--------|-----|---------|-----|---------|-----|
| | ° | 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 | 265 | 0.2 | 265 | 0.2 | 265 | 0.3 | 250 | 0.4 | 250 | 0.2 | 275 | 0.3 | 260 | 0.5 | 290 | 0.8 | 305 | 1.4 | 315 | 2.2 | 305 | 2.8 | 315 | 1.9 |
| 2 | 360 | 0.9 | 20 | 0.9 | 355 | 1.2 | 15 | 3.1 | 30 | 3.4 | 45 | 3.0 | 50 | 2.7 | 60 | 4.4 | 40 | 4.9 | 45 | 4.4 | 50 | 5.1 | 65 | 5.0 |
| 3 | 115 | 0.5 | 230 | 0.2 | 305 | 0.2 | 315 | 0.5 | 315 | 0.1 | 240 | 0.1 | 210 | 0.2 | 185 | 0.1 | 55 | 1.4 | 65 | 4.4 | 70 | 4.0 | 55 | 4.0 |
| 4 | --- | 0.0 | --- | 0.0 | 120 | 0.1 | --- | 0.0 | --- | 0.0 | --- | 0.0 | 120 | 0.2 | 125 | 0.6 | 105 | 0.8 | 200 | 0.9 | 90 | 2.0 | 60 | 1.6 |
| 5 | --- | 0.0 | 140 | 0.1 | 115 | 0.3 | 100 | 0.7 | 100 | 0.9 | 95 | 1.3 | 95 | 2.8 | 85 | 3.9 | 80 | 6.0 | 75 | 6.7 | 80 | 6.8 | 85 | 6.3 |
| 6 | 90 | 4.3 | 90 | 4.0 | 90 | 3.8 | 100 | 3.2 | 95 | 3.9 | 95 | 4.5 | 90 | 5.2 | 100 | 4.0 | 95 | 5.9 | 85 | 5.7 | 90 | 6.1 | 80 | 6.6 |
| 7 | 65 | 3.0 | 65 | 2.7 | 60 | 1.5 | 65 | 1.8 | 65 | 1.6 | 65 | 2.5 | 75 | 2.5 | 85 | 3.0 | 90 | 2.1 | 165 | 3.3 | 210 | 5.0 | 225 | 6.8 |
| 8 | 195 | 3.5 | 200 | 3.2 | 190 | 3.5 | 195 | 4.1 | 195 | 3.2 | 195 | 3.1 | 210 | 4.4 | 225 | 4.9 | 190 | 5.0 | 200 | 5.2 | 190 | 5.8 | 185 | 6.1 |
| 9 | 205 | 2.7 | 155 | 2.5 | 185 | 2.8 | 205 | 2.1 | 210 | 2.6 | 220 | 2.5 | 240 | 3.0 | 240 | 3.5 | 240 | 3.3 | 225 | 5.2 | 225 | 5.7 | 230 | 5.5 |
| 10 | 210 | 5.8 | 205 | 6.5 | 200 | 5.9 | 195 | 6.8 | 190 | 5.0 | 190 | 5.0 | 190 | 5.4 | 190 | 5.2 | 190 | 4.5 | 200 | 5.2 | 205 | 5.9 | 205 | 6.6 |
| 11 | 220 | 3.3 | 210 | 4.7 | 215 | 4.5 | 215 | 4.6 | 210 | 5.0 | 215 | 5.1 | 215 | 4.6 | 225 | 6.6 | 230 | 6.2 | 220 | 6.1 | 215 | 6.9 | 210 | 7.2 |
| 12 | 230 | 2.9 | 220 | 3.8 | 225 | 3.5 | 220 | 4.0 | 220 | 4.4 | 225 | 3.8 | 225 | 3.9 | 230 | 4.8 | 235 | 5.5 | 255 | 5.0 | 235 | 5.8 | 220 | 5.8 |
| 13 | 220 | 2.9 | 215 | 3.3 | 220 | 3.2 | 215 | 3.9 | 210 | 4.3 | 205 | 4.8 | 210 | 4.5 | 200 | 4.4 | 200 | 6.0 | 200 | 6.3 | 190 | 6.3 | 185 | 5.7 |
| 14 | 210 | 6.0 | 215 | 5.5 | 215 | 6.0 | 215 | 6.3 | 225 | 5.5 | 220 | 6.0 | 225 | 6.0 | 240 | 6.2 | 245 | 6.5 | 255 | 6.5 | 250 | 7.0 | 250 | 7.1 |
| 15 | 215 | 3.1 | 225 | 1.8 | 215 | 1.6 | 175 | 1.0 | 200 | 1.0 | 200 | 1.7 | 180 | 2.2 | 180 | 2.5 | 180 | 3.5 | 170 | 4.2 | 175 | 5.5 | 180 | 4.8 |
| 16 | 295 | 1.1 | 310 | 1.6 | 265 | 1.3 | 275 | 0.9 | 265 | 1.2 | 295 | 2.0 | 275 | 1.8 | 310 | 3.2 | 310 | 3.4 | 305 | 3.1 | 305 | 3.0 | 300 | 3.0 |
| 17 | 275 | 1.1 | 275 | 0.7 | 235 | 2.0 | 230 | 1.8 | 240 | 0.9 | 230 | 1.0 | 225 | 1.5 | 235 | 2.5 | 235 | 2.3 | 230 | 2.9 | 250 | 3.5 | 255 | 4.3 |
| 18 | 245 | 2.2 | 250 | 2.8 | 260 | 2.6 | 260 | 1.4 | 225 | 1.4 | 260 | 1.0 | 265 | 1.8 | 260 | 2.2 | 270 | 1.8 | 255 | 1.9 | 270 | 1.2 | 260 | 1.4 |
| 19 | 220 | 0.9 | 205 | 0.2 | 200 | 0.8 | 220 | 0.7 | 220 | 1.5 | 220 | 1.2 | 220 | 0.8 | 220 | 1.3 | 220 | 2.0 | 210 | 2.5 | 200 | 3.9 | 200 | 4.0 |
| 20 | 210 | 0.2 | 230 | 0.1 | 210 | 0.2 | 210 | 0.4 | 270 | 0.2 | 245 | 1.0 | 150 | 0.4 | 210 | 0.4 | 195 | 0.5 | 165 | 0.3 | 300 | 0.2 | 225 | 0.5 |
| 21 | 280 | 1.0 | 255 | 0.7 | 265 | 1.0 | 240 | 0.8 | 295 | 0.6 | 315 | 0.2 | 295 | 0.3 | 15 | 2.3 | 20 | 2.0 | 15 | 1.8 | 340 | 1.9 | 355 | 2.0 |
| 22 | 250 | 0.2 | 290 | 0.2 | 300 | 0.4 | 300 | 0.4 | 325 | 0.2 | 230 | 0.2 | --- | 0.0 | 60 | 0.1 | 40 | 0.5 | 80 | 0.4 | 55 | 1.0 | 120 | 0.9 |
| 23 | 215 | 0.1 | 210 | 0.2 | 210 | 0.3 | --- | 0.0 | 240 | 0.1 | 250 | 0.1 | 240 | 0.5 | 335 | 0.1 | 290 | 0.1 | 210 | 0.5 | 345 | 1.5 | 295 | 2.1 |
| 24 | 250 | 0.2 | 265 | 0.3 | 235 | 0.2 | 235 | 0.6 | 240 | 0.4 | 230 | 0.5 | 245 | 0.3 | 235 | 0.5 | 240 | 0.8 | 230 | 1.8 | 225 | 3.3 | 270 | 2.5 |
| 25 | 225 | 1.2 | 225 | 1.4 | 240 | 1.3 | 255 | 1.0 | 235 | 2.3 | 235 | 2.2 | 245 | 1.8 | 245 | 3.3 | 255 | 3.9 | 260 | 4.0 | 265 | 2.8 | 275 | 2.5 |
| 26 | 230 | 1.0 | 225 | 1.5 | 235 | 1.4 | 215 | 0.7 | 235 | 0.6 | 235 | 0.9 | 235 | 2.0 | 225 | 2.2 | 230 | 2.5 | 220 | 2.4 | 245 | 2.5 | 245 | 2.7 |
| 27 | 80 | 1.4 | 55 | 1.0 | 45 | 1.9 | 40 | 2.3 | 65 | 2.5 | 60 | 2.0 | 70 | 2.9 | 70 | 3.0 | 85 | 2.5 | 85 | 2.6 | 165 | 4.8 | 205 | 6.8 |
| 28 | 320 | 5.5 | 305 | 5.0 | 300 | 2.6 | 290 | 2.2 | 280 | 1.7 | 265 | 2.1 | 280 | 3.0 | 285 | 4.2 | 280 | 3.2 | 280 | 4.1 | 270 | 4.1 | 250 | 5.5 |
| 29 | 230 | 3.8 | 230 | 3.8 | 230 | 4.2 | 225 | 4.3 | 225 | 3.0 | 220 | 3.4 | 225 | 4.0 | 220 | 3.5 | 230 | 3.0 | 220 | 3.2 | 255 | 3.4 | 280 | 4.6 |
| 30 | 275 | 1.4 | 280 | 2.5 | 275 | 2.1 | 270 | 2.4 | 275 | 2.4 | 285 | 1.1 | 265 | 1.8 | 310 | 2.0 | 305 | 3.4 | 300 | 2.5 | 255 | 1.5 | 250 | 2.4 |
| 31 | 210 | 6.1 | 210 | 6.9 | 210 | 8.4 | 210 | 8.0 | 220 | 10.0 | 240 | 8.8 | 235 | 8.5 | 245 | 7.5 | 250 | 7.5 | 250 | 8.7 | 260 | 7.9 | 255 | 6.7 |
| Mean | --- | 2.1 | --- | 2.2 | --- | 2.2 | --- | 2.3 | --- | 2.3 | --- | 2.3 | --- | 2.6 | --- | 3.0 | --- | 3.3 | --- | 3.7 | --- | 4.1 | --- | 4.3 |

518. RICHMOND (Kew Observatory): H_a = 5 metres + 23 metres.

| Day | ° | 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 | 290 | 5.2 | 295 | 4.5 | 310 | 5.3 | 315 | 6.2 | 305 | 5.2 | 305 | 5.1 | 305 | 5.2 | 285 | 4.8 | 295 | 5.0 | 315 | 6.0 | 320 | 5.0 | 315 | 5.0 |
| 2 | 260 | 0.9 | 250 | 1.1 | 260 | 1.2 | 240 | 1.7 | 230 | 1.4 | 235 | 1.5 | 235 | 1.4 | 225 | 1.1 | 270 | 3.0 | 265 | 3.4 | 265 | 4.2 | 285 | 3.9 |
| 3 | 360 | 1.2 | 325 | 0.5 | 345 | 0.2 | 280 | 0.1 | 285 | 0.2 | 275 | 0.5 | 290 | 0.5 | 345 | 1.2 | 20 | 2.8 | 20 | 3.1 | 15 | 2.5 | 20 | 2.0 |
| 4 | 335 | 0.2 | --- | 0.0 | 25 | 0.1 | 305 | 0.2 | 310 | 0.1 | 310 | 0.1 | --- | 0.0 | --- | 0.0 | 40 | 2.2 | 60 | 3.4 | 90 | 4.3 | 85 | 4.4 |
| 5 | 100 | 1.8 | 90 | 1.9 | 65 | 2.0 | 50 | 0.8 | 75 | 0.2 | 90 | 0.3 | 85 | 3.0 | 85 | 3.2 | 85 | 2.9 | 70 | 3.0 | 80 | 3.5 | 95 | 4.5 |
| 6 | 70 | 1.4 | 65 | 1.3 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | 250 | 0.2 | 160 | 1.1 | 180 | 2.2 |
| 7 | 345 | 0.3 | 345 | 0.2 | 325 | 0.1 | 280 | 0.3 | 285 | 0.5 | 280 | 0.4 | 320 | 0.3 | 340 | 0.2 | 200 | 0.1 | 260 | 0.9 | 270 | 2.9 | 265 | 4.0 |
| 8 | 255 | 1.8 | 240 | 2.1 | 225 | 2.5 | 225 | 2.2 | 235 | 2.3 | 235 | 2.2 | 245 | 2.6 | 265 | 2.9 | 270 | 3.3 | 285 | 3.7 | 275 | 3.5 | 265 | 4.8 |
| 9 | 260 | 1.3 | 260 | 1.4 | 265 | 0.3 | 245 | 0.7 | 230 | 1.6 | 230 | 1.4 | 245 | 1.4 | 260 | 1.5 | 240 | 3.0 | 240 | 4.7 | 230 | 4.9 | 235 | 4.1 |
| 10 | 5 | 3.4 | 15 | 3.5 | 10 | 2.7 | 15 | 3.3 | 20 | 2.6 | 15 | 2.8 | 35 | 4.2 | 30 | 5.9 | 35 | 4.9 | 40 | 4.1 | 60 | 3.5 | 40 | 3.9 |
| 11 | 80 | 5.0 | 75 | 4.8 | 80 | 6.3 | 80 | 6.4 | 75 | 5.1 | 50 | 3.3 | 60 | 3.6 | 70 | 5.0 | 75 | 4.5 | 80 | 7.5 | 70 | 8.2 | 75 | 6.8 |
| 12 | 35 | 3.8 | 30 | 4.3 | 30 | 5.2 | 35 | 5.1 | 35 | 5.0 | 50 | 5.4 | 55 | 4.9 | 45 | 5.7 | 50 | 5.4 | 50 | 5.5 | 50 | 4.8 | 45 | 5.0 |
| 13 | 90 | 2.3 | 95 | 1.9 | 85 | 1.7 | 90 | 2.0 | 90 | 1.0 | 90 | 2.0 | 100 | 2.5 | 110 | 3.1 | 125 | 4.9 | 110 | 6.0 | 115 | 5.2 | 120 | 5.2 |
| 14 | 15 | 0.7 | 5 | 1.2 | 60 | 1.3 | 85 | 1.1 | 160 | 1.9 | 30 | 2.1 | 45 | 3.8 | 105 | 3.9 | 60 | 1.2 | 25 | 1.2 | 85 | 0.7 | 70 | 1.7 |
| 15 | 230 | 2.3 | 225 | 2.2 | 220 | 1.9 | 220 | 2.9 | 215 | 3.0 | 225 | 2.6 | 225 | 3.8 | 220 | 4.9 | 220 | 5.8 | 210 | 4.9 | 220 | 5.2 | 225 | 6.6 |
| 16 | 235 | 1.7 | 230 | 1.7 | 235 | 1.6 | 225 | 2.1 | 255 | 1.3 | 265 | 1.1 | 250 | 0.9 | 270 | 1.6 | 315 | 1.8 | 320 | 2.0 | 340 | 2.0 | 310 | 2.0 |
| 17 | 215 | 1.1 | 210 | 1.4 | 215 | 1.9 | 230 | 2.0 | 225 | 1.4 | 225 | 2.0 | 230 | 3.0 | 235 | 3.6 | 230 | 4.7 | 230 | 5.0 | 230 | 6.5 | 225 | 7.3 |
| 18 | 220 | 5.5 | 245 | 4.9 | 250 | 4.9 | 240 | 4.1 | 235 | 4.2 | 235 | 3.2 | 240 | 3.5 | 240 | 3.8 | 250 | 4.8 | 255 | 4.8 | 255 | 4.6 | 245 | 5.6 |
| 19 | 235 | 3.0 | 230 | 3.4 | 225 | 3.3 | 230 | 2.8 | 230 | 2.4 | 235 | 2.2 | 230 | 3.0 | 245 | 3.8 | 250 | 3.6 | 245 | 3.7 | 250 | 4.2 | 245 | 5.0 |
| 20 | 270 | 1.7 | 250 | 1.5 | 260 | 2.4 | 265 | 2.1 | 235 | 2.5 | 245 | 2.5 | 255 | 3.6 | 265 | 4.1 | 265 | 5.3 | 280 | 4.3 | 260 | 6.0 | 260 | 6.0 |
| 21 | 225 | 3.2 | 225 | 3.3 | 220 | 3.0 | 225 | 3.5 | 225 | 3.0 | 230 | 2.7 | 235 | 3.5 | 250 | 3.4 | 255 | 4.3 | 260 | 4.3 | 270 | 5.0 | 260 | 5.3 |
| 22 | 275 | 2.2 | 265 | 1.9 | 250 | 1.5 | 250 | 1.8 | 250 | 1.9 | 235 | 1.6 | 235 | 1.7 | 240 | 2.5 | 270 | 3.5 | 275 | 3.6 | 270 | 3.7 | 270 | 3.5 |
| 23 | 175 | 3.0 | 240 | 2.1 | 265 | 2.9 | 275 | 3.4 | 335 | 5.2 | 340 | 3.5 | 320 | 2.8 | 320 | 3.5 | 315 | 4.5 | 325 | 4.6 | 310 | 4.7 | 300 | 5.0 |
| 24 | 245 | 1.5 | 245 | 1.1 | 230 | 1.1 | 240 | 1.3 | 225 | 1.3 | 220 | 0.2 | 220 | 0.6 | 240 | 1.0 | 290 | 0.8 | 280 | 0.7 | 270 | 2.3 | 295 | 2.1 |
| 25 | 210 | 0.7 | 205 | 0.5 | 200 | 0.6 | 220 | 0.3 | 210 | 0.4 | 230 | 1.1 | 220 | 1.8 | 225 | 1.9 | 245 | 2.2 | 265 | 1.8 | 245 | 2.0 | 255 | 1.0 |
| 26 | 240 | 0.2 | 205 | 0.3 | --- | 0.0 | --- | 0. | | | | | | | | | | | | | | | | |

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 5 metres + 23 metres.

JULY, 1933.

Table with 23 columns (12-13 to Mean) and 33 rows of wind speed data for July 1933. Includes a summary row at the bottom with values like 4.7, 4.6, 4.6, 4.7, 4.6, 4.6, 4.7, 4.6, 4.2, 3.6, 3.2, 3.0, 2.6, 2.5, 3.4.

AUGUST, 1933.

Table with 23 columns (12-13 to Mean) and 33 rows of wind speed data for August 1933. Includes a summary row at the bottom with values like 4.1, 4.5, 4.5, 4.6, 4.5, 4.5, 4.7, 4.0, 3.0, 2.6, 2.4, 2.1, 2.0, 3.1.

WIND: DIRECTION AND SPEED. Direction expressed in degrees from North (E = 90°, S = 180°, W = 270°, N = 360°). Speed in metres per second

519. RICHMOND (Kew Observatory): Dines Anemograph from Jan., 1926.

H_a (height of vane of anemograph above M.S.L.) = Height of ground above

Table with 24 columns (Hour G. M. T., 0-1, 1-2, ..., 11-12) and 30 rows (Day 1-30). Each cell contains two values for wind speed in m/s.

520. RICHMOND (Kew Observatory): H_a = 5 metres + 23 metres.

Table with 24 columns (Hour G. M. T., 0-1, 1-2, ..., 11-12) and 31 rows (Day 1-31). Each cell contains two values for wind speed in m/s.

WIND: DIRECTION AND SPEED.

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 5 metres + 23 metres.

SEPTEMBER, 1933.

Table with columns for dates (12-13 to 23-24), Mean, and Day. Each date column contains two columns of wind speed data in degrees and m/s. The table covers the month of September 1933.

OCTOBER, 1933.

Table with columns for dates (12-13 to 23-24), Mean, and Day. Each date column contains two columns of wind speed data in degrees and m/s. The table covers the month of October 1933.

WIND: DIRECTION AND SPEED.

Direction expressed in degrees from North (E = 90°, S = 180°, W = 270°, N = 360°). Speed in metres per second

521. RICHMOND (Kew Observatory):
Dines Anemograph from Jan., 1926.

H_a (height of vane of anemograph above M.S.L.) = Height of ground above

Table with 12 columns for hours (0-1 to 11-12) and 30 rows for days (1-30). Each cell contains wind speed data in degrees and m/s. Includes a 'Mean' row at the bottom.

522. RICHMOND (Kew Observatory): H_a = 5 metres + 25 metres.

Table with 12 columns for hours (0-1 to 11-12) and 31 rows for days (1-31). Each cell contains wind speed data in degrees and m/s. Includes 'Mean' and 'Annual Mean' rows at the bottom.

WIND: DIRECTION AND SPEED.

Averages for periods of sixty minutes, ending at the exact hours, Greenwich Mean Time.

M.S.L. + h_a (height of anemograph above ground) = 5 metres + 23 metres.

NOVEMBER, 1933.

| 12 - 13 | | 13 - 14 | | 14 - 15 | | 15 - 16 | | 16 - 17 | | 17 - 18 | | 18 - 19 | | 19 - 20 | | 20 - 21 | | 21 - 22 | | 22 - 23 | | 23 - 24 | | Mean | Day |
|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|------|-----|
| ° | m/s | ° | m/s | ° | m/s | ° | m/s | ° | m/s | ° | m/s | ° | m/s | ° | m/s | ° | m/s | ° | m/s | ° | m/s | ° | m/s | | |
| 290 | 6.5 | 300 | 6.0 | 295 | 6.0 | 275 | 3.7 | 255 | 3.4 | 260 | 5.0 | 265 | 5.6 | 270 | 6.1 | 265 | 5.4 | 270 | 5.5 | 275 | 5.4 | 270 | 5.2 | 4.8 | 1 |
| 310 | 7.4 | 310 | 7.5 | 295 | 5.2 | 305 | 6.6 | 305 | 5.0 | 295 | 4.0 | 295 | 5.6 | 280 | 3.8 | 290 | 4.5 | 315 | 6.4 | 325 | 6.4 | 335 | 5.6 | 5.3 | 2 |
| 340 | 7.0 | 335 | 5.2 | 340 | 5.0 | 330 | 4.0 | 325 | 3.6 | 340 | 3.4 | 355 | 5.0 | 355 | 3.7 | 350 | 3.2 | 340 | 2.5 | 350 | 3.2 | 350 | 3.2 | 4.8 | 3 |
| 5 | 5.2 | 360 | 4.8 | 360 | 5.4 | 5 | 4.0 | 355 | 3.1 | 355 | 3.5 | 355 | 3.5 | 360 | 3.5 | 355 | 3.2 | 360 | 3.7 | 355 | 3.8 | 350 | 3.8 | 4.1 | 4 |
| 5 | 3.2 | 355 | 3.5 | 360 | 3.0 | 355 | 2.2 | 350 | 2.1 | 345 | 1.6 | 330 | 1.2 | 320 | 1.2 | 270 | 0.8 | 245 | 1.1 | 245 | 1.3 | 240 | 1.0 | 1.8 | 5 |
| 275 | 3.3 | 270 | 2.3 | 270 | 1.9 | 260 | 1.5 | 245 | 1.8 | 255 | 1.9 | 255 | 1.8 | 260 | 1.8 | 260 | 1.6 | 240 | 1.7 | 245 | 1.3 | 240 | 1.2 | 1.7 | 6 |
| 20 | 3.0 | 15 | 3.3 | 15 | 3.6 | 15 | 3.5 | 15 | 3.9 | 15 | 3.8 | 15 | 3.6 | 10 | 2.8 | 10 | 2.7 | 30 | 2.5 | 30 | 3.2 | 40 | 4.6 | 2.4 | 7 |
| 55 | 1.3 | 65 | 1.2 | 75 | 0.6 | 110 | 0.1 | --- | 0.0 | --- | 0.0 | 205 | 0.8 | 240 | 0.3 | 215 | 0.7 | 225 | 0.7 | 205 | 0.3 | 205 | 0.6 | 1.3 | 8 |
| 185 | 2.6 | 180 | 2.3 | 180 | 1.9 | 175 | 1.8 | 170 | 1.4 | 180 | 1.1 | 235 | 0.3 | 185 | 0.8 | 165 | 0.2 | 185 | 0.5 | 185 | 0.9 | 200 | 0.6 | 0.8 | 9 |
| 320 | 5.2 | 305 | 4.5 | 310 | 3.4 | 295 | 2.6 | 290 | 2.2 | 300 | 0.8 | 280 | 1.9 | 280 | 2.4 | 290 | 2.0 | 305 | 1.8 | 310 | 1.9 | 315 | 1.5 | 2.4 | 10 |
| 320 | 2.1 | 320 | 2.2 | 335 | 1.1 | 315 | 0.5 | 290 | 0.1 | 250 | 0.9 | 250 | 0.7 | 250 | 1.1 | 250 | 0.7 | 250 | 0.2 | 240 | 0.4 | 240 | 0.2 | 1.1 | 11 |
| 350 | 3.5 | 10 | 4.8 | 5 | 5.2 | 360 | 5.0 | 340 | 2.8 | 335 | 2.0 | 320 | 2.1 | 310 | 1.5 | 280 | 1.4 | 260 | 1.0 | 235 | 1.2 | 245 | 1.0 | 2.1 | 12 |
| 200 | 0.7 | 170 | 1.4 | 200 | 2.0 | 200 | 2.4 | 185 | 3.0 | 185 | 3.2 | 170 | 2.9 | 180 | 2.9 | 215 | 2.5 | 265 | 2.2 | 285 | 2.5 | 300 | 3.0 | 1.8 | 13 |
| 250 | 2.4 | 240 | 2.5 | 260 | 1.7 | 230 | 1.3 | 190 | 1.4 | 175 | 1.8 | 165 | 1.4 | 170 | 2.8 | 165 | 3.0 | 145 | 1.8 | 140 | 2.6 | 140 | 2.7 | 1.9 | 14 |
| 265 | 5.0 | 265 | 4.2 | 260 | 3.0 | 245 | 2.4 | 240 | 1.2 | 200 | 1.1 | 185 | 1.3 | 180 | 1.0 | 205 | 0.4 | 210 | 0.6 | 360 | 0.6 | 65 | 0.2 | 3.2 | 15 |
| 65 | 3.3 | 40 | 4.2 | 30 | 3.8 | 20 | 3.8 | 25 | 4.3 | 30 | 4.9 | 25 | 5.7 | 30 | 5.5 | 30 | 5.2 | 35 | 5.2 | 35 | 5.3 | 35 | 5.6 | 2.9 | 16 |
| 25 | 6.9 | 20 | 6.6 | 20 | 6.3 | 25 | 6.0 | 20 | 5.2 | 15 | 5.2 | 15 | 5.6 | 25 | 5.0 | 25 | 5.4 | 30 | 5.5 | 30 | 5.5 | 30 | 5.2 | 5.3 | 17 |
| 60 | 1.3 | 95 | 2.8 | 85 | 3.4 | 75 | 3.6 | 80 | 3.6 | 75 | 3.0 | 65 | 3.0 | 70 | 3.0 | 80 | 2.8 | 75 | 1.6 | 60 | 2.6 | 75 | 2.5 | 3.3 | 18 |
| 65 | 3.0 | 80 | 3.0 | 80 | 3.0 | 80 | 3.3 | 75 | 3.5 | 80 | 3.4 | 75 | 3.0 | 90 | 2.3 | 110 | 2.0 | 140 | 2.7 | 145 | 2.4 | 140 | 2.3 | 3.5 | 19 |
| 340 | 0.3 | 360 | 0.7 | 35 | 1.4 | 60 | 2.5 | 45 | 1.9 | 40 | 2.5 | 40 | 3.0 | 45 | 2.9 | 45 | 3.5 | 35 | 3.4 | 20 | 3.5 | 30 | 3.8 | 1.8 | 20 |
| 25 | 3.8 | 20 | 3.3 | 25 | 3.2 | 15 | 3.4 | 30 | 3.3 | 15 | 3.4 | 30 | 2.2 | 10 | 1.4 | 340 | 1.5 | 340 | 1.5 | 335 | 1.5 | 355 | 1.6 | 3.7 | 21 |
| 310 | 2.8 | 310 | 2.7 | 320 | 2.4 | 315 | 2.4 | 315 | 2.2 | 320 | 2.3 | 325 | 2.3 | 320 | 1.9 | 310 | 1.5 | 315 | 2.0 | 315 | 2.0 | 320 | 1.2 | 1.7 | 22 |
| 340 | 2.9 | 350 | 3.2 | 355 | 3.5 | 355 | 3.0 | 340 | 2.0 | 330 | 2.0 | 320 | 1.5 | 280 | 1.3 | 280 | 1.7 | 290 | 1.3 | 295 | 1.6 | 270 | 1.8 | 2.3 | 23 |
| 350 | 6.0 | 355 | 6.5 | 350 | 5.3 | 355 | 5.8 | 355 | 5.8 | 355 | 6.1 | 355 | 4.6 | 355 | 4.4 | 355 | 5.0 | 360 | 5.2 | 355 | 5.0 | 355 | 4.9 | 4.5 | 24 |
| 15 | 7.3 | 25 | 7.2 | 15 | 5.5 | 15 | 4.6 | 15 | 4.8 | 15 | 4.9 | 15 | 4.3 | 20 | 4.8 | 20 | 5.0 | 20 | 5.2 | 20 | 5.1 | 20 | 4.9 | 5.5 | 25 |
| 15 | 4.5 | 15 | 5.0 | 10 | 4.3 | 360 | 3.9 | 360 | 3.0 | 15 | 2.9 | 5 | 2.5 | 15 | 3.0 | 15 | 2.5 | 20 | 2.0 | 36 | 2.4 | 30 | 1.4 | 3.7 | 26 |
| 200 | 0.5 | 240 | 0.1 | 20 | 0.2 | 35 | 1.9 | 60 | 1.6 | 35 | 1.9 | 30 | 2.3 | 45 | 2.6 | 30 | 2.5 | 30 | 2.2 | 15 | 1.2 | 355 | 1.4 | 1.5 | 27 |
| 110 | 3.0 | 110 | 3.6 | 100 | 3.3 | 100 | 3.2 | 110 | 4.0 | 105 | 4.5 | 115 | 3.8 | 100 | 3.2 | 100 | 4.7 | 100 | 4.0 | 100 | 4.3 | 110 | 3.4 | 2.9 | 28 |
| 95 | 6.0 | 90 | 6.3 | 90 | 6.2 | 90 | 5.4 | 85 | 6.1 | 75 | 6.4 | 75 | 6.2 | 75 | 6.1 | 85 | 5.6 | 90 | 5.0 | 100 | 2.3 | 105 | 2.4 | 4.9 | 29 |
| 160 | 3.0 | 130 | 3.3 | 125 | 3.0 | 115 | 2.4 | 110 | 2.5 | 135 | 2.0 | 145 | 1.8 | 175 | 1.1 | 155 | 1.8 | 140 | 2.0 | 140 | 1.3 | 125 | 0.8 | 1.6 | 30 |
| --- | 3.8 | --- | 3.8 | --- | 3.5 | --- | 3.2 | --- | 3.0 | --- | 3.0 | --- | 3.0 | --- | 2.8 | --- | 2.6 | --- | 2.7 | --- | 2.7 | --- | 2.6 | 3.0 | |

DECEMBER and Year, 1933.

| ° | 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 |
|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|-----|------|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|
| 115 | 5.5 | 115 | 5.2 | 115 | 6.5 | 110 | 5.6 | 105 | 5.0 | 95 | 5.3 | 95 | 4.9 | 95 | 5.0 | 95 | 5.2 | 95 | 6.1 | 95 | 5.5 | 90 | 5.0 | 4.6 | 1 | | | | | | | | | | | | | | |
| 90 | 7.1 | 80 | 7.2 | 65 | 7.8 | 60 | 7.4 | 45 | 6.6 | 40 | 6.5 | 50 | 7.3 | 65 | 8.4 | 60 | 9.0 | 65 | 9.0 | 65 | 9.4 | 60 | 7.6 | 6.9 | 2 | | | | | | | | | | | | | | |
| 45 | 10.3 | 45 | 10.0 | 50 | 9.8 | 45 | 9.4 | 40 | 9.6 | 45 | 8.9 | 45 | 8.5 | 40 | 7.9 | 40 | 7.5 | 40 | 8.3 | 40 | 8.1 | 40 | 8.0 | 9.0 | 3 | | | | | | | | | | | | | | |
| 55 | 11.4 | 65 | 9.8 | 60 | 9.8 | 70 | 9.5 | 65 | 9.0 | 70 | 7.5 | 70 | 7.4 | 65 | 8.4 | 80 | 5.6 | 85 | 6.8 | 85 | 4.9 | 90 | 3.8 | 8.1 | 4 | | | | | | | | | | | | | | |
| 40 | 4.0 | 40 | 4.5 | 35 | 5.0 | 40 | 5.1 | 40 | 5.0 | 45 | 5.1 | 45 | 4.8 | 45 | 3.4 | 25 | 2.5 | 30 | 2.5 | 20 | 2.0 | 360 | 2.4 | 4.2 | 5 | | | | | | | | | | | | | | |
| 220 | 0.6 | 200 | 0.9 | 230 | 0.1 | 265 | 0.2 | 280 | 0.6 | 325 | 0.9 | 340 | 1.0 | 5 | 1.3 | 20 | 1.4 | 320 | 0.3 | 220 | 0.7 | 230 | 0.7 | 1.1 | 6 | | | | | | | | | | | | | | |
| 35 | 1.4 | 45 | 5.0 | 50 | 6.0 | 65 | 8.4 | 70 | 8.0 | 70 | 8.0 | 70 | 7.4 | 60 | 6.3 | 50 | 6.0 | 50 | 5.2 | 60 | 6.6 | 55 | 7.2 | 3.7 | 7 | | | | | | | | | | | | | | |
| 45 | 6.2 | 50 | 9.0 | 55 | 10.1 | 50 | 9.9 | 50 | 8.9 | 50 | 9.5 | 40 | 7.3 | 35 | 6.2 | 45 | 6.3 | 60 | 9.4 | 65 | 9.9 | 70 | 9.5 | 8.0 | 8 | | | | | | | | | | | | | | |
| 55 | 6.2 | 55 | 6.4 | 30 | 5.8 | 55 | 6.1 | 40 | 6.3 | 35 | 5.6 | 35 | 5.5 | 40 | 6.0 | 35 | 5.9 | 45 | 5.9 | 45 | 4.4 | 35 | 5.2 | 5.9 | 9 | | | | | | | | | | | | | | |
| 40 | 4.4 | 40 | 5.2 | 35 | 5.5 | 40 | 5.5 | 40 | 5.7 | 40 | 6.4 | 40 | 6.5 | 40 | 6.2 | 40 | 6.6 | 40 | 6.9 | 50 | 6.3 | 40 | 5.2 | 5.0 | 10 | | | | | | | | | | | | | | |
| 15 | 3.4 | 355 | 3.9 | 355 | 2.8 | 355 | 2.9 | 360 | 2.5 | 325 | 1.3 | 315 | 1.1 | 270 | 1.1 | 245 | 1.1 | 245 | 1.6 | 235 | 1.4 | 230 | 1.7 | 3.0 | 11 | | | | | | | | | | | | | | |
| 80 | 2.3 | 70 | 2.5 | 70 | 4.5 | 70 | 4.8 | 60 | 4.5 | 50 | 4.3 | 50 | 5.2 | 50 | 4.9 | 50 | 5.1 | 50 | 5.2 | 50 | 5.1 | 60 | 5.8 | 2.7 | 12 | | | | | | | | | | | | | | |
| 50 | 12.4 | 45 | 12.8 | 45 | 13.6 | 40 | 13.4 | 40 | 13.2 | 40 | 12.6 | 40 | 11.9 | 40 | 12.0 | 40 | 11.3 | 45 | 10.1 | 40 | 10.9 | 40 | 9.9 | 10.7 | 13 | | | | | | | | | | | | | | |
| 45 | 9.8 | 40 | 8.8 | 40 | 7.9 | 30 | 6.4 | 25 | 4.4 | 10 | 3.5 | 5 | 2.4 | 345 | 0.8 | 300 | 1.0 | 260 | 1.3 | 250 | 1.5 | 250 | 1.7 | 6.5 | 14 | | | | | | | | | | | | | | |
| 25 | 7.5 | 25 | 6.6 | 15 | 6.1 | 20 | 6.5 | 15 | 5.0 | 15 | 4.8 | 10 | 4.0 | 15 | 4.4 | 15 | 4.0 | 10 | 2.9 | 360 | 3.0 | 5 | 3.4 | 5.4 | 15 | | | | | | | | | | | | | | |
| 35 | 3.0 | 25 | 2.7 | 25 | 3.5 | 20 | 2.2 | 360 | 1.4 | 350 | 1.5 | 355 | 0.9 | 340 | 0.8 | 340 | 0.4 | 295 | 0.2 | 160 | 0.2 | 335 | 1.0 | 1.9 | 16 | | | | | | | | | | | | | | |
| 40 | 1.0 | 10 | 1.3 | 40 | 3.8 | 50 | 4.6 | 40 | 3.5 | 60 | 3.8 | 60 | 3.8 | 80 | 3.9 | 70 | 4.0 | 60 | 3.7 | 50 | 3.8 | 60 | 3.4 | 2.5 | 17 | | | | | | | | | | | | | | |
| 95 | 3.8 | 105 | 2.5 | 130 | 2.8 | 125 | 0.9 | 60 | 0.5 | 340 | 1.0 | 5 | 1.5 | 330 | 1.0 | 220 | 0.4 | 265 | 0.2 | 265 | 0.2 | 230 | 0.4 | 1.5 | 18 | | | | | | | | | | | | | | |
| 230 | 1.2 | 235 | 1.3 | 235 | 0.9 | 245 | 0.8 | 250 | 0.4 | 225 | 0.7 | 270 | 0.4 | 250 | 0.3 | 220 | 0.6 | 230 | 0.8 | 230 | 1.0 | 260 | 0.8 | 0.8 | 19 | | | | | | | | | | | | | | |
| 310 | 2.1 | 310 | 1.5 | 315 | 0.9 | 310 | 0.8 | 310 | 0.9 | 325 | 1.6 | 330 | 1.9 | 320 | 1.6 | 300 | 0.9 | 280 | 1.4 | 300 | 1.2 | 310 | 1.5 | 1.0 | 20 | | | | | | | | | | | | | | |
| 235 | 2.1 | 240 | 2.1 | 240 | 2.2 | 220 | 1.8 | 240 | 1.9 | 235 | 1.0 | 240 | 0.4 | 220 | 0.5 | 175 | 0.6 | 155 | 0.4 | 190 | 0.3 | 280 | 0.2 | 1.4 | 21 | | | | | | | | | | | | | | |
| 235 | 2.4 | 225 | 3.7 | 220 | 3.5 | 230 | 3.0 | 230 | 2.8 | 240 | 1.5 | 225 | 1.4 | 215 | 1.9 | 230 | 1.9 | 225 | 1.5 | 220 | 1.4 | 210 | 1.5 | 1.5 | 22 | | | | | | | | | | | | | | |
| 240 | 2.0 | 225 | 2.5 | 225 | 2.9 | 235 | 2.2 | 230 | 1.9 | 230 | 1.6 | 215 | 1.5 | 210 | 1.6 | 195 | 2.5 | 185 | 2.8 | 190 | 2.6 | 210 | 2.0 | 1.6 | 23 | | | | | | | | | | | | | | |
| 240 | 1.5 | 265 | 1.5 | 240 | 1.0 | 235 | 1.0 | 225 | 0.9 | 235 | 0.7 | 225 | 0.8 | 230 | 1.8 | 250 | 2.3 | 265 | 3.0 | 225 | 2.6 | 230 | 2.6 | 1.6 | 24 | | | | | | | | | | | | | | |

523. RICHMOND (Kew Observatory): $H_a = 5$ metres + 23 metres.

1933.

| Day. | Jan. | | Feb. | | Mar. | | Apr. | | May. | | June | | July | | Aug. | | Sept. | | Oct. | | Nov. | | Dec. | |
|------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|
| | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. | Max. in a Gust. | Time of Gust. |
| | m/s | h. m. | m/s | h. m. | m/s | h. m. | m/s | h. m. | m/s | h. m. | m/s | h. m. | m/s | h. m. | m/s | h. m. | m/s | h. m. | m/s | h. m. | m/s | h. m. | m/s | h. m. |
| 1 | 17 | 13 30 | 22 | 9 35 | 12 | 16 45 | 12 | 18 5 | 13 | 23 45 | 11 | 16 5 | 9 | 19 35 | 15 | 2 55 | 10 | 17 5 | 10 | 4 35 | 15 | 11 10 | 12 | 21 35 |
| 2 | 23 | 23 10 | 14 | 13 55 | 12 | 12 15 | 15 | 17 40 | 20 | 12 30 | 11 | 11 0 | 10 | 8 35 | 11 | 14 25 | 9 | 12 30 | 13 | 7 25 | 17 | 11 50 | 19 | 19 55 |
| 3 | 24 | 0 40 | 13 | 20 20 | 18 | 12 15 | 13 | 11 30 | 13 | 17 5 | 15 | 10 10 | 9 | 10 35 | 7 | 14 50 | 7 | 20 25 | 11 | 10 10 | 15 | 13 5 | 21 | 12 35 |
| 4 | 16 | 22 40 | 16 | 6 45 | 19 | 13 25 | 9 | 18 25 | 12 | 13 30 | 13 | 11 10 | 9 | 17 5 | 10 | 17 35 | 10 | 15 40 | 7 | 12 0 | 16 | 14 0 | 19 | 12 45 |
| 5 | 23 | 4 0 | 22 | 14 55 | 19 | 23 55 | 9 | 10 25 | 13 | 16 15 | 9 | 18 10 | 13 | 21 30 | 10 | 19 55 | 12 | 17 20 | 5 | 20 45 | 7 | 2 55 | 11 | 2 50 |
| 6 | 12 | 2 15 | 13 | 6 55 | 19 | 7 15 | 7 | 17 30 | 18 | 16 45 | 11 | 14 10 | 12 | 11 50 | 10 | 17 10 | 11 | 15 30 | 10 | 11 50 | 7 | 12 35 | 4 | 0 50 |
| 7 | 14 | 23 20 | 17 | 15 0 | 17 | 17 30 | 10 | 15 15 | 14 | 15 10 | 15 | 12 5 | 16 | 16 5 | 14 | 12 45 | 18 | 10 45 | 6 | 12 20 | 10 | 17 45 | 15 | 23 30 |
| 8 | 13 | 21 20 | 16 | 16 55 | 9 | 15 0 | 11 | 14 25 | 12 | 16 15 | 15 | 13 30 | 14 | 9 45 | 12 | 11 35 | 18 | 15 40 | 13 | 12 20 | 9 | 0 45 | 21 | 21 55 |
| 9 | 15 | 9 55 | 17 | 4 5 | 12 | 9 30 | 12 | 13 20 | 18 | 13 45 | 15 | 19 40 | 16 | 15 5 | 13 | 11 20 | 20 | 9 30 | 16 | 22 30 | 6 | 12 25 | 17 | 1 30 |
| 10 | 7 | 20 15 | 16 | 19 5 | 13 | 16 15 | 9 | 15 0 | 14 | 10 50 | 16 | 8 35 | 15 | 12 35 | 13 | 19 50 | 18 | 16 20 | 23 | 12 55 | 12 | 12 30 | 14 | 20 35 |
| 11 | 14 | 19 25 | 18 | 13 5 | 11 | 15 50 | 13 | 13 40 | 9 | 15 50 | 14 | 16 40 | 16 | 14 35 | 15 | 10 20 | 13 | 10 15 | 25 | 7 35 | 7 | 13 15 | 10 | 2 25 |
| 12 | 11 | 2 10 | 8 | 13 10 | 7 | 16 5 | 14 | 19 50 | 9 | 18 0 | 13 | 16 30 | 17 | 14 20 | 13 | 5 35 | 12 | 14 50 | 14 | 14 5 | 12 | 14 5 | 11 | 22 0 |
| 13 | 7 | 22 35 | 18 | 9 40 | 7 | 14 45 | 11 | 7 20 | 7 | 20 30 | 11 | 3 20 | 17 | 19 30 | 11 | 12 5 | 12 | 22 40 | 11 | 14 10 | 7 | 17 5 | 26 | 13 15 |
| 14 | 6 | 17 20 | 15 | 15 40 | 12 | 11 15 | 8 | 11 30 | 11 | 6 50 | 12 | 15 15 | 17 | 15 40 | 7 | 7 30 | 17 | 11 55 | 14 | 11 5 | 7 | 0 10 | 19 | 1 5 |
| 15 | 15 | 12 15 | 13 | 12 40 | 14 | 20 20 | 11 | 12 20 | 11 | 13 50 | 12 | 19 15 | 14 | 11 0 | 16 | 16 30 | 8 | 13 10 | 12 | 23 0 | 11 | 12 25 | 17 | 15 10 |
| 16 | 11 | 17 50 | 9 | 1 25 | 21 | 16 5 | 9 | 13 20 | 9 | 13 30 | 11 | 23 45 | 21 | 12 20 | 10 | 17 30 | 10 | 13 25 | 17 | 14 30 | 13 | 22 0 | 8 | 0 50 |
| 17 | 7 | 13 25 | 11 | 14 35 | 24 | 1 55 | 13 | 3 5 | 9 | 18 40 | 22 | 13 50 | 15 | 14 5 | 19 | 14 20 | 13 | 14 50 | 10 | 9 30 | 14 | 12 35 | 9 | 15 55 |
| 18 | 7 | 12 10 | 15 | 15 35 | 14 | 18 25 | 16 | 19 10 | 7 | 6 20 | 15 | 16 10 | 8 | 1 20 | 15 | 15 40 | 11 | 2 55 | 7 | 15 0 | 12 | 2 30 | 8 | 0 10 |
| 19 | 9 | 0 40 | 19 | 13 55 | 25 | 22 5 | 16 | 16 20 | 10 | 12 0 | 14 | 14 50 | 11 | 13 15 | 12 | 16 0 | 12 | 15 40 | 13 | 9 40 | 12 | 7 25 | 3 | 11 20 |
| 20 | 11 | 8 20 | 8 | 20 5 | 20 | 3 55 | 17 | 13 40 | 15 | 10 10 | 13 | 15 30 | 8 | 16 20 | 13 | 14 35 | 13 | 13 35 | 21 | 12 20 | 8 | 23 50 | 4 | 18 35 |
| 21 | 11 | 11 10 | 19 | 19 25 | 11 | 10 15 | 17 | 17 15 | 8 | 17 10 | 9 | 15 50 | 10 | 18 50 | 14 | 13 10 | 12 | 19 20 | 14 | 11 30 | 11 | 3 55 | 6 | 9 15 |
| 22 | 10 | 14 45 | 20 | 14 0 | 14 | 15 35 | 8 | 10 30 | 9 | 17 20 | 11 | 19 20 | 8 | 17 5 | 12 | 15 0 | 12 | 9 45 | 7 | 11 55 | 6 | 12 15 | 9 | 13 50 |
| 23 | 6 | 23 45 | 14 | 6 5 | 17 | 16 50 | 15 | 14 15 | 15 | 17 50 | 13 | 17 20 | 7 | 17 30 | 14 | 15 20 | 11 | 16 55 | 5 | 21 50 | 9 | 10 10 | 7 | 13 25 |
| 24 | 19 | 19 40 | 22 | 12 30 | 14 | 16 50 | 10 | 14 30 | 11 | 8 5 | 9 | 18 45 | 10 | 17 40 | 10 | 17 55 | 8 | 0 25 | 15 | 18 0 | 15 | 13 30 | 6 | 21 25 |
| 25 | 17 | 9 25 | 19 | 9 30 | 10 | 13 55 | 10 | 9 5 | 18 | 7 35 | 11 | 23 30 | 8 | 13 10 | 7 | 15 5 | 8 | 16 35 | 19 | 14 5 | 16 | 13 40 | 7 | 21 25 |
| 26 | 13 | 12 20 | 16 | 14 45 | 6 | 12 15 | 13 | 15 20 | 13 | 9 5 | 11 | 4 10 | 8 | 12 35 | 8 | 12 35 | 12 | 15 30 | 22 | 13 35 | 11 | 11 15 | 6 | 1 55 |
| 27 | 14 | 14 0 | 17 | 12 0 | 10 | 10 30 | 12 | 14 25 | 11 | 13 10 | 10 | 13 30 | 21 | 15 10 | 12 | 15 40 | 12 | 5 5 | 13 | 16 55 | 6 | 19 30 | 9 | 23 40 |
| 28 | 12 | 21 5 | 10 | 10 40 | 7 | 13 40 | 11 | 16 25 | 10 | 8 30 | 12 | 16 30 | 16 | 19 35 | 13 | 15 30 | 13 | 8 20 | 14 | 12 35 | 11 | 20 10 | 12 | 3 5 |
| 29 | 14 | 15 55 | - | - | 12 | 16 5 | 15 | 11 20 | 11 | 12 25 | 10 | 10 5 | 14 | 16 15 | 11 | 17 55 | 11 | 19 10 | 16 | 6 10 | 13 | 14 15 | 9 | 0 20 |
| 30 | 10 | 13 55 | - | - | 18 | 13 40 | 8 | 15 25 | 10 | 17 15 | 10 | 16 35 | 13 | 22 35 | 11 | 18 0 | 11 | 20 30 | 14 | 13 25 | 7 | 11 15 | 15 | 17 35 |
| 31 | 16 | 18 45 | - | - | 14 | 16 55 | - | - | 10 | 13 11 | - | - | 21 | 9 10 | 10 | 18 10 | - | - | 16 | 14 15 | - | - | 12 | 5 35 |

DISTRIBUTION OF WIND SPEED: EXTREME VELOCITIES AS RECORDED BY THE DINES TUBE ANEMOGRAPH.

524. RICHMOND (Kew Observatory): $H_a = 5$ metres + 23 metres.

1933.

| Month. | DISTRIBUTION OF WIND SPEED. | | | | | | | | EXTREME VELOCITIES. | | | | | |
|-----------|-----------------------------|----------|-------------------|----------|-----------------|----------------|--------------------|------------|----------------------|--------|----------------------|---------------|---------------|--|
| | More than 17.1 m/s. | | 10.8 to 17.1 m/s. | | 5.5 to 10.7 m/s | 1.6 to 5.4 m/s | Less than 1.6 m/s. | No Record. | Highest Hourly Wind. | | | Highest Gust. | | |
| | Dates of Occurrence | Duration | No. of Days. | Duration | Duration | Duration | Duration | Duration | Veer from N. | Speed. | Mid. Time. | Speed. | Date. | |
| | hr. | | hr. | hr. | hr. | hr. | hr. | hr. | ° | m/s. | day. h. m. | m/s. | day. h. m. | |
| Jan. ... | --- | 0 | 3 | 14 | 207 | 399 | 124 | 0 | 205 | 13 | 3 30 | 24 | 3 0 40 | |
| Feb. ... | --- | 0 | 3 | 10 | 275 | 319 | 68 | 0 | 215 | 13 | 1 10 30 | 22 | 24 12 30 | |
| Mar. ... | --- | 0 | 3 | 10 | 228 | 379 | 127 | 0 | 190 | 13 | 17 3 30 | 25 | 19 22 5 | |
| Apr. ... | --- | 0 | 0 | 0 | 84 | 448 | 188 | 0 | 55 | 9 | 18 9 30 | 17 | 21 17 15 | |
| May. ... | --- | 0 | 1 | 1 | 76 | 429 | 238 | 0 | 70 | 12 | 2 11 30 | 20 | 2 12 30 | |
| June. ... | --- | 0 | 0 | 0 | 92 | 459 | 169 | 0 | { 80 20 | 8 | { 7 12 30 9 18 30 | 22 | 17 13 50 | |
| July. ... | --- | 0 | 0 | 0 | 165 | 389 | 190 | 0 | 220 | 10 | 31 4 30 | 21 | 27 15 10 | |
| Aug. ... | --- | 0 | 0 | 0 | 79 | 484 | 181 | 0 | 225 | 9 | 17 14 30 | 19 | 17 14 20 | |
| Sept. ... | --- | 0 | 1 | 6 | 121 | 441 | 152 | 0 | 85 | 13 | 9 9 30 | 20 | 9 9 30 | |
| Oct. ... | --- | 0 | 2 | 8 | 157 | 434 | 145 | 0 | 80 | 12 | 20 11 30 | 25 | 11 7 35 | |
| Nov. ... | --- | 0 | 0 | 0 | 69 | 449 | 202 | 0 | 15 | 8 | 25 11 30 | 17 | 2 11 50 | |
| Dec. ... | --- | 0 | 2 | 13 | 186 | 311 | 234 | 0 | 45 | 14 | 13 14 30 | 26 | 13 13 15 | |
| Year ... | --- | 0 | 15 | 62 | 1739 | 4941 | 2018 | 0 | 45 | 14 | Dec. 13 14 30 | 26 | Dec. 13 13 15 | |

525. RICHMOND (Kew Observatory) Readings in degrees absolute at 9h., Greenwich Mean Time.

1933.

Table with 24 columns (Month, Jan., Feb., Mar., Apr., May, June, July, Aug., Sept., Oct., Nov., Dec.) and 2 rows per month (30cm, 122cm). Data includes temperature readings in degrees absolute.

The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is written 75.0.

Year ... 83.8 84.2

MINIMUM TEMPERATURE "ON THE GRASS" DURING THE INTERVAL 18h. to 7h. G.M.T.

HEIGHT IN CM. ABOVE M.S.L. OF SURFACE OF UNDERGROUND WATER

526. RICHMOND (Kew Observatory) 1933. Readings in degrees absolute.

527. RICHMOND (Kew Observatory) 1933. To August daily Means; In Nov. & Dec. 9h. readings.

Table with 12 columns (Month, Jan., Feb., Mar., Apr., May, June, July, Aug., Sept., Oct., Nov., Dec.) and 2 rows per month (Day, °A). Data includes minimum temperature readings.

Table with 12 columns (Month, Jan., Feb., Mar., Apr., May, June, July, Aug., Sept., Oct., Nov., Dec.) and 2 rows per month (Day, cm.). Data includes height in cm. above M.S.L. of surface of underground water.

Year 76.8

The initial 2 or 3 of the readings is omitted, i.e., 275.0 degrees absolute is written 75.0. Note.- The minimum refers to the interval from 18h. the previous day to 7h. on the day to which it is entered.

Annual Mean = --- cms.

Extremes for the months:- Jan., 211, 201; Feb., 227, 206; Mar., 293, 225; April., 177, 216; May., 216, 190; June., 189, 171; July., 172, 160; Aug., 161, -; Sept., -, -; Oct., -, -; Nov., -, 146; Dec., 147, 141.

| Day. | Cloud Forms. | | | Cloud Amount (All Forms). | | | | | | Visibility. | | | | | | Precipitation. | | | | | Remarks on the Weather of the Day. | | | |
|------------------|----------------|-----------------|----------------|---------------------------|-----|-----|------|------|-----|-------------|----|-----|-----|-----|-----|----------------|-----|-----|-----|-----|------------------------------------|-----|--|-----|
| | 7h | 13h | 18h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | 15h | 18h | | 21h | | |
| 1 | Ci. | Stcu. Cunb. | St: Freus Ast. | 4 | 7 | 9 | - | 10 | 8 | K | 1 | i | - | 1 | J | ... | ... | ... | ... | ... | ... | ... | ... ⁰ early a : p ⁰ late a. | |
| 2 | St: Stcu. | Stcu. | Stcu. | 9 | 9 | 9 | 10 | 9 | 10 | K | J | H | i | K | J | ... | ... | ... | ... | ... | ... | ... | ... ⁰ early a. | |
| 3 | Stcu: Ast. | Stcu: Ast: Acu. | Ci. | 10 | 9 | 9 | 9 | 2 | 6 | J | i | J | J | J | J | ... | ... | ... | ... | ... | ... | ... | ... ⁰ early a. | |
| 4 | Cu: Stcu. | Stcu: Ci: Cist. | --- | 8 | 9 | 9 | 7 | 0 | 5 | J | H | J | J | J | J | ... | ... | ... | ... | ... | ... | ... | p ⁰ p. | |
| 5 | Nb. | Ast. | --- | 10 | 10 | 10 | 9 | 0 | 0 | J | J | H | i | G | G | ... | ... | ... | ... | ... | ... | ... | ... ⁰ early a : D U n. | |
| 6 | --- | Ci: Cist. | --- | 0 | 0 | 7 | 4 | 0 | 0 | J | J | H | i | G | G | ... | ... | ... | ... | ... | ... | ... | p ⁰ early a : D U m n. | |
| 7 | Acu. | Acu: Cist. | Acu. | 3 | 9 | 9 | 2 | 9 | 9 | D | D | F | H | J | i | ... | ... | ... | ... | ... | ... | ... | ... f m a. | |
| 8 | Nb. | Frst: Ast. | St: Stcu. | 10 | 10 | 10 | - | 10 | 10 | J | H | G | - | J | K | ... | ... | ... | ... | ... | ... | ... | ... ⁰ a. | |
| 9 | St. | Frst: Acu. | --- | 10 | 1 | 2 | 1 | 0 | 0 | H | i | i | i | F | D | ... | ... | ... | ... | ... | ... | ... | ... ⁰ early a : m D f U n. | |
| 10 | St. | St. | Acu. | 10 | 10 | 10 | 8 | 4 | 10 | C | B | C | C | E | F | ... | ... | ... | ... | ... | ... | ... | ... f a : f a, p and n : m D n. | |
| 11 | Stcu: Ast. | St. | St: Stcu. | 10 | 10 | 10 | 10 | 9 | 9 | J | G | F | G | J | J | ... | ... | ... | ... | ... | ... | ... | ... ⁰ a and p : m late a. | |
| 12 | Stcu. | Stcu. | --- | 1 | 0 | 1 | 3 | 0 | 0 | i | F | F | G | E | F | ... | ... | ... | ... | ... | ... | ... | ... f m a : m f p : f m U n. | |
| 13 | St: Stcu. | St. | St. | 9 | 10 | 10 | 10 | 10 | 10 | F | E | D | E | F | F | ... | ... | ... | ... | ... | ... | ... | ... f early a : ⁰ f late a and p f m n. | |
| 14 | St: Stcu. | --- | Stcu. | 10 | 10 | 0 | 0 | 1 | 2 | G | D | G | F | i | E | ... | ... | ... | ... | ... | ... | ... | ... m f a : m p : f U n. | |
| 15 | St: Stcu. | Stcu: Ast. | Nb. | 10 | 10 | 10 | - | 10 | 10 | K | H | H | - | G | K | ... | ... | ... | ... | ... | ... | ... | ... feary a : ⁰ p and n. | |
| 16 | St: Stcu. | St. | St: Stcu. | 9 | 10 | 10 | 10 | 10 | 8 | i | G | G | H | J | G | ... | ... | ... | ... | ... | ... | ... | ... ⁰ a : ⁰ p. | |
| 17 | Stcu: Acu. | St: Stcu: Ast. | St: Stcu. | 9 | 8 | 10 | 10 | 10 | 10 | H | G | H | i | G | J | ... | ... | ... | ... | ... | ... | ... | ... ⁰ p and n. | |
| 18 | St: Ast. | --- | St. | 10 | 0 | 0 | 2 | 2 | 1 | G | F | F | F | F | F | ... | ... | ... | ... | ... | ... | ... | ... m a, p and n : U n. | |
| 19 | Nb. | St. | St. | 10 | 10 | 10 | 9 | 10 | 10 | G | F | E | E | F | F | ... | ... | ... | ... | ... | ... | ... | ... ⁰ m f a : f m p : m n. | |
| 20 | St: Ast. | Stcu. | --- | 10 | 5 | 9 | 10 | 0 | 3 | G | F | G | G | G | F | ... | ... | ... | ... | ... | ... | ... | ... m a : m U n. | |
| 21 | Stcu. | Stcu. | --- | 9 | 9 | 8 | 8 | 0 | 7 | J | G | G | G | G | G | ... | ... | ... | ... | ... | ... | ... | ... f a and n. | |
| 22 | Stcu. | Stcu. | --- | 9 | 9 | 9 | - | 0 | 0 | G | F | F | - | G | G | ... | ... | ... | ... | ... | ... | ... | ... f m * a : U n. | |
| 23 | --- | Stcu. | --- | 0 | 0 | 9 | 8 | 0 | 0 | E | D | D | F | F | F | ... | ... | ... | ... | ... | ... | ... | ... f a : f m p : m U n. | |
| 24 | Stcu: Ast. | Stcu: Ast. | Stcu. | 9 | 10 | 10 | 10 | 10 | 10 | i | i | G | H | i | J | ... | ... | ... | ... | ... | ... | ... | ... f a. | |
| 25 | Stcu. | --- | --- | 10 | 9 | 0 | 0 | 0 | 0 | J | G | H | H | i | J | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26 | Acu. | Stcu. | --- | 1 | 1 | 6 | 0 | 0 | 0 | G | G | G | G | G | J | ... | ... | ... | ... | ... | ... | ... | ... f a. | |
| 27 | St: Ast. | Stcu. | Stcu. | 10 | 9 | 9 | 4 | 10 | 10 | G | F | G | G | G | i | ... | ... | ... | ... | ... | ... | ... | ... f m a : U n. | |
| 28 | --- | --- | --- | 0 | 0 | 0 | 0 | 10 | 10 | F | D | G | G | E | G | ... | ... | ... | ... | ... | ... | ... | ... f m f a : f early n. | |
| 29 | Stcu. | Ci. | Stcu. | 9 | 9 | 3 | - | 8 | 5 | G | F | F | - | F | C | ... | ... | ... | ... | ... | ... | ... | ... m a and p : ⁰ late n. | |
| 30 | St. | St. | Stcu. | 10 | 10 | 10 | 10 | 9 | 1 | F | C | D | G | G | J | ... | ... | ... | ... | ... | ... | ... | ... ⁰ m f a and p : U n. | |
| 31 | St: Ast: Cist. | Stcu: Acu: Ast. | Acu: Ast. | 5 | 5 | 9 | 10 | 9 | 9 | i | G | i | i | i | J | ... | ... | ... | ... | ... | ... | ... | ... f a : ⁰ n. | |
| Mean Cloud Am't. | | | | 7.5 | 7.0 | 7.3 | *6.3 | †4.9 | 5.6 | | | | | | | | | | | | | | | |

529. RICHMOND (KEW OBSERVATORY).

| | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|------------------|-----------------|------------------|------|-----|-------|------|----|----|---|---|---|---|---|-----|-----|-----|-----|-----|-----|-----|-----|---|--|
| 1 | Cunb: Ast. | Stcu: Ast. | St: Stcu: Ast. | 10 | 10 | 10 | 10 | 10 | 10 | K | 1 | K | J | J | K | ... | ... | ... | ... | ... | ... | ... | ... ⁰ a and late n. | |
| 2 | Stcu: Acu: Cist. | Ci: Cieu. | Ast. | 7 | 2 | 2 | 2 | 10 | 3 | J | H | J | J | J | H | ... | ... | ... | ... | ... | ... | ... | ... ⁰ early a. | |
| 3 | Cu: Stcu: Acu | Ci. | Ast: Acu. | 8 | 2 | 8 | 10 | 9 | 10 | G | D | i | i | i | J | ... | ... | ... | ... | ... | ... | ... | ... f a : ⁰ n. | |
| 4 | Nb: Ast. | St: Stcu. | Stcu. | 10 | 10 | 10 | 10 | 10 | 10 | J | H | G | G | H | K | ... | ... | ... | ... | ... | ... | ... | ... ⁰ early a : ⁰ p. | |
| 5 | Frst: Stcu. | Stcu: Cunb. | Stcu: Cunb. | 9 | 8 | 9 | - | 7 | 5 | K | K | K | - | J | K | ... | ... | ... | ... | ... | ... | ... | p ⁰ p. | |
| 6 | Stcu: Ast. | Stcu. | Stcu. | 9 | 10 | 9 | 10 | 10 | 10 | J | H | J | i | i | G | ... | ... | ... | ... | ... | ... | ... | ... ⁰ n. | |
| 7 | Stcu: Cunb: Ast. | Cu: Stcu. | Cu: Stcu. | 10 | 10 | 9 | 9 | 10 | 2 | i | H | J | J | J | i | ... | ... | ... | ... | ... | ... | ... | ... ⁰ a : p ⁰ p. | |
| 8 | St: Ast. | Stcu. | Stcu. | 10 | 10 | 10 | 10 | 10 | 10 | i | G | H | H | i | J | ... | ... | ... | ... | ... | ... | ... | ... ⁰ a and n. | |
| 9 | Stcu: Acu: Ci. | Stcu: Ast. | Stcu: Acu. | 4 | 10 | 10 | 10 | 9 | 7 | i | J | J | J | J | J | ... | ... | ... | ... | ... | ... | ... | ... U n. | |
| 10 | Cu: Stcu: Ast. | Cu: Stcu. | Nb: Cunb. | 7 | 9 | 6 | 10 | 10 | 10 | G | H | J | G | G | J | ... | ... | ... | ... | ... | ... | ... | p ⁰ a : ⁰ n p : ⁰ n. | |
| 11 | Frst: Stcu. | Cu: Cunb. | Cu. | 2 | 0 | 4 | 8 | 5 | 9 | J | J | J | J | H | i | ... | ... | ... | ... | ... | ... | ... | ... f n. | |
| 12 | St: Stcu. | Cu: Stcu. | Stcu. | 2 | 0 | 4 | - | 7 | 9 | i | F | H | - | F | H | ... | ... | ... | ... | ... | ... | ... | ... early a : m a and p. | |
| 13 | Stcu: Ast. | --- | --- | 10 | 9 | 0 | 0 | 0 | 0 | G | G | i | J | F | F | ... | ... | ... | ... | ... | ... | ... | ... m U n. | |
| 14 | --- | Frst. | Stcu. | 0 | 0 | 1 | 8 | 9 | 1 | E | E | H | H | H | J | ... | ... | ... | ... | ... | ... | ... | ... f a. | |
| 15 | Stcu. | Cu: Stcu. | Stcu. | 9 | 9 | 7 | 8 | 4 | 5 | G | G | i | i | G | J | ... | ... | ... | ... | ... | ... | ... | ... early a : p * ⁰ p. | |
| 16 | St: Stcu: Ast. | St: Stcu. | Stcu. | 10 | 9 | 9 | 6 | 9 | 10 | G | G | H | i | E | G | ... | ... | ... | ... | ... | ... | ... | ... f n. | |
| 17 | St: Stcu: Ast. | Cu: Stcu. | --- | 10 | 10 | 8 | 3 | 0 | 5 | G | G | i | J | E | G | ... | ... | ... | ... | ... | ... | ... | ... ⁰ early a : f n. | |
| 18 | Stcu: Acu: Ci. | Stcu. | St. | 6 | 10 | 9 | 6 | 10 | 3 | J | H | i | i | H | J | ... | ... | ... | ... | ... | ... | ... | p * ⁰ a : * * ⁰ n. | |
| 19 | Nb: Ast. | Stcu. | Cunb: Nb: Acu. | 10 | 9 | 10 | - | 8 | 3 | i | H | H | - | G | J | ... | ... | ... | ... | ... | ... | ... | ... * * ⁰ a, p and n. | |
| 20 | Stcu. | --- | St: Ast. | 1 | 10 | 0 | 3 | 4 | 10 | H | G | G | H | F | G | ... | ... | ... | ... | ... | ... | ... | ... m * ⁰ n. | |
| 21 | Acu: Ast: Ci. | Cu: Stcu. | Cunb: Stcu: Acu. | 9 | 9 | 6 | 4 | 7 | 3 | i | H | J | J | H | J | ... | ... | ... | ... | ... | ... | ... | p ⁰ * ⁰ early a : q * ⁰ n. | |
| 22 | Stcu. | Cu: Stcu. | Cu: Stcu. | 1 | 0 | 8 | 9 | 2 | 0 | i | H | i | i | G | J | ... | ... | ... | ... | ... | ... | ... | p * ⁰ a. | |
| 23 | Stcu. | Cu: Stcu. | --- | 2 | 0 | 8 | 3 | 0 | 0 | G | H | H | J | G | F | ... | ... | ... | ... | ... | ... | ... | ... f a and n : m n. | |
| 24 | Cu: Ast. | Stcu: Ast. | Nb: Ast. | 10 | 10 | 10 | 10 | 10 | 10 | G | H | i | F | G | J | ... | ... | ... | ... | ... | ... | ... | ... * * ⁰ a : * m p : * * ⁰ n. | |
| 25 | Stcu: Ast. | Nb: Ast. | Nb: Ast. | 10 | 10 | 10 | 10 | 10 | 10 | K | H | G | G | i | ... | ... | ... | ... | ... | ... | ... | ... | * * ⁰ a : ⁰ p and n. | |
| 26 | Stcu: Ast. | Nb: Ast. | Nb: Ast. | 10 | 10 | 10 | - | 10 | 10 | J | i | H | - | G | i | ... | ... | ... | ... | ... | ... | ... | ... ⁰ a, p and n. | |
| 27 | Nb: Ast. | Cu: Stcu: Cieu. | Stcu: Ast: Ci. | 10 | 10 | 5 | 7 | 7 | 4 | i | i | J | K | O | i | ... | ... | ... | ... | ... | ... | ... | ... ⁰ early a. | |
| 28 | Stcu: Ast: Cist. | Stcu. | Stcu. | 9 | 10 | 8 | 9 | 2 | 0 | i | J | i | J | G | G | ... | ... | ... | ... | ... | ... | ... | ... D m n. | |
| Mean Cloud Am't. | | | | 7.37 | 4.7 | †17.3 | 7.16 | 0 | | | | | | | | | | | | | | | | |

530. RICHMOND (KEW OBSERVATORY).

Table for station 530, Richmond (Kew Observatory), March 1933. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Data rows 1-31 show various cloud types like Sts Cist., Nbs Ast., and cloud amounts.

531. RICHMOND (KEW OBSERVATORY).

Table for station 531, Richmond (Kew Observatory), April 1933. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Data rows 1-30 show various cloud types like Stcu., Cus Stcu., and cloud amounts.

* Mean of 27 days. † Mean of 24 days.

| Day. | Cloud Forms. | | | Cloud Amount (All Forms). | | | | | Visibility. | | | | | Precipitation. | | | | | Remarks on the Weather of the Day. | | | |
|------------------|------------------|------------------|------------------|---------------------------|-----|------|------|-----|-------------|----|----|-----|-----|----------------|-----|-----|-----|-----|------------------------------------|-----|-----|---------------------------------------|
| | 7h | 13h | 18h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | | 15h | 18h | 21h |
| 1 | St. | Cus Stcu. | Stcus Ast: Ci. | 10 | 5 | 9 | 9 | 10 | 10 | E | F | G | G | G | G | ... | ... | ... | ... | ... | ... | f m a : K ● p. |
| 2 | St: Stcu. | St: Stcu. | Nb. | 10 | 10 | 10 | 10 | 10 | 10 | i | H | H | H | H | H | ... | ... | ... | ... | ... | ... | ● a : ● ● p : ● n. |
| 3 | St. | St. | Stcus Cus Cieu. | 10 | 10 | 10 | 10 | 5 | 1 | G | H | H | H | H | K | ... | ... | ... | ... | ... | ... | K ● ● a. |
| 4 | Stcus Ci: Cieu. | Cus Ci: Cieu. | Acus Ci: Cist. | 7 | 8 | 7 | 9 | 10 | 6 | G | J | L | L | K | L | ... | ... | ... | ... | ... | ... | p early: ⊕ a and p. |
| 5 | Nb: Stcu: Ast. | Stcus Nb. | Cus Ci. | 10 | 10 | 9 | 7 | 8 | 6 | G | H | K | L | L | J | ... | ... | ... | ... | ... | ... | ● ● a. |
| 6 | Acus Ci: Cist. | Cus Ci: Cist. | St: Acus: Ci. | 7 | 9 | 7 | 8 | 9 | 9 | J | J | L | L | K | K | ... | ... | ... | ... | ... | ... | p ⊕ a : ⊕ p ● p : p ● ● n. |
| 7 | Nb: Ast. | Stcus Ast: Cist. | Stcus Acu. | 10 | 10 | 9 | - | 9 | 9 | i | i | K | - | J | i | ... | ... | ... | ... | ... | ... | ● ● a : p ● ● p. |
| 8 | Stcu. | Cus Stcus Acu. | St: Stcus Ast. | 9 | 9 | 9 | 9 | 9 | 9 | i | J | J | J | K | J | ... | ... | ... | ... | ... | ... | ● ● n. |
| 9 | Cunb: Stcus Acu. | Cus Cunb. | Cus Cunb. | 6 | 9 | 9 | 8 | 5 | 6 | K | J | L | K | L | K | ... | ... | ... | ... | ... | ... | p ● ● p ● a : T p ● ● p ● p : p ● ● n |
| 10 | Cus: Stcu: Acu. | Stcus Cunb. | Stcus St. | 7 | 10 | 10 | 10 | 9 | 9 | K | J | J | J | i | J | ... | ... | ... | ... | ... | ... | p ● ● a, p and n. |
| 11 | Cus Stcu. | Cunb: Stcu. | Cunb: Acus Ast. | 4 | 8 | 10 | 10 | 10 | 10 | G | J | J | J | i | H | ... | ... | ... | ... | ... | ... | ● ● ● p and n. |
| 12 | Stcu. | Cus Frcus Acu. | Acu. | 9 | 4 | 9 | 7 | 9 | 6 | G | J | J | K | i | H | ... | ... | ... | ... | ... | ... | p early. |
| 13 | St: Ast. | Cus Acu. | Cus Ci. | 10 | 10 | 5 | 9 | 2 | 10 | H | G | i | i | i | i | ... | ... | ... | ... | ... | ... | ● ● ● a. |
| 14 | Cunb: Stcus Ast. | Cus Stcu. | Cunb: Stcu. | 9 | 10 | 9 | - | 9 | 0 | J | H | i | - | i | G | ... | ... | ... | ... | ... | ... | ● ● ● a : ● ● p and n. |
| 15 | --- | Cu | Cus Stcus Acu. | 0 | 0 | 5 | 7 | 8 | 2 | G | J | K | J | J | i | ... | ... | ... | ... | ... | ... | p early. |
| 16 | Stcus Acus Ast. | Cus Ci: Cist. | Cus Stcus Ast. | 9 | 10 | 9 | 9 | 10 | 8 | i | i | J | K | K | J | ... | ... | ... | ... | ... | ... | p early: p ● ● p. |
| 17 | Stcu. | Stcu. | Stcus St. | 10 | 9 | 9 | 10 | 8 | 9 | G | H | i | i | G | G | ... | ... | ... | ... | ... | ... | |
| 18 | Stcus St. | Stcus Ast. | Ast: Acu. | 9 | 10 | 10 | 10 | 9 | 1 | G | i | J | J | i | i | ... | ... | ... | ... | ... | ... | ⊕ a, p and n. |
| 19 | Cist: Ci. | Cus Acus Cist. | Cus Acus Ci. | 10 | 9 | 10 | 9 | 9 | 3 | G | i | J | J | K | J | ... | ... | ... | ... | ... | ... | ⊕ a, p and n. |
| 20 | Acus Ci: Cieu. | Acus Ci: Cieu. | Acus Ci. | 4 | 3 | 6 | 7 | 8 | 5 | J | J | K | K | K | J | ... | ... | ... | ... | ... | ... | |
| 21 | Stcu. | acu. | Acus Ast: Ci. | 9 | 8 | 9 | - | 7 | 6 | G | H | i | - | J | J | ... | ... | ... | ... | ... | ... | |
| 22 | Acu | --- | Cus Stcus Acu. | 4 | 0 | 0 | 6 | 8 | 4 | H | H | J | J | K | G | ... | ... | ... | ... | ... | ... | T p ● n. |
| 23 | Cis Cist. | Cu. | Cunb. | 4 | 1 | 3 | 6 | 8 | 10 | G | H | J | J | G | H | ... | ... | ... | ... | ... | ... | K ● ● a : ● ● n. |
| 24 | Cus Stcu. | Cu. | Stcus Ast: Ci. | 5 | 4 | 6 | 8 | 9 | 10 | i | i | J | J | J | J | ... | ... | ... | ... | ... | ... | ⊕ p : ● ● n. |
| 25 | Cus Stcus Ci. | Cus Stcu. | Cus Ci. | 3 | 8 | 9 | 7 | 3 | 3 | K | K | K | K | K | J | ... | ... | ... | ... | ... | ... | p ● ● late a. |
| 26 | Stcus Ast. | Cus Stcu. | Stcus Cus Cist. | 10 | 9 | 9 | 10 | 8 | 9 | J | J | J | J | i | H | ... | ... | ... | ... | ... | ... | p ● n. |
| 27 | Acu. | Stcus Cus Ast. | Nb. | 1 | 9 | 10 | 10 | 10 | 10 | H | i | J | J | H | G | ... | ... | ... | ... | ... | ... | p p ● ● a : ● ● ● p and n. |
| 28 | Cus Ci. | Cu. | Cu. | 1 | 5 | 6 | - | 6 | 8 | J | J | J | - | J | i | ... | ... | ... | ... | ... | ... | |
| 29 | --- | Cunb: Acu. | Stcus Cunb: Acu. | 0 | 1 | 9 | 7 | 9 | 3 | H | i | J | J | J | i | ... | ... | ... | ... | ... | ... | T p ● ● p. |
| 30 | --- | Cunb: Nb: Ast. | Cus Stcu. | 0 | 8 | 9 | 9 | 6 | 5 | H | i | J | J | J | H | ... | ... | ... | ... | ... | ... | p ● ● p. |
| 31 | Stcus St: Acu. | Cus Acus Ast. | Acus Cieu. | 9 | 10 | 9 | 9 | 6 | 7 | J | J | K | K | J | J | ... | ... | ... | ... | ... | ... | |
| Mean Cloud Am't. | | | | 6.6 | 7.3 | 8.18 | *5.7 | 9.6 | 6.5 | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | |
|------------------|-----------------|----------------|-----------------|---------------------------|-----|-----|-----|-----|-------------|----|----|-----|-----|----------------|-----|-----|-----|-----|-----|-----|-----|---------------------------------------|
| 1 | --- | Cu. | Ci. | 0 | 0 | 3 | 1 | 1 | 2 | G | J | J | J | J | i | ... | ... | ... | ... | ... | ... | |
| 2 | Stcus Acus Ci. | Cus Ci: Cist. | Ci. | 3 | 7 | 8 | 8 | 8 | 4 | J | J | J | J | K | K | ... | ... | ... | ... | ... | ... | ⊕ early a. |
| 3 | Acus Ci. | Cus Acus Ci. | Acus Ci. | 7 | 6 | 5 | 5 | 3 | 2 | J | J | K | L | K | K | ... | ... | ... | ... | ... | ... | |
| 4 | --- | --- | Cis Cist. | 0 | 0 | 0 | - | 2 | 2 | J | L | L | - | L | J | ... | ... | ... | ... | ... | ... | |
| 5 | --- | Cu. | Cus Stcu. | 0 | 0 | 1 | 1 | 3 | 1 | H | H | K | K | K | J | ... | ... | ... | ... | ... | ... | |
| 6 | --- | Ci. | Ci. | 0 | 0 | 3 | 6 | 4 | 4 | G | H | J | K | K | i | ... | ... | ... | ... | ... | ... | p early. |
| 7 | --- | --- | --- | 0 | 0 | 0 | 0 | 0 | 0 | G | H | K | K | K | K | ... | ... | ... | ... | ... | ... | |
| 8 | --- | Frcu. | --- | 0 | 0 | 2 | 3 | 0 | 2 | G | J | J | J | K | J | ... | ... | ... | ... | ... | ... | |
| 9 | Ci. | Cus Stcu. | Cus Stcu. | 1 | 4 | 8 | 6 | 7 | 4 | J | J | J | J | J | J | ... | ... | ... | ... | ... | ... | |
| 10 | Cus Stcus Ast. | Stcus Cu. | Stcus Cus Ast. | 9 | 9 | 9 | 9 | 8 | 5 | K | K | K | J | J | i | ... | ... | ... | ... | ... | ... | |
| 11 | Cus Cunb: Acu. | Stcus Cunb. | Stcus Acus Ci. | 8 | 10 | 9 | - | 7 | 3 | K | J | J | - | J | J | ... | ... | ... | ... | ... | ... | ● ● ● early a : p ● late a : p ● ● p. |
| 12 | Cu. | Cus Stcu. | Acu. | 3 | 8 | 8 | 7 | 6 | 6 | J | J | J | J | J | J | ... | ... | ... | ... | ... | ... | early. |
| 13 | St. | Cus Stcu. | Stcus Ast. | 10 | 10 | 10 | 10 | 9 | 9 | i | i | i | i | i | H | ... | ... | ... | ... | ... | ... | ● ● a : p ● ● p. |
| 14 | --- | Cu. | Acus Ci. | 0 | 0 | 5 | 9 | 4 | 2 | G | H | J | K | K | J | ... | ... | ... | ... | ... | ... | p early: p ● ● p. |
| 15 | --- | Cus Stcu. | Cus Cunb. | 0 | 0 | 8 | 8 | 8 | 10 | i | i | J | J | J | i | H | ... | ... | ... | ... | ... | ● ● K ● n. |
| 16 | Acu. | Cus Ci. | Cus Stcus Ci. | 3 | 0 | 4 | 7 | 7 | 10 | i | i | K | K | K | K | ... | ... | ... | ... | ... | ... | ● early a. |
| 17 | Frcus Cunb: Ci. | Frcus Cunb. | Cunb. | 5 | 9 | 8 | 8 | 5 | 6 | L | L | L | K | J | J | ... | ... | ... | ... | ... | ... | ● early a : T p ● p. |
| 18 | Cus Acus Ci. | Cus Cunb: Acu. | Stcus Cunb: Ci. | 9 | 10 | 9 | - | 9 | 9 | L | K | K | - | K | J | ... | ... | ... | ... | ... | ... | p ● ● p ● a, p and n. |
| 19 | Cunb: Stcus Ci. | Cus Cunb: Ci. | Cus Cunb: Ci. | 9 | 9 | 9 | 9 | 6 | 8 | J | J | J | J | K | K | ... | ... | ... | ... | ... | ... | p ● ● K a and p : p ● ● n. |
| 20 | Cus Ci: Cieu. | Cus Stcu. | Cus Nb: Ast. | 6 | 10 | 9 | 9 | 9 | 9 | K | K | L | L | i | K | ... | ... | ... | ... | ... | ... | p ● ● a, p and n : p ● late p. |
| 21 | Cus Acus Ci. | Cus Cunb: Ci. | Cus Cunb: Ci. | 4 | 9 | 8 | 9 | 6 | 3 | L | L | L | L | L | J | ... | ... | ... | ... | ... | ... | p ● ● a : ● ● T ▲ p : p ● n |
| 22 | Stcu. | Cus Cunb: Ci. | Cus Acus Ast. | 4 | 3 | 9 | 9 | 8 | 5 | E | i | i | K | G | J | ... | ... | ... | ... | ... | ... | i p early: T a and p. |
| 23 | --- | Cu. | Cus Cunb. | 0 | 0 | 7 | 6 | 5 | 9 | G | i | J | J | K | K | ... | ... | ... | ... | ... | ... | p early. |
| 24 | St. | Stcus Ast. | Cus Stcu. | 10 | 10 | 10 | 10 | 9 | 7 | F | i | i | H | K | J | ... | ... | ... | ... | ... | ... | ● ● ● a and p : T late a, p and n. |
| 25 | Stcus Ci: Cieu. | Stcus Ci. | Cus Acus Ci. | 8 | 8 | 9 | - | 7 | 4 | K | K | L | - | K | K | ... | ... | ... | ... | ... | ... | |
| 26 | St: Stcu. | Cus Stcu. | St: Stcus Ast. | 10 | 10 | 9 | 7 | 9 | 8 | J | J | J | J | J | J | ... | ... | ... | ... | ... | ... | ● ● K n. |
| 27 | Ci. | Frcus Ci. | Acus Ci: Cieu. | 1 | 0 | 2 | 1 | 2 | 10 | J | K | L | L | K | i | ... | ... | ... | ... | ... | ... | ● ● n. |
| 28 | Cus Ci. | Cus Acu. | Stcu. | 6 | 4 | 9 | 9 | 9 | 9 | J | J | K | J | J | J | ... | ... | ... | ... | ... | ... | ● early a. |
| 29 | Stcu. | Cus Stcu. | Stcus Cu. | 8 | 9 | 9 | 8 | 9 | 9 | J | J | J | J | J | i | ... | ... | ... | ... | ... | ... | p early. |
| 30 | Cus Stcu. | Cus Stcu. | Cus Ci. | 6 | 4 | 7 | 3 | 5 | 2 | i | i | i | J | K | J | ... | ... | ... | ... | ... | ... | |
| Mean Cloud Am't. | | | | 4.3 | 5.0 | 6.6 | 6.5 | 5.8 | 5.5 | | | | | | | | | | | | | |
| Day | 7h | 13h | 18h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | 15h | 18h | 21h | Remarks on the Weather of the Day. |
| | Cloud Forms. | | | Cloud Amount (All Forms). | | | | | Visibility. | | | | | Precipitation. | | | | | | | | |

* Mean of 27 days. † Mean of 26 days.

| Day. | Cloud Forms. | | | Cloud Amount (All Forms). | | | | | Visibility. | | | | | Precipitation. | | | | | Remarks on the Weather of the Day. | | | |
|------------------|-------------------|-------------------|------------------|---------------------------|----|-----|-----|-----|-------------|----|----|-----|-----|----------------|-----|-----|-----|-----|------------------------------------|-----|-----|-----|
| | 7h | 13h | 18h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | | 15h | 18h | 21h |
| 1 | Ci: Cist. | Cus Cist. | Steu. | 1 | 2 | 6 | 7 | 9 | 6 | i | i | K | K | J | i | ... | ... | ... | ... | ... | ... | ... |
| 2 | Cus Acus Ci. | Steu. | --- | 1 | 7 | 7 | - | 0 | 0 | J | J | J | - | K | J | ... | ... | ... | ... | ... | ... | ... |
| 3 | --- | Freu. | Cus Ci. | 0 | 1 | 2 | 1 | 1 | 2 | H | i | J | K | J | J | ... | ... | ... | ... | ... | ... | ... |
| 4 | Ci. | Freu. | Freu. | 2 | 4 | 1 | 1 | 3 | 1 | H | H | H | H | K | K | ... | ... | ... | ... | ... | ... | ... |
| 5 | --- | Steu. | Cus Steu. | 0 | 1 | 9 | 9 | 6 | 9 | J | i | i | J | J | J | ... | ... | ... | ... | ... | ... | ... |
| 6 | St: Steu. | Ci. | Cis Cist. | 10 | 9 | 3 | 7 | 5 | 3 | G | H | J | i | H | H | ... | ... | ... | ... | ... | ... | ... |
| 7 | Acus Ci: Cist. | Cus Steu. Acu. | Steu. | 6 | 3 | 8 | 8 | 9 | 4 | G | i | K | L | K | K | ... | ... | ... | ... | ... | ... | ... |
| 8 | Cus Steu. | Cus Steu. | Cus Steu. Ci. | 5 | 9 | 9 | 7 | 3 | 6 | K | K | M | L | K | K | ... | ... | ... | ... | ... | ... | ... |
| 9 | Cus Steu. | Cus Steu. Ci. | Cus Ast: Cist. | 6 | 7 | 5 | - | 8 | 10 | K | K | L | - | L | K | ... | ... | ... | ... | ... | ... | ... |
| 10 | Nbr: Ast. | St: Steu. | Cunbs Steu. | 10 | 10 | 10 | 9 | 6 | 9 | J | J | i | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 11 | Steu. Cumb: Cist. | St: Steu. Acu. | Cus Steu. | 9 | 9 | 9 | 9 | 9 | 9 | K | J | J | J | K | J | ... | ... | ... | ... | ... | ... | ... |
| 12 | Steu. | Cus Acus Cieu. | Cus Steu. | 9 | 9 | 9 | 6 | 3 | 2 | K | K | K | K | M | L | ... | ... | ... | ... | ... | ... | ... |
| 13 | St: Nbr: Ast. | Nbr: St. | St: Steu. | 10 | 10 | 10 | 10 | 10 | 10 | K | i | J | J | H | J | ... | ... | ... | ... | ... | ... | ... |
| 14 | Steu. Cumb: Acu. | Cus Steu. | Cus Steu. Acu. | 9 | 8 | 7 | 7 | 6 | 2 | K | K | L | L | L | K | ... | ... | ... | ... | ... | ... | ... |
| 15 | Steu: St: Ast. | Steu. Cumb: Cist. | Steu. Nbr: Cumb. | 10 | 10 | 9 | 9 | 9 | 10 | J | J | J | K | M | J | ... | ... | ... | ... | ... | ... | ... |
| 16 | St: Steu. | Steu. Cumb. | Cunbs Nbr: Acu. | 10 | 10 | 9 | - | 6 | 3 | i | J | J | - | J | i | ... | ... | ... | ... | ... | ... | ... |
| 17 | Acus Ci: Cist. | Cunbs Acu: Cist. | Cus Steu. Ast. | 8 | 9 | 9 | 10 | 10 | 9 | i | J | K | K | K | J | ... | ... | ... | ... | ... | ... | ... |
| 18 | St: Steu. | Steu. Cumb: Ast. | Cunbs: Acu: Ci. | 10 | 10 | 10 | 9 | 8 | 4 | i | J | J | K | K | J | ... | ... | ... | ... | ... | ... | ... |
| 19 | Steu. Acu. | Cus Ci. | Cus Acus Ci. | 2 | 2 | 7 | 5 | 6 | 5 | i | K | L | L | K | K | ... | ... | ... | ... | ... | ... | ... |
| 20 | Steu. Acus Ast. | Cus Acu. | Cunb. | 9 | 9 | 3 | 4 | 1 | 6 | G | H | K | J | J | J | ... | ... | ... | ... | ... | ... | ... |
| 21 | Cist: Ci. | Cus Steu. | Steu. Cumb. | 7 | 4 | 9 | 7 | 8 | 7 | G | i | J | J | i | H | ... | ... | ... | ... | ... | ... | ... |
| 22 | --- | Cus Steu. | Cus Steu. | 0 | 2 | 8 | 9 | 4 | 4 | G | G | i | i | J | J | ... | ... | ... | ... | ... | ... | ... |
| 23 | Steu. | Cu. | Cus Steu. | 3 | 2 | 4 | - | 2 | 2 | i | i | J | - | J | J | ... | ... | ... | ... | ... | ... | ... |
| 24 | --- | Cus Steu. | Cus Acus Ci. | 0 | 1 | 5 | 5 | 3 | 4 | H | H | J | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 25 | Cus Cist: Cieu. | Ci. | --- | 7 | 9 | 7 | 1 | 0 | 0 | J | J | J | K | K | i | ... | ... | ... | ... | ... | ... | ... |
| 26 | --- | --- | Cu. | 0 | 0 | 0 | 0 | 2 | 1 | G | J | K | K | K | i | ... | ... | ... | ... | ... | ... | ... |
| 27 | --- | Steu. Acus Cieu. | Cunbs Acus Ci. | 0 | 0 | 8 | 10 | 6 | 3 | G | H | L | K | K | J | ... | ... | ... | ... | ... | ... | ... |
| 28 | Acus Ci: Cieu. | Cus Steu. Ci. | Cus Acus Ci. | 2 | 3 | 8 | 9 | 9 | 9 | K | L | M | L | L | J | ... | ... | ... | ... | ... | ... | ... |
| 29 | Nbr: St: Ast. | Cus Cumb. | Steu. | 9 | 10 | 9 | 9 | 9 | 3 | i | i | K | K | L | K | ... | ... | ... | ... | ... | ... | ... |
| 30 | Steu. | Cus Steu. Acu. | Cus Acus Cieu. | 8 | 9 | 8 | - | 3 | 4 | J | J | K | - | L | L | ... | ... | ... | ... | ... | ... | ... |
| 31 | Steu. Cumb. | Steu. | Steu. Cumb. | 9 | 9 | 10 | 10 | 9 | 6 | K | K | J | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| Mean Cloud Am't. | | | | 5-5-5-17-06-85-64-9 | | | | | | | | | | | | | | | | | | |

late a.
early a: p ● ● p.
● ● ● a: p ● ● late p: p ● n.
● ● a and p: i ● ● n.
late p.
● ● ● a: ● ● p.
p ● ● early a.
late p: K ● ● p ● n.
p ● K Q K ● ● a: K ● p: D n.
D early: p ● ● p.
D early.
p ● a.
D early.
p ● ● p.
late a: p ● ● late p.
● ● ● p ● a: p ● ● early n: ● ● ● late n.
● ● early a: p ● n.
p ● ● early a.

| Day. | Cloud Forms. | | | Cloud Amount (All Forms). | | | | | Visibility. | | | | | Precipitation. | | | | | Remarks on the Weather of the Day. | | | |
|------------------|------------------|-----------------|-------------------|---------------------------|----|-----|-----|-----|-------------|----|----|-----|-----|----------------|-----|-----|-----|-----|------------------------------------|-----|-----|-----|
| | 7h | 13h | 18h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | | 15h | 18h | 21h |
| 1 | Steu. Acu. | Cus Steu. | Cus Ci. | 9 | 9 | 6 | 5 | 5 | 0 | K | J | J | J | K | i | ... | ... | ... | ... | ... | ... | ... |
| 2 | Steu. Acu. | Acus Ci. | Steu. Acu. | 8 | 3 | 5 | 6 | 9 | 6 | i | J | J | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 3 | Steu. | Steu. | Acu. | 9 | 9 | 9 | 10 | 3 | 5 | G | J | J | J | J | i | ... | ... | ... | ... | ... | ... | ... |
| 4 | Steu. | Steu. | --- | 9 | 3 | 4 | 3 | 0 | 0 | G | H | J | J | K | J | ... | ... | ... | ... | ... | ... | ... |
| 5 | Steu. | Cu. | --- | 8 | 0 | 6 | 5 | 0 | 0 | H | G | J | J | J | i | ... | ... | ... | ... | ... | ... | ... |
| 6 | --- | Cu. | Acus Ci: Cist. | 0 | 0 | 4 | - | 7 | 5 | D | G | K | - | J | J | ... | ... | ... | ... | ... | ... | ... |
| 7 | Acu. | Cus Ci. | Cus Ci. | 2 | 0 | 4 | 7 | 1 | 1 | i | i | J | J | K | K | ... | ... | ... | ... | ... | ... | ... |
| 8 | Steu. Acu. | Cus Steu. | Cu. | 9 | 9 | 7 | 4 | 2 | 0 | K | K | K | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 9 | Acu. | Acus Cist. | Cus Acus Ci. | 1 | 1 | 1 | 7 | 4 | 1 | i | K | L | L | K | K | ... | ... | ... | ... | ... | ... | ... |
| 10 | Steu. Acu | Acus Cieu. | Ast. | 7 | 4 | 3 | 7 | 10 | 9 | J | J | J | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 11 | Steu. Ast: Cist. | St: Ast: Acu. | Steu. | 10 | 9 | 10 | 10 | 9 | 8 | i | i | J | J | J | K | ... | ... | ... | ... | ... | ... | ... |
| 12 | Cus Steu. Acu. | Steu. | Cus Acu. | 3 | 3 | 9 | 7 | 1 | 0 | J | K | K | K | L | L | ... | ... | ... | ... | ... | ... | ... |
| 13 | Cus Ci. | Acus Cist. | Steu. Cist: Cist. | 2 | 2 | 7 | - | 6 | 0 | K | L | L | - | J | J | ... | ... | ... | ... | ... | ... | ... |
| 14 | St: Ast: Cist. | Steu. Ast: Acu. | Steu. Acus Ci. | 10 | 10 | 10 | 9 | 6 | 7 | F | F | F | F | G | i | ... | ... | ... | ... | ... | ... | ... |
| 15 | Cus Steu. Acu. | Cus Steu. Ci. | Nbr: St. | 7 | 9 | 8 | 9 | 10 | 10 | K | K | L | L | L | J | ... | ... | ... | ... | ... | ... | ... |
| 16 | St: Steu. Acu. | Cus Cumb. | Cus Steu. | 6 | 7 | 6 | 6 | 1 | 0 | G | J | K | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 17 | Steu. Acu. | St: Steu. Acu. | Steu. | 7 | 9 | 9 | 10 | 10 | 10 | K | K | K | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 18 | Steu. Acu. | Cus Steu. | Cus Acus Ci. | 8 | 9 | 7 | 7 | 5 | 4 | K | K | L | L | K | K | ... | ... | ... | ... | ... | ... | ... |
| 19 | Acus Ci: Cist. | Cus Acus Cieu. | Steu. Acus Ci. | 5 | 9 | 9 | 9 | 9 | 8 | J | J | K | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 20 | Steu. Acu. | Cus Steu. | Cu. | 8 | 6 | 9 | - | 4 | 0 | K | K | L | - | L | L | ... | ... | ... | ... | ... | ... | ... |
| 21 | Steu. Acu. | Cus Steu. Acu. | Cunbs Acus Ci. | 8 | 9 | 8 | 9 | 8 | 5 | K | K | L | L | K | K | ... | ... | ... | ... | ... | ... | ... |
| 22 | Steu. Acu. | Cus Steu. Ci. | St: Steu. Ast. | 7 | 4 | 9 | 9 | 10 | 10 | i | K | K | K | K | H | ... | ... | ... | ... | ... | ... | ... |
| 23 | Nbr: Steu. Ast. | Cus Steu. | Cus Steu. | 10 | 8 | 8 | 6 | 4 | 0 | i | J | L | L | L | L | ... | ... | ... | ... | ... | ... | ... |
| 24 | Acu. | Cus Steu. | Steu. | 1 | 1 | 7 | 9 | 9 | 9 | i | K | K | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 25 | St. | Acus Ci: Cieu. | Steu. Acus Ci. | 10 | 9 | 7 | 4 | 2 | 1 | E | H | J | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 26 | Ci. | --- | --- | 5 | 0 | 0 | 0 | 0 | 0 | G | H | K | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 27 | --- | Ci. | Steu. Ci. | 0 | 3 | 4 | - | 6 | 0 | G | H | K | - | K | K | ... | ... | ... | ... | ... | ... | ... |
| 28 | Cis Cist. | Cis Cist. | Ci. | 6 | 7 | 6 | 5 | 4 | 0 | J | J | K | K | K | K | ... | ... | ... | ... | ... | ... | ... |
| 29 | --- | --- | Cus Acus Ci. | 0 | 0 | 0 | 0 | 7 | 7 | G | J | K | J | K | K | ... | ... | ... | ... | ... | ... | ... |
| 30 | --- | Cu. | Cus Steu. Ci. | 0 | 0 | 6 | 4 | 5 | 6 | i | J | K | K | J | K | ... | ... | ... | ... | ... | ... | ... |
| 31 | Cus Steu. | Cu. | Cus Ast: Acu. | 4 | 7 | 6 | 9 | 10 | 4 | G | H | i | J | J | K | ... | ... | ... | ... | ... | ... | ... |
| Mean Cloud Am't. | | | | 5-5-5-16-36-55-43-7 | | | | | | | | | | | | | | | | | | |
| Day. | Cloud Forms. | | | Cloud Amount (All Forms). | | | | | Visibility. | | | | | Precipitation. | | | | | Remarks on the Weather of the Day. | | | |
| | 7h | 13h | 18h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | 15h | 18h | 21h | 7h | 9h | 13h | | 15h | 18h | 21h |

* Mean of 26 days. † Mean of 27 days.

536. RICHMOND (KEW OBSERVATORY).

Table with columns: Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), Remarks on the Weather of the Day. Includes data for days 2-30 and mean cloud amount.

537. RICHMOND (KEW OBSERVATORY).

Table with columns: Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), Remarks on the Weather of the Day. Includes data for days 1-31 and mean cloud amount.

* Mean of 26 days. † Mean of 26 days.

Table for station 538, Richmond (Kew Observatory), November 1933. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Includes a Mean Cloud Am't. row at the bottom.

539. RICHMOND (KEW OBSERVATORY).

Table for station 539, Richmond (Kew Observatory), December 1933. Columns include Day, Cloud Forms (7h, 13h, 18h), Cloud Amount (7h-21h), Visibility (7h-21h), Precipitation (7h-21h), and Remarks on the Weather of the Day. Includes Mean Cloud Am't. and Mean Annual Cloud Am't. rows.

* Mean of 26 days. † Mean of 24 days.

540. RICHMOND (KEW OBSERVATORY).

1935.

| Month | January | | | February | | | March | | | April | | | May | | | June | | | | | |
|------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|------------------------|-----|
| | Day | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | | |
| | | Volt. cm. ⁻¹ | ohm. cm. ⁻¹ | amp. cm. ⁻² | | Volt. cm. ⁻¹ | ohm. cm. ⁻¹ | amp. cm. ⁻² | | Volt. cm. ⁻¹ | ohm. cm. ⁻¹ | amp. cm. ⁻² | | Volt. cm. ⁻¹ | ohm. cm. ⁻¹ | amp. cm. ⁻² | | Volt. cm. ⁻¹ | ohm. cm. ⁻¹ | amp. cm. ⁻² | |
| 1 | ... | ... | ... | ... | ... | ... | 4.60 | 24 | 109 | ... | ... | ... | ... | 6.55 | 23 | 152 | ... | ... | ... | | |
| 2 | 2.60 | 26 | 68 | 3.00 | 24 | 73 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 3 | 4.40 | 19 | 81 | 5.20 | 19 | 89 | ... | ... | ... | ... | 3.40 | 30 | 105 | 2.55 | 23 | 59 | ... | ... | ... | ... | |
| 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.45 | 41 | 101 | 2.10 | 53 | 111 | ... | ... | ... | ... | |
| 5 | 6.65 | 11 | 74 | ... | ... | ... | ... | ... | ... | ... | 2.50 | 43 | 109 | 2.80 | 65 | 182 | ... | ... | ... | ... | |
| 6 | 3.30 | 17 | 58 | 3.90 | 22 | 84 | 4.25 | 30 | 127 | ... | ... | ... | ... | ... | ... | ... | 2.30 | 44 | 100 | ... | |
| 7 | ... | ... | ... | ... | ... | ... | 2.95 | 38 | 114 | 2.05 | 51 | 105 | ... | ... | ... | ... | 2.85 | 54 | 152 | ... | |
| 8 | ... | ... | ... | 2.65 | 17 | 44 | 2.80 | 34 | 94 | ... | ... | ... | ... | 2.75 | 44 | 121 | 2.40 | 65 | 155 | ... | |
| 9 | 4.20 | 21 | 87 | 2.70 | 20 | 53 | 3.05 | 31 | 95 | ... | ... | ... | ... | ... | ... | ... | 2.00 | 71 | 143 | ... | |
| 10 | 10.20 | 5 | 54 | ... | ... | ... | 5.05 | 32 | 159 | 3.40 | 43 | 147 | 1.80 | 36 | 65 | ... | ... | ... | ... | ... | |
| 11 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.00 | 57 | 116 | 2.45 | 38 | 93 | ... | ... | ... | ... | ... | |
| 12 | 9.50 | 14 | 129 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.00 | 58 | 115 | 1.60 | 73 | 116 | ... | ... | |
| 13 | ... | ... | ... | 4.30 | 25 | 109 | 4.85 | 16 | 79 | 2.50 | 48 | 120 | ... | ... | ... | ... | ... | ... | ... | ... | |
| 14 | ... | ... | ... | 4.45 | 21 | 91 | 2.65 | 37 | 97 | ... | ... | ... | ... | ... | ... | ... | 4.10 | 45 | 183 | ... | |
| 15 | ... | ... | ... | ... | ... | ... | 3.20 | 31 | 100 | ... | ... | ... | 1.95 | 59 | 116 | 1.75 | 56 | 97 | ... | ... | |
| 16 | ... | ... | ... | 4.55 | 24 | 107 | ... | ... | ... | ... | ... | ... | 1.85 | 62 | 113 | 1.40 | 95 | 131 | ... | ... | |
| 17 | 4.80 | 16 | 75 | 2.70 | 29 | 78 | ... | ... | ... | ... | ... | ... | 5.55 | 20 | 113 | ... | ... | ... | ... | ... | |
| 18 | 7.10 | 11 | 76 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.25 | 48 | 107 | ... | ... | ... | ... | ... | |
| 19 | 7.45 | 8 | 59 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.70 | 55 | 93 | ... | ... | ... | ... | ... | |
| 20 | 6.45 | 10 | 64 | 3.30 | 20 | 67 | 3.40 | 39 | 133 | 5.20 | 40 | 204 | ... | ... | ... | 1.65 | 89 | 145 | ... | ... | |
| 21 | ... | ... | ... | 3.25 | 32 | 104 | 3.50 | 30 | 106 | 3.15 | 59 | 185 | ... | ... | ... | 2.45 | 60 | 148 | ... | ... | |
| 22 | ... | ... | ... | 4.15 | 29 | 118 | 3.45 | 31 | 106 | ... | ... | ... | 2.30 | 44 | 102 | ... | ... | ... | ... | ... | |
| 23 | 8.35 | 8 | 64 | 4.25 | 23 | 99 | 8.00 | 23 | 186 | ... | ... | ... | 1.70 | 60 | 103 | 1.05 | 62 | 67 | ... | ... | |
| 24 | ... | ... | ... | ... | ... | ... | 8.30 | 19 | 155 | ... | ... | ... | 1.55 | 70 | 107 | ... | ... | ... | ... | ... | |
| 25 | 6.80 | 15 | 101 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| 26 | 5.55 | 13 | 71 | ... | ... | ... | ... | ... | ... | 2.45 | 40 | 97 | 1.80 | 50 | 91 | 1.60 | 64 | 102 | ... | ... | |
| 27 | 6.15 | 13 | 81 | ... | ... | ... | 6.70 | 23 | 154 | 2.00 | 46 | 92 | ... | ... | ... | ... | ... | ... | ... | ... | |
| 28 | ... | ... | ... | 3.85 | 39 | 150 | 3.10 | 27 | 83 | 1.55 | 54 | 83 | ... | ... | ... | 1.25 | 68 | 87 | ... | ... | |
| 29 | ... | ... | ... | ... | ... | ... | 2.30 | 52 | 118 | ... | ... | ... | 2.25 | 64 | 143 | 1.45 | 56 | 80 | ... | ... | |
| 30 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1.15 | 75 | 87 | ... | ... | |
| 31 | ... | ... | ... | ... | ... | ... | 1.95 | 49 | 96 | ... | ... | ... | 1.50 | 56 | 85 | ... | ... | ... | ... | ... | |
| Mean | 6.25 | 14 | 76 | 3.75 | 25 | 90 | 4.10 | 31 | 117 | 2.70 | 46 | 122 | 2.50 | 49 | 109 | 1.95 | 65 | 120 | ... | ... | |
| No. of Days Used | 15 | 15 | 15 | 14 | 14 | 14 | 18 | 18 | 18 | 12 | 12 | 12 | 19 | 19 | 19 | 15 | 15 | 15 | ... | ... | |
| Month | July | | | August | | | September | | | October | | | November | | | December | | | | | |
| Day | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | F | $\lambda^+ \times 10^{18}$ | $\lambda^- \times 10^{18}$ | | | |
| | | Volt. cm. ⁻¹ | ohm. cm. ⁻¹ | amp. cm. ⁻² | | Volt. cm. ⁻¹ | ohm. cm. ⁻¹ | amp. cm. ⁻² | | Volt. cm. ⁻¹ | ohm. cm. ⁻¹ | amp. cm. ⁻² | | Volt. cm. ⁻¹ | ohm. cm. ⁻¹ | amp. cm. ⁻² | | Volt. cm. ⁻¹ | ohm. cm. ⁻¹ | amp. cm. ⁻² | |
| 1 | ... | ... | ... | 1.65 | 54 | 89 | 1.80 | 71 | 129 | ... | ... | ... | ... | ... | ... | ... | 3.30 | 27 | 89 | ... | ... |
| 2 | ... | ... | ... | 1.40 | 57 | 79 | ... | ... | ... | 5.10 | 38 | 196 | 4.70 | 17 | 78 | ... | ... | ... | ... | ... | ... |
| 3 | 2.55 | 40 | 103 | ... | ... | ... | ... | ... | ... | 5.60 | 34 | 191 | 4.10 | 22 | 91 | ... | ... | ... | ... | ... | ... |
| 4 | ... | ... | ... | 2.80 | 39 | 110 | 1.30 | 58 | 76 | 3.15 | 37 | 115 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5 | 3.85 | 43 | 165 | ... | ... | ... | 2.80 | 56 | 159 | 3.35 | 21 | 71 | ... | ... | ... | 6.15 | 13 | 80 | ... | ... | ... |
| 6 | 5.15 | 33 | 172 | ... | ... | ... | 3.30 | 41 | 136 | 2.25 | 56 | 124 | ... | ... | ... | 5.35 | 7 | 39 | ... | ... | ... |
| 7 | 1.70 | 87 | 148 | ... | ... | ... | 3.65 | 53 | 193 | ... | ... | ... | 2.85 | 18 | 52 | ... | ... | ... | ... | ... | ... |
| 8 | ... | ... | ... | 1.15 | 65 | 75 | 4.05 | 53 | 214 | ... | ... | ... | 4.75 | 20 | 96 | 5.65 | 20 | 114 | ... | ... | ... |
| 9 | ... | ... | ... | 1.55 | 61 | 96 | ... | ... | ... | ... | ... | ... | 3.85 | 25 | 96 | ... | ... | ... | ... | ... | ... |
| 10 | ... | ... | ... | 2.70 | 45 | 123 | ... | ... | ... | 2.50 | 63 | 157 | 3.45 | 22 | 77 | ... | ... | ... | ... | ... | ... |
| 11 | 1.85 | 65 | 119 | ... | ... | ... | 3.75 | 40 | 148 | 2.00 | 43 | 86 | ... | ... | ... | 6.85 | 12 | 83 | ... | ... | ... |
| 12 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2.45 | 43 | 106 | ... | ... | ... | 8.85 | 6 | 54 | ... | ... | ... |
| 13 | ... | ... | ... | ... | ... | ... | 3.10 | 48 | 148 | 2.60 | 47 | 123 | 4.60 | 15 | 69 | 6.10 | 22 | 133 | ... | ... | ... |
| 14 | 1.85 | 77 | 143 | ... | ... | ... | 2.10 | 52 | 110 | ... | ... | ... | 5.40 | 16 | 85 | 6.80 | 18 | 123 | ... | ... | ... |
| 15 | ... | ... | ... | ... | ... | ... | 1.40 | 61 | 84 | ... | ... | ... | 4.95 | 21 | 103 | 3.85 | 21 | 82 | ... | ... | ... |
| 16 | ... | ... | ... | 1.45 | 68 | 98 | ... | ... | ... | ... | ... | ... | 7.60 | 13 | 101 | ... | ... | ... | ... | ... | ... |
| 17 | ... | ... | ... | 1.15 | 59 | 89 | ... | ... | ... | 2.65 | 23 | 61 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18 | 1.50 | 65 | 98 | 1.20 | 72 | 87 | 1.70 | 57 | 98 | 2.35 | 34 | 80 | ... | ... | ... | 3.40 | 14 | 49 | ... | ... | ... |
| 19 | 1.60 | 86 | 139 | ... | ... | ... | 2.05 | 65 | 134 | 2.75 | 37 | 101 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20 | 1.85 | 46 | 85 | ... | ... | ... | 2.15 | 64 | 137 | 5.65 | 29 | 162 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21 | 1.75 | 60 | 103 | 1.00 | 55 | 55 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5.70 | 10 | 60 | ... | ... | ... |
| 22 | ... | ... | ... | 1.10 | 55 | 61 | 4.30 | 54 | 233 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23 | ... | ... | ... | 1.45 | 56 | 81 | ... | ... | ... | 2.25 | 25 | 57 | 6.40 | 16 | 102 | ... | ... | ... | ... | ... | ... |
| 24 | ... | ... | ... | 1.40 | 70 | 96 | ... | ... | ... | 3.95 | 27 | 105 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25 | 2.15 | 68 | 146 | 2.10 | 68 | 141 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26 | ... | ... | ... | ... | ... | ... | 5.30 | 32 | 167 | 2.30 | 27 | 61 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27 | ... | ... | ... | ... | ... | ... | 3.25 | 33 | 108 | 2.25 | 24 | 54 | 7.55 | 9 | 69 | ... | ... | ... | ... | ... | ... |
| 28 | ... | ... | ... | 1.80 | 91 | 165 | 3.75 | 38 | 142 | ... | ... | ... | 3.30 | 19 | 62 | ... | ... | ... | ... | ... | ... |
| 29 | ... | ... | ... | ... | ... | ... | 3.95 | 40 | 158 | ... | ... | ... | 6.20 | 17 | 108 | 5.25 | 13 | 70 | ... | ... | ... |
| 30 | ... | ... | ... | 1.80 | 73 | 129 | ... | ... | ... | 4.30 | 24 | 104 | 5.40 | 19 | 102 | ... | ... | ... | ... | ... | ... |
| 31 | ... | ... | ... | 1.25 | 55 | 67 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Mean | 2.35 | 61 | 129 | 1.60 | 61 | 95 | 3.00 | 51 | 143 | 3.20 | 35 | 109 | 5.00 | 18 | 86 | 5.60 | 15 | 81 | ... | ... | ... |
| No. of Days Used | 11 | 11 | 11 | 17 | 17 | 17 | 18 | 18 | 18 | 18 | 18 | 18 | 15 | 15 | 15 | 12 | 12 | 12 | ... | ... | ... |
| The Year. | Mean No. of Days Used. | | | 184 | 184 | 184 | | | | | | | | | | | | | | | |

541. RICHMOND (Kew Observatory).

1933.

| Month. | JANUARY | | FEBRUARY | | MARCH | | APRIL | | MAY | | JUNE | |
|-------------------|-----------|------------------------------------|-----------|------------------------------------|-----------|------------------------------------|-----------|------------------------------------|-----------|------------------------------------|-----------|------------------------------------|
| Day. | Character | Duration Negative Pot. Grad. | Character | Duration Negative Pot. Grad. | Character | Duration Negative Pot. Grad. | Character | Duration Negative Pot. Grad. | Character | Duration Negative Pot. Grad. | Character | Duration Negative Pot. Grad. |
| | | Hours | | Hours | | Hours | | Hours | | Hours | | Hours |
| 1 | 1 | 2.1 | 2 | 3.4 | 1 | 1.4 | 0 | ... | 1 | 0.9 | 0 | ... |
| 2 | 0 | ... | 1 | 1.2 | 2 | 4.5 | 0 | ... | 1 | 2.5 | 0 | ... |
| 3 | 0 | ... | 1 | 0.4 | 2 | 3.4 | 0 | ... | 1 | 1.7 | 0 | ... |
| 4 | 1 | 0.2 | 1 | 0.2 | 1 | 0.4 | 0 | ... | 0 | ... | 0 | ... |
| 5 | 1 | 2.3 | 0 | ... | 0 | ... | 0 | ... | 1 | 2.2 | 1 | 0.1 |
| 6 | 1 | 0.1 | 1 | 0.8 | 2 | 4.8 | 0 | ... | 1 | 1.4 | 0 | ... |
| 7 | 0 | ... | 1 | 1.1 | 1 | 1.3 | 0 | ... | 2 | 6.7 | 0 | ... |
| 8 | 1 | 0.9 | 0 | ... | 0 | ... | 0 | ... | 0 | ... | 0 | ... |
| 9 | 0 | ... | 0 | ... | 1 | 0.1 | 0 | ... | 1 | 2.0 | 0 | ... |
| 10 | 0 | ... | 1 | 2.7 | 0 | ... | 0 | ... | 1 | 0.3 | 1 | 0.1 |
| 11 | 2 | 4.1 | 0 | ... | 0 | ... | 0 | ... | 1 | 1.2 | 1 | 2.9 |
| 12 | 0 | ... | 0 | ... | 0 | ... | 1 | 0.9 | 1 | 0.2 | 0 | ... |
| 13 | 2 | 3.6 | 0 | ... | 1 | 0.1 | 0 | ... | 1 | 2.0 | 1 | 1.3 |
| 14 | 0 | ... | 0 | ... | 0 | ... | 0 | ... | 1 | 0.6 | 0 | ... |
| 15 | 2 | 8.9 | 0 | ... | 1 | 0.5 | 0 | ... | 0 | ... | 2 | 4.3 |
| 16 | 2 | 5.4 | 0 | ... | 2 | 8.2 | 0 | ... | 0 | ... | 1 | 1.6 |
| 17 | 1 | 0.4 | 1 | 0.7 | 2 | 8.4 | 0 | ... | 0 | ... | 1 | 2.2 |
| 18 | 1 | 0.8 | 1 | 0.8 | 1 | 2.3 | 0 | ... | 0 | ... | 2 | 3.2 |
| 19 | 1 | 1.3 | 1 | 1.4 | 2 | 3.9 | 1 | 2.8 | 0 | ... | 2 | 4.2 |
| 20 | 0 | ... | 0 | ... | 2 | 4.1 | 1 | 1.5 | 0 | ... | 1 | 1.4 |
| 21 | 0 | ... | 1 | 0.6 | 0 | ... | 0 | ... | 1 | 0.2 | 2 | 3.2 |
| 22 | 0 | ... | 0 | ... | 0 | ... | 0 | ... | 1 | 0.9 | 1 | 2.0 |
| 23 | 0 | ... | 0 | ... | 0 | ... | 1 | 0.2 | 1 | 0.9 | 0 | ... |
| 24 | 0 | ... | 2 | 5.4 | 0 | ... | 1 | 0.5 | 1 | 0.8 | 1 | 1.7 |
| 25 | 0 | ... | 2 | 13.9 | 0 | ... | 1 | 2.6 | 1 | 0.1 | 0 | ... |
| 26 | 0 | ... | 2 | 13.1 | 0 | ... | 0 | ... | 1 | 0.6 | 1 | 0.3 |
| 27 | 0 | ... | 2 | 7.3 | 0 | ... | 0 | ... | 1 | 2.9 | 0 | ... |
| 28 | 0 | ... | 0 | ... | 0 | ... | 0 | ... | 1 | 0.6 | 0 | ... |
| 29 | 1 | 0.3 | - | --- | 0 | ... | 1 | 2.3 | 1 | 0.7 | 1 | 0.1 |
| 30 | 2 | 3.3 | - | --- | 1 | 2.5 | 1 | 0.7 | 0 | ... | 0 | ... |
| 31 | 0 | ... | - | --- | 0 | ... | - | --- | 0 | ... | - | --- |
| Total | - | 33.7 | - | 53.0 | - | 45.9 | - | 11.5 | - | 29.4 | - | 28.6 |
| No. of Days Used. | - | 31 | - | 28 | - | 31 | - | 30 | - | 31 | - | 30 |
| Mean | - | 1.1 | - | 1.9 | - | 1.5 | - | 0.4 | - | 0.9 | - | 1.0 |
| Month. | JULY | | AUGUST | | SEPTEMBER | | OCTOBER | | NOVEMBER | | DECEMBER | |
| Day. | Character | Duration Negative Pot. Grad. | Character | Duration Negative Pot. Grad. | Character | Duration Negative Pot. Grad. | Character | Duration Negative Pot. Grad. | Character | Duration Negative Pot. Grad. | Character | Duration Negative Pot. Grad. |
| | | Hours | | Hours | | Hours | | Hours | | Hours | | Hours |
| 1 | 0 | ... | 0 | ... | 1 | 1.9 | 1 | 1.0 | 0 | ... | 1 | 0.1 |
| 2 | 0 | ... | 0 | ... | 0 | ... | 1 | 1.1 | 2 | 3.2 | 0 | ... |
| 3 | 1 | 0.1 | 1 | 0.1 | 1 | 0.1 | 0 | ... | 1 | 0.3 | 0 | ... |
| 4 | 1 | 0.1 | 0 | ... | 1 | 0.1 | 0 | ... | 1 | 0.1 | 0 | ... |
| 5 | 0 | ... | 0 | ... | 0 | ... | 0 | ... | 1 | 2.4 | 0 | ... |
| 6 | 0 | ... | 0 | ... | 0 | ... | 0 | ... | 0 | ... | 1 | 1.6 |
| 7 | 0 | ... | 0 | ... | 0 | ... | 1 | 0.3 | 1 | 0.3 | 0 | ... |
| 8 | 1 | 0.1 | 0 | ... | 0 | ... | 1 | 1.2 | 1 | 0.1 | 0 | ... |
| 9 | 1 | 0.4 | 0 | ... | 0 | ... | 0 | ... | 0 | ... | 0 | ... |
| 10 | 0 | ... | 0 | ... | 0 | ... | 1 | 0.1 | 1 | 1.8 | 0 | ... |
| 11 | 1 | 2.9 | 1 | 1.5 | 0 | ... | 1 | 0.3 | 0 | ... | 0 | ... |
| 12 | 1 | 0.1 | 0 | ... | 1 | 1.5 | 1 | 0.1 | 1 | 0.2 | 0 | ... |
| 13 | 1 | 1.8 | 0 | ... | 2 | 5.1 | 0 | ... | 1 | 1.1 | 0 | ... |
| 14 | 0 | ... | 1 | 2.1 | 0 | ... | 1 | 1.0 | 0 | ... | 1 | 1.2 |
| 15 | 2 | 3.1 | 1 | 0.6 | 0 | ... | 0 | ... | 2 | 6.1 | 2 | 7.0 |
| 16 | 1 | 1.8 | 0 | ... | 0 | ... | 1 | 0.4 | 1 | 0.3 | 0 | ... |
| 17 | 1 | 0.3 | 0 | ... | 1 | 1.2 | 0 | ... | 1 | 1.1 | 1 | 0.6 |
| 18 | 0 | ... | 1 | 0.1 | 1 | 0.6 | 0 | ... | 0 | ... | 1 | 0.1 |
| 19 | 0 | ... | 0 | ... | 0 | ... | 0 | ... | 1 | 0.7 | 1 | 0.3 |
| 20 | 1 | 1.3 | 1 | 0.4 | 1 | 2.6 | 0 | ... | 1 | 0.2 | 1 | 0.6 |
| 21 | 0 | ... | 1 | 2.9 | 1 | 2.7 | 1 | 0.2 | 2 | 4.0 | 0 | ... |
| 22 | 0 | ... | 1 | 0.8 | 1 | 0.1 | 1 | 1.2 | 0 | ... | 0 | ... |
| 23 | 0 | ... | 1 | 0.1 | 2 | 6.1 | 0 | ... | 1 | 0.3 | 0 | ... |
| 24 | 0 | ... | 0 | ... | 1 | 2.3 | 2 | 3.1 | 1 | 0.4 | 0 | ... |
| 25 | 0 | ... | 1 | 0.1 | 2 | 4.3 | 2 | 4.0 | 1 | 0.9 | 0 | ... |
| 26 | 0 | ... | 1 | 0.2 | 1 | 0.1 | 0 | ... | 1 | 0.1 | 2 | 4.1 |
| 27 | 1 | 1.2 | 0 | ... | 1 | 1.7 | 2 | 5.7 | 0 | ... | 1 | 0.9 |
| 28 | 0 | ... | 0 | ... | 0 | ... | 2 | 3.7 | 0 | ... | 2 | 4.8 |
| 29 | 1 | 0.9 | 1 | 0.1 | 0 | ... | 2 | 4.1 | 0 | ... | 0 | ... |
| 30 | 0 | ... | 0 | ... | 0 | ... | 1 | 2.0 | 0 | ... | 1 | 2.0 |
| 31 | 0 | ... | 0 | ... | - | --- | 1 | 1.8 | - | --- | 2 | 4.0 |
| Total | - | 14.1 | - | 9.0 | - | 30.4 | - | 31.3 | - | 23.6 | - | 27.3 |
| No. of Days Used. | - | 31 | - | 31 | - | 30 | - | 31 | - | 30 | - | 31 |
| Mean | - | 0.5 | - | 0.3 | - | 1.0 | - | 1.0 | - | 0.8 | - | 0.9 |

POTENTIAL GRADIENT (reduced to level surface, Paddock Site): VOLTS PER METRE.
 KELVIN ELECTROGRAPH STANDARDIZED BY WILSON READINGS, UNDERGROUND LABORATORY.
 Mean Values for periods of sixty minutes, between the exact hours, Greenwich Mean Time.

542. RICHMOND (Kew Observatory)

1933.

| Month. | JANUARY. Factor 2.64. | | | | FEBRUARY. Factor 2.64. | | | | MARCH. Factor 2.64. | | | |
|---------------|-----------------------|-------|---------|---------|------------------------|-------|---------|---------|---------------------|-------|---------|---------|
| Hour G. M. T. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. |
| Day. | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m |
| 1 | 290 | 475 | 170 | 265 | 90 | -130 | 225 | 240 | 420 | 355 | 460 | 420 |
| 2 | 130 | 210 | 265 | 170 | 90 | 715 | 315 | 685 | 420 | 635 | -275 | 490 |
| 3 | 55 | 315 | 420 | 555 | 530 | 605 | 475 | 275 | 120 | 265 | 80 | 200 |
| 4 | 315 | 460 | Z± | 500 | 105 | 210 | 200 | 210 | 120 | 305 | 355 | 675 |
| 5 | 120 | 265 | 715 | 870 | 105 | 185 | 250 | 315 | 315 | 500 | 370 | 530 |
| 6 | 145 | 570 | 385 | 555 | 130 | 450 | 345 | 130 | -210 | Z± | 450 | 860 |
| 7 | 435 | 555 | 530 | 420 | -55 | 355 | 345 | 595 | 450 | 715 | 315 | 925 |
| 8 | 55 | 160 | 120 | 210 | 305 | 450 | 345 | 265 | 700 | 805 | 265 | 395 |
| 9 | 65 | 315 | 435 | 570 | 200 | 395 | 290 | 315 | 160 | 315 | 355 | 490 |
| 10 | 1240 | 1635 | 1015 | 700 | 265 | 475 | Z± | 315 | 275 | 475 | 570 | 475 |
| 11 | 265 | 435 | -540 | 500 | 315 | 475 | 530 | 870 | 500 | 620 | 675 | 595 |
| 12 | 385 | 885 | 925 | 790 | 515 | 595 | 435 | 450 | 265 | 500 | 570 | 635 |
| 13 | 990 | 1015 | 830 | 580 | 475 | 605 | 475 | 475 | 250 | 290 | 435 | 570 |
| 14 | 635 | 540 | 645 | 805 | 395 | 420 | 490 | 790 | 240 | 240 | 250 | 555 |
| 15 | 500 | 290 | -315 | Z- | 580 | 660 | 490 | 620 | 370 | 420 | 315 | 370 |
| 16 | 935 | 385 | 540 | 635 | 475 | 725 | 450 | 660 | 90 | -130 | 0 | 420 |
| 17 | 515 | 845 | 420 | 620 | -160 | 530 | 265 | 580 | -475 | 500 | 185 | 290 |
| 18 | 450 | 580 | 740 | 1015 | 410 | 540 | 450 | 420 | -160 | 385 | 370 | 830 |
| 19 | 160 | 675 | 790 | 635 | 145 | 450 | 385 | 620 | -370 | -1055 | 200 | 370 |
| 20 | 500 | 700 | 635 | 910 | 595 | 885 | 330 | 580 | -160 | 185 | 660 | 580 |
| 21 | 460 | 500 | 450 | 900 | -240 | 700 | 315 | 515 | 490 | 765 | 315 | 540 |
| 22 | 475 | 685 | 450 | 740 | 395 | 530 | 420 | 620 | 395 | 685 | 315 | 450 |
| 23 | 675 | 660 | 830 | 910 | 395 | 635 | 410 | 530 | 315 | 530 | 805 | 635 |
| 24 | 420 | 715 | 540 | 500 | 570 | 25 | -635 | 25 | 250 | 450 | 780 | 700 |
| 25 | 305 | 595 | 635 | 820 | -780 | -185 | Z± | -990 | 475 | 740 | 580 | 645 |
| 26 | 635 | 900 | 580 | 845 | -420 | 225 | Z± | Z- | 315 | 540 | 410 | 660 |
| 27 | 530 | 790 | 660 | 765 | -275 | 200 | 450 | 620 | 420 | 790 | 555 | 715 |
| 28 | 450 | 760 | 605 | 765 | 515 | 675 | 420 | 645 | 515 | 570 | 315 | 460 |
| 29 | 315 | 540 | 555 | 845 | 545 | 545 | 545 | 545 | 330 | 605 | 240 | 395 |
| 30 | 315 | 200 | -120 | 765 | 765 | 765 | 765 | 765 | 160 | 370 | -120 | 450 |
| 31 | 475 | 740 | 385 | 240 | 240 | 240 | 240 | 240 | 315 | 420 | 210 | 500 |
| Means (a) | 427 | 593 | 566 | 647 | 345 | 489 | 379 | 476 | 334 | 499 | 393 | 543 |
| Means (b) | 428 | 608 | 504 | 652 | 264 | 475 | 339 | 482 | 250 | 426 | 352 | 532 |
| Mean for day. | (a) 558 (b) 548 | | | | (a) 422 (b) 390 | | | | (a) 442 (b) 390 | | | |
| Month. | APRIL. Factor 2.60. | | | | MAY. Factor 2.62. | | | | JUNE. Factor 2.62. | | | |
| Hour G.M.T. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. |
| Day. | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m |
| 1 | 220 | 300 | 275 | 365 | 210 | 430 | 760 | 130 | 355 | 225 | 105 | 290 |
| 2 | 260 | 415 | 235 | 365 | 195 | 405 | 300 | 325 | 130 | 210 | 145 | 195 |
| 3 | 170 | 310 | 340 | 375 | 170 | -185 | 300 | 420 | 155 | 250 | 155 | 300 |
| 4 | 300 | 470 | 235 | 260 | 510 | 430 | 210 | 355 | 300 | 290 | 105 | 155 |
| 5 | 195 | 430 | 260 | 275 | 235 | -420 | 290 | 500 | 275 | 535 | 80 | 105 |
| 6 | 220 | 405 | 210 | 310 | 290 | 405 | 275 | 170 | 145 | 470 | 250 | 380 |
| 7 | 220 | 415 | 210 | 415 | Z- | 105 | 235 | 235 | 235 | 565 | 315 | 420 |
| 8 | 180 | 520 | 180 | 340 | 65 | 260 | 275 | 210 | 210 | 315 | 210 | 340 |
| 9 | 90 | 375 | 180 | 265 | 145 | 325 | Z± | 250 | 290 | 380 | 210 | 210 |
| 10 | 145 | 235 | 365 | 415 | 130 | 290 | 185 | 260 | 130 | 155 | 130 | 185 |
| 11 | 310 | 365 | 180 | 285 | 290 | 380 | 250 | 315 | -25 | 120 | 300 | 365 |
| 12 | 80 | 310 | 325 | 285 | 275 | 445 | 195 | 300 | 365 | 325 | 170 | 225 |
| 13 | 235 | 520 | 235 | 415 | --- | -315 | 225 | 275 | 145 | 90 | 195 | 185 |
| 14 | 90 | 325 | 105 | 365 | 155 | 15 | 235 | 185 | 210 | 550 | 395 | 315 |
| 15 | 50 | 260 | 260 | 285 | 80 | 445 | 195 | 395 | 155 | 395 | 185 | Z- |
| 16 | 105 | 260 | 105 | 155 | 80 | 325 | 185 | 225 | 0 | 195 | 145 | 275 |
| 17 | 235 | 325 | 365 | 545 | 80 | 365 | 470 | 225 | 210 | 290 | -225 | 300 |
| 18 | 310 | 560 | 675 | 480 | 260 | 250 | 210 | 185 | 210 | 210 | 40 | Z- |
| 19 | 260 | 520 | -235 | 610 | 105 | 355 | 170 | 380 | 90 | Z+ | Z± | 225 |
| 20 | 405 | 560 | 15 | 650 | 250 | 250 | 185 | 300 | 90 | 195 | 225 | 260 |
| 21 | 340 | 480 | 325 | 630 | 120 | 355 | 300 | 260 | 80 | 250 | 250 | 355 |
| 22 | 340 | 535 | 235 | 390 | 210 | 670 | 275 | 210 | 405 | 405 | 445 | 25 |
| 23 | 145 | 235 | 210 | 105 | 240 | 430 | 170 | 420 | 120 | 260 | 155 | 210 |
| 24 | 80 | 180 | 210 | 260 | 210 | 260 | 155 | 170 | 80 | 80 | 120 | 315 |
| 25 | 105 | 130 | -1025 | 545 | 80 | 235 | 145 | 105 | --- | 130 | 195 | 155 |
| 26 | 285 | 340 | 275 | 340 | 195 | 225 | 170 | 130 | 130 | 300 | 170 | 105 |
| 27 | 105 | 180 | 220 | 430 | 145 | 365 | 315 | 420 | 120 | 460 | 155 | 210 |
| 28 | 260 | 365 | 155 | 285 | 155 | 250 | 155 | 185 | 185 | 275 | 145 | 290 |
| 29 | 90 | 220 | 180 | 470 | 145 | 365 | 235 | 500 | 80 | 250 | 145 | 195 |
| 30 | 155 | 285 | 155 | 40 | 235 | 460 | 155 | 155 | 120 | 275 | 105 | 210 |
| 31 | | | | | 120 | 225 | 170 | 325 | | | | |
| Means (a) | 199 | 361 | 240 | 373 | 186 | 333 | 247 | 275 | 179 | 291 | 187 | 243 |
| Means (b) | 199 | 361 | 182 | 373 | 188 | 296 | 248 | 277 | 175 | 297 | 177 | 247 |
| Mean for day. | (a) 293 (b) 279 | | | | (a) 260 (b) 262 | | | | (a) 225 (b) 224 | | | |

Note.- The 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.
 (a) Mean from all Positive readings.
 (b) Mean from all complete days, using both positive and negative readings.

POTENTIAL GRADIENT (reduced to level surface, Paddock Site): VOLTS PER METRE.
 KELVIN ELECTROGRAPH STANDARDIZED BY WILSON READINGS, UNDERGROUND LABORATORY.
 Mean Values for periods of sixty minutes, between the exact hours, Greenwich Mean Time.

542. RICHMOND (Kew Observatory).

1933.

| Month. | JULY. Factor 2.63 | | | | AUGUST. Factor 2.68 | | | | SEPTEMBER. Factor 2.67 | | | |
|---------------|----------------------|-------|---------|---------|-----------------------|-------|---------|---------|------------------------|-------|---------|---------|
| Hour G.M.T. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. |
| Day. | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m |
| 1 | 105 | 315 | 185 | 210 | 105 | 190 | 145 | 135 | -135 | 400 | 160 | 215 |
| 2 | 170 | 315 | 210 | 105 | 280 | 350 | 145 | 230 | 105 | 295 | 200 | 200 |
| 3 | 65 | 420 | 265 | 340 | 80 | 310 | 160 | 135 | 65 | 265 | 80 | 160 |
| 4 | 195 | 300 | 330 | 105 | 145 | 430 | 270 | 320 | 80 | 280 | 135 | 535 |
| 5 | 195 | 485 | 395 | 420 | 215 | 390 | 230 | 310 | 185 | 455 | 295 | 335 |
| 6 | 340 | 340 | 475 | 370 | 65 | 270 | 105 | 80 | 265 | 560 | 335 | 360 |
| 7 | 250 | 395 | 170 | 235 | 40 | 200 | 55 | 190 | 215 | 400 | 375 | 425 |
| 8 | 130 | 210 | 130 | 315 | 200 | 280 | 105 | 160 | 145 | 415 | 375 | 280 |
| 9 | 145 | 210 | 130 | 210 | 200 | 350 | 135 | 160 | 175 | 425 | 265 | 345 |
| 10 | 145 | 225 | 180 | 160 | 180 | 480 | 270 | 310 | 120 | 375 | 175 | 295 |
| 11 | 160 | 225 | 195 | 170 | 230 | 415 | Z± | 400 | 215 | 440 | 360 | 400 |
| 12 | 120 | 265 | 170 | 195 | 135 | 400 | 280 | 360 | 145 | 360 | 120 | 25 |
| 13 | 195 | 145 | 130 | 170 | 270 | 255 | 190 | 360 | 175 | 615 | 305 | 240 |
| 14 | 120 | 235 | 185 | 290 | 160 | -230 | 415 | 160 | 160 | 400 | 200 | 215 |
| 15 | 330 | 250 | 210 | 0 | 95 | 230 | 120 | Z± | 135 | 360 | 135 | 160 |
| 16 | 120 | 185 | 130 | 210 | 135 | 390 | 135 | 215 | 240 | 375 | 175 | 295 |
| 17 | 340 | 420 | 25 | 185 | 190 | 310 | 105 | 200 | Z± | 265 | 185 | 265 |
| 18 | 210 | 225 | 145 | 185 | 65 | 200 | 120 | 215 | 55 | 185 | 200 | 295 |
| 19 | 90 | 355 | 145 | 290 | 135 | 215 | 175 | 215 | 135 | 535 | 185 | 375 |
| 20 | 210 | 300 | 185 | 170 | 120 | 160 | 135 | 145 | 185 | 305 | 225 | 335 |
| 21 | 145 | 380 | 185 | 340 | 175 | 280 | 105 | 400 | 305 | 585 | Z- | 535 |
| 22 | 265 | 355 | 160 | 120 | 230 | 400 | 120 | 190 | 240 | 400 | 400 | 240 |
| 23 | 65 | 225 | 105 | 145 | 180 | 310 | 145 | 335 | 240 | 385 | -440 | 265 |
| 24 | 105 | 330 | 130 | 185 | 190 | 535 | 160 | 270 | 215 | 455 | Z± | 575 |
| 25 | 225 | 250 | 225 | 250 | 65 | 320 | 190 | 105 | 55 | 400 | -145 | 710 |
| 26 | 225 | 355 | 130 | 130 | 120 | 440 | 135 | 200 | 455 | 465 | 480 | 400 |
| 27 | 250 | 515 | -160 | 250 | 120 | 350 | 145 | 495 | 160 | 255 | 360 | 545 |
| 28 | 185 | 290 | 130 | 170 | 240 | 320 | 190 | 320 | 225 | 425 | 320 | 375 |
| 29 | --- | --- | 90 | 210 | 160 | 360 | 145 | 160 | 790 | 320 | 425 | 360 |
| 30 | --- | 235 | 90 | 185 | 230 | 455 | 190 | 190 | 265 | 305 | 375 | 375 |
| 31 | 80 | 145 | 65 | 170 | 55 | 350 | 105 | 160 | | | | |
| Means (a) | 179 | 297 | 176 | 209 | 154 | 331 | 164 | 237 | 205 | 390 | 263 | 338 |
| Means (b) | 179 | 299 | 170 | 210 | 153 | 313 | 166 | 232 | 189 | 385 | 225 | 324 |
| Mean for Day. | (a) 215 (b) 215 | | | | (a) 221 (b) 216 | | | | (a) 299 (b) 281 | | | |
| Month. | OCTOBER. Factor 2.64 | | | | NOVEMBER. Factor 2.68 | | | | DECEMBER. Factor 2.71 | | | |
| Hour G.M.T. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. | 2-3h. | 8-9h. | 14-15h. | 20-21h. |
| Day. | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m | v/m |
| 1 | Z± | 305 | 210 | 395 | 190 | 525 | 360 | 335 | 230 | 490 | 340 | 595 |
| 2 | 170 | 355 | 500 | 540 | 40 | 360 | 390 | 390 | 435 | 625 | 675 | 515 |
| 3 | 305 | 700 | 555 | 555 | 200 | 480 | 400 | 565 | 190 | 325 | 500 | 500 |
| 4 | 315 | 555 | 315 | 315 | 270 | 480 | 95 | 400 | 245 | 625 | 635 | 570 |
| 5 | 160 | 475 | 345 | 475 | --- | --- | 480 | 270 | 325 | 675 | 650 | 760 |
| 6 | 80 | 395 | 130 | 410 | 320 | 350 | 270 | 160 | 570 | 500 | 555 | -610 |
| 7 | 200 | 210 | 225 | 395 | 215 | 335 | 295 | 160 | 490 | 705 | 405 | 690 |
| 8 | 130 | 265 | 240 | 275 | 335 | 415 | 525 | 375 | 460 | 760 | 595 | 825 |
| 9 | 275 | 395 | 305 | 315 | 415 | 190 | 400 | 390 | 380 | 675 | 540 | 555 |
| 10 | 130 | 130 | 265 | 210 | -120 | 565 | 350 | 270 | 530 | 570 | 595 | 515 |
| 11 | 65 | 130 | 210 | 490 | 230 | 390 | 525 | 320 | 515 | 815 | 665 | 760 |
| 12 | 265 | 475 | 240 | 500 | 430 | 105 | 440 | 655 | 255 | 570 | 840 | 770 |
| 13 | 265 | 580 | 275 | 500 | 340 | 495 | 645 | Z± | 350 | 420 | 595 | 705 |
| 14 | 80 | 305 | Z± | 490 | 535 | 685 | 495 | 710 | 445 | 840 | 585 | 950 |
| 15 | 290 | 420 | 250 | 410 | 175 | -175 | 440 | 790 | -55 | -300 | 365 | 585 |
| 16 | 130 | 385 | Z± | 385 | 910 | 725 | 750 | 480 | 380 | 690 | 595 | 475 |
| 17 | 145 | 395 | 275 | 420 | 135 | Z± | 360 | 430 | 515 | 475 | 325 | 490 |
| 18 | 290 | 605 | 240 | 315 | 135 | 280 | 535 | 440 | 460 | 595 | 405 | 500 |
| 19 | 240 | 370 | 275 | 420 | 360 | 470 | -80 | 270 | 160 | 635 | 530 | 540 |
| 20 | 410 | 460 | 515 | 475 | 135 | 430 | 1045 | 695 | 190 | 490 | 405 | 365 |
| 21 | 330 | 410 | 500 | 460 | 40 | 25 | 415 | 335 | 380 | 460 | 555 | 865 |
| 22 | 225 | 225 | 200 | 330 | 335 | 400 | 535 | 535 | 555 | 770 | 490 | 625 |
| 23 | 170 | 225 | 210 | 305 | 95 | 565 | 670 | 565 | 340 | 475 | 310 | 445 |
| 24 | Z± | 330 | 385 | 290 | 415 | 320 | 465 | 440 | 245 | 255 | 365 | 475 |
| 25 | 55 | 160 | 15 | 500 | 105 | 375 | 190 | 255 | 230 | 270 | 705 | 540 |
| 26 | 290 | 450 | 240 | 460 | 295 | 350 | 565 | 400 | 205 | 95 | 405 | 635 |
| 27 | 210 | -225 | Z± | 385 | 480 | 630 | 670 | 910 | 460 | 460 | 555 | 595 |
| 28 | 275 | 450 | 275 | 105 | 310 | 605 | 270 | 390 | 165 | 175 | 515 | 555 |
| 29 | 90 | 210 | 385 | 225 | 240 | 590 | 615 | 670 | 380 | 475 | 490 | 595 |
| 30 | 210 | -410 | 420 | 490 | 295 | 455 | 480 | 815 | 325 | 625 | 475 | 585 |
| 31 | 410 | 395 | 55 | 515 | | | | | 110 | 70 | 420 | 595 |
| Means (a) | 214 | 371 | 288 | 399 | 286 | 429 | 471 | 463 | 350 | 520 | 519 | 606 |
| Means (b) | 223 | 347 | 287 | 400 | 274 | 405 | 448 | 471 | 337 | 494 | 519 | 567 |
| Mean for Day. | (a) 318 (b) 314 | | | | (a) 412 (b) 399 | | | | (a) 499 (b) 479 | | | |
| | | | | | | | | | Annual Means (a) | | | |
| | | | | | | | | | 255 409 324 401 | | | |
| | | | | | | | | | (b) | | | |
| | | | | | | | | | 238 392 301 397 | | | |
| | | | | | | | | | (a) 347 (b) 333 | | | |

Note.- The 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.
 (a) Mean from all positive readings.
 (b) Mean from all complete days, using both positive and negative readings.

POTENTIAL GRADIENT (reduced to level surface): DIURNAL INEQUALITIES (in volts per metre). The departures from the mean of the day are adjusted for non-cyclic change.†

543. RICHMOND (Kew Observatory).

1933.

Table with 25 columns (Month and Season, Hour 0-1 to 23-24, Non Cyclic Change, Mean Values) and 13 rows (Jan to Dec, Year, Winter, Eqnx, Summer).

AIR POLLUTION: HOURLY MEANS FOR EACH MONTH (milligrams per cubic metre). COMPLETE DAYS ONLY.

544. RICHMOND (Kew Observatory).

1933.

Table with 25 columns (Month and Season, Hour 0-1 to 23-24, Mean, No. of Days Used) and 13 rows (Jan to Dec, Year, Winter, Eqnx, Autumn, Summer).

AIR POLLUTION: DIURNAL INEQUALITIES (milligrams per cubic metre). † The departures from the mean of the day are adjusted for non-cyclic change.

545. RICHMOND (Kew Observatory).

1933.

Table with 25 columns (Month and Season, Hour 0-1 to 23-24, Non Cyclic Change, Range) and 13 rows (Jan to Dec, Year, Winter, Eqnx, Summer).

† See page 21.

SEISMOLOGICAL DIARY.

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory).

Lat. 51° 28' 6" N. Long. 0° 18' 47" W. Height above M.S.L. 5 metres.

1933.

| Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. | Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. |
|---------|---|--|--|---------|------------|--------|--|----------|--|---|---|---------|------------|-------|---|
| | | | h. m. s. | s. | μ | km. | | | | | h. m. s. | s. | μ | km. | |
| Jan. 1* | ZNE | eL F | 9 58 10 25 | ... | ... | ... | New Hebrides. 15° S., 167° E. (Manila). | Feb. 3 | N NE NE Z N | e i L L M F | 22 33 52 33 57 52 58 59 12 23 30 | ... | ... | ... | Kurile Islands. 46° N., 151° E. (J.S.A.). |
| 3* | ZNE | eL F | 16 9 40 | ... | ... | ... | Japan. (40° N., 144° E. (Tokyo). | | | | | | | | |
| 4* | ZNE | eL F | 2 9 45 | ... | ... | ... | S.E. of Japan 26° N., 145° E. (Tokyo). | 8 | | e F | 7 10 24 12 | ... | ... | ... | Southern Germany. Very small. |
| 4* | ZNE | eL F | 4 29 50 | ... | ... | ... | Coast of Alaska 62° N., 148° W. (U.S.C.G.S.) | 13 | NE NE Z N E Z | e L eL M M M F | 3 10 15 20 20 37 24 59 25 1 4 5 | ... | ... | ... | Gobi Desert, China. 45° N., 89° E. (Bombay). |
| 7 | ZN ZNE E NE NE E N Z N E | eP eS e(SS) e eL M M eL M M F | 4 19 29 31 35 00 36 16 45 46 55 47 54 52 54 54 55 3 6 5 | ... | ... | (9000) | Japan, 40° N., 144° E. (Tokyo). | | | | | | | | |
| | | | | | | | | 14 | | e F | 6 45 7 10 | ... | ... | ... | China. 43° N., 81° E. (U.R.S.S.) |
| | | e F | 7 13 40 | ... | ... | ... | | 19 | | e F | 5 26 45 | ... | ... | ... | |
| 8 | | | | | | | | 22 | | e F | 18 25 40 | ... | ... | ... | Azores. |
| 9 | ZE Z ZNE NE NE ZNE N | iP ipP iS esS iScS eSS esSS F | 2 10 27 11 17 17 29 18 54 19 53 21 21 22 41 3 15 | ... | ... | ... | Compression. Azimuth about east. Samarkand, 40° N., 67° E. (Strasbourg). Deep focus (0.03). †Distance and depth from tables by F. J. Scrase. | 23 | Z ZNE ZNE E NE N NE NE NE N E ZNE E N Z | iP iPP i eSKS iSKKS i iPS iPPS iSS Lq M M M M M F | 8 22 31 26 12 26 36 33 8 33 28 34 6 35 18 35 48 40 7 48 51 16 51 21 54 59 12 9 0 16 0 33 11 30 | ... | ... | 10700 | Compression. Pacific Ocean off Northern Chile, 20° S., 71° W. (J.S.A.). |
| 14 | ZNE ZNE | i(Sg) i F | 8 31 52 31 56 33 | ... | ... | ... | Northern England. Very small. | | | | | | | | |
| 17 | | e F | 19 40 20 5 | ... | ... | ... | | | | | | | | | |
| 17 | | e F | 22 46 55 | ... | ... | ... | | 25 | | e F | 23 32 45 | ... | ... | ... | Felt in Sicily. |
| 18 | ZNE | eL F | 9 13 25 | ... | ... | ... | | 27 | | e F | 17 35 18 10 | ... | ... | ... | |
| 21 | | e F | 16 3 17 10 | ... | ... | ... | | 28 | | e F | 22 27 35 | ... | ... | ... | Very small. |
| 21 | ZNE ZNE E NE E NE NE NE NE Z N Z E N E E | iP iPP ePPP eSKS iSKKS iS iPS iSS eSSS L eL M M M M M M F | 19 34 58 39 2 41 17 45 31 46 7 46 37 48 5 53 37 57 19 20 3 8 16 43 17 36 17 54 21 29 22 22 24 35 24 38 22 40 | ... | ... | 11200 | Dilatation. Indian Ocean, 34° S., 58.5° E. (Strasbourg). | Mar. 2/3 | ZNE ZNE ZNE ZNE Z E E E E E E N ZNE N E Z | iP i i iPP iPPP iSKS i iS i i i i i i i SS eL M M M F | 17 43 31 43 35 43 39 46 58 49 3 49 5 53 51 53 57 54 1 54 53 55 3 55 32 58 59 59 9 59 16 59 (43) 18 7 From 18 10 to 18 40 1 30 | ... | ... | 9400 | Amplitudes of iP as read in mm. N. E. Z. +5.3 +2.4 -18.7 Azimuth = 26°. Destructive in N.E. Japan. 40° N., 145° E. (hinfeng). |
| 23 | | e F | 18 58 19 5 | ... | ... | ... | | | | | | | | | |
| 27/28 | Z E Z | iP eL eL F | 22 56 14 23 35 43 1 0 | ... | ... | ... | No "N" record. Felt in Apia. 14° S., 171° W. (U.S.C.G.S.) | 3 | | e F | 5 15 50 | ... | ... | ... | Probably repetition from preceding epi- centre. |
| 29 | ZE | e F | 18 58 19 5 | ... | ... | ... | No "N" record. | 3 | NE E Z | eL M eL F | 9 52 10 1 34 10 2 11 5 | ... | ... | ... | Pacific Ocean off Japan, 39° N., 150° E. (Manila). |

SEISMOLOGICAL DIARY—continued.

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory).

Lat. 51° 28' 6" N. Long. 0° 18' 47" W. Height above M.S.L. 5 metres.

1933.

| Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. | Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. |
|--------|--|--|---|---------|------------|-----|--|-------------------|---|---|---|-----------|--------------|------|--|
| | | | h. m. s. | s. | μ | km. | | | | | h. m. s. | s. | μ | km. | |
| Mar. 3 | | e F | 15 50 16 10 | ... | ... | ... | | Mar. 17* cont. | E Z E Z | M eL M M F | 29 57 30 42 22 42 26 21 25 | 27 ... | +24 ... | ... | |
| 6 | | e F | 13 46 14 5 | ... | ... | ... | Garó Hills, Assam. (Bombay.) | | | | | | | | |
| 7 | | e F | 14 49 15 0 | ... | ... | ... | Southern Italy. | 18* | N NE | e eL | 3 35 51 | ... | ... | ... | Western Pacific Ocean. 21° N., 135° E. (U.R.S.S.) |
| 8 | | e F | 2 22 40 | ... | ... | ... | Pacific Ocean off Japan. 42° N., 148° E. (U.R.S.S.) | | E Z N | M eL M F | 54 8 59 4 6 40 30 | 46 ... | (-50) ... | ... | Small on "N-S" component |
| 10 | | e F | 6 29 35 | ... | ... | ... | Very small. | 22 | NE NE Z | eS eL eL F | 18 22 46 25 28 35 | ... | ... | ... | Felt in Ionian Is. lands. |
| 11 | ZNE NE NE Z N E Z | eP eS eL eL M M M F | 2 6 15 16 18 26 30 37 34 39 52 44 58 3 30 | ... | ... | ... | 8855 Destructive round long Beach, Southern California. 33° 35' N., 117° 59' W. (Pasadena.) | 23 | Z NE Z | e eL eL F | 18 4 (23) 12 14 45 | ... | ... | ... | Gobi Desert, China. (Bombay.) |
| 11 | Z N ZNE Z NE E Z Z N | eP ePP eSKS e(S) eL M eL M M F | 14 34 24 38 8 44 19 45 27 15 6 8 44 14 17 39 19 48 16 10 | ... | ... | ... | (10100) | 26 | | e F | 5 38 45 | ... | ... | ... | } Very small. |
| | | | | | | | | 26 | | e F | 19 47 55 | ... | ... | ... | |
| | | | | | | | | 28 | | e F | 4 54 5 10 | ... | ... | ... | Alaska. 58° N., 160° W. (U.R.S.S.) |
| 11 | Z Z ZNE NE NE Z E E | iP i iPP eSKS iS i e iSS F | 19 45 7 47 2 49 5 54 53 55 31 56 55 58 57 20 2 13 21 5 | ... | ... | ... | Western Pacific Ocean. 24° N., 138° E. (Manila.) Deep focus. Surface waves very poorly developed. | 31 Apr. 1 | | e F | 22 38 55 | ... | ... | ... | Yun nan, China. 24° N., 102° E. (Bombay.) |
| | | | | | | | | Apr. 1 | NE E Z N | eL M eL M F | 16 44 47 24 48 50 9 17 15 | ... | ... | ... | Japan. 39° 5' N. 143° 5' E. (Tokyo.) |
| 12 | | e F | 5 55 6 10 | ... | ... | ... | Japan. 36° N., 140° E. (U.R.S.S.) | 9 | ZNE Z ZNE NE N E N NE Z E Z | iP e ePP S e eSS eSSS eL eL M M M F | 2 59 11 59 30 3 2 16 9 35 13 37 15 9 21 2 26 32 35 22 35 33 39 36 | ... | ... | 9280 | Japan. 39° N., 143° E. (J.S.A.) |
| 13 | | e F | 8 5 20 | ... | ... | ... | | | | | | | | | |
| 14 | ZNE E N NE Z N | eP eS e L L M F | 1 24 30 28 34 28 42 30 0 32 4 32 29 — | ... | ... | ... | 2485 Aegean Sea. 39° N., 25° E. (U.R.S.S.) | | | | | | | | |
| | | | | | | | | | | | | | | | Overlapped by next shock. |
| 14 | N NE Z | e eL eL F | 1 47 50 56 2 40 | ... | ... | ... | | 9 | Z ZNE N E E NE Z N N E Z | eP eS e eSS eSSS eL eL M M M F | 4 10 51 21 14 25 37 26 57 30 39 37 39 40 56 45 58 48 12 48 16 5 30 | ... | ... | 9250 | Pacific Ocean off Central America. 19° N., 107° W. (J.S.A.) |
| 15 | ZNE | eL F | 6 23 7 10 | ... | ... | ... | | | | | | | | | |
| 17* | ZN NE N ZE N E ZN N E Z | iP eS iSKS eSP eSS eL eL M M M F | 16 6 58 16 36 17 13 17 21 20 58 25 29 38 44 48 46 17 40 | ... | ... | ... | 8365 Kamtchatka. 56° N., 160° E. (J.S.A.) | 9 | | e F | 11 19 40 | ... | ... | ... | Japan. |
| | | | | | | | | 9 | ZE | e eL F | 21 47 53 22 10 | ... | ... | ... | Repetition of shock at 9d. 4h. |
| 17* | Z E E NE NE N | ePP eSKS ePS e eL M | 19 51 13 57 44 20 0 19 16 53 23 29 57 | ... | ... | ... | (11800) Felt in Eastern Mindanao. 6.5° N., 128° E. (Manila.) | 12 | N N N | i i i F | 14 31 57 32 16 32 19 33 | ... | ... | ... | Very small. Felt in Jersey. |
| | | | | | | | | 13 | | e F | 23 22 55 | ... | ... | ... | |

* Confused by wind and microseisms.

SEISMOLOGICAL DIARY—continued.

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory).

Lat. 51° 28' 6" N. Long. 0° 18' 47" W. Height above M.S.L. 5 metres.

1933.

| Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. | Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. |
|---------|--|---|--|---------|------------|---------|--|---------------------------------|---|---|---|---------|------------|-------|---|
| | | | h. m. s. | s. | μ | km. | | | | | h. m. s. | s. | μ | km. | |
| Apr. 16 | | e F | 7 26 8 25 | ... | ... | ... | Between New Zealand and Kermadec Islands 34° S., 178° W. (Stuttgart.) | May 1 | Z E ZN | eP eL eL | 19 1 45 30 34 | ... | ... | ... | South of Aleutian Islands. 50° N., 170° W. (J.S.A.) |
| 16 | ZE Z E Z Z | ePP eSP eL M F | 19 37 6 46 35 20 13 27 31 58 21 45 | ... | ... | (13000) | No "N" record. New Guinea. 3° S., 139° E. (Stuttgart.) | 1 | Z E E ZN E Z | iP eS eL eL M M F | 20 3 23 13 34 26 31 35 5 44 51 22 5 | ... | ... | 9010 | Overlapped by next shock. Pacific Ocean off Kurile Islands. 45° N., 153° E. (U.R.S.S.) |
| 19 | | e F | 2 34 4 00 | ... | ... | ... | | 2 | | e F | 0 2 35 | ... | ... | ... | |
| 19 | Z E NE NE E N Z N E Z | ePP e(S) eSSS eL M M eL M M M F | 7 1 4 8 20 18 40 30 32 42 32 55 37 42 9 42 9 42 15 8 50 | ... | ... | (10000) | Felt at Fu-chow. 24° N., 122° E. (Kōti.) | 2 4 5 | | e F e F eL eL M F | 0 2 35 0 18 35 4 43 52 52 36 5 20 | ... | ... | ... | |
| 23 | ZNE ZNE NE ZNE Z NE Z E Z N | iP i iS i i L L M M M | 6 2 54 2 57 7 16 7 23 7 26 9 11 13 24 14 1 15 11 | ... | ... | 2720 | Amplitudes of iP as read in mm. :— Z. N. E. +2.7 +1.4 -2.8 Giving azimuth about 115°. 36.5° N., 26.5° E. (Strasbourg.) Destructive in Italian island of Kos, Ægean Sea. Overlapped by next shock. | 6 7 8 8 8 8 8 | Z E ZN NE N ZE E Z | iP iS e e eL eL M M F | 5 45 52 55 57 56 2 6 1 6 8 11 12 51 15 44 7 10 21 12 30 17 28 35 1 22 40 10 46 11 46 15 49 19 56 10 11 9 13 20 14 24 23 41 24 36 13 35 18 50 19 15 | ... | ... | 8900 | Pacific Ocean off Central America. 6° N., 83° W. (J.S.A.) |
| 23 | Z NE NE Z E | eP eS L L M F | 7 26 14 36 40 54 8 1 2 51 9 30 | ... | ... | 9310 | Pacific Ocean east of Japan. 39.7° N., 143.6° E. (Tokyo.) | 8 8 | e F e F ZE ZE E N ZE N E Z | iP iS ePP eS eL eL M M M F | 10 46 11 46 15 49 19 56 10 11 9 13 20 14 24 23 41 24 36 13 35 18 50 19 15 | ... | ... | 8770 | Ægean Sea. 38.5° N., 24.0° E. (U.R.S.S.) Compression. Pacific Ocean off Mexico. 16° N., 101° W. (J.S.A.) |
| 23 | ZNE | eL F | 11 27 40 | ... | ... | ... | | | | eL F | 11 27 40 | ... | ... | ... | |
| 25 | ZN ZNE | e eL F | 22 42 41 48 23 00 | ... | ... | ... | | | | e eL F | 22 42 41 48 23 00 | ... | ... | ... | |
| 27 | ZN ZNE ZNE E N N E NE Z N Z E | P iP iPP iS iS iS i iSS eL eL M M M eL ₂ F | 2 46 48 46 53 49 14 49 14 55 35 55 51 56 50 59 36 3 5 9 11 54 18 3 19 47 5 8 6 0 | ... | ... | 7350 | Amplitudes of iP as read in mm. :— Z. N. E. -10.0 +5.3 -1.4 Giving azimuth about 344°. Alaska. 61° N., 150° W. (U.S.C.G.S.) Via Antipodes. | 8 9 11 | e F e F Z ZNE Z ZNE ZNE N E M Z | eP iP PP eS eL eL M M M F | 19 14 18 14 20 15 40 17 59 20 20 56 22 18 22 22 20 15 18 50 19 15 3 25 40 19 14 18 14 20 15 40 17 59 20 20 56 22 18 22 22 20 15 | ... | ... | 2210 | Dilatation. Amplitudes of iP as read in mm. :— Z. N. E. +6.0 +2.0 -3.4 Azimuth = 118° giving epicentre near 40° N., 23° E. Gulf of Salonica. |
| 27 | Z NE Z NE Z | e(PP) e(S) e eL eL F | 12 12 27 17 11 19 17 34 37 13 40 | ... | ... | ... | South of Aleutian Islands. 50° N., 170° W. (U.R.S.S.) | 15 16 | | e F e F eP eSKS eL eL M M F | 20 11 30 1 25 (28) 35 (50) 2 3 7 5 32 15 17 3 35 0 40 1 5 | ... | ... | 10000 | North-west of Sumatra. 6° N., 95° E. (U.R.S.S.) |
| 28 | NE N Z | eS L M eL F | 22 38 48 42 43 18 45 23 0 | ... | ... | ... | Eastern Mediterranean. 35° N., 28° E. (U.R.S.S.) | 18 | | e F | 0 40 1 5 | ... | ... | ... | Kamtchatka. |

SEISMOLOGICAL DIARY—continued.
Galitzin Seismographs, three components.

546. Richmond (Kew Observatory).

Lat. 51° 28' 6" N. Long. 0° 18' 47" W. Height above M.S.L. 5 metres.

1933.

| Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. | Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. | |
|--------|--------|--------|----------|---------|------------|---|--|---------|---------|---------|----------|---------|------------|------|--|---|
| May 19 | Z | eP | h. m. s. | s. | μ | km. | Atlantic Ocean. 1° 5' S., 11° W. (Strasbourg.) | June 10 | Z | eP | h. m. s. | s. | μ | km. | Compression. Atlantic Ocean west of Iceland. 64° N., 25° W. (J.S.A.) | |
| | ZNE | iP | 18 7 30 | ... | ... | 5990 | | | ZNE | iP | 12 10 52 | ... | ... | 2050 | | |
| | ZNE | eS | 7 34 | ... | ... | ... | | | NE | eS | 10 57 | ... | ... | ... | | |
| | NE | eL | 15 5 | ... | ... | ... | | | ZNE | L | 14 20 | ... | ... | ... | | |
| | Z | eL | 20 | ... | ... | ... | | | Z | M | 15 | ... | ... | ... | | |
| | N | M | 24 | ... | ... | ... | | | E | M | 17 4 | 15 | +16 | ... | | |
| | E | M | 27 41 | 26 | +55 | ... | | | N | M | 17 27 | 13 | -16 | ... | | |
| Z | M | 31 27 | 15 | -43 | ... | F | F | 18 20 | 12 | +17 | ... | | | | | |
| Z | M | 31 57 | 13 | +39 | ... | | | 14 10 | ... | ... | ... | | | | | |
| | F | 20 10 | ... | ... | ... | | | | | | | | | | | |
| 20 | e | F | 5 50 | ... | ... | ... | 10 | ZNE | eL | 14 23 | ... | ... | ... | | | |
| | F | F | 7 0 | ... | ... | ... | | | F | 40 | ... | ... | ... | | | |
| 23 | e | F | 17 29 | ... | ... | ... | 10 | | e | 15 21 | ... | ... | ... | | | |
| | F | F | 18 00 | ... | ... | ... | | | F | 35 | ... | ... | ... | | | |
| 30 | e | F | 12 22 | ... | ... | ... | Very small. | 10 | | e | 16 38 | ... | ... | ... | | |
| | F | F | 45 | ... | ... | ... | | | | F | 17 00 | ... | ... | ... | | |
| 30 | e | F | 14 48 | ... | ... | ... | 10 | | e | 20 42 | ... | ... | ... | | | |
| | F | F | 55 | ... | ... | ... | | | F | 55 | ... | ... | ... | | | |
| 31 | e | F | 20 6 | ... | ... | ... | 11 | | e | 13 28 | ... | ... | ... | | | |
| | F | F | 15 | ... | ... | ... | | | F | 35 | ... | ... | ... | | | |
| June 1 | ZN | eP | 2 45 13 | ... | ... | 2280 | Felt in eastern Macedonia. 40° 5' N., 22° 5' E. (U.R.S.S.) | 12 | Z | eP | 15 34 22 | ... | ... | ... | Pacific Ocean. 50° N., 145° W. (U.R.S.S.) | |
| | ZNE | eS | 49 00 | ... | ... | ... | | ZNE | eL | 16 2 | ... | ... | ... | | | |
| | N | eL | 51 | ... | ... | ... | | | | F | 45 | ... | ... | ... | | |
| | N | M | 52 3 | 13 | + 3 | ... | | 12 | ZNE | eL | 21 50 | ... | ... | ... | | Japan. 38° 8' N., 141° 7' E. (Tokyo.) |
| | N | F | 3 10 | ... | ... | ... | | | | F | 22 10 | ... | ... | ... | | |
| 2 | Z | eP | 7 51 30 | ... | ... | 9550 | Japan. 31° 7' N., 131° 1' E. (Tokyo.) | 13 | Z | eP | 20 45 59 | ... | ... | 9100 | Pacific Ocean off Japan. 40° 7' N., 143° 7' E. (Tokyo.) | |
| | E | eS | 8 1 57 | ... | ... | ... | | Z | ePcP | 46 15 | ... | ... | ... | | | |
| | NE | eL | 22 | ... | ... | ... | | Z | ePP | 49 10 | ... | ... | ... | | | |
| | Z | eL | 26 | ... | ... | ... | | NE | eS | 56 15 | ... | ... | ... | | | |
| | N | M | 33 56 | 20 | +10 | ... | | E | eL | 21 12 | ... | ... | ... | | | |
| E | M | 37 48 | 18 | -11 | ... | ZN | eL | 17 | ... | ... | ... | | | | | |
| | F | 9 10 | ... | ... | ... | N | M | 22 25 | 20 | + 9 | ... | | | | | |
| 2 | e | F | 13 27 | ... | ... | ... | E | M | 24 00 | 18 | - 9 | ... | | | | |
| | F | F | 40 | ... | ... | ... | Z | M | 26 53 | 20 | - 7 | ... | | | | |
| 3 | Z | eP | 17 22 2 | ... | ... | (10000) | Japan. 29° N., 129° 5' E. (Manila.) | 13 | Z | eP | 22 30 33 | ... | ... | 7230 | Alaska. 61° N., 149° W. (J.S.A.) | |
| | Z | ePP | 25 32 | ... | ... | ... | | Z | ePP | 32 54 | ... | ... | ... | | | |
| | ZNE | eL | 58 | ... | ... | ... | | NE | eS | 39 14 | ... | ... | ... | | | |
| | N | M | 18 1 5 | 19 | + 8 | ... | | E | eL | 51 | ... | ... | ... | | | |
| | Z | M | 6 30 | 15 | - 8 | ... | | ZN | eL | 54 | ... | ... | ... | | | |
| | F | 45 | ... | ... | ... | E | M | 59 52 | 18 | + 3 | ... | | | | | |
| 4 | e | F | 13 32 | ... | ... | ... | N | M | 23 0 52 | 19 | + 6 | ... | | | | |
| | F | F | 40 | ... | ... | ... | F | F | 50 | ... | ... | ... | | | | |
| 4 | e | F | 14 9 | ... | ... | Very small | 14 | | e | 21 33 | ... | ... | ... | | | |
| | F | F | 15 | ... | ... | | | | F | 45 | ... | ... | ... | | | |
| 6 | e | F | 2 51 | ... | ... | ... | 16 | | e | 1 30 | ... | ... | ... | | | |
| | NE | eL | 3 18 | ... | ... | ... | | | F | 2 5 | ... | ... | ... | | | |
| | Z | eL | 27 | ... | ... | Philippine Islands. 14° 20' N., 121° 35' E. (Manila.) | 18 | E | e | 5 0 | ... | ... | ... | | | |
| | Z | M | 30 46 | 19 | - 7 | ... | ZNE | eL | 8 | ... | ... | ... | | | | |
| | N | M | 32 8 | 20 | - 6 | ... | N | M | 10 28 | 24 | - 7 | ... | | | | |
| | F | 4 0 | ... | ... | ... | | | F | 6 0 | ... | ... | ... | | | | |
| 7 | Z | eP | 11 57 49 | ... | ... | 8400 | Southern China. 25° 2' N., 101° 9' E. (Chiufeng.) | 18/19 | ZNE | iP | 21 50 9 | ... | ... | 9200 | Amplitudes of iP as read in mm. :— Z. N. E. +4.7 -2.0 (-0.8) | |
| | NE | eS | 12 7 29 | ... | ... | ... | | ZNE | iPP | 53 20 | ... | ... | ... | | | |
| | NE | eL | 23 | ... | ... | ... | | ZN | ePPP | 55 29 | ... | ... | ... | | | |
| | Z | eL | 28 | ... | ... | ... | | NE | iS | 22 0 29 | ... | ... | ... | | | |
| | Z | M | 35 8 | 15 | - 7 | ... | | E | i | 0 34 | ... | ... | ... | | | |
| | F | 14 00 | ... | ... | ... | ZE | i | 0 57 | ... | ... | ... | | | | | |
| 8 | Z | iP | 18 23 10 | ... | ... | 9300 | Pacific Ocean off Japan. 40° 2' N., 144° 0' E. (Tokyo.) | ZE | iPS | 1 27 | ... | ... | ... | | | |
| | ZNE | ePP | 26 25 | ... | ... | ... | | N | iPPS | 2 20 | ... | ... | ... | | | |
| | NE | eL | 52 | ... | ... | ... | | E | iSS | 6 18 | ... | ... | ... | | | |
| | ZE | eL | 55 | ... | ... | ... | | E | iSSS | 9 38 | ... | ... | ... | | | |
| | E | M | 57 10 | 25 | + 9 | ... | | NE | L | 15 | ... | ... | ... | | | |
| | | F | 20 00 | ... | ... | ... | | Z | L | 20 | ... | ... | ... | | | |
| | | F | — | ... | ... | ... | | E | M | 20 28 | 36 | -200 | ... | | | |
| 10 | e | F | 12 4 | ... | ... | ... | N | M | 22 24 | 30 | -155 | ... | | | | |
| | | F | — | ... | ... | ... | E | M | 23 20 | 27 | +165 | ... | | | | |
| | | F | — | ... | ... | ... | N | M | 26 57 | 23 | +140 | ... | | | | |
| | | F | — | ... | ... | ... | E | M | 27 56 | 20 | +125 | ... | | | | |
| | | F | — | ... | ... | ... | N | M | 29 18 | 23 | -195 | ... | | | | |
| | | F | — | ... | ... | ... | E | M | 29 35 | 22 | +125 | ... | | | | |
| | | F | — | ... | ... | ... | N | M | 30 29 | 22 | -170 | ... | | | | |
| | | F | — | ... | ... | ... | Z | M | 30 44 | 21 | -185 | ... | | | | |
| | | F | — | ... | ... | ... | | | | | | ... | | | | |

SEISMOLOGICAL DIARY—continued.
Galitzin Seismographs, three components.

546. Richmond (Kew Observatory).

Lat. 51° 28' 6" N. Long. 0° 18' 47" W. Height above M.S.L. 5 metres.

1933.

| Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. | Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. |
|------------------|--|--|---|-----------------|------------------|-------------------|--|--------------|--------------------------------|-------------------------------------|---|------------------|-----------------|-------------------|---|
| June 18/19 cont. | Z | M F | h. m. s. 32 56 1 45 | s. 17 ... | μ -135 ... | km. | | July 9 cont. | ZNE | eL F | h. m. s. 10 10 — | s. | μ | km. | Overlapped by next shock. |
| 19 | | e F | 19 23 50 | ... | ... | ... | Alaska. 60° N., 145° W. (U.R.S.S.) | 9 | Z | eP F | 10 0 29 11 30 | ... | ... | ... | |
| 24/25 | ZNE E E NE N Z E N E Z N E Z | eP iSKS iSS eL M eL M M M M M M M F | 22 8 46 19 40 29 6 37 44 50 45 51 48 56 36 23 1 16 1 28 3 6 4 25 4 37 2 40 | ... | ... | (11200) ... | Destructive in southern Sumatra. 5° S., 104.2° E. (Batavia.) | 9 | Z | eP F | 10 0 29 11 30 | ... | ... | ... | Very small; traces only on horizontal components. |
| 25 | | e F | 6 36 7 0 | ... | ... | ... | Very small. Borneo. 2° N., 112° E. (U.R.S.S.) | 9 | ZNE NE NE Z E Z | iP iS L L M M F | 12 42 52 52 59 13 12 16 15 32 23 40 15 45 | ... | ... | 8930 | Compression. Kurile Islands. 45° N., 150° E. (U.S.C.G.S.) Repetition of 9d. rh. |
| 25 | ZNE ZNE Z | e eL M F | 21 14 24 30 54 22 20 | ... | ... | ... | Nevada. 39° N., 119° W. (U.S.C.G.S.) | 9 | Z ZNE | eP eL F | 18 3 49 38 19 10 | ... | ... | ... | |
| 27 | ZE NE ZNE | eP eS L F | 15 44 41 48 21 50 16 15 | ... | ... | 2200 | Iceland. | 9 | | e F | 21 49 22 15 | ... | ... | ... | |
| 28 | | e F | 12 9 30 | ... | ... | ... | Very small. | 9 | | e F | 23 0 30 | ... | ... | ... | |
| 28/29 | Z NE ZNE | e eL F | 23 46 38 56 14 0 10 1 5 | ... | ... | 8330 | Aleutian Islands. 53° N., 163° W. (J.S.A.) | 10 | Z ZNE | eP eL F | 0 34 7 1 8 30 | ... | ... | ... | East Indies. (Manila.) |
| 29 | | e F | 3 9 30 | ... | ... | ... | | 10 | ZNE E E ZN E Z | iP eS eL eL M M F | 3 34 33 44 45 4 2 5 12 1 12 4 5 30 | ... | ... | 9030 | Compression. Pacific Ocean off Mexico. 17° N., 104° W. (U.S.C.G.S.) Repetition of 9d. 5h. |
| 29 | | e F | 15 30 35 | ... | ... | ... | Very small. | 10 | Z | eP eL F | 10 53 36 11 40 12 30 | ... | ... | ... | |
| 29 | ZNE ZNE | eP eL F | 16 58 37 17 3 15 | ... | ... | ... | Iceland. | 10 | | e F | 12 35 13 0 | ... | ... | ... | |
| 29 | ZNE ZNE | eP eL F | 18 33 50 39 50 | ... | ... | ... | | 11 | | e F | 7 44 50 | ... | ... | ... | |
| July 2 | | e F | 12 7 40 | ... | ... | ... | | 12 | | e F | 12 50 13 5 | ... | ... | ... | Very small. |
| 3 | | e F | 15 52 16 15 | ... | ... | ... | | 12 | | e F | 14 15 25 | ... | ... | ... | |
| 7 | | e F | 8 7 25 | ... | ... | ... | Very small. | 14 | Z | e(P) F | 1 58 11 2 5 | ... | ... | ... | |
| 9 | ZNE NE E ZN E N M M Z | iP eS eL eL M M M M F | 1 42 16 52 21 2 5 13 14 52 21 29 24 15 4 25 | ... | ... | 8900 | Compression. Kurile Islands. 45° N., 150° E. (U.S.C.G.S.) | 18 | Z E ZN | ePP eL eL F | 19 24 15 58 20 5 40 | ... | ... | ... | Caroline Islands. 8° N., 144° E. (Manila.) |
| 9 | Z NE N ZE | eP eS eL eL F | 5 46 59 57 27 11 14 45 | ... | ... | 9550 | Pacific Ocean off Mexico. 17° N., 105° W. (U.S.C.G.S.) | 19 | ZNE | eL F | 5 45 6 0 | ... | ... | ... | Aleutian Islands. 50° N., 170° W. (J.S.A.) |
| 9 | | e F | 11 27 12 30 | ... | ... | ... | | 19 | | e F | 11 27 12 30 | ... | ... | ... | Aleutian Islands. 50° N., 170° W. (J.S.A.) |
| 9 | NE | e(S) | 9 50 22 | ... | ... | ... | Earlier phases lost during changing of charts. | 19 | ZN ZNE | eP eL F | 15 11 47 40 16 50 | ... | ... | (8700) | Aleutian Islands. 51° N., 174° W. (U.S.C.G.S.) |

SEISMOLOGICAL DIARY—continued.

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory).

Lat. 51° 28' 6" N. Long. 0° 18' 47" W. Height above M.S.L. 5 metres.

1933.

| Date. | Compt. | Phase. | G.M.T. | Period. | Ampli- tude. | Δ | Remarks. | Date. | Compt. | Phase. | G.M.T. | Period. | Ampli- tude. | Δ | Remarks. | | |
|------------|--------|-----------------|----------|---------|-----------------|---------|---|-----------|---------|--------|----------|---------|-----------------|-------|--|--|--|
| July 19 | ZNE | eP | h. m. s. | s. | μ | km. | Ægean Sea. 36° N., 27° E. (Strasbourg.) | Aug. 7 | Z | eP | h. m. s. | s. | μ | km. | Very small. | | |
| | NE | eS | 20 12 29 | ... | ... | 2800 | | | 3 15 19 | ... | ... | (9370) | | | | | |
| | Z | e | 16 57 | ... | ... | ... | | | 25 48 | ... | ... | ... | | | | | |
| | NE | L | 17 6 | ... | ... | ... | | | 41 | ... | ... | ... | | | | | |
| | N | M | 18 | ... | ... | ... | | | 4 10 | ... | ... | ... | | | | | |
| | | F | 21 18 | 16 | -25 | ... | | | e | | 13 30 | ... | ... | ... | | | |
| | | F | 21 0 | ... | ... | ... | | | F | | 14 5 | ... | ... | ... | | | |
| 20/21 | Z | eP | 23 26 34 | ... | ... | 9210 | Pacific Ocean off Japan. 41° N., 146° E. (Stuttgart.) | 11 | ZNE | iP | 9 5 47 | ... | ... | 8430 | Kachin. 27° N., 97° E. (Manila.) | | |
| | NE | eS | 36 55 | ... | ... | ... | | | Z | ePP | 8 41 | ... | ... | ... | | | |
| | E | eL | 54 | ... | ... | ... | | | ZNE | eS | 15 29 | ... | ... | ... | | | |
| | ZN | F | 57 | ... | ... | ... | | | E | eSSS | 24 8 | ... | ... | ... | | | |
| | | F | 0 35 | ... | ... | ... | | | ZNE | eL | 31 | ... | ... | ... | | | |
| 21/22 | Z | eP | 20 21 13 | ... | ... | 12170 | Near Sandwich Islands. (Bombay.) | 13 | Z | eP | 9 41 46 | ... | ... | ... | Indian Ocean. 31° S., 56° E. (Stuttgart.) | | |
| | Z | e(PP) | 25 23 | ... | ... | ... | | | Z | ePP | 45 49 | ... | ... | ... | | | |
| | E | eS | 33 40 | ... | ... | ... | | | ZNE | eL | 10 18 | ... | ... | ... | | | |
| | Z | e | 35 6 | ... | ... | ... | | | | F | 12 10 | ... | ... | ... | | | |
| | N | ePS | 35 24 | ... | ... | ... | | | | | | | | | | | |
| | E | ePPS | 36 3 | ... | ... | ... | | | | | | | | | | | |
| | N | eSS | 41 31 | ... | ... | ... | | | | | | | | | | | |
| | E | eL | 52 | ... | ... | ... | | | | | | | | | | | |
| | ZN | eL | 21 2 | ... | ... | ... | | | | | | | | | | | |
| | N | M | 8 31 | 19 | -20 | ... | | | | | | | | | | | |
| | Z | M | 8 36 | 20 | -24 | ... | | | | | | | | | | | |
| | | F | 0 10 | ... | ... | | | | | | | | | | | | |
| 22 | ZNE | eP | 21 7 2 | ... | ... | 8420 | Amplitudes of eP as read in mm. :- Z. N. E. +1.5 -0.8 (+0.2) Azimuth between N. and NNW. Aleutian Islands. 52° N., 169° W. (U.S.C.G.S.) | 15 | ZNE | eP | 0 50 8 | ... | ... | 2570 | Felt in Ponta Delgada, Azores. | | |
| | NE | eS | 16 43 | ... | ... | ... | | | E | eS | 54 19 | ... | ... | ... | | | |
| | N | eSS | 21 44 | ... | ... | ... | | | ZNE | eL | 55 | ... | ... | ... | | | |
| | N | eSSS | 25 37 | ... | ... | ... | | | | F | 2 0 | ... | ... | ... | | | |
| | Z | ePKKP | 25 49 | ... | ... | ... | | | | | | | | | | | |
| | E | eL | 27 | ... | ... | ... | | | | | | | | | | | |
| | ZN | eL | 32 | ... | ... | ... | | | | | | | | | | | |
| | E | M | 34 14 | 26 | -33 | ... | | | | | | | | | | | |
| | N | M | 43 27 | 20 | -37 | ... | | | | | | | | | | | |
| | E | M | 44 53 | 20 | +40 | ... | | | | | | | | | | | |
| | N | M | 46 34 | 19 | -40 | ... | | | | | | | | | | | |
| | Z | M | 46 37 | 18 | +41 | ... | | | | | | | | | | | |
| | | eL ₂ | 23 17 | ... | ... | | | | | | | | | | | | |
| | | F | 1 15 | ... | ... | | | | | | | | | | | | |
| 23 | Z | eP | 4 26 10 | ... | ... | (11000) | Pacific Ocean off Peru. 16.5° S., 77.5° W. (Stuttgart.) | 18 | | | | ... | ... | ... | No records 5h. 15m. to 8h. 15m. | | |
| | E | eSKS | 36 52 | ... | ... | ... | | | | | | | | | | | |
| | ZNE | eL | 57 | ... | ... | ... | | | | | | | | | | | |
| | | F | 5 45 | ... | ... | ... | | | | | | | | | | | |
| 23 | Z | eP | 9 44 41 | ... | ... | ... | Atlantic Ocean. 30° N., 40° W. (Stuttgart.) | 20 | NE | eL | 12 36 | ... | ... | ... | Felt in S.E. Luzon. 13.6° N., 124.8° E. (Manila.) | | |
| | ZNE | eL | 54 | ... | ... | ... | | | Z | eL | 45 | ... | ... | ... | | | |
| | | F | 10 30 | ... | ... | ... | | | | F | 13 0 | ... | ... | ... | | | |
| 24 | Z | e | 10 22 | ... | ... | ... | Very small; traces only on horizontal components. | 25 | ZNE | eP | 8 2 2 | ... | ... | 8430 | Compression. Destructive near Chentu, China. 30.5° N., 103.5° E. (Chinfeng.) | | |
| | | F | 40 | ... | ... | ... | | | | | | | | | | | |
| 24 | Z | ePKP | 19 15 11 | ... | ... | (16000) | Felt in Samoa. 15° S., 175° W. (J.S.A.) | 25 | NE | eSS | 11 44 | ... | ... | ... | North Atlantic Ocean. | | |
| | ZN | ePP | 18 37 | ... | ... | ... | | | NE | eSSS | 16 27 | ... | ... | ... | | | |
| | N | eSKS | 25 17 | ... | ... | ... | | | NE | L | 19 30 | ... | ... | ... | | | |
| | ZNE | eL | 20 2 | ... | ... | ... | | | Z | eL | 23.8 | ... | ... | ... | | | |
| | Z | M | 15 1 | 20 | +22 | ... | | | N | M | 26 | ... | ... | ... | | | |
| | N | M | 15 6 | 20 | +18 | ... | | | E | M | 31 7 | 23 | -135 | ... | | | |
| | E | M | 20 (o) | 20 | +11 | ... | | | | F | 35 44 | 24 | +175 | ... | | | |
| | F | 22 10 | ... | ... | ... | | | 10 45 | ... | ... | ... | | | | | | |
| 25 | Z | e | 3 40.2 | ... | ... | ... | Possibly not seismic. | 25 | | e | 21 18 | ... | ... | ... | S. Atlantic, Sandwich Group. 58° S., 27° W. (J.S.A.) | | |
| | | F | 43 | ... | ... | ... | | | | F | 35 | ... | ... | ... | | | |
| 25 | Z | e | 5 5 6 | ... | ... | ... | | 26 | ZE | eP | 20 23 56 | ... | ... | 2160 | | | |
| | NE | L | 27 | ... | ... | ... | | | ZNE | eS | 27 33 | ... | ... | ... | | | |
| | | F | 45 | ... | ... | ... | | | | L | 28.4 | ... | ... | ... | | | |
| 31 | Z | iP | 11 40 26 | ... | ... | ... | Confused by micro- seisms and wind. Greenland. 67° N., 52° W. (U.R.S.S.) | 28/29 | Z | eP | 22 34 23 | ... | ... | 12670 | | | |
| | ZNE | L | 46 | ... | ... | ... | | | ZNE | ePKP | 38 21 | ... | ... | ... | | | |
| | | M | 48 | ... | ... | ... | | | Z | ePP | 39 19 | ... | ... | ... | | | |
| | | F | 12 10 | ... | ... | ... | | | NE | iSKS | 45 3 | ... | ... | ... | | | |
| 31 | | e | 16 11 | ... | ... | ... | | 25 | E | iS | 47 8 | ... | ... | ... | | | |
| | | F | 25 | ... | ... | ... | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | |
| Aug. 4 | | e | 18 21 | ... | ... | ... | Very small. | | | e | 21 18 | ... | ... | ... | | | |
| | | F | 30 | ... | ... | ... | | | | F | 35 | ... | ... | ... | | | |
| | | | | | | | | | | | | | | | | | |
| 5 | NE | e | 1 4 | ... | ... | ... | Solomon Islands. (Stuttgart.) | | | e | 21 18 | ... | ... | ... | | | |
| | Z | eL | 44 | ... | ... | ... | | | | | | | | | | | |
| | | eL | 53 | ... | ... | ... | | | | | | | | | | | |
| | | F | 3 5 | ... | ... | ... | | | | | | | | | | | |

SEISMOLOGICAL DIARY—continued.

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory).

Lat. 51° 28' 6" N. Long. 0° 18' 47" W. Height above M.S.L. 5 metres.

1933.

| Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. | Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. |
|---------|----------------------------|--------------------------------|---|-----------|------------|---------------|---|----------|--|---|--|-----------|------------|------------|---|
| Aug. 29 | ZN NE | isP iSKS | h. m. s. 15 6 30 13 48 | s. ... | μ ... | km. (9500) | Brazil. 8° S., 71° W. (J.S.A.) | Sept. 21 | | e F | h. m. s. 20 27 21 10 | s. ... | μ ... | km. ... | Very small. |
| | ZNE ZNE | iS iSP eL F | 13 59 15 6 30 16 5 | ... | ... | ... | Focus about 400 km. Below normal. "L" waves very poorly developed. | 22 | Z Z N | e(P) i e F | 11 57 10 57 23 12 1 3 15 | ... | ... | ... | Pacific Ocean (Stuttgart.) Deep focus. |
| 31 | NE NE Z | e eL eL F | 3 10 23 27 50 | ... | ... | ... | | 22 | ZNE | eL F | 12 56 13 45 | ... | ... | ... | |
| Sept. 2 | Z ZN NE NE ZNE | eP ipP iSKS iS iSP | 16 53 34 55 11 17 3 24 3 51 5 8 | ... | ... | (10000) | Pacific Ocean off Japan. Focus about 400 km. below normal. 30° N., 139° E. (Stuttgart.) | 24 | ZNE NE NE Z E N | eP eS eL eL M M F | 15 31 24 41 14 45 50 16 1 54 6 38 17 20 | ... | ... | 8600 | Aleutian Islands. 51° N., 177° W. (U.S.C.G.S.) |
| | NE Z N Z | eL eL M M F | 10 15 39 36 39 42 18 50 | ... | ... | ... | "L" waves very poorly developed. | 25 | E N ZE | e eL eL F | 14 34 38 43 15 15 | ... | ... | ... | |
| 6 | | e F | 2 40 3 25 | ... | ... | ... | | 25 | ZNE Z ZNE ZNE NE Z ZNE | eP i ePP ePPP eS e eL | 19 1 27 1 39 3 41 5 5 9 41 15 21 19 | ... | ... | 6710 | Compression. Tibet. 33° N., 85° E. (Stuttgart.) |
| 6 | | e F | 18 30 19 5 | ... | ... | ... | | | E Z ZNE | e eL M M F | 17 20 | ... | ... | ... | |
| 6/7 | Z Z N | iPKP ipPKP e(SKKS) | 22 27 9 29 34 36 47 | ... | ... | (17000) | Small on horizontal components. Pacific Ocean. 24° S., 178° W. (J.S.A.) | 26 | Z N ZNE | eP e iL F | 3 36 6 40 (17) 41 11 4 5 | ... | ... | ... | Destructive around Lama dei Peligni, Central Italy. |
| | ZNE | eL F | 48 0 40 | ... | ... | ... | Focus about 600 km. below normal. "L" waves very poorly developed. | 27 | ZNE | eL F | 22 48 23 10 | ... | ... | ... | |
| 7 | | e F | 9 9 20 | ... | ... | ... | | 27/28 | ZNE | eL F | 23 45 0 5 | ... | ... | ... | Very small. |
| 7 | | e F | 18 53 19 10 | ... | ... | ... | Very small. | 27/28 | ZNE | eL F | 23 45 0 5 | ... | ... | ... | Very small. |
| 7/8 | | e F | 23 10 0 10 | ... | ... | ... | | 30 | Z NE Z Z N Z | ePP eL eL M M F | 14 41 29 15 17 27 35 31 35 36 17 15 | ... | ... | ... | New Guinea. 3° S., 139° E. (Stuttgart.) |
| 8 | | e F | 7 2 10 | ... | ... | ... | Very small. | | E N Z | e eL M M F | 17 15 | ... | ... | ... | |
| 9 | Z NE | iPKP ePKS eL F | 21 39 19 42 52 22 23 23 45 | ... | ... | (15000) | Small on horizontal components. Pacific Ocean near Santa Cruz Island. 11° S., 165° E. (Stuttgart.) | Oct. 2 | | eL F | 15 18 — | ... | ... | ... | Overlapped by next shock. |
| 12 | ZN | eP eL F | 12 36 42 42 55 | ... | ... | ... | | 2 | ZE ZN ZN Z E NE Z E NE Z E Z Z | iP i i iPP iSKS iS e i L L M M M M M F | 15 42 4 42 56 43 51 45 24 52 29 52 37 53 45 53 54 16 4 9 15 9 18 35 18 41 20 15 22 40 19 40 | ... | ... | 9450 | Compression. Azimuth about W. Coast of Ecuador. 2.5° S., 80° W. (J.S.A.) |
| 12 | | e F | 13 55 14 10 | ... | ... | ... | | | NE Z E NE Z E Z Z | iS e i L L M M M M M F | 52 37 53 45 53 54 16 4 9 15 9 18 35 18 41 20 15 22 40 19 40 | ... | ... | ... | Focus about 230 km. below normal. |
| 17 | | e F | 4 44 5 10 | ... | ... | ... | Very small. | 3 | E N Z | e eL M M F | 19 19 20 5 | ... | ... | ... | Norecords, 3d. 8h. 32m. to 15h. 5m. and 4d. 8h. 45m. to 12h. om. during standardiza- tion, etc. |
| 20 | NE Z | eL eL F | 0 7 15 40 | ... | ... | ... | South of Aleutian Islands. 48° N., 175° W. (U.R.S.S.) | 3 | | e F | 19 19 20 5 | ... | ... | ... | |
| 21 | NE Z | eL eL F | 1 22 31 55 | ... | ... | ... | East Indies. 12° N., 120° E. (U.R.S.S.) | 3 | | e F | 19 19 20 5 | ... | ... | ... | |
| 21 | NE ZNE | e eL F | 3 47 59 4 45 | ... | ... | ... | Japan. 35° N., 135° E. (U.R.S.S.) | 3 | | e F | 22 32 45 | ... | ... | ... | |
| 21 | NE Z E N | eL eL M M F | 10 28 35 38 56 39 11 11 15 | ... | ... | ... | Pacific Ocean off Japan. 35° N., 143° E. (Stuttgart.) | 5 | | e F | 5 58 6 15 | ... | ... | ... | |

SEISMOLOGICAL DIARY—continued.

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory).

Lat. 51° 28' 6" N. Long. 0° 18' 47" W. Height above M.S.L. 5 metres.

1933.

| Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. | Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. |
|--------|--|--|--|---------|------------|---------|--|--------|---|---|--|-------------------|--|---------|--|
| | | | h. m. s. | s. | μ | km. | | | | | h. m. s. | s. | μ | km. | |
| Oct. 5 | ZNE NE ZNE | eP eS eL F | 6 26 2 29 30 31 55 | ... | ... | 2050 | Compression. North Atlantic Ocean. (Stuttgart.) | Nov. 5 | NE N | eL M F | 21 5 9 30 22 0 | ... | ... | ... | Aleutian region. 49° N., 179° W. (U.R.S.S.) |
| 5 | ZE NE E ZNE E N Z | iP eS eL M M F | 13 37 56 44 29 47 52 51 57 32 58 50 14 5 39 15 50 | ... | ... | 4830 | Persia. 34° N., 54° E. (U.R.S.S.) | 6 | | e F | 7 27 40 | ... | ... | ... | Persia. 35° N., 53° E. (U.R.S.S.) |
| 7 | | e F | 3 34 4 15 | ... | ... | ... | | 8 | | e F | 0 54 6 58 | ... | ... | ... | Felt in Southern Germany. |
| 14 | Z NE NE Z | eP eS eL eL F | 22 30 39 40 24 56 23 0 45 | ... | ... | 8500 | Gulf of Alaska. 54° N., 158° W. (Stuttgart.) | 19 | Z NE NE NE Z | ePKP eSS e eL F | 3 30 57 53 5 54 31 4 21 29 5 45 | ... | ... | (15500) | New Hebrides. 16° S., 167° E. (Stuttgart.) |
| *16 | NE Z | eL eL F | 5 4 10 15 | ... | ... | ... | Afghanistan. 32° N., 67° E. (U.R.S.S.) | 20/21 | ZNE ZNE ZNE Z NE E ZNE | eP iP iPP iP _c P iS iSS eL | 23 28 34 28 39 30 8 31 4 34 10 36 16 37 | ... | ... | 3810 | Compression. Amplitudes of iP as read in mm. :— Z. N. E. -14.0 +9.7 -4.2 Azimuth=335° giving epicentre near 75° N., 65° W. Baffin Bay. |
| *17 | ZNE | eL F | 14 15 40 | ... | ... | ... | | | E N E N Z N Z Z | M M M M M M M F | 38-41 39-40 44 33 44 43 44 47 47 7 47 10 50 17 3 30 | 22 (20) | >310* >270* >260* >250* +340 +170 -165 -140 | ... | *Maxima too large to be recorded com- pletely. |
| 20 | | e F | 11 17 40 | ... | ... | ... | Possibly not seismic. Confused by wind and microseisms. | 22 | ZE NE Z | e eL eL F | 0 11 25 27 1 5 | ... | ... | ... | Central America. 9° N., 83° W. (J.S.A.) |
| 21 | E ZN | eL eL F | 3 30 35 4 40 | ... | ... | ... | Pacific Ocean east of Japan. 35° N., 135° E. (U.R.S.S.) | 22 | E N ZE | e eL eL F | 5 14 25 29 6 5 | ... | ... | ... | Central America. 9° N., 84° W. (J.S.A.) |
| 22 | ZNE | eL F | 12 35 13 15 | ... | ... | ... | Kurile Islands. (Stuttgart.) | 22 | E N ZE | e eL eL F | 8 50 9 40 | ... | ... | ... | Very small. |
| 23 | ZNE | eL F | 5 22 6 10 | ... | ... | ... | Indian Ocean. (Tananarive.) | 22 | Z ZNE ZE N NE Z N E Z | iPKP iPKS eSKS eSS eL eL M M M F | 13 1 28 4 45 8 39 21 14 40 48 58 21 59 22 14 6 10 15 30 | ... | ... | (14000) | Arafura Sea. |
| 23 | ZNE NE Z N | e eL eL M F | 14 4 26 20 23 28 51 15 5 | ... | ... | ... | | 22 | NE NE Z | e eL eL F | 19 44 47 52 20 5 | ... | ... | ... | |
| 24 | | e F | 16 35 17 0 | ... | ... | ... | } Very small. | 22 | NE NE Z | e eL eL F | 23 17 21 40 | ... | ... | ... | |
| 24 | | e F | 22 45 55 | ... | ... | ... | | | 22 | NE NE Z | e eL eL F | 23 17 21 40 | ... | ... | ... |
| 25/26 | Z Z N NE NE Z N N E Z | eP isP ePP iSKS iS isS ePS eL M M M F | 23 41 14 42 6 45 15 51 28 52 2 53 34 53 38 0 8 20 35 20 45 20 50 1 40 | ... | ... | (10500) | Chile. 22° S., 68° W. (J.S.A.) Focus about 180 km. below normal. | 23 | ZNE | e F | 1 20 25 | ... | ... | ... | Very small. Central Italy. |
| 26 | Z | e eL F | 12 40 55 14 45 | ... | ... | ... | Confused by wind and microseisms. | 23 | NE ZNE E | eS eL M F | 19 19 49 35 38 13 20 20 | ... | ... | ... | Central America. 9° N., 83° W. (J.S.A.) |
| 30 | | e F | 8 20 40 | ... | ... | ... | New Hebrides. 17° S., 172° E. (U.R.S.S.) | 23 | NE NE Z | e eL eL F | 23 17 21 40 | ... | ... | ... | |
| Nov. 1 | ZE | eL F | 16 17 40 | ... | ... | ... | | 28 | Z NE ZNE E N Z | iP eS eL M M M F | 11 17 44 24 11 27 36 51 39 11 40 23 12 35 | ... | ... | 4720 | Persia. 33° N., 55° E. (Stuttgart.) |
| 2 | Z ZNE Z | eP eL M F | 12 38 56 13 0 23 21 14 15 | ... | ... | ... | Horizontal compon- ents disturbed by wind. South of Aleutian Islands. 48° N., 168° W. (J.S.A.) | | | | | ... | ... | ... | |

SEISMOLOGICAL DIARY—continued.

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory).

Lat 51° 28' 6" N. Long 0° 18' 47" W. Height above M.S.L. 5 metres.

1933.

| Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. | Date. | Compt. | Phase. | G.M.T. | Period. | Amplitude. | Δ | Remarks. | |
|---------|-----------------------------|--|--|---------|------------|---------|--|---------------|--|---|---|---------|------------|-----|----------|--|
| | | | h. m. s. | s. | μ | km. | | | | | h. m. s. | s. | μ | km. | | |
| Nov. 29 | ZNE | eL F | 5 38 6 20 | ... | ... | ... | | Dec. 13 cont. | E NE NE Z E N Z | i e eL eL M M M F | 50 30 55 46 22 3 6 13 15 13 23 13 45 23 10 | s. | ... | ... | ... | Pacific Ocean off Central America. 18° N., 104° W. (U.S.C.G.S.) |
| 29 | ZNE | eL F | 19 47 20 15 | ... | ... | ... | | | | | | | | | | |
| 30 | | e F | 4 54 5 5 | ... | ... | ... | | | | | | | | | | |
| Dec. 2 | ZNE | eL F | 6 45 7 15 | ... | ... | ... | "N" record defective (broken contact between pendulum coils and leads) 2d. 9h. 38m. to 7d. 11h. 57m. | 14 | ZNE E Z | eL M M F | 8 3 6 47 6 49 25 | ... | ... | ... | ... | Repetition from preceding epicentre. |
| 2 | ZE | eL F | 20 55 22 5 | ... | ... | ... | 57m. | 14 | | e F | 19 18 45 | ... | ... | ... | ... | Persia. 32° N., 54° E. (U.R.S.S.) |
| 4 | E E | iS iPS F | 19 54 39 55 1 20 15 | ... | ... | ... | Karafuto. 47° N., 144° E. (Stuttgart.) | 15 | ZE ZNE ZE ZNE ZNE N E Z | iP i iPP iS L M M M F | 7 46 47 46 50 47 8 50 45 51 43 52 42 53 15 53 28 8 25 | ... | ... | ... | 2410 | Atlantic Ocean. 54° N., 35° W. (J.S.A.) |
| 6 | | | — | ... | ... | ... | No records 10h. 19m. to 11h. 25m. Adjustments for tilt of pillar. | | | | | | | | | |
| 7 | | | — | ... | ... | ... | No records 10h. 45m. to 11h. 57m. Repairing "N." | | | | | | | | | |
| 9 | ZNE | eL F | 8 25 35 | ... | ... | ... | Kashmir. 37° N., 75° E. (U.R.S.S.) | 18 | | e F | 21 44 55 | ... | ... | ... | ... | |
| 12 | Z Z N NE Z N | iPKP ePKS eSKS eL eL M F | 14 30 20 33 35 37 24 15 7 16 19 20 16 45 | ... | ... | (13800) | New Britain. 5° S., 153° E. (Manila.) | 19 | | e F | 18 4 25 | ... | ... | ... | ... | |
| | | | | | | | | 21/22 | | e F | 23 59 0 30 | ... | ... | ... | ... | Very small. Pacific Ocean South of Japan. 25° N., 137° E. (U.R.S.S.) |
| 13 | ZNE ZNE N NE | iP i i iS | 21 36 16 36 23 45 39 46 39 | ... | ... | ... | Compression. Horizontal components disturbed by wind. | 24 | NE E ZN | e eL eL F | 11 27 46 52 12 55 | ... | ... | ... | ... | Pacific Ocean. 37° N., 171° E. (U.R.S.S.) |

547. RICHMOND (Kew Observatory).

1933.

| Month. | JANUARY | | | | | | | | FEBRUARY | | | | | | | | MARCH | | | | | | | |
|---------------|----------------------------|-----|-------|-----|-------|-----|-------|-----|----------------------------|-----|-------|-----|-------|-----|-------|-----|----------------------------|-----|-------|-----|-------|-----|-------|-----|
| | Oh. | | 6h. | | 12h. | | 18h. | | Oh. | | 6h. | | 12h. | | 18h. | | Oh. | | 6h. | | 12h. | | 18h. | |
| | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp |
| Day. | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s |
| 1 | 5.4 | 7.7 | 6.4 | 7.0 | 4.1 | 7.0 | 2.6 | 6.7 | 2.9 | 5.8 | 3.4 | 6.0 | 3.6 | 5.6 | 3.2 | 6.0 | 0.2 | 4.7 | 0.2 | 4.7 | 0.3 | 4.0 | 0.2 | 5.0 |
| 2 | 2.4 | 6.7 | 1.9 | 6.3 | 2.2 | 7.3 | 4.2 | 6.7 | 2.0 | 6.0 | 3.6 | 6.5 | 3.1 | 6.3 | 4.5 | 6.5 | 0.2 | 7.0 | 0.2 | 6.5 | 0.3 | 4.0 | ... | ... |
| 3 | 4.8 | 6.7 | 4.6 | 7.5 | 6.5 | 9.0 | 6.6 | 8.0 | 3.2 | 7.0 | 2.5 | 6.3 | 2.0 | 6.7 | 1.8 | 6.7 | 0.3 | 4.3 | 0.5 | 5.0 | 0.9 | 4.8 | 0.4 | 5.6 |
| 4 | 5.5 | 9.0 | 4.7 | 9.0 | 8.1 | 8.3 | 4.8 | 8.3 | 1.8 | 6.7 | 1.6 | 5.2 | 1.3 | 5.2 | 1.4 | 6.0 | 1.9 | 5.6 | 2.2 | 5.2 | 1.5 | 6.3 | 1.4 | 5.8 |
| 5 | 4.3 | 8.7 | 2.7 | 8.3 | 2.8 | 8.0 | 3.3 | 9.0 | 1.8 | 5.0 | 2.1 | 5.6 | 2.7 | 5.6 | 3.4 | 6.0 | 1.6 | 5.8 | 1.1 | 5.6 | 0.9 | 5.4 | 1.5 | 5.4 |
| 6 | 3.1 | 8.7 | 2.3 | 8.7 | 3.3 | 8.0 | 3.8 | 8.3 | 3.2 | 6.0 | 2.3 | 6.5 | 2.0 | 5.8 | 2.0 | 5.8 | 2.4 | 5.4 | 2.3 | 5.6 | 2.3 | 5.6 | 2.0 | 6.0 |
| 7 | 2.3 | 8.0 | 2.0 | 7.0 | 1.8 | 8.0 | 2.0 | 7.0 | 2.6 | 6.0 | 1.9 | 6.3 | 2.0 | 6.0 | 2.1 | 6.3 | 2.0 | 6.0 | 2.0 | 5.8 | 1.5 | 5.6 | 1.6 | 5.8 |
| 8 | 1.8 | 6.7 | 1.8 | 7.0 | 2.2 | 7.7 | 2.0 | 7.7 | 2.4 | 6.7 | 2.3 | 7.0 | 1.9 | 6.5 | 1.9 | 6.5 | 1.3 | 5.4 | 1.2 | 6.0 | 0.6 | 5.6 | 0.9 | 5.2 |
| 9 | 2.2 | 7.5 | 1.8 | 7.0 | 1.8 | 7.5 | 1.8 | 6.7 | 3.2 | 6.3 | 7.7 | 7.5 | 5.7 | 7.0 | 5.4 | 7.5 | 0.6 | 5.6 | 0.6 | 5.6 | 0.8 | 5.6 | 1.1 | 5.6 |
| 10 | 1.3 | 6.5 | 1.3 | 6.5 | 0.9 | 6.7 | 0.9 | 6.7 | 5.1 | 7.5 | 3.6 | 7.3 | 3.3 | 6.7 | 2.9 | 7.3 | 1.1 | 5.6 | 1.0 | 6.0 | 0.8 | 6.0 | 1.0 | 6.0 |
| 11 | 1.6 | 8.0 | 0.9 | 7.3 | 1.2 | 7.5 | 1.8 | 6.7 | 2.5 | 7.0 | 1.5 | 5.6 | 2.3 | 5.0 | 1.8 | 6.7 | 0.2 | 5.0 | 0.6 | 6.0 | 0.2 | 5.4 | 0.4 | 4.5 |
| 12 | 1.8 | 7.0 | 1.4 | 7.3 | 3.4 | 7.0 | 1.8 | 6.7 | 1.9 | 6.3 | 1.0 | 7.5 | 1.9 | 7.5 | 1.7 | 7.7 | 0.2 | 6.0 | 0.2 | 5.4 | 0.2 | 6.5 | 0.2 | 6.0 |
| 13 | 2.6 | 7.3 | 3.6 | 8.7 | 2.9 | 8.7 | 3.1 | 8.0 | 2.5 | 7.0 | 3.1 | 7.5 | 3.3 | 7.3 | 3.1 | 7.5 | 0.2 | 6.0 | 0.2 | 6.0 | 0.2 | 6.5 | 0.2 | 6.5 |
| 14 | 1.7 | 7.7 | 3.6 | 7.0 | 3.3 | 7.3 | 4.6 | 7.5 | 1.9 | 7.3 | 1.5 | 6.7 | 1.5 | 6.5 | 1.6 | 5.2 | 0.2 | 7.0 | 0.8 | 6.5 | 0.8 | 6.5 | 0.9 | 6.5 |
| 15 | 4.1 | 8.3 | 4.6 | 8.0 | 4.0 | 7.7 | 4.5 | 8.3 | 1.6 | 5.0 | 0.9 | 5.4 | 0.6 | 5.6 | 0.5 | 5.0 | 1.0 | 6.3 | 1.1 | 5.0 | 1.1 | 6.5 | 1.0 | 4.5 |
| 16 | 3.7 | 8.3 | 4.9 | 8.0 | 3.5 | 7.7 | 2.8 | 8.0 | 0.7 | 5.0 | 0.4 | 6.3 | 0.4 | 6.0 | 0.2 | 6.0 | 1.7 | 4.8 | 2.0 | 6.0 | 2.7 | 7.0 | 2.8 | 6.5 |
| 17 | 2.8 | 8.0 | 1.8 | 7.0 | 1.6 | 7.3 | 1.2 | 6.0 | 0.3 | 4.0 | 0.3 | 4.3 | 0.3 | 4.1 | 0.3 | 4.3 | 3.0 | 7.0 | 3.1 | 6.7 | 3.1 | 5.8 | 3.8 | 6.0 |
| 18 | 0.8 | 6.5 | 1.4 | 5.8 | 1.1 | 6.5 | 1.6 | 5.0 | 0.2 | 5.6 | 0.2 | 5.6 | 0.2 | 6.0 | 0.2 | 5.2 | 3.7 | 5.4 | 2.7 | 6.3 | 2.8 | 6.5 | 2.0 | 6.0 |
| 19 | 1.2 | 7.5 | 1.8 | 6.7 | 1.9 | 6.5 | 1.8 | 7.0 | 0.2 | 4.8 | 0.2 | 4.7 | 0.2 | 4.7 | 0.2 | 4.7 | 1.9 | 6.5 | 1.8 | 6.7 | 1.9 | 6.5 | 2.3 | 6.5 |
| 20 | 1.5 | 7.5 | 1.6 | 6.0 | 0.5 | 4.0 | 0.8 | 4.1 | 0.5 | 5.0 | 1.7 | 5.6 | 1.6 | 5.0 | 0.8 | 6.0 | 2.7 | 7.0 | 2.7 | 6.3 | 2.0 | 5.8 | 1.9 | 6.5 |
| 21 | 0.5 | 4.3 | 0.5 | 4.7 | 1.6 | 5.0 | 1.0 | 6.0 | 1.0 | 6.0 | 1.4 | 6.0 | 1.6 | 5.0 | 2.0 | 6.0 | 1.9 | 5.6 | 2.2 | 5.4 | 2.0 | 5.2 | 1.9 | 6.5 |
| 22 | 1.4 | 6.0 | 1.8 | 6.7 | 2.0 | 6.0 | 1.4 | 5.8 | 1.8 | 5.8 | 2.1 | 5.6 | 0.2 | 5.4 | 0.2 | 5.0 | 2.1 | 6.5 | 2.1 | 6.3 | 2.3 | 6.3 | 2.3 | 6.5 |
| 23 | 1.3 | 5.4 | 0.9 | 5.0 | 0.5 | 4.7 | 0.7 | 4.8 | 0.3 | 3.7 | 0.2 | 5.4 | 0.2 | 6.0 | 0.2 | 6.0 | 1.8 | 5.2 | 2.0 | 5.8 | 2.3 | 4.3 | 1.8 | 4.3 |
| 24 | 1.1 | 5.0 | 0.7 | 7.0 | 1.2 | 6.0 | 0.4 | 6.0 | 0.4 | 5.2 | 0.2 | 4.8 | 0.3 | 3.7 | 0.3 | 3.5 | 2.7 | 4.0 | 1.7 | 4.5 | 1.4 | 4.0 | 0.8 | 4.0 |
| 25 | 1.4 | 6.5 | 0.8 | 6.5 | 1.4 | 6.5 | 0.6 | 6.0 | 0.3 | 4.3 | 0.5 | 4.0 | 2.3 | 5.0 | 1.6 | 5.0 | 0.3 | 4.3 | 0.3 | 4.1 | 0.2 | 5.4 | 0.3 | 4.3 |
| 26 | 0.5 | 4.5 | 0.5 | 5.4 | 0.2 | 6.0 | 0.2 | 5.0 | 1.6 | 4.3 | 1.4 | 5.0 | 1.3 | 4.1 | 0.3 | 4.3 | 0.2 | 5.4 | 0.4 | 5.6 | 0.2 | 5.6 | 0.2 | 6.0 |
| 27 | 0.2 | 5.0 | 0.0 | --- | 0.0 | --- | 0.3 | 4.7 | 0.6 | 5.4 | 1.1 | 5.0 | 1.6 | 5.0 | 1.8 | 5.2 | 0.2 | 6.0 | 0.4 | 6.0 | 0.2 | 6.0 | 0.2 | 6.0 |
| 28 | ... | ... | 0.5 | 5.0 | 0.7 | 5.6 | 0.7 | 5.0 | 1.4 | 4.7 | 1.6 | 5.0 | 1.3 | 4.3 | 0.7 | 4.8 | 0.5 | 4.7 | 0.2 | 5.2 | 0.2 | 5.4 | 0.2 | 6.0 |
| 29 | 0.7 | 5.0 | 0.7 | 5.0 | 0.5 | 4.5 | 0.3 | 4.3 | 0.4 | 6.5 | 0.8 | 6.5 | 0.5 | 6.7 | 0.6 | 6.3 | 0.4 | 6.5 | 0.8 | 6.5 | 0.5 | 6.7 | 0.6 | 6.3 |
| 30 | 0.6 | 6.0 | 0.4 | 6.0 | 0.2 | 5.0 | 0.4 | 5.6 | 0.6 | 5.8 | 0.4 | 5.8 | 0.2 | 5.6 | 0.8 | 6.0 | 0.6 | 5.8 | 0.4 | 5.8 | 0.2 | 5.6 | 0.4 | 5.6 |
| 31 | 0.6 | 5.4 | 1.1 | 5.6 | 1.2 | 5.4 | 2.4 | 6.0 | 0.4 | 6.0 | 0.4 | 5.6 | 0.9 | 5.6 | 0.8 | 6.0 | 0.4 | 6.0 | 0.4 | 5.6 | 0.9 | 5.2 | 0.7 | 5.2 |
| Mean | 2.1 | 6.9 | 2.0 | 6.8 | 2.1 | 6.7 | 2.1 | 6.5 | 1.7 | 5.7 | 1.8 | 5.9 | 1.7 | 5.6 | 1.7 | 5.8 | 1.2 | 5.7 | 1.2 | 5.7 | 1.1 | 5.7 | 1.2 | 5.7 |
| Mean for Day. | A = 2.1 μ ; Tp = 6.7s. | | | | | | | | A = 1.7 μ ; Tp = 5.7s. | | | | | | | | A = 1.2 μ ; Tp = 5.7s. | | | | | | | |

| Month. | APRIL | | | | | | | | MAY | | | | | | | | JUNE | | | | | | | |
|--------|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|
| | Oh. | | 6h. | | 12h. | | 18h. | | Oh. | | 6h. | | 12h. | | 18h. | | Oh. | | 6h. | | 12h. | | 18h. | |
| | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp |
| Day. | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s |
| 1 | 0.2 | 5.6 | 0.2 | 5.0 | 0.5 | 5.0 | 0.5 | 5.0 | 0.4 | 6.5 | 0.2 | 6.0 | 0.2 | 5.0 | 0.2 | 6.0 | 0.2 | 5.0 | 0.0 | --- | 0.0 | --- | 0.0 | --- |
| 2 | 0.2 | 5.2 | 0.4 | 5.2 | 1.9 | 5.4 | 1.7 | 5.6 | 0.0 | --- | 0.3 | 4.0 | 0.3 | 4.0 | 0.5 | 4.3 | 0.2 | 4.7 | 0.0 | --- | 0.0 | --- | 0.3 | 4.0 |
| 3 | 1.8 | 6.0 | 1.5 | 5.6 | 1.1 | 5.6 | 1.1 | 5.6 | 1.9 | 4.1 | 1.8 | 4.3 | 1.7 | 4.5 | 1.0 | 4.7 | 0.2 | 5.0 | 0.2 | 4.7 | 0.0 | --- | 0.0 | --- |
| 4 | 1.2 | 5.8 | 0.9 | 4.9 | 0.9 | 5.2 | 0.4 | 5.6 | 1.1 | 4.0 | 0.5 | 4.3 | 1.2 | 4.5 | 1.2 | 4.7 | 0.3 | 4.3 | 0.2 | 4.7 | 0.3 | 4.3 | 0.2 | 4.7 |
| 5 | 0.4 | 5.2 | 0.4 | 5.4 | 0.5 | 5.0 | 0.5 | 5.0 | 1.1 | 5.0 | 1.2 | 4.5 | 1.0 | 4.5 | 0.9 | 5.0 | 0.3 | 4.3 | 0.2 | 4.7 | 0.3 | 4.3 | 0.2 | 4.7 |
| 6 | 0.2 | 5.0 | 0.2 | 5.4 | 0.2 | 6.5 | 0.2 | 6.0 | 0.5 | 4.3 | 0.7 | 4.7 | 0.2 | 4.7 | 0.3 | 3.7 | 0.2 | 5.6 | 0.2 | 5.0 | 0.2 | 5.4 | 0.2 | 5.6 |
| 7 | 0.2 | 5.6 | 0.5 | 4.8 | 0.2 | 5.2 | 0.2 | 5.0 | 0.3 | 4.0 | 0.3 | 4.3 | 0.3 | 4.3 | 0.3 | 4.3 | 0.2 | 5.4 | 0.2 | 5.0 | 0.0 | --- | 0.0 | --- |
| 8 | 0.5 | 5.0 | 0.2 | 5.4 | 0.3 | 4.3 | 0.0 | --- | 0.3 | 4.3 | 0.0 | --- | 0.0 | --- | 0.3 | 4.3 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- |
| 9 | 0.2 | 4.5 | 0.2 | 4.5 | 0.2 | 5.0 | 0.2 | 4.7 | 0.2 | 5.0 | 0.5 | 4.7 | 0.7 | 5.0 | 1.8 | 5.0 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- |
| 10 | 0.2 | 5.0 | 0.2 | 5.0 | 0.4 | 5.6 | 0.4 | 5.6 | 1.5 | 6.3 | 0.7 | 5.0 | 0.4 | 6.0 | 0.8 | 6.3 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- |
| 11 | 0.6 | 6.0 | 1.8 | 5.0 | 1.4 | 6.0 | 1.3 | 6.3 | 0.9 | 7.5 | 0.5 | 4.8 | 0.6 | 6.0 | 0.6 | 6.3 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- |
| 12 | 1.5 | 5.6 | 0.6 | 5.4 | 0.7 | 5.2 | 0.8 | 5.6 | 0.9 | 6.7 | 1.0 | 7.3 | 0.8 | 6.0 | 0.4 | 5.6 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- |
| 13 | 1.0 | 6.0 | 1.2 | 6.0 | 0.4 | 6.3 | 0.6 | 6.0 | 0.4 | 6.0 | 0.2 | 5.8 | 0.2 | 6.0 | 0.2 | 5.2 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- |
| 14 | 0.4 | 5.2 | 0.4 | 5.6 | 0.5 | 5.0 | 0.7 | 5.2 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- |
| 15 | 1.9 | 5.4 | 1.7 | 5.4 | 1.8 | 5.2 | 1.9 | 5.6 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.3 | 4.0 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- |
| 16 | 1.8 | 5.8 | 1.3 | 5.6 | 1.7 | 5.6 | 1.1 | 5.4 | 0.5 | 5.0 | 0.2 | 6.0 | 0.2 | 6.5 | 0.2 | 6.3 | 0.0 | --- | 0.0 | | | | | |

MICROSEISMS OF NORTH COMPONENT: AMPLITUDE ($\mu = .001$ mm.) AND PERIOD (seconds).
Derived from readings for the period of thirty minutes centring at the exact hours, Greenwich Mean Time.

547. RICHMOND (Kew Observatory).

| Month. | JULY | | | | | | | | AUGUST | | | | | | | | SEPTEMBER | | | | | | | |
|---------------|----------------------|-----|-----|-----|------|-----|------|-----|----------------------|-----|-----|-----|------|-----|------|-----|----------------------|-----|-----|-----|------|-----|------|--|
| | Oh. | | 6h. | | 12h. | | 18h. | | Oh. | | 6h. | | 12h. | | 18h. | | Oh. | | 6h. | | 12h. | | 18h. | |
| | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | | |
| | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | | |
| Day. | 1 | 0.2 | 5.6 | 0.2 | 5.6 | 0.2 | 5.2 | 0.2 | 5.2 | 0.3 | 4.1 | 0.3 | 3.5 | 0.3 | 3.7 | 0.3 | 4.0 | 0.2 | 4.5 | 0.2 | 4.7 | 0.2 | 4.7 | |
| 2 | 0.2 | 5.4 | 0.2 | 5.0 | 0.2 | 5.0 | 0.2 | 5.0 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.3 | 4.3 | 0.0 | --- | 0.3 | 4.3 | 0.0 | --- | ... | |
| 3 | 0.2 | 4.6 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.3 | 4.3 | 0.2 | 4.8 | 0.0 | --- | 0.3 | 4.3 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | |
| 4 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | 4.8 | 0.2 | 4.8 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | |
| 5 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | 4.6 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | 5.6 | 0.2 | 6.0 | 0.0 | --- | 0.2 | |
| 6 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | 4.5 | 0.2 | 5.2 | 0.2 | 4.7 | 0.4 | |
| 7 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.4 | 5.6 | 0.5 | 4.7 | 0.2 | 5.0 | 0.3 | |
| 8 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | 4.7 | 0.2 | 5.0 | 0.2 | 5.0 | 0.2 | 5.0 | 0.3 | 4.3 | 0.3 | 4.0 | 0.3 | 4.0 | 0.2 | |
| 9 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | 4.5 | 0.3 | 4.3 | 0.2 | 4.5 | 0.0 | --- | 0.0 | --- | 0.2 | 4.7 | 0.2 | 4.7 | 0.2 | 5.0 | 0.2 | |
| 10 | 0.3 | 4.3 | 0.3 | 4.3 | 0.2 | 4.7 | 0.2 | 4.7 | 0.2 | 4.7 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | 5.0 | 0.2 | 4.7 | 0.0 | --- | 0.0 | |
| 11 | 0.2 | 4.7 | 0.2 | 4.7 | 0.2 | 5.4 | 0.2 | 5.4 | 0.3 | 3.3 | 0.3 | 4.3 | 0.3 | 3.6 | 0.3 | 4.3 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | |
| 12 | 0.2 | 4.8 | 0.2 | 5.0 | 0.2 | 5.0 | 0.2 | 4.8 | 0.3 | 3.6 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | |
| 13 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | |
| 14 | 0.3 | 4.3 | 0.2 | 4.8 | 0.2 | 5.0 | 0.2 | 5.0 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | 5.0 | 0.2 | 4.7 | 0.2 | |
| 15 | 0.2 | 5.0 | 0.2 | 5.8 | 0.2 | 5.6 | 0.2 | 5.6 | 0.0 | --- | 0.0 | --- | 0.3 | 4.3 | 0.2 | 4.5 | 0.2 | 4.6 | 0.2 | 6.0 | 0.3 | 4.0 | 0.5 | |
| 16 | 0.2 | 5.8 | 0.2 | 5.0 | 0.2 | 4.7 | 0.2 | 4.7 | 0.2 | 5.0 | 0.2 | 4.5 | 0.2 | 4.5 | 0.0 | --- | 0.2 | 5.4 | 0.5 | 5.0 | 0.2 | 5.0 | 0.5 | |
| 17 | 0.2 | 4.5 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.3 | 4.0 | 0.3 | 4.3 | 0.0 | --- | 0.2 | 4.5 | 0.2 | 5.0 | 0.3 | 4.3 | 0.3 | 4.3 | 0.2 | |
| 18 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | 4.7 | 1.3 | 6.7 | ... | ... | 0.2 | 4.7 | 0.2 | 4.7 | 0.5 | 4.3 | 0.4 | 5.2 | 0.5 | 4.0 | 0.5 | |
| 19 | 0.2 | 4.7 | 0.2 | 4.7 | 0.0 | --- | 0.2 | 4.7 | 0.5 | 4.7 | 0.2 | 4.8 | 0.2 | 4.7 | 0.2 | 4.7 | 0.5 | 4.5 | 0.7 | 5.0 | 0.5 | 4.8 | 0.5 | |
| 20 | 0.2 | 5.2 | 0.2 | 4.7 | 0.0 | --- | 0.0 | --- | 0.5 | 5.0 | 0.2 | 4.8 | 0.2 | 4.8 | 0.2 | 4.5 | 0.5 | 4.7 | 0.6 | 5.6 | 0.2 | 4.8 | 0.3 | |
| 21 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | 4.5 | 0.5 | 4.8 | 0.0 | --- | 0.2 | 4.7 | 0.2 | 5.6 | 0.4 | 5.4 | 0.3 | 4.3 | 0.3 | |
| 22 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.3 | 3.6 | 0.3 | 4.3 | 0.3 | 3.2 | 0.3 | 4.0 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | |
| 23 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.3 | 4.0 | 0.2 | 4.8 | 0.3 | 4.0 | 0.3 | 3.7 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.2 | |
| 24 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.3 | 4.3 | 0.3 | 4.3 | 0.3 | 4.3 | 0.3 | 3.7 | 0.5 | 5.0 | 0.6 | 6.0 | 0.8 | 5.6 | 0.2 | |
| 25 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.3 | 4.3 | 0.3 | 4.3 | 0.0 | --- | 0.0 | --- | 0.5 | 4.7 | 0.4 | 6.7 | 0.2 | 5.0 | 0.3 | |
| 26 | 0.0 | --- | 0.0 | --- | 0.2 | 5.6 | 0.2 | 6.5 | 0.2 | 5.6 | 0.3 | 4.3 | 0.0 | --- | 0.2 | 4.7 | 0.2 | 4.7 | 0.2 | 5.0 | 0.0 | --- | 0.0 | |
| 27 | 0.2 | 5.0 | 0.2 | 5.0 | 0.0 | --- | 0.0 | --- | 0.5 | 4.7 | 0.5 | 4.8 | 0.5 | 4.8 | 0.5 | 5.0 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | |
| 28 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.3 | 4.3 | 0.3 | 4.0 | 0.3 | 4.3 | 0.2 | 4.8 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.0 | |
| 29 | 0.4 | 2.7 | 0.4 | 2.9 | 0.0 | --- | 0.3 | 3.5 | ... | ... | 0.2 | 5.0 | 0.2 | 4.7 | 0.2 | 4.7 | 0.0 | --- | 0.0 | --- | 0.3 | 4.0 | 0.3 | |
| 30 | 0.2 | 4.7 | 0.2 | 4.7 | 0.3 | 4.3 | 4.3 | 4.3 | 0.2 | 4.7 | 0.3 | 4.3 | 0.3 | 4.3 | 0.2 | 4.7 | 0.2 | 4.5 | 0.3 | 4.0 | 0.3 | 3.7 | 0.3 | |
| 31 | 0.2 | 4.5 | 0.3 | 4.1 | 0.2 | 6.0 | 0.5 | 4.0 | 0.2 | 5.0 | 0.0 | --- | 0.2 | 4.7 | 0.3 | 4.3 | 0.2 | 4.5 | 0.3 | 4.0 | 0.3 | 3.7 | 0.3 | |
| Mean | 0.1 | 4.7 | 0.1 | 4.7 | 0.1 | 5.2 | 0.1 | 4.8 | 0.3 | 4.5 | 0.2 | 4.5 | 0.1 | 4.3 | 0.2 | 4.5 | 0.2 | 4.8 | 0.2 | 5.1 | 0.2 | 4.6 | 0.2 | |
| Mean For Day. | A = 0.1μ; Tp = 4.9s. | | | | | | | | A = 0.2μ; Tp = 4.5s. | | | | | | | | A = 0.2μ; Tp = 4.6s. | | | | | | | |

| Month. | OCTOBER | | | | | | | | NOVEMBER | | | | | | | | DECEMBER | | | | | | | |
|--------|---------|-----|-----|-----|------|-----|------|-----|----------|-----|-----|-----|------|-----|------|-----|----------|-----|-----|-----|------|-----|------|--|
| | Oh. | | 6h. | | 12h. | | 18h. | | Oh. | | 6h. | | 12h. | | 18h. | | Oh. | | 6h. | | 12h. | | 18h. | |
| | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | A. | Tp | | |
| | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | μ | s | | |
| Day. | 1 | 0.3 | 4.0 | 0.3 | 4.0 | 0.0 | --- | 0.0 | --- | 1.5 | 6.5 | 1.0 | 6.0 | 1.0 | 5.8 | 0.4 | 5.6 | 0.4 | 6.5 | 0.4 | 6.5 | 0.8 | 6.0 | |
| 2 | 0.2 | 4.8 | 0.2 | 6.0 | 0.0 | --- | 0.3 | 4.1 | 0.7 | 5.4 | 0.8 | 4.3 | 0.4 | 3.2 | 0.5 | 4.3 | 0.6 | 6.5 | 0.2 | 6.0 | 2.1 | 4.8 | | |
| 3 | 0.2 | 5.0 | 0.2 | 4.8 | ... | ... | 0.2 | 5.6 | 1.0 | 4.7 | 1.0 | 4.5 | 1.0 | 5.8 | 0.4 | 5.8 | 1.1 | 4.8 | 0.5 | 5.4 | 1.2 | 5.6 | | |
| 4 | 0.2 | 5.8 | 0.2 | 6.0 | 0.2 | 4.7 | 0.2 | 5.0 | 0.2 | 4.7 | 0.2 | 4.7 | 0.2 | 5.0 | 0.3 | 4.5 | 1.8 | 5.0 | 2.3 | 5.6 | 2.1 | 5.6 | | |
| 5 | 0.2 | 5.0 | 0.2 | 4.7 | 0.0 | --- | 0.0 | --- | 0.3 | 4.0 | 0.3 | 4.3 | 0.4 | 6.5 | 0.5 | 5.0 | 2.0 | 5.0 | 1.2 | 5.6 | 0.6 | 7.3 | | |
| 6 | 0.2 | 4.8 | 0.2 | 5.0 | 0.2 | 4.6 | 0.2 | 5.0 | 0.4 | 6.5 | 0.6 | 6.5 | 0.4 | 5.6 | 0.4 | 5.8 | 1.0 | 7.0 | 0.9 | 6.0 | 1.6 | 7.0 | | |
| 7 | 0.2 | 5.0 | 0.0 | --- | 0.0 | --- | 0.0 | --- | 0.4 | 6.3 | 0.7 | 5.2 | 0.5 | 4.8 | 0.2 | 6.5 | 0.4 | 7.0 | 0.2 | 6.5 | 0.6 | 6.7 | | |
| 8 | 0.0 | --- | 0.0 | --- | 0.3 | 3.7 | 0.3 | 3.7 | 0.4 | 6.3 | 0.8 | 6.5 | 0.4 | 6.3 | 0.4 | 6.3 | 0.4 | 6.7 | 0.3 | 3.7 | 0.3 | 4.0 | | |
| 9 | 0.8 | 4.3 | 0.7 | 5.4 | 1.6 | 5.0 | 1.5 | 5.6 | 0.5 | 7.5 | 0.9 | 7.0 | 0.4 | 6.0 | 0.8 | 5.8 | 1.6 | 5.0 | 0.5 | 4.3 | 0.2 | 4.7 | | |
| 10 | 2.0 | 5.4 | 0.7 | 5.6 | 2.0 | 5.2 | 1.3 | 6.0 | 0.5 | 5.0 | 0.4 | 5.6 | 0.2 | 5.6 | 0.2 | 5.0 | 0.3 | 3.6 | 0.3 | 4.3 | 0.0 | --- | | |
| 11 | 1.7 | 5.4 | 1.5 | 5.0 | 2.1 | 5.0 | 1.9 | 6.5 | 0.4 | 6.5 | 0.6 | 6.0 | 0.6 | 6.0 | 1.0 | 6.0 | 0.0 | --- | 0.0 | --- | 0.0 | --- | | |
| 12 | 3.5 | 5.4 | 2.5 | 5.6 | 1.9 | 5.6 | 1.4 | 5.8 | 1.4 | 5.8 | 1.8 | 8.0 | 2.9 | 7.5 | 1.7 | 7.5 | 0.0 | --- | 0.0 | --- | 0.3 | 3.5 | | |
| 13 | 1.1 | 5.4 | 0.4 | 5.8 | 0.5 | 5.0 | 0.7 | 5.0 | 0.9 | 6.7 | 0.9 | 6.7 | 1.4 | 7.0 | 1.4 | 6.0 | 0.2 | 4.8 | 0.6 | 4.0 | 0.9 | 4.0 | | |
| 14 | 0.8 | 5.8 | 1.0 | 6.0 | 1.0 | 5.8 | 0.7 | 5.2 | 1.4 | 6.0 | 0.9 | 7.5 | 1.6 | 8.7 | 2.2 | 7.7 | 1.4 | 5.0 | 1.6 | 5.2 | 1.3 | 5.6 | | |
| 15 | 0.8 | 5.8 | 1.4 | 6.0 | 1.4 | 6.0 | 1.4 | 6.0 | 2.2 | 8.3 | 3.5 | 7.7 | 3.8 | 9.0 | 3.3 | 8.0 | 1.9 | 6.5 | 1.8 | 7.0 | 1.8 | 7.0 | | |
| 16 | 2.5 | 8.0 | 2.8 | 7.3 | 3.0 | 7.0 | 1.9 | 7.3 | 2.7 | 7.7 | 2.8 | 6.7 | 1.9 | 7.5 | 1.7 | 7.5 | 0.4 | 6.0 | 0.4 | 6.5 | 0.6 | 6.5 | | |
| 17 | 1.7 | 7.3 | 1.6 | 7.3 | 1.8 | 6.0 | 1.5 | 6.5 | 1.0 | 6.0 | 0.3 | 7.5 | 0.5 | 4.3 | 0.2 | 4.7 | 1.4 | 7.0 | 0.9 | 6.5 | 0.6 | 6.3 | | |
| 18 | 1.0 | 6.0 | 1.1 | 5.6 | 1.1 | 5.6 | 1.3 | 5.4 | 0.3 | 4.3 | 0.3 | 4.5 | 0.5 | 4.7 | 0.4 | 5.4 | 1.7 | 7.3 | 0.6 | 6.3 | 0.9 | 6.5 | | |
| 19 | 2.0 | 5.4 | 0.9 | 5.0 | 1.9 | 4.3 | 0.8 | 4.3 | 0.2 | 5.0 | 0.5 | 5.0 | 0.2 | 5.0 | 0.5 | 5.0 | 1.0 | 6.3 | 1.6 | 6.0 | 1.0 | 6.3 | | |
| 20 | 0.9 | 4.0 | 0.3 | 3.9 | 0.6 | 4.0 | 0.3 | 4.3 | 0.5 | 5.0 | 0.6 | 5.6 | 0.7 | 5.0 | 0.7 | 5.4 | 0.9 | 6.7 | 1.1 | 6.5 | 1.3 | 7.0 | | |
| 21 | 0.9 | 4.0 | 0.6 | 3.7 | 0.3 | 4.1 | 0.3 | 3.7 | ... | ... | 0.6 | 6.0 | 0.2 | 5.0 | 0.2 | 6.0 | 1.9 | 6.5 | 1.8 | 6.7 | 1.8 | 7.7 | | |
| 22 | 0.5 | 4.7 | 0.3 | 4.5 | 0.3 | 4.5 | 0.3 | 4.3 | 0.4 | 6.0 | 0.2 | 6.0 | 0.3 | 4.3 | 0.2 | 6.0 | 1.8 | 6.0 | 1.8 | 6.7 | 1.6 | 8.7 | | |
| 23 | 0.3 | 4.0 | 0.3 | 4.3 | 0.2 | 5.0 | 0.2 | 4.7 | 0.2 | 5.6 | 0.2 | 6.0 | 0.2 | 5.6 | 0.2 | 5.4 | 2.0 | 7.0 | 1.8 | 7.0 | 1.6 | 7.0 | | |
| 24 | 0.3 | 4.3 | 0.3 | 4.3 | 0.3 | 3.7 | 0.0 | --- | 0.2 | 6.0 | 0.2 | 5.6 | 0.2 | 6.0 | 0.2 | 6.0 | 1.7 | 6.7 | 1.1 | 6.7 | 0.8 | 6.6 | | |
| 25 | 0.3 | 4.0 | 0.3 | 4.0 | 0.3 | 4.0 | 0.2 | 5.0 | 0.4 | 6.0 | 0.2 | 5.8 | 0.2 | 6.0 | 0.3 | 4.3 | 0.2 | 6.5 | 0.2 | 5.6 | 0.4 | 7.0 | | |
| 26 | ... | ... | 0.7 | 5.0 | 1.9 | 6.3 | 1.5 | 5.6 | 0.3 | 3.7 | 0.0 | --- | 0.3 | 3.7 | 0.5 | 5.0 | 2.0 | 6.0 | 2.0 | 6.0 | 2.0 | 7.5 | | |
| 27 | 0.8 | 4.5 | 0.6 | 3.7 | 1.5 | 3.7 | 0.9 | 7.0 | 0.7 | 5.4 | 0.4 | 5.4 | ... | ... | 1.1 | 5.6 | 3.0 | 7.7 | 1.9 | 7.3 | 1.9 | 8.3 | | |
| 28 | 1.8 | 7.0 | 1.7 | 7.5 | 2.3 | 7.0 | 1.8 | 7.0 | 0.9 | 5.4 | 0.7 | 5.2 | ... | ... | 0.2 | 5.2 | 2.8 | 8.0 | 2.7 | 7.5 | 5.0 | 9.0 | | |
| 29 | 2.1 | 4.3 | 1.3 | 4.3 | 0.6 | 4.0 | 0.5 | 4.8 | 0.2 | 6.0 | 0.3 | 4.3 | 0.2 | 5.0 | 0.3 | 3.9 | 4.6 | 9.0 | 3.1 | 8.7 | 3.8 | 9.0 | | |
| 30 | 0.3 | 4.1 | 0.2 | 4.8 | 0.2 | 4.7 | | | | | | | | | | | | | | | | | | |

Air Ministry
METEOROLOGICAL OFFICE

THE
OBSERVATORIES' YEAR BOOK
1933

Comprising the meteorological and geophysical results obtained from autographic records and eye observations at the observatories at Lerwick, Aberdeen, Eskdalemuir, Cahirciveen (Valentia Observatory), and Richmond (Kew Observatory), and the results of soundings of the upper atmosphere by means of registering balloons.

AEROLOGICAL SECTION

Published by the authority of the
METEOROLOGICAL COMMITTEE



LONDON

PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE

1935

AEROLOGICAL SECTION.

| Station. | Latitude. | Longitude. | Height above Sea Level. |
|--------------------|---------------|--------------|----------------------------|
| Kew Observatory .. | 51° 28' N. .. | 0° 19' W. .. | 7 metres. |
| Sealand .. | 53° 14' N. .. | 3° 0' W. .. | 5 metres. |

INTRODUCTION.

Notes on the tables of Upper Air Temperatures obtained from soundings with registering balloons at Richmond and Sealand, 1933.

The tables in the Aerological Section are presented in the same form as those appearing in the Observatories' Year Book since 1930. As in that volume geopotential is used in place of geometric height for the vertical coordinate. The units employed are :

1 Leo (symbol l.) = 10^5 c.g.s. units of geopotential

1 Kileo (symbol Kl.) = 10^8 c.g.s. " " "

A table shewing the relation between height and geopotential in latitude $52^\circ 20'$, the approximate mean latitude of Kew Observatory and Sealand, is given in the Introduction to the Aerological Section of the Observatories' Year Book, 1930.

The Dines pattern meteorograph was employed solely as before, and the method of operation remained the same as in recent years. A full description will be found in "The Dines Balloon Meteorograph and the method of using it."* In the computation of pressure-geopotentials the graphical method was employed, checked as to its main features by an arithmetical process. The effect of humidity on the density of the air was neglected.

A total of 44 soundings were made during the year, 33 from the Aviation Service Station of the Meteorological Office at Sealand Aerodrome and 11 from Kew Observatory. In the cases of 39 of these soundings the instruments were found and returned, the rest being lost. In two, which were found and returned, the record was unsatisfactory and could only partly be utilised. The choice of station from which a sounding was made was generally determined in view of the probable direction and length of the run of the balloon.

The ventilation of the Dines meteorograph is effected solely by the natural draught produced by its vertical velocity. The vertical velocity of the rising balloon may be taken to have lain between the limits 200 and 360 metres per minute in the troposphere. It is probable that even when the balloon is known to have burst, this velocity was not always maintained up to the highest point of the sounding. After the balloon had burst the velocity of fall was much higher, ranging from about 900 metres per minute at 20 Kl. down to 300 near the ground. The ventilation on the descent was much more adequate than on the ascent, especially in the stratosphere.

As regards temperature, unless stated to the contrary the mean of the records on the ascent and descent was employed entirely in computing the published figures. In general the difference between the two records did not exceed 4°A. , with a mean of about half that amount. Whenever direct evidence is available it is almost always found that in the troposphere the descending record is the colder of the two. An analysis of a large number of British soundings has led to the conclusion that as far as the troposphere is concerned this effect is mainly due to a temperature lag of the thermograph member, and that the mean of the two records gives in general a close approximation to the true air temperature.† Occasionally in exceptional circumstances it is deemed best to give greater weight to one record than to the other, or to publish the data from one record only. All such occasions are mentioned in the notes, they generally refer either to occasions of strong solar radiation when the less vigorous

* M.O. 321, H.M. Stationery Office.

† See also :—Memoirs of the Indian Meteorological Department. Vol. XXIV. Part V. By J. H. Field.

ventilation of the meteorograph on the ascent makes that record less reliable than that of the descent, or to the lowest layers of the troposphere only.

In the case of high soundings made during the day-time a pronounced rise of temperature is sometimes observed over about a kiloleo at the extreme top. There is good evidence that this is a fictitious effect due to solar radiation and that the ascent is a great deal more affected by it than the descent. The rise of temperature in such cases is therefore usually ignored, and in addition greater weight is given to the descent than to the ascent in the upper parts of such records as show an unusually large difference between them. All occasions on which such selection has been made are specifically mentioned in the notes. An account of this phenomenon is to be found in "Memoirs of the Royal Meteorological Society," Vol. 2, No. 18. By L. H. G. Dines.

In most cases the meteorograph was fitted with a hair hygograph. Only the record of relative humidity on the ascent in each case has been published, except when specific mention to the contrary is made in the Notes. The record of the descent appears to be the less reliable for two reasons, first that the previous exposure of the hair to extreme cold and dryness makes it more sluggish in response to changes in the relative humidity, second that the higher velocity at which the meteorograph falls increases the lag in its response reckoned in terms of height. The hygrometer readily shows changes in the relative humidity in the lower part of the troposphere, but the absolute value of its readings may be subject to an uncertain error of five or more on the percentage scale. No difference has been made as concerns this or previous volumes, in the interpretation of the records as between temperatures above and below the freezing point. For purposes of reference it may however be stated that Depegrams supplied to the International Commission for the exploration of the Upper Air were, up to the year 1929, drawn on the assumption that the published figures of relative humidity at temperatures below 273°A . referred to ice; since 1930 it has been presumed that they refer to water in all cases. Below a temperature of 250°A . it seems doubtful if in the ordinary way the record has any meaning, and the figures for the higher parts of the atmosphere have not therefore been published.

In order to ensure as far as possible that the hygograph works under standard conditions, it is normally exposed to a saturated atmosphere for ten minutes about an hour before the sounding is made.

The method employed in calibrating the hygograph is as follows:—It is first immersed in either water or a saturated atmosphere for at least ten minutes, and a mark made by the scribe on the record plate which is taken as corresponding with steady saturated conditions. It is then taken out, roughly dried to remove superfluous water, and placed as soon as possible in a testing chamber through which a current of air flows continually. The relative humidity of the air stream is next reduced in two or more stages to a minimum value of about 20%, plenty of time being allowed at each stage for the conditions to become steady. When in each case steady conditions have been attained a mark is made by the scribe. The object of the test is to obtain two marks at relative humidities near 25%, and in such case the total time taken is about 25 to 30 minutes from the instant when the hygograph is removed from the water in the first place. If the relative humidity is reduced in more than two stages the total time taken is greater, allowing about ten minutes per stage. The calibration is carried out at temperatures above 288°A .

When the contraction of the hair corresponding with a relative humidity of 25% has been determined in the manner described, the contraction throughout the scale under the conditions met with in the sounding is assumed to follow an empirical law, which has been determined from the average behaviour of a large number of hairs. A table expressing this law appeared in the Introduction to the Aerological Section of the Year Book for 1930 and represented the procedure which had been adopted up to the end of that year. As a result of further experiments made in 1931 it was found

desirable to amend the statement of the empirical law of contraction of the hygrograph hairs, and for purposes of tabulation since January, 1931, the following table has been used :

| | | | | | | | | | | | |
|----------------------|-------|-----|-------|-------|-------|-------|------|------|------|------|------|
| Relative humidity % | 110 | 100 | 95 | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 25 |
| Contraction of hair. | -.07k | 00k | .035k | .080k | .185k | .315k | .45k | .59k | .74k | .90k | .99k |
| Saturated length. | | | | | | | | | | | |

Here, the quantity k is defined as the contraction of the hair from its saturated length at the relative humidity of 25% expressed as a fraction of the saturated length, and determined as set out above.

The average value of k has been found to be about .0099, but individual hairs differ from the mean by anything up to 15% on either side. This figure is based on observations made on about 80 meteorographs, involving 40 or more entirely separate human hairs derived from various sources.

In working up the records the hair has been assumed to have a uniform absolute coefficient of thermal expansion of 34×10^{-6} per degree A. Since the frame of the hygrograph is made of nickel silver having a coefficient of 18×10^{-6} the relative expansion of hair to frame is assumed to be 16×10^{-6} per degree A.

No allowance has been made in computing the published figures for the fact that the results of the calibration are not necessarily valid at low temperatures below the freezing point.

It has been noticed on many occasions that on passing through a cloud the hygrograph hairs expand more than they do when immersed in water or in an artificial saturated atmosphere. This phenomenon is not yet fully understood, but it has been proved that it is not due to errors in calibration or setting of the instrument; accordingly in this volume its occurrence is indicated by publishing a value of the relative humidity in excess of 100%. The values are determined by extrapolation of the table upwards through 100. If, for example, the hairs are found to have extended by .035 k beyond their length when immersed in water at the same temperature the relative humidity is tabulated as 105%, but there is not enough evidence to be able to state what exactly is the corresponding physical condition of the atmosphere in regard to water vapour.

Data of well marked inversions and regions of zero lapse rate in the troposphere are included in the notes on the soundings. They are set out in a uniform manner on the principle that corresponding values of geopotential, temperature and relative humidity are given for the salient points in each special case, the sequence being always from lesser geopotentials to greater.

The figures given in the table of lapse rates do not in every case agree with the temperatures appearing in the table of temperature-geopotentials. The reason for this is that both were determined independently from the original data, which can sometimes profitably be read to the nearest half degree, but are rounded off to whole degrees for publication.

The lapse rates given between ground level and 0.5 Kl. are determined from the reading in the thermometer screen at the station and that of the meteorograph at 0.5 Kl. A source of error arises here in that the two standards are independent and are not exposed in the same manner. A small difference is capable of making an appreciable error in the lapse rate, and it is possible that lapse rates apparently greater than 10°A. per Kl. in this layer are sometimes due to this cause.

Whenever possible the meteorograph was briefly calibrated again at one temperature after return, before the record plate had been disturbed, in order to discover

whether any shift of zero had taken place since the previous calibration. This provides some check on the behaviour of the instrument, but disturbance is almost inevitable considering the rough treatment experienced in the shock of the fall and after. The mean values of the disturbance without regard to sign were 1.1°A . for the temperature and 4mb . for the pressure.

All new meteorographs, and all old ones used again after repair, were seasoned in a vacuum chamber before use by being subjected to several slow reductions of pressure. This process has been found greatly to reduce the chance of a systematic difference occurring between the results of a fast and slow calibration. More detail is given in the Introduction to the tables for 1923, and within the limits of accuracy at present attainable in the measurement of upper air pressures, the results of the fast reduction of pressure in the calibration test may be taken as applying to the slow reduction in the actual sounding.

The lag, or difference in pressure reading as between a falling and a rising pressure, is of the order 3 or 4 millibars on the average in the middle region of a high sounding, falling off to lesser values on either side. If a correction be applied to the recorded temperature-pressures to allow for this error, it results, for an average sounding in the troposphere, in an increase in the difference between the temperatures recorded at any pressure on the ascent and descent. The effect is to make the recorded temperatures on the descent too high by about half a degree at a level of 6 or 7 kiloleos, with a tendency for the error to fall off above and below. When the mean of the two records is employed the resultant error is halved and becomes negligible.

In Table 548 occur the entries "Type of Tropopause" and " L_c =Geopotential at Tropopause." These are defined as follows:—Type I. The stratosphere commences with an inversion, and L_c is the geopotential at the first point of zero temperature gradient. Type II. The stratosphere begins with an abrupt transition to a temperature gradient below 2°A . per kiloleo without inversion, and L_c is the geopotential of the abrupt transition. Type III. There is no abrupt change of temperature gradient, and the base of the stratosphere is taken at the point where the mean fall of temperature for the kiloleo next above is 2°A . or less, provided that it does not exceed 2°A . for any subsequent kiloleo. In the Remarks on the Soundings the pressure distribution is classified according to the types defined in "Aids to Forecasting."†

†—E. Gold, F.R.S., Geophysical Memoir No. 16, M.O. 22of, London, 1920.

T.=Temperature in degrees absolute.

P.=Pressure in millibars.

L.=Geopotential Level above M.S.L. in kiloleos (Kl.)

RH.=Relative Humidity as percentage.

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| No. of Sounding. | 913. | 914. | 915. | 920. | 921. | 922. | 923. | 924. | 925. | 926. |
|--|-------------------------------|----------------------|-----------------------------|----------------------------------|--------------------------|-----------------------|------------------|------------------|---------------------------------------|---------------------------------------|
| Date. | Jan. 11. | Jan. 12. | Jan. 12. | Mar. 9. | Mar. 9. | Mar. 23. | Apr. 5. | Apr. 12. | Apr. 13. | Apr. 13. |
| Station. | Sealand. | Sealand. | Sealand. | Sealand. | Sealand. | Kew. | Kew. | Sealand. | Sealand. | Sealand. |
| Start G.M.T. | 17h. 40m. | 7h. 31m. | 13h. 00m. | 7h. 30m. | 12h. 48m. | 11h. 24m. | 16h. 32m. | 17h. 45m. | 6h. 25m. | 12h. 57m. |
| L_t =Geopotential at Greatest Height ... (Kl.) | 19.25 | 21.53 | 4.77 | 18.05 | 15.80 | 21.24 | 2.19 | 14.70 | 20.40 | 18.16 |
| T_t =Corresponding Temperature ... (°A) | 216 | 217 | 257 | 215 | 219 | 219 | 274 | 219 | 219 | 222 |
| P_t =Corresponding Pressure ... (mb.) | 56 | 39 | 550 | 70 | 101 | 42 | 780 | 119 | 48 | 69 |
| Place of Fall | In sea at Clevedon, Somerset. | Kingsland, Hereford. | Rossett, Wrexham, N. Wales. | Penistone, nr. Sheffield, Yorks. | Heaton, Bradford, Yorks. | Berkhampstead, Herts. | Tooting, Surrey. | Seaton, Rutland. | Essington, nr. Wolverhampton, Staffs. | Nether-seale, Burton-on Trent, Derby. |
| Distance (Km.) | 197 | 109 | 14 | 97 | 103 | 37 | 11 | 172 | 91 | 123 |
| Bearing. Degrees from N. | 178 | 174 | 162 | 70 | 50 | 330 | 120 | 115 | 138 | 114 |
| Geostrophic Wind— Speed (m/s.) | 14 | 0 | 5 | 15 | 14 | 17 | 3 | 9 | 9 | 11 |
| Degrees from N. Wind (Anemograph)— Speed (m/s.) | 30 | — | 220 | 230 | 230 | 135 | 315 | 10 | 10 | 350 |
| Degrees from N. | 315 | — | 145 | 155 | 155 | 90 | 315 | 315 | 325 | 295 |
| Humidity at surface (%) | 85 | 98 | 78 | 79 | 69 | 44 | 63 | 67 | 78 | 60 |
| Type of Tropopause | I. | I. | — | I. | I. | I. | — | I. | I. | I. |
| L_c =Geopotential at ... (Kl.) | 11.54 | 12.45 | — | 11.69 | 11.20 | 12.07 | — | 10.50 | 11.15 | 10.99 |
| T_c =Temp. at ... (°A) | 209 | 206 | — | 208 | 210 | 205 | — | 213 | 213 | 209 |
| P_c =Pressure at ... (mb.) | 197 | 172 | — | 197 | 213 | 186 | — | 233 | 210 | 217 |
| Mean Temp. in Stratosphere | (L_c+2) to (L_c+5) (°A.) | 214 | 212 | — | 215 | — | 215 | — | 219 | 219 |
| | (L_c+5) to (L_c+8) (°A.) | 215 | 214 | — | — | — | 218 | — | 218 | — |
| | (L_c+8) to (L_c+11) (°A.) | — | — | — | — | — | — | — | — | — |
| T_m (Mean Temp. 1 to 9 Kl.) ... (°A.) | 250 | 253 | — | 256 | 255 | 256 | — | 252 | 251 | 252 |
| P_s (Pressure at M.S.L.) ... (mb.) | 1026 | 1027 | 1025 | 1024 | 1025 | 1026 | 1025 | 1021 | 1027 | 1030 |

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REMARKS ON THE SOUNDINGS AND THE PREVAILING WEATHER CONDITIONS, 1933.

- No. of Sounding.
913. Weather cm. Clouds St-Cu. 9/10 from NNE. at about 0.9 Kl. *Inversion* (3.31–3.61 Kl., 667–631 mb., 256–255°A., 53–45%). Pressure distribution:—A ridge of high pressure extends from the British Isles to the south-west, a deep depression is centred west of Iceland. Type XII.
914. Weather bmx. Clouds Cirrus 1/10. *Inversion* near the ground, upper limit at about (0.38 Kl., 977 mb., 274°A., 81%). *Inversion* (2.00–2.57 Kl., 792–735 mb., 264–266.6°A., 43–30%). Pressure distribution:—High pressure still maintained over the British Isles, pressure falling rapidly between England and Iceland. Type VIIc.
915. Weather bz. Clouds Cirrus trace from N'W. Balloon did not burst; maximum level about 5.5 Kl. The upper portion of the record was deemed to be unreliable and was not used. *Inversion* (1.77–2.08 Kl., 816–784 mb., 266–267.2°A., 49–34%). Nearly *isothermal* (2.08–2.74 Kl., 784–720 mb., 267.2–267.5°A., 34–27%). Pressure distribution:—Similar to the foregoing, but the depression near Iceland is less deep. Type XIa.
920. Weather cloudy. Clouds St-Cu. 8/10 from W'S, Ci-St. 1/10. Very small lapse rate between the surface and 1.5 Kl. *Inversion* on descent (3.60–3.84 Kl., 650–630 mb., 264.5–265.5°A.). *Isothermal* on ascent (4.10–4.54 Kl., 609–574 mb., 262.8°A., 102–76%). Pressure distribution:—A depression centred over Iceland with a secondary west of Ireland; pressure high over the Continent. Type Va or VIa.
921. Weather cloudy. Clouds St-Cu. 7/10 from SW. at about 2 Kl. and a higher level, Cirrus and Ci-St. 2/10 from SW. moving at 8 r.p.h. *Inversion* on ascent (0.93–1.34 Kl., 916–869 mb., 280–281.7°A., 52–30%), small lapse rate (4.10–4.42 Kl., 609–584 mb., 261–260.7°A., 82–60%). Pressure distribution:—Similar to the foregoing, the depression is slowly filling up. Type VIa.
922. Weather b. Clouds Cirrus 2/10. Balloon followed by theodolite and seen to burst after 78 minutes. The mean of both records was employed in determining the temperature except above 18 Kl., where the descent was given greater weight. The mean of both ascent and descent was employed in determining the relative humidity, as they differed very little anywhere. *Inversion* (0.87–1.16 Kl., 920–887 mb., 276–279°A., 35–33%). Pressure distribution:—An anticyclone centred over Sweden extends over the British Isles and the Continent, while depressions are situated to the north and south west of Iceland. Type VIIb.
923. Weather b. Clouds St-Cu. 2/10, nearly stationary, at about 2 Kl. *Inversion* (0.96–1.31 Kl., 912–873 mb., 278–279.4°A., 88–70%). Pressure distribution:—A complex anticyclone covers the British Isles and the Continent, a ridge of high pressure extends from it to Greenland, depressions are centred west of Ireland and over Scandinavia. Type IXb or XIIIa.
924. Weather b. Clouds Fr-Cu. 1/10 from NNW. at about 0.9 Kl., Cirrus 2/10 from WSW. moving at 10 r.p.h. Balloon did not burst. *Inversion* (1.50–1.68 Kl., 845–825 mb., 270.6–273.1°A., 72–60%). A rise of temperature at the extreme top of 4°A. on both records was evidently due to the balloon floating and was ignored. Pressure distribution:—Depressions are centred over Scandinavia and the Atlantic whilst a ridge of high pressure extends from Greenland to the west of Spain. Type X or XIa.
925. Weather bc. Clouds Cu. 1/10 from NNW. at about 0.9 Kl., Cirrus 4/10 from NNW. moving at 8 r.p.h. The balloon floated at the highest point, previous to bursting, with a rise of temperature of about 8°A. which was ignored. The mean of both records was employed for the temperature except over the last Kl. at the top where greater weight was given to the descent. *Inversion* (1.42–2.35 Kl., 857–760 mb., 268–270°A.), change of lapse rate at (9.83 Kl., 260 mb., 214°A.). Pressure distribution:—Similar to the foregoing, the depression over the Atlantic is moving NE. Type I or X.
926. Weather b. Clouds Cu. 1/10 from NNW. at about 1.3 Kl., Cirrus 1/10 from NW. moving at 10 r.p.h. The relative humidity was determined from the mean of both records which agreed closely. *Inversion* (1.67–2.33 Kl., 833–765 mb., 268.3–270.0°A., 46–40%). Pressure distribution:—Similar to the foregoing, an anticyclone is developing over the British Isles. Type IXb.

T.=Temperature in degrees absolute.

P.=Pressure in millibars.

L.=Geopotential Level above M.S.L. in kiloeos (Kl.)

RH.=Relative Humidity as percentage.

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| No. of Sounding. | 927. | 928. | 929. | 930. | 931. | 932. | 934. | 935. | 936. | 937. |
|--|-------------------------------------|---------------------------------|------------------------------------|------------------|---------------------|--------------------|-----------------------------------|----------------------------|----------------------|---------------------------------|
| Date. | May 10. | May 11. | May 11. | May 18. | May 27. | June 8. | June 21. | July 10. | July 12. | July 13. |
| Station. | Sealand. | Sealand. | Sealand. | Sealand. | Kew. | Kew. | Sealand. | Sealand. | Sealand. | Sealand. |
| Start G.M.T. | 18h. 10m. | 6h. 40m. | 13h. 00m. | 7h. 02m. | 10h. 33m. | 7h. 38m. | 18h. 10m. | 13h. 05m. | 17h. 40m. | 6h. 25m. |
| L_t =Geopotential at Greatest Height ... (Kl.) | 18·01 | 16·82 | 19·77 | 20·44 | 12·43 | 17·05 | 15·78 | 19·59 | 21·11 | 20·35 |
| T_t =Corresponding Temperature ... (°A) | 217 | 219 | 222 | 222 | 228 | 221 | 226 | 231 | 228 | 231 |
| P_t =Corresponding Pressure ... (mb.) | 70 | 87 | 55 | 50 | 174 | 86 | 103 | 61 | 46 | 52 |
| Place of Fall | Draycot, Chippenham, Wilts. | Kinver, Stourbridge, Worcester. | Netherwood Heath, Knowle, Warwick. | Cheadle, Staffs. | Edgware, Middlesex. | Guildford, Surrey. | Crickheath, Oswestry, Shropshire. | Horbury, Wakefield, Yorks. | Radbourne nr. Derby. | Rawcliffe Bridge, Goole, Yorks. |
| Distance (Km.) | 204 | 101 | 125 | 72 | 17 | 31 | 47 | 107 | 101 | 147 |
| Bearing. Degrees from N. | 163 | 150 | 138 | 112 | 18 | 216 | 180 | 62 | 109 | 68 |
| Geostrophic Wind— Speed (m/s.) | 9 | 5 | 7 | 9 | 9 | 5 | 9 | 13 | 11 | 13 |
| Degrees from N. | 360 | 325 | 335 | 180 | 360 | 70 | 330 | 250 | 290 | 210 |
| Wind (Anemograph)— Speed (m/s.) | 7 | 2 | 8 | 4 | 2 | 1 | 2 | 9 | 7 | 3 |
| Degrees from N. | 280 | 295 | 305 | 145 | 155 | 360 | 280 | 225 | 235 | 155 |
| Humidity at surface (%) | 74 | 84 | 82 | 90 | 63 | 58 | 83 | 54 | 66 | 95 |
| Type of Tropopause | I. | I. | I. | I. | II. | — | I. | I. | I. | I. |
| L_c =Geopotential at ,, ... (Kl.) | 10·07 | 10·15 | 10·63 | 12·11 | 8·23 | — | 8·83 | 9·36 | 10·47 | 10·49 |
| T_c =Temp. at ,, ... (°A) | 219 | 219 | 216 | 210 | 228 | — | 222 | 228 | 219 | 218 |
| P_c =Pressure at ,, ... (mb.) | 250 | 250 | 232 | 190 | 331 | — | 300 | 288 | 240 | 238 |
| Mean Temp. in Stratosphere | { (L_c+2) to (L_c+5) (°A.) | 217 | 220 | 221 | 216 | — | 228 | 230 | 225 | 225 |
| | { (L_c+5) to (L_c+8) (°A.) | 216 | — | 219 | 219 | — | — | 229 | 224 | 226 |
| | { (L_c+8) to (L_c+11) (°A.) | — | — | — | — | — | — | — | — | — |
| T_m (Mean Temp. 1 to 9 Kl.) ... (°A.) | 252 | 254 | 255 | 261 | 252 | — | 252 | 259 | 257 | 257 |
| P_s (Pressure at M.S.L.) ... (mb.) | 1015 | 1016 | 1017 | 1023 | 1012 | 1019 | 1001 | 1010 | 1009 | 1005 |

The results of an ascent from Kew at 13h. 01m. on June 8th 1933, received too late for inclusion in above Table, will be found in the 1934 Volume.

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REMARKS ON THE SOUNDINGS AND THE PREVAILING WEATHER CONDITIONS, 1933.

- No. of Sounding.
927. Weather b. Clouds Cu. 1/10 from N. at about 1·3 Kl. Pressure distribution :—A complex low pressure area covers Europe, whilst pressure is high north-east of Iceland and west of Spain. Type IV.
928. Weather cloudy. Clouds Fr-St. 2/10 from NW. at about 0·4 Kl., High St-Cu. 3/10 from NNW. at about 2 Kl., Ci-St. 4/10. *Inversion* (2·47–2·69 Kl., 743–722 mb., 266·6–268·6°A., 107–85%). Pressure distribution :—Similar to the foregoing, the anticyclone west of Spain is spreading north-east. Type IV.
929. Weather cloudy. Clouds St-Cu. 5/10 from WNW. at about 0·8 Kl., A-Cu. 3/10 and Ci-St. 1/10. The mean of both records was used in determining the temperature except at the top where greater weight was given to the descending record ; a pronounced rise at the extreme top on the descending record was also ignored. Small *inversion* at (3·04 Kl., 690 mb., 266°A., 75%). Pressure distribution :—Similar to the foregoing. The anticyclone now extends to Ireland and South West England. Type IV.
930. Weather overcast. Clouds 10/10 Stratus at about 0·3 Kl. The mean of both records was employed for the temperature except near the top where the two records diverged widely and greater weight was given to the descending one. An apparent rise of 8°A. at the extreme top shown on the descending record was ignored. *Inversion* with upper limit at (0·85 Kl., 922 mb., 282·3°A., 93%), *inversion* (2·46–2·94 Kl., 753–708 mb., 273–273·4°A., 107–106%). Pressure distribution :—A complex low pressure area covers Europe ; a depression west of Ireland is moving east. Type VII.
931. Weather cloudy. Clouds Cu. and Fr-Cu. 7/10 from SE. at about 1 Kl., A-St. and A-Cu. 3/10 from SE. Pressure distribution :—A complex low pressure system covers Europe with a secondary centred over the English Channel. Pressure is high to the north of Iceland and west of Spain and low to the west of Ireland. Type X.
932. Weather b. Clouds nil. The balloon was followed by a theodolite and seen to burst after 70 minutes. Owing to a defect no record was obtained except for a few Kl. from the top, the published levels are approximate and were computed with the aid of temperatures obtained from an aeroplane flight at Duxford. Pressure distribution :—A ridge of high pressure extends over the British Isles and Scandinavia, depressions are centred over Italy and north of Iceland. Type IX or X.
934. Weather cloudy with slight rain. Clouds St. 2/10, St-Cu. 6/10, High St-Cu. 1/10. Pressure distribution :—A complex depression is centred over the British Isles with small centres over Europe. An anticyclone exists to the south west of Iceland. Type XIII.
935. Weather bc. Clouds Fr-Cu. 2/10 from SW. at about 0·6 Kl., A-Cu. 2/10 from WSW. at about 3·5 Kl. moving at 15 r.p.h. A sudden rise of about 5°A. at the extreme top shown on both records, due to a slowing up of the balloon, was ignored. *Inversion* (3·70–4·00 Kl., 635–611 mb., 266·6–267·3°A., 100–80%). Pressure distribution :—A depression centred north-west of Scotland extends over the British Isles, whilst a ridge of high pressure extends over the Continent from an anticyclone west of Spain. Type Va.
936. Weather cloudy. Clouds St-Cu. and Cu. 3/10 from W'S. at about 1 Kl., High St-Cu. 6/10 from W. at 2·5 Kl. *Inversion* (2·76–2·99 Kl., 715–695 mb., 270·5–271·6°A., 101–83%). Pressure distribution :—A depression near Iceland with associated secondaries extends over Northern Europe, an anticyclone is centred west of Spain. Type Ia or II.
937. Weather or. Clouds Nb. 10/10 from SSW. at about 0·5 Kl. The sounding was made in the middle of the rain area in front of an active depression. Apparent supersaturation was indicated over a wide range of level on both ascent and descent independently. Pressure distribution :—The depression referred to in the foregoing has moved south and is centred west of Scotland and moving eastward. Type IVa or VII.

T.=Temperature in degrees absolute.

P.=Pressure in millibars.

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L.=Geopotential Level above M.S.L. in kiloleos (Kl.)

RH.=Relative Humidity as percentage.

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| No. of Sounding. | 938. | 939. | 940. | 941. | 942. | 943. | 944. | 945. | 946. | 947. |
|--|---------------------------------|------------------------------------|----------------|--------------------------------|-------------------------------|---------------------|-------------------------|--|--------------------------------|----------------------|
| Date. | July 13. | Aug. 9. | Aug. 10. | Aug. 10. | Aug. 11. | Sept. 1. | Sept. 13. | Sept. 14. | Sept. 14. | Oct. 4. |
| Station. | Kew. | Sealand. | Sealand. | Sealand. | Sealand. | Sealand. | Sealand. | Sealand. | Sealand. | Kew. |
| Start G.M.T. | 11h. 33m. | 18h. 20m. | 7h. 25m. | 13h. 15m. | 13h. 40m. | 12h. 25m. | 17h. 40m. | 6h. 30m. | 12h. 40m. | 11h. 27m. |
| L_t =Geopotential at Greatest Height ... (Kl.) | 7.52 | 21.68 | 20.81 | 19.67 | 21.75 | 19.35 | 11.49 | 17.95 | 18.35 | 21.13 |
| T_t =Corresponding Temperature ... (°A) | 251 | 223 | 230 | 229 | 229 | 225 | 223 | 227 | 220 | 217 |
| P_t =Corresponding Pressure ... (mb.) | 380 | 42 | 49 | 59 | 43 | 62 | 203 | 75 | 70 | 44 |
| Place of Fall | Springfield, Chelmsford, Essex. | Barnoldby-le-Beck, Grimsby, Lincs. | Tealby, Lincs. | Messingham, Scunthorpe, Lincs. | Hemsworth, Pontefract, Yorks. | Kempsey, Worcester. | Foss Cross, Gloucester. | In sea 2 miles ESE. of Lyme Regis, Dorset. | Queen Camel, Yeovil, Somerset. | Itchen Stoke, Hants. |
| Distance (Km.) | 63 | 193 | 183 | 159 | 118 | 163 | 208 | 281 | 247 | 75 |
| Bearing. Degrees from N. | 60 | 79 | 83 | 77 | 68 | 144 | 147 | 179 | 174 | 236 |
| Geostrophic Wind— Speed (m/s.) | 22 | 9 | 3 | 2 | 7 | 9 | 11 | 11 | 9 | 2 |
| Degrees from N. | 220 | 300 | 315 | 50 | 100 | 300 | 35 | 350 | 360 | 60 |
| Wind (Anemograph)— Speed (m/s.) | 4 | 4 | 2 | 5 | 2 | 5 | 8 | 1 | 7 | 2 |
| Degrees from N. | 180 | 295 | 315 | 295 | 180 | 295 | 305 | 315 | 305 | 360 |
| Humidity at surface (%) | 89 | 55 | 71 | 51 | 50 | 83 | 66 | 83 | 53 | 57 |
| Type of Tropopause | — | I. | I. | I. | I. | I. | — | I. | I. | I. |
| L_c =Geopotential at (Kl.) | — | 11.55 | 11.52 | 12.11 | 11.17 | 12.89 | — | 11.27 | 13.01 | 13.91 |
| T_c =Temp. at (°A) | — | 216 | 216 | 214 | 220 | 215 | — | 217 | 211 | 211 |
| P_c =Pressure at (mb.) | — | 209 | 209 | 193 | 222 | 173 | — | 215 | 165 | 142 |
| Mean Temp. in Stratosphere | (L_c+2) to (L_c+5) (°A.) | — | 219 | 221 | 222 | 223 | — | 219 | 218 | 215 |
| | (L_c+5) to (L_c+8) (°A.) | — | 221 | 226 | — | 225 | — | — | — | — |
| | (L_c+8) to (L_c+11) (°A.) | — | — | — | — | — | — | — | — | — |
| T_m (Mean Temp. 1 to 9 Kl.) (°A.) | — | 262 | 261 | 263 | 261 | 265 | 253 | 259 | 261 | 260 |
| P_s (Pressure at M.S.L.) (mb.) | 1007 | 1019 | 1022 | 1023 | 1022 | 1020 | 1016 | 1022 | 1025 | 1025 |

549.

1933.

REMARKS ON THE SOUNDINGS AND THE PREVAILING WEATHER CONDITIONS, 1933.

- No. of Sounding.
938. Weather or. Clouds Fr-Nb. 5/10 from SSE, High St. 5/10. Ascent curtailed by an automatic release. *Inversion* (1.14-1.47 Kl., 875-840 mb., 279.7-281.0°A., 99-95%). Pressure distribution:—A depression centred near the north of Ireland is moving east. Type XV.
939. Weather bc. Clouds Cu. and St-Cu. 2/10, A-Cu. 1/10, Cirrus 1/10 from W.S. moving at 11 r.p.h. *Inversion* (1.18-1.48 Kl., 882-850 mb., 280.3-283.2°A., 79-42%). Pressure distribution:—A ridge of high pressure extends over the British Isles and France, depressions are centred over Scandinavia and Spain. Type Ia.
940. Weather bc. Clouds Cu. 3/10 at about 0.9 Kl., Cirrus 2/10 from WSW. moving at 15 r.p.h. The vertical velocity of the balloon fell off prior to the burst and a sudden fall of 9°A. is shown on the record after the burst; the latter was ignored, while greater weight was given to the descending record than the ascending one above 19 Kl. Pressure distribution:—Similar to the foregoing, the depression over Spain has moved northwards. Type XIa.
941. Weather bc. Clouds Cu. 1/10, Cirrus 3/10 moving from W. at 10 r.p.h. Greater weight was given to the descending than to the ascending record of temperature above 16 Kl., a sudden drop in apparent temperature after the balloon burst was ignored. Pressure distribution:—Similar to the foregoing, a shallow region of low pressure now covers Southern Europe. Type Ia.
942. Weather cloudy, slight rain. Clouds St. from WSW. at about 0.8 Kl. A marked rise in the apparent temperature at the extreme top was ignored. Super-saturation was shown on the hygogram independently on both ascent and descent. Pressure distribution:—A quiescent region of high pressure covers the British Isles and Europe. Type IX or IXa.
943. Weather overcast with slight drizzle. Clouds St. 10/10. Over the last two Kl. at the top, more weight was given to the record of temperature on the descent than on the ascent; a sudden fall in the apparent temperature after the balloon burst was ignored. *Isothermal* (2.57-3.05 Kl., 743-700 mb., 278°A., 86-49%). Pressure distribution:—A ridge of high pressure extends over the British Isles and Norway, pressure is low over Russia, Iceland and Spain. Type IV.
944. Weather cloudy. Clouds St., Cu., and St-Cu. 9/10 from NW. at about 0.6 Kl. upwards. Pressure distribution:—A ridge of high pressure extends from south-west of Ireland to the east of Greenland, a shallow depression is centred over the Baltic. Type X.
945. Weather b. Clouds Cu. 1/10 from NW. at about 0.9 Kl., Cirrus trace. Balloon did not burst and evidently floated at the highest point, the whole sounding probably lasted very many hours. An apparent rise of temperature of 24°A. was shown at the top on both records, which was ignored. *Isothermal* on both records, mean values (1.39-2.23 Kl., 857-770 mb., 273.5°A.). Pressure distribution:—Similar to the foregoing, a depression has now developed west of Iceland. Type X.
946. Weather b. Clouds Fr-Cu. 2/10 at 1.4 Kl. from N. Balloon did not burst and the ventilation near the top was so bad that the results have not been published above 18.4 Kl., below which they appear to be reliable. *Inversion* (1.99-2.17 Kl., 800-781 mb., 275-276.2°A., 45-43%). Pressure distribution:—An anticyclone lies over Ireland, pressure is low over Iceland, Russia and Southern Europe. Type IXb.
947. Weather b. Clouds Fr-Cu. trace, moving very slowly, Cirrus 3/10 very slow. Greater weight was given to the record of temperature on the descent than on the ascent near the top. *Inversion* (1.24-1.61 Kl., 880-840 mb., 277.7-279.2°A., 72-63%). *Isothermal* (4.89-5.14 Kl., 550-532 mb., 261°A., 37-34%). Sudden change of lapse rate at (11.61 Kl., 206 mb., 215°A.). Pressure distribution:—An anticyclone centred west of Ireland extends over the British Isles and Central Europe. Depressions are centred over Scandinavia and to the west of Spain. Type Ia.

T.=Temperature in degrees absolute.

P.=Pressure in millibars.

L.=Geopotential Level above M.S.L. in kiloleos (Kl.)

RH.=Relative Humidity as percentage.

548.

1933.

| No. of Sounding. | 948. | 949. | 950. | 951. | 952. | 953. | 954. | 955. | 956. |
|---|--|----------------------------|-----------------------------|--------------------------|--------------------------------|-----------------------------|------------------------------------|---------------------|-----------------------------|
| Date. | Oct. 11. | Oct. 12. | Oct. 12. | Nov. 8. | Nov. 9. | Nov. 29. | Dec. 13. | Dec. 14. | Dec. 14. |
| Station. | Sealand. | Sealand. | Sealand. | Sealand. | Sealand. | Kew. | Kew. | Kew. | Kew. |
| Start G.M.T. | 17h. 59m. | 7h. 45m. | 14h. 10m. | 17h. 22m. | 6h. 57m. | 15h. 39m. | 17h. 33m. | 7h. 30m. | 12h. 30m. |
| L_t =Geopotential at Greatest Height (Kl.) | 10.63 | 18.74 | 19.08 | 16.92 | 20.29 | 17.37 | 5.76 | 15.93 | 15.38 |
| T_t =Corresponding Temperature (°A) | 224 | 218 | 217 | 211 | 213 | 215 | 242 | 218 | 215 |
| P_t =Corresponding Pressure (mb.) | 222 | 63 | 60 | 83 | 48 | 78 | 465 | 94 | 102 |
| Place of Fall | North Hillswood, Leek, Staffs. | Bilsthorpe, Newark, Notts. | Swithland, Leicester-shire. | Upholland, Wigan, Lancs. | New Hey, near Rochdale, Lancs. | Chalton, Portsmouth, Hants. | Nether Wallop, Stockbridge, Hants. | Kimmeridge, Dorset. | Beacon Hill, Poole, Dorset. |
| Distance (Km.) | 67 | 132 | 134 | 40 | 73 | 74 | 96 | 159 | 154 |
| Bearing. Degrees from N. | 102 | 92 | 114 | 28 | 55 | 217 | 247 | 233 | 237 |
| Geostrophic Wind— Speed (m/s.) | 15 | 15 | 13 | 5 | 10 | 10 | 11 | 20 | 22 |
| Degrees from N. | 285 | 275 | 300 | 250 | 245 | 100 | 85 | 70 | 80 |
| Wind (Anemograph)— Speed (m/s.) | 6 | 3 | 11 | Calm. | 2 | 4 | 9 | 9 | 7 |
| Degrees from N. | 260 | 250 | 280 | — | 170 | 90 | 25 | 45 | 65 |
| Humidity at surface (%) | 68 | 63 | 57 | 92 | 86 | 73 | 50 | 60 | 61 |
| Type of Tropopause | I. | I. | II. | I. | I. | I. | — | II. | I. |
| L_c =Geopotential at ,, (Kl.) | 8.87 | 9.67 | 9.33 | 11.15 | 10.25 | 9.27 | — | 9.90 | 10.35 |
| T_c =Temp. at ,, (°A) | 218 | 218 | 219 | 214 | 216 | 222 | — | 214 | 212 |
| P_c =Pressure at ,, (mb.) | 292 | 263 | 279 | 214 | 245 | 283 | — | 248 | 230 |
| Mean Temp. in Stratosphere | { (L_c+2) to (L_c+5) (°A.) | — | 222 | 222 | 211 | 215 | 220 | — | 216 |
| | { (L_c+5) to (L_c+8) (°A.) | — | 221 | 221 | — | 213 | 215 | — | — |
| | { (L_c+8) to (L_c+11) (°A.) | — | — | — | — | — | — | — | — |
| T_m (Mean Temp. 1 to 9 Kl.) (°A.) | 248 | 250 | 250 | 254 | 253 | 251 | — | 246 | 248 |
| P_s (Pressure at M.S.L.) (mb.) | 1005 | 1014 | 1017 | 1023 | 1018 | 1020 | 1011 | 1016 | 1016 |

549.

1933.

REMARKS ON THE SOUNDINGS AND THE PREVAILING WEATHER CONDITIONS, 1933.

- No. of Sounding.
948. Weather bc. Clouds Cu-Nb. 1/10 and St-Cu. 1/10 from W'N. at about 1.5 Kl., Cirrus 2/10 from WNW. moving at 8 r.p.h. Pressure distribution:—A complex depression over Scandinavia extending over the British Isles is giving way to an anticyclone south-west of Ireland. Type II.
949. Weather bc. Clouds Cu. 3/10, St-Cu. 1/10, A-Cu. trace. Cirrus (later) from WNW. moving at 8 r.p.h. Greater weight was given to the record of temperature on the descent than on the ascent near the top, and the usual sudden drop after the balloon burst was ignored. Pressure distribution:—Similar to the foregoing. Type I.
950. Weather b. Clouds Cu and Fr-Cu. 3/10 from NW. at about 1.4 Kl. Ci-Cu. (earlier) from WNW. moving at 8 r.p.h. Greater weight was given to the record of temperature on the descent than on the ascent above 18 Kl. and the usual sudden drop after the balloon burst was ignored. Several small *inversions* occurred between 2.7 and 4.5 Kl. Change of lapse rate (9.78 Kl., 260 mb., 219°A.). Pressure distribution:—The depression in the foregoing is now centred over northern Scandinavia while the anticyclone now extends over the British Isles, France and Spain. Type I.
951. Weather overcast. Clouds St. 10/10 from WSW. at about 0.9 Kl. *Inversion* (1.20–1.44 Kl., 881–855 mb., 275.2–276.8°A., 101–92%), *inversion* (2.94–3.24 Kl., 706–678 mb., 266–267.3°A., 86–69%), small *inversion* (10.18–10.38 Kl., 250–242 mb., 218.4–218.8°A.). Pressure distribution:—Depressions are centred over Iceland and the Mediterranean, a ridge of high pressure extends over the British Isles, Northern France and Germany from an anticyclone to the south-west of Ireland. Type Ia or IV.
952. Weather bcm. Clouds St-Cu. 7/10 from SW'W. at 1 Kl. In the temperature record rather more weight was given to the descent than the ascent above 18 Kl. *Inversion* on descent (1.13–1.44 Kl., 883–849 mb., 274–275°A.), *inversion* on ascent (1.51–1.62 Kl., 842–830 mb., 273.1–274.0°A., 104–94%), *inversion* (3.29–3.43 Kl., 670–657 mb., 263.7–264.3°A., 81–68%). Pressure distribution:—Depressions are centred east of Iceland and over the Mediterranean, anticyclones to the west of Spain and over Germany. Type XIa or XII.
953. Weather overcast. Clouds St-Cu. 10/10 from E. at about 0.6 Kl. *Inversion* on ascent (0.94–1.11 Kl., 906–886 mb., 270–275.7°A., 93–57%), *inversion* on descent (0.71–1.02 Kl., 934–897 mb., 272–276°A.). Pressure distribution:—Depressions are centred south-west of Iceland and over the western Mediterranean while pressure is high over Russia and to the south-west of Spain. Type VIIb.
954. Weather bc. Clouds Cirrus 3/10. Record failed at a low level owing to instrumental defect. *Inversion* (1.09–1.46 Kl., 877–836 mb., 262.7–265.4°A.). Pressure distribution:—Pressure is low over Spain, Italy, and Northern Scandinavia, while a ridge of high pressure extends across Ireland and Scotland to North Germany. Type VIIIa.
955. Weather b. Clouds none. For the record of temperature the ascent only was employed from the start to 1 Kl.; a small rise at the extreme top on both records was ignored. Sudden change of lapse rate at (10.44 Kl., 228 mb., 214.5°A.). Pressure distribution:—Areas of high pressure are centred to the west of Ireland and over Russia with depressions over Eastern Spain, Northern Russia and Greenland. Type XIa.
956. Weather bz. Clouds none. Greater weight was given to the record of temperature on the descent than on the ascent above 14 Kl. *Inversion* on ascent (1.19–1.51 Kl., 870–835 mb., 262–265.4°A., 55–46%), *inversion* on descent (0.94–1.19 Kl., 900–871 mb., 263.7–266.3°A.), sudden change of lapse rate at (4.73 Kl., 540 mb., 251°A., 38%). Pressure distribution:—Similar to the foregoing, but pressure rising over Norway. Type IX.

T.=Temperature in degrees absolute.

P.=Pressure in millibars.

L.=Geopotential Level above M.S.L. in kiloleos (Kl.)

RH.=Relative Humidity as percentage.

Table with columns for No., Date, Station, Start (G.M.T.), and years 913-926. It lists observation dates and times for various stations like Sealand and Kew.

GEOPOTENTIALS, TEMPERATURES AND RELATIVE HUMIDITIES CORRESPONDING WITH ISOBARIC SURFACES.

550.

1933.

Table 550: Geopotentials, Temperatures and Relative Humidities corresponding with isobaric surfaces. Columns include Pressure (Millibars), L., T., and RH. for years 913-926.

551.

PRESSURES, TEMPERATURES AND HUMIDITIES AT GIVEN GEOPOTENTIALS.

1933.

Table 551: Pressures, Temperatures and Humidities at given geopotentials. Columns include Geopotentials (Kiloleos), P., T., and RH. for years 913-926.

Note.—The temperatures are derived from the original tabulations which are generally made to the nearest half-degree, and are shown to the nearest whole degree. Tables of mean seasonal temperatures and correlation coefficients will be found in the Introduction. Year Book 1929.

LAPSE RATE OF TEMPERATURE BETWEEN GIVEN GEOPOTENTIALS.

552.

Degrees absolute per kiloleo.

1933.

Table 552: Lapse rate of temperature between given geopotentials. Columns show lapse rates for various geopotential intervals across years 913-926.

Note.—The lapse rates are derived from the original tabulations, which are generally made to the nearest half-degree.

T.=Temperature in degrees absolute.

P.=Pressure in millibars.

L.=Geopotential Level above M.S.L. in kiloleos (Kl.)

RH.=Relative Humidity as percentage.

| No. | 927. | 928. | 929. | 930. | 931. | 932. | 934. | 935. | 936. | 937. |
|-----------------|------------------|------------------|------------------|------------------|--------------|--------------|-------------------|-------------------|-------------------|-------------------|
| Date. Station. | May 10. Sealand. | May 11. Sealand. | May 11. Sealand. | May 18. Sealand. | May 27. Kew. | June 8. Kew. | June 21. Sealand. | July 10. Sealand. | July 12. Sealand. | July 13. Sealand. |
| Start. (G.M.T.) | 18h. 10m. | 6h. 40m. | 13h. 00m. | 7h. 02m. | 10h. 33m. | 7h. 38m. | 18h. 10m. | 13h. 05m. | 17h. 40m. | 6h. 25m. |

GEOPOTENTIALS, TEMPERATURES AND RELATIVE HUMIDITIES CORRESPONDING WITH ISOBARIC SURFACES—continued.

550. 1933.

| Pressure. | L. | | | T. | | | RH. | | | L. | | | T. | | | RH. | | | L. | | | T. | | | RH. | | | L. | | | T. | | | RH. | | | L. | | | T. | | | RH. | | | L. | | | T. | | | RH. | | |
|-----------|-------|----|-----|-------|----|-----|-------|----|-----|-------|----|-----|-----|-----|-------|-----|-----|-----|-----|-----|-------|-----|-----|-------|-----|-----|-------|-----|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|--|--|-----|--|--|
| | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | Kl. | °A | % | | | | | | | | | | | | |
| 100 | 15.81 | 15 | ... | 15.93 | 19 | ... | 15.95 | 19 | ... | 16.06 | 16 | ... | ... | ... | 16.10 | 21 | ... | ... | ... | ... | 16.33 | 29 | ... | 16.09 | 24 | ... | 16.09 | 24 | ... | 16.08 | 25 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | | | | | | |

551. PRESSURES, TEMPERATURES AND HUMIDITIES AT GIVEN GEOPOTENTIALS—continued. 1933.

| Geopotentials. | P. | | | T. | | | RH. | | | P. | | | T. | | | RH. | | | P. | | | T. | | | RH. | | | P. | | | T. | | | RH. | | | P. | | | T. | | | RH. | | | P. | | | T. | | | RH. | | |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|----|--|--|-----|--|--|
| | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | mb. | °A | % | | | | | | | | | |
| 21 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | | | | | | | |

Note.—The temperatures are derived from the original tabulations which are generally made to the nearest half-degree, and are shown to the nearest whole degree. Tables of mean seasonal temperatures and correlation coefficients will be found in the Introduction. Year Book 1929.

LAPSE RATE OF TEMPERATURE BETWEEN GIVEN GEOPOTENTIALS—continued.

552. Degrees absolute per kiloleo. 1933.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 20 to 21 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| 19 to 20 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

Note.—The lapse rates are derived from the original tabulations, which are generally made to the nearest half-degree.

T.=Temperature in degrees absolute.

P.=Pressure in millibars.

L.=Geopotential Level above M.S.L. in kiloleos (Kl.)

RH.=Relative Humidity as percentage.

Table with 11 columns for stations: 938, 939, 940, 941, 942, 943, 944, 945, 946, 947. Rows include Date, Station, Start (G.M.T.).

GEOPOTENTIALS, TEMPERATURES AND RELATIVE HUMIDITIES CORRESPONDING WITH ISOBARIC SURFACES—continued.

550.

1933.

Table with 27 columns (Pressure, L, T, RH for 10 stations) and 11 rows (100 to 1000 Millibars).

551.

PRESSURES, TEMPERATURES AND HUMIDITIES AT GIVEN GEOPOTENTIALS—continued.

1933.

Table with 27 columns (Geopotentials, P, T, RH for 10 stations) and 20 rows (21 to Ground Kiloleos).

Note.—The temperatures are derived from the original tabulations which are generally made to the nearest half-degree, and are shown to the nearest whole degree. Tables of mean seasonal temperatures and correlation coefficients will be found in the Introduction. Year Book 1929.

LAPSE RATE OF TEMPERATURE BETWEEN GIVEN GEOPOTENTIALS—continued.

Degrees absolute per kiloleo.

1933.

Table with 11 columns for lapse rate intervals and 11 rows for different geopotential differences.

Note.—The lapse rates are derived from the original tabulations, which are generally made to the nearest half-degree.

T.=Temperature in degrees absolute.

P.=Pressure in millibars.

L.=Geopotential level above M.S.L. in kiloeos (Kl.)

RH.=Relative Humidity as percentage.

Table with columns for No., Date, Station, Start, and 10 observation points (948-956) with sub-columns for specific time and location details.

GEOPOTENTIALS, TEMPERATURES AND RELATIVE HUMIDITIES CORRESPONDING WITH ISOBARIC SURFACES—*continued.*

550. 1933.

Table showing geopotential, temperature, and relative humidity at various isobaric surfaces (100-1000 millibars) across 10 stations.

551. PRESSURES, TEMPERATURES AND HUMIDITIES AT GIVEN GEOPOTENTIALS—*continued.*

1933.

Table showing pressures, temperatures, and humidities at given geopotentials (1000-12 kiloeos) across 10 stations.

Note.—The temperatures are derived from the original tabulations which are generally made to the nearest half-degree, and are shown to the nearest whole degree. Tables of mean seasonal temperatures and correlation coefficients will be found in the Introduction. Year Book 1929.

LAPSE RATE OF TEMPERATURE BETWEEN GIVEN GEOPOTENTIALS—*continued.*

552. Degrees absolute per kiloeo. 1933.

Table showing lapse rates of temperature between given geopotentials for various intervals (20 to 21 down to Gd. to 0.5).

Note.—The lapse rates are derived from the original tabulations, which are generally made to the nearest half-degree.

