

METEOROLOGICAL OFFICE.

BRITISH METEOROLOGICAL AND MAGNETIC YEAR BOOK, 1914.  
PART IV.

---

HOURLY VALUES FROM AUTOGRAPHIC RECORDS:  
1914.

COMPRISING

HOURLY READINGS OF TERRESTRIAL MAGNETISM AT ESKDALE OBSERVATORY

AND

SUMMARIES OF THE RESULTS OBTAINED

IN

TERRESTRIAL MAGNETISM, METEOROLOGY, AND ATMOSPHERIC ELECTRICITY

CHIEFLY BY MEANS OF SELF-RECORDING INSTRUMENTS AT THE OBSERVATORIES  
OF THE METEOROLOGICAL OFFICE.

IN CONTINUATION OF

*The Reports of the National Physical Laboratory, 1900–1909, and (in similar form) Summaries of Results of Geophysical and Meteorological Observations, 1910, the Reports of the Kew Committee of the Royal Society, 1872–1899, and of the Kew Observatory Committee of the British Association, 1842–1871.*

---

Published by Authority of the Meteorological Committee.

---



LONDON:

To be purchased from

THE METEOROLOGICAL OFFICE, EXHIBITION ROAD, LONDON, S.W. 7.

*Price Five Shillings Net.*

1917.

## PREFACE.

FOR the years 1911 to 1913, "Hourly Values from Autographic Records" was published in two sections. The issue of the first section, which contained hourly values of pressure, temperature, humidity, wind, rainfall, and sunshine, is now discontinued. The present volume represents the Section 2 of the three earlier years, and is the fourth of the series. It may be regarded as a continuation in extended form of the tables and summaries giving the results of observations in terrestrial magnetism and atmospheric electricity which were included in the reports of the committee of management of the Kew Observatory from 1842 to 1910, and of tables published by the Meteorological Office in the Quarterly Weather Report from 1869 to 1880, and thereafter in Hourly Readings.

The tables now published fall into three groups. In the first group fall Tables I. to XLVIII., in which the readings of the magnetographs at Eskdale Observatory for each hour throughout the year are set out, together with appropriate notes; Tables XLIX. to LXIV., giving results deduced from these readings and corresponding figures for Kew; Tables LXV. and LXVI., which show details on the occasion of a solar eclipse; and Tables LXVII. and LXVIII., in which magnetic data for various stations are set out.

In the second group of tables the mean daily variation of the various meteorological elements is given for each month. The figures refer to the five observatories, Aberdeen, Eskdalemuir, Cahirciveen (Valencia Observatory), Richmond (Kew Observatory), and Falmouth.

In the third group are the three tables on page 62. These tables show the mean daily variation of potential gradient at Richmond and Eskdalemuir. The values from which the means have been computed are not published.

The tables are followed by notes on the management of the magnetic and electrical instruments and on results of interest. For notes on the meteorological instruments reference may be made to the Year Book, Part IV., Section 1, 1913, but notes on the Meteorological Summaries are included in this volume.

It is proper to add that in all matters concerning the scientific work of the observatories full advantage is taken of the advice of the Gassiot Committee, which was appointed for that purpose by the President and Council of the Royal Society in 1910, in accordance with the scheme approved by the Lords Commissioners of H. M. Treasury when the transfer of the administration of the observatories at Kew and Eskdalemuir was effected.

In particular, reference may be made to one point of great importance, namely, the units employed for the representation of the various quantities.

The letter of the Royal Society, dated 14th April 1910, which conveyed to the Meteorological Committee the information of the appointment of the Gassiot Committee, communicated also the following information as to the proceedings at the first meeting held on 13th April 1910:—

“The question of the units employed in the international publication of meteorological observations was discussed, and it was unanimously resolved—

“ (1) That in the opinion of the Gassiot Committee of the Royal Society it is essential that all meteorological returns compiled for international use should be expressed in terms of an international system of units founded on the metric system.

“ (2) That a system in which the measure of barometric pressure is expressed in megadynes per square centimetre, and of temperature in absolute degrees Centigrade, would be a satisfactory one.”

In furtherance of the views expressed in these resolutions, and therefore departing from the traditional practice of printing meteorological results in Inch-Fahrenheit units in the same volume which gave electrical and magnetic results in C.G.S. units, the meteorological data have been given in C.G.S. units with temperature in absolute degrees.

In 1911, the first year of the British Meteorological and Magnetic Year Book, this principle was carried out in Part III., Section 1 (the *Geophysical Journal*), and in the two sections of Part IV. In 1912 it was adopted for Part III., Section 1 (*Daily Readings*). The expression of pressure in millibars in the *Monthly Weather Report* and in the maps of the *Weekly Weather Report*, Section 2, dates from 1914. At the time of writing it can be added that rainfall has been given in millimetres in the Monthly and Weekly Reports since the beginning of 1915, and that the use of Absolute Temperatures in the descriptive summaries and in the Tables of District-Values in those publications commenced in 1916.

Tables for conversion of meteorological data between Inch-Fahrenheit units and the units used in this publication are given in the 1913 volume and in the *Computer's Handbook*.

In carrying out the arrangement of the tables endeavour has been made to provide (1) that at the head of each column there shall be found an indication of the denomination of the units employed, and (2) that wherever the same quantity is represented the same unit shall be employed, so that the decimal point as regards a particular quantity always has the same meaning.

A feature in the present volume, as in that for 1913, is an analysis of the disturbances at Eskdalemuir by the Superintendent, Mr Richardson. Particulars as to the amplitude, direction, and period of a number of oscillatory movements appear in the Monthly Notes. In the tables X has been used to denote the North Component and —Y the West Component, in accordance with the International practice of employing X and Y to denote the North and East Components. In the notes, however, the letters N and W have been generally employed, so as to avoid any confusion between numerical and algebraic increases in the South-North and East-West Components.

The exigencies of printing have made it necessary in the tables of diurnal in-

equalities to reduce the width of the column used to indicate the months and seasons to the space necessary for two letters at most. No difficulty can be experienced by the reduction of the names of the months to their initial letters, J., F., etc., standing for *January, February*, and so on, and in the same way Y. will easily be appreciated as representing *Year*. But "W.," "Eq.," and "S.," standing for *Winter, Equinox, and Summer*, require some explanation. The *Winter*, which "W" represents in these tables, includes the months of *November, December, January, February*; the *Summer, May, June, July, August*; and the *Equinox, the remaining four months of the year, viz., September, October, March, and April*. The division of the year into these seasons is adopted at the suggestion of the Superintendent of Kew Observatory.

The publication of meteorological and geophysical data for the British Isles in the year 1914 is arranged in accordance with the following scheme of observations and data for stations in the United Kingdom:—

(a) DAILY WEATHER REPORT.—

This includes meteorological observations for 7 a.m. and 6 p.m. at thirty stations and supplementary data from about sixty additional stations in the British Isles, together with data from forty foreign stations, and weather charts of North-Western Europe and the Eastern Atlantic. Issued daily, post free to any address in the United Kingdom for 5s. per official quarter.

(b) BRITISH METEOROLOGICAL AND MAGNETIC YEAR BOOK.—

The serial statistical publications of the Meteorological Office which have been grouped together under this title are as follows:—

Part I.—*Weekly Weather Report*, comprising weekly results of observations of the meteorological elements for stations and districts in the British Isles, a table and a map of sea temperature, and daily synoptic charts of the North Atlantic Ocean and adjoining continents, with annual and occasional appendices. Issued on Thursday of each week. Price 6d. per number. Annual subscription (which includes the *Monthly Weather Report*) 30s., postage paid.

Part II.—*Monthly Weather Report*, prepared for issue at the end of the month to which it refers, and uniform with a summary issued annually. Price 6d. per number.

Part III.—(1) *Daily Readings at Stations of the First and Second Orders*. Issued in monthly parts within about five weeks of the close of each month. Price 6d. each part. Annual Volume 5s.

(2) *Geophysical Journal* of the Observatories of the Meteorological Office. Issued in monthly parts. Price 1s. each part.

Part IV.—*Hourly Values* from Autographic Records. Terrestrial Magnetism, Atmospheric Electricity and Meteorology. Issued at the end of each year. Price 5s.

The publications include the results of the work of the observatories in the departments of Meteorology, Terrestrial Magnetism, and Atmospheric Electricity. A brief journal of events as recorded on the seismograms at Eskdalemuir is also included, but the summary of the seismological data for 1914, comprising the times of commencement and amplitudes of the various movements, has been sent to the Seismological Committee of the British Association for the Advancement of Science. Such a summary for 1915 is published in the *Geophysical Journal*.

It can scarcely be hoped that all the difficulties in the way of adequate presentation and co-ordination of data for different branches of geophysics have been overcome, but, so far as possible, precautions have been taken to enable the reader to know exactly where he stands when he takes up any question which depends upon a comparison of the results of the observatories of the Meteorological Office *inter se*, or with those of other institutions or other countries.

NAPIER SHAW,  
*Director.*

METEOROLOGICAL OFFICE,  
SOUTH KENSINGTON, S.W. 7, *June 1st, 1917.*

## TABLE OF CONTENTS.

	PAGE
Preface . . . . .	2
Table of Contents . . . . .	6
Geographical Position of the Observatories, and Index of Tables . . . . .	7
Table of Results of Observations of Terrestrial Magnetism :	
Hourly Readings, Eskdalemuir, with absolute observations, base line values, etc. . . . .	8
Diurnal Inequalities, Eskdalemuir . . . . .	32
Quiet Days : Diurnal Inequalities, Eskdalemuir . . . . .	34
"          "          "          Kew . . . . .	36
Range of Diurnal Inequalities and Non-Cyclic Change . . . . .	37
Harmonic Components of the Diurnal Inequality, Eskdalemuir . . . . .	37
Mean Monthly and Annual Values for Meteorological Office Observatories . . . . .	38
Mean Annual Values for Magnetic Observatories of the Globe . . . . .	39
Summary of Results in Meteorology :	
Monthly Means for each Hour for Five Observatories . . . . .	40
Summary of Results of Observations of Atmospheric Electricity :	
Diurnal Inequality of Potential Gradient at Kew Observatory . . . . .	62
"          "          "          "          "          Eskdalemuir, (0, <i>a</i> days only) . . . . .	62
"          "          "          "          "          "          (1, <i>a</i> and 2, <i>a</i> days only) . . . . .	62
Notes on the Management and Manipulation of the Instruments at Kew Observatory, and on the corresponding Tables . . . . .	63
Notes on the Management and Manipulation of the Magnetic Instruments at Eskdalemuir, and on the corresponding Tables . . . . .	69
Review of Magnetic Disturbance at Eskdalemuir in the year 1914 . . . . .	75
Notes on the Electrograph at Eskdalemuir . . . . .	79
Notes on the Magnetic Observations made at the Valencia Observatory . . . . .	81
Notes on the Meteorological Summaries . . . . .	82

## HOURLY VALUES FROM AUTOGRAPHIC RECORDS. 1914.

### LIST OF OBSERVATORIES.

	Latitude.	Longitude.	G.M.T. of Local Mean Noon.	Height above M.S.L. in metres.
<b>Central Observatory:</b> KEW Observatory, Richmond, Surrey	51° 28' N.	0° 19' W.	<sup>h</sup> 12 <sup>m</sup> 1	5.5
<b>Magnetic Observatory:</b> ESKDALEMUIR, Dumfriesshire . . . . .	55 19 N.	3 12 W.	12 13	242.0
<b>Western Observatory:</b> VALENCIA Observatory, Cahirciveen, Co. Kerry . . . . .	51 56 N.	10 15 W.	12 41	12.6
<b>Auxiliary Observatories:</b>				
ABERDEEN (Meteorology) . . . . .	57 10 N.	2 6 W.	12 8	14.0
FALMOUTH (Meteorology) . . . . .	50 9 N.	5 4 W.	12 20	50.8

*Notes.*—(1) The height given is that of the site of the rain-gauge. The heights of other meteorological instruments are shown under the appropriate Tables.

(2) Values printed in *italic* type in the following Tables are obtained by interpolation.

I.—READINGS OF THE NORTH COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (X.)

January, 1914.

Table with 25 columns (Hour G.M.T., 0-23, Midt., Mean) and 31 rows (Day 1-31). Data values range from 995 to 1015. Includes a sub-header '15,000 γ (15 C.G.S. unit) +'

II.—READINGS OF THE WEST COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (-Y.)

January, 1914.

Table with 25 columns (Hour G.M.T., 0-23, Midt., Mean) and 31 rows (Day 1-31). Data values range from 141 to 158. Includes a sub-header '5000 γ (50 C.G.S. unit) +'

† Mean 30 days ; 1st omitted.

c International quiet day.

‡ Adjustment being made to instrument.









IX.—READINGS OF THE NORTH COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (X.)

March, 1914.

Table with 24 columns (Hour G.M.T., 0-23, Midt., Mean) and 31 rows (Day 1-31). Values represent magnetic force readings in units of 15,000 gamma (-15 C.G.S. unit) +.

X.—READINGS OF THE WEST COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (-Y.)

March, 1914.

Table with 24 columns (Hour G.M.T., 0-23, Midt., Mean) and 31 rows (Day 1-31). Values represent magnetic force readings in units of 5000 gamma (-05 C.G.S. unit) +.

c International quiet day.

\* Day "proposed for reproduction" by the International Magnetic Commission (single star).

XI.—READINGS OF THE VERTICAL COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME. Eskdalemuir. (Z.) OF GREENWICH MEAN TIME. March, 1914.

Table with 25 columns (Hour G.M.T., 0-24) and 32 rows (Day 1-31). Values represent magnetic force readings in units of 45,000 gamma (-45 C.G.S. unit). A 'Mean' row is provided at the bottom. Includes a note for 'International quiet day' on March 31.

c International quiet day.

\* Day "proposed for reproduction" by the International Magnetic Commission (single star).

XII.—AUXILIARY OBSERVATIONS IN ABSOLUTE MEASURE; DAILY VALUES OF TEMPERATURE IN THE EAST ROOM OF THE MAGNET HOUSE; MAGNETIC NOTES FOR THE MONTH. Eskdalemuir. OF THE MAGNET HOUSE; MAGNETIC NOTES FOR THE MONTH. March, 1914.

Table with columns for Date, Time (G.M.T. From/To), Horizontal Force, Declination, Dip, Temperature in Magnet House, and Magnetic Character of day. Includes detailed text for 'MARCH, 1914' describing disturbances on the 6th and 9th, and magnetic notes for the month.

M6 By Magnetic Needle on Pillar 6. E3 By Electromagnetic Inductor on Pillar 3. \* Mean of the Corrected Readings of the Thermometers in the N, W, and V Magnetograph Boxes.

XIII.—READINGS OF THE NORTH COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (X.)

April, 1914.

Table with 24 columns (Hour G.M.T., 0-23, Midt., Mean) and 31 rows (Day 1-30, Mean). Values range from 985 to 1009. Includes a section for 6\*-8 days with values from 984 to 1006.

XIV.—READINGS OF THE WEST COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (-Y.)

April, 1914.

Table with 24 columns (Hour G.M.T., 0-23, Midt., Mean) and 31 rows (Day 1-30, Mean). Values range from 125 to 144. Includes a section for 6\*-8 days with values from 131 to 144.

† Mean from 29 days. 6th omitted. c International quiet day. † Clock stopped. \*\* Day "proposed for reproduction" by the International Magnetic Commission (double star).



XVII.—READINGS OF THE NORTH COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (X.)

May, 1914.

Table with 24 columns (0-23, Midt., Mean.) and 31 rows (Day 1-31, Mean). Values range from 975 to 1028. Includes a sub-header '15,000 γ (-15 C.G.S. unit) +'.

XVIII.—READINGS OF THE WEST COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (-Y.)

May, 1914.

Table with 24 columns (0-23, Midt., Mean.) and 31 rows (Day 1-31, Mean). Values range from 89 to 138. Includes a sub-header '5000 γ (-05 C.G.S. unit) +'.





XXI.—READINGS OF THE NORTH COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (X.)

June, 1914.

Table with 25 columns (0-24) and 26 rows (0-30). Header includes 'Hour. G.M.T.', 'Day.', and '15,000 γ (-15 C.G.S. unit) +'. Data columns are labeled with Greek letter γ.

XXII.—READINGS OF THE WEST COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (-Y.)

June, 1914.

Table with 25 columns (0-24) and 26 rows (0-30). Header includes 'Hour. G.M.T.', 'Day.', and '5000 γ (-05 C.G.S. unit) +'. Data columns are labeled with Greek letter γ.

c International quiet day

\* Day "proposed for reproduction" by the International Magnetic Commission (single star).



XXV.—READINGS OF THE NORTH COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

July, 1914.

Table with 24 columns (0-23, Midt., Mean.) and 31 rows (Day 1-31). Includes sub-headers for Eskdalemuir (X.) and 15,000 γ (-15 C.G.S. unit) +.

XXVI.—READINGS OF THE WEST COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

July, 1914.

Table with 24 columns (0-23, Midt., Mean.) and 31 rows (Day 1-31). Includes sub-headers for Eskdalemuir (-Y.) and 5000 γ (-05 C.G.S. unit) +.

c International quiet day.

† Mean 28 days. 9th, 10th, and 29th omitted.

‡ Light failed.

\* and \*\* Days "proposed for reproduction" by the International Magnetic Commission (single and double star).



XXIX.—READINGS OF THE NORTH COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

August, 1914.

Eskdalemuir. (X.)

Table with 24 columns (0 to 23) and 31 rows (Day 1 to 31). Columns 0-23 contain magnetic force readings in gamma (γ) units. A central column contains 'Noon' readings. A header indicates '15,000 γ (-15 C.G.S. unit) +'. Includes 'Hour G.M.T.', 'Day', and 'Mean' rows.

XXX.—READINGS OF THE WEST COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

August, 1914.

Eskdalemuir. (-Y.)

Table with 24 columns (0 to 23) and 31 rows (Day 1 to 31). Columns 0-23 contain magnetic force readings in gamma (γ) units. A central column contains 'Noon' readings. A header indicates '5000 γ (-05 C.G.S. unit) +'. Includes 'Hour G.M.T.', 'Day', and 'Mean' rows.

c International quiet day.

\* Day "proposed for reproduction" by the International Magnetic Commission (single star).







XXXV.—READINGS OF THE VERTICAL COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME. Eskdalemuir. (Z.) September, 1914.

Table with 24 columns (0-23) and 25 rows (Day 1-30). Includes a 'Mean' column and a header for '45,000 γ (-45 C.G.S. unit) +'. Values range from 177 to 210.

c International quiet day. \* \* Day "proposed for reproduction" by the International Magnetic Commission (double star). † Mean of 29 days only. 30th omitted. § Discontinuity.

XXXVI.—AUXILIARY OBSERVATIONS IN ABSOLUTE MEASURE ; DAILY VALUES OF TEMPERATURE IN THE EAST ROOM OF THE MAGNET HOUSE ; MAGNETIC NOTES FOR THE MONTH. Eskdalemuir. September, 1914.

Table with columns: Date, Time (From/To), Horizontal Force, Declination, Dip, Temperature in Magnet House, Mag. Character of day, Date. Includes data for Sept 1-30.

SEPTEMBER, 1914. The 27th is doubly starred in the international list. Between 12h and 15h small serrations of Class K of a few γ magnitude were present. From 15h onwards the downward force increased above its quiet day value ; the increase became more and more rapid, and then suddenly stopped at 16h 35m at a value about 87 γ higher than that at the same time on a quiet day, the 21st. The general high level of downward force was maintained, with various irregular serrations, until just before 20h. The serrations appeared also on the N and W traces, and were of Class L. At 19h 55m the downward force began to fall very rapidly. It reached a minimum at 20h 26m about 102 γ below the level at the same time on a quiet day (21st). Within 5 minutes of this minimum the horizontal traces showed conspicuous forces acting to S and to W. The irregular serrations on all three components continued until about 2h on the 28th. They were, at least mainly, of Class L. If the serrations were smoothed out, the horizontal disturbance from 18h onward would have been directed to S and to E. It diminished after 23h, but had not entirely disappeared by 8h next day. The vertical disturbance from the quiet day level changed from an upward to a downward force near 2h on 28th.

Wave-like Disturbances of Class K.

Table with columns: Date, Hours—G.M.T., Period—Minutes, Direction, Remarks. Data for Sept 16, 18, 19.

Serrations of Class K.

Table with columns: Date, Interval—Minutes, Direction, Remarks. Data for Sept 12.

E6 By Electromagnetic Inductor on Pillar 6. M3 By Magnetic Needle on Pillar 3. \* Mean of Corrected Readings of the Thermometers in the N, W, and V Magnetograph Boxes



XXXIX.—READINGS OF THE VERTICAL COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME. Eskdalemuir. (Z.) October, 1914.

Table with 24 columns (0-23) and 25 rows (Day 1-31 + Mean). Columns represent hours of the day. Rows represent days of the month. Values are in gamma units. Includes a 'Mean' row at the bottom.

c International quiet day.

\*\* Day "proposed for reproduction" by the International Magnetic Commission (double star).

XL.—AUXILIARY OBSERVATIONS IN ABSOLUTE MEASURE; DAILY VALUES OF TEMPERATURE IN THE EAST ROOM OF THE MAGNET HOUSE; MAGNETIC NOTES FOR THE MONTH. Eskdalemuir. October, 1914.

Table with columns for Date, Time (From/To), Horizontal Force, Declination, Dip, Temperature in Magnet House, Magnetic Character of day, and Date. Includes descriptive text for the 28th and 29th, and a section for 'Wave-like Disturbances of Class K' with a sub-table of Date, Hours, Period, Direction, and Remarks.

E6 By Electromagnetic Inductor on Pillar 6. \* Mean of Corrected Readings of the Thermometers in the N, W, and V Magnetograph Boxes.

XLI.—READINGS OF THE NORTH COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME. Eskdalemuir. (X.) November, 1914.

Table with columns for Hour, Day, and magnetic force readings (gamma) for hours 0 to 23 and Mean. Includes a scale of 15,000 gamma (-15 C.G.S. unit) +.

XLII.—READINGS OF THE WEST COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME. Eskdalemuir. (-Y.) November, 1914.

Table with columns for Hour, Day, and magnetic force readings (gamma) for hours 0 to 23 and Mean. Includes a scale of 5000 gamma (-05 C.G.S. unit) +.

c International quiet day.

\* Day "proposed for reproduction" by the International Magnetic Commission (single star).

TERRESTRIAL MAGNETISM.

XLIII.—READINGS OF THE VERTICAL COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME. Eskdalemuir. (Z.) November, 1914.

Table with 24 columns (0-23) and 31 rows (Day 1-30, Mean). Values are in gamma (γ) units. Includes a header for 45,000 γ (-45 C.G.S. unit) +.

c International quiet day.

\* Day "proposed for reproduction" by the International Magnetic Commission (single star).

XLIV.—AUXILIARY OBSERVATIONS IN ABSOLUTE MEASURE; DAILY VALUES OF TEMPERATURE IN THE EAST ROOM OF THE MAGNET HOUSE; MAGNETIC NOTES FOR THE MONTH. Eskdalemuir. November, 1914.

Main table with columns for Date, Time (From/To), Horizontal Force, Declination, Dip, Temperature in Magnet House, Magnetic Character of day, and Date. Includes text descriptions for Nov 9, 11, 17, 24, 26, and 30.

Wave-like Disturbances of Class K.

Table with 5 columns: Date, Hours—G.M.T., Period—Minutes, Direction, Remarks. Contains data for disturbances on Nov 3, 11, 15, and 30.

E6 By Electromagnetic Inductor on Pillar 6. \* Mean of Corrected Readings of the Thermometers in the N, W, and V Magnetograph Boxes.

XLV.—READINGS OF THE NORTH COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (X.)

December, 1914.

Table with 24 columns (0-23 hours, Midt., Mean) and 31 rows (Day 1-31). Values are in Gauss units, with a multiplier of 15,000 γ (-15 C.G.S. unit) +. Includes a 'Mean †' row at the bottom.

XLVI.—READINGS OF THE WEST COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (-Y.)

December, 1914.

Table with 24 columns (0-23 hours, Midt., Mean) and 31 rows (Day 1-31). Values are in Gauss units, with a multiplier of 5000 γ (-05 C.G.S. unit) +. Includes a 'Mean †' row at the bottom.

c International quiet day. † Mean of 30 days. 28th omitted.

\* Day "proposed for reproduction" by the International Magnetic Commission (single star). ‡ Adjusting instrument.

XLVII.—READINGS OF THE VERTICAL COMPONENT OF TERRESTRIAL MAGNETIC FORCE FOR EACH HOUR OF GREENWICH MEAN TIME.

Eskdalemuir. (Z.)

December, 1914.

Table with 24 columns (0-23 hours) and 25 rows (Day 1-31). Includes a 'Mean †' row at the bottom. A note above the table indicates '45,000 γ (-45 C.G.S. unit) +'. The table contains numerical readings for each hour of each day.

c International quiet day. † Mean 30 days. 28th omitted. \* Day "proposed for reproduction" by the International Magnetic Commission (single star).

XLVIII.—AUXILIARY OBSERVATIONS IN ABSOLUTE MEASURE; DAILY VALUES OF TEMPERATURE IN THE EAST ROOM OF THE MAGNET HOUSE; MAGNETIC NOTES FOR THE MONTH. December, 1914.

Table with columns: Date, Time (From/To), Horizontal Force, Declination, Dip, Temperature in Magnet House, Magnetic Character of day, Date. Includes a section titled 'DECEMBER, 1914.' with text describing magnetograms and disturbances, and a table for 'Wave-like Disturbances of Class K.' with columns: Date, Hours—G.M.T., Period—Minutes, Direction, Remarks.

E6 By Electromagnetic Inductor on Pillar 6. \* Mean of Corrected Readings of the Thermometers in the N, W, and V Magnetograph Boxes.

XLIX.-LI.—DIURNAL INEQUALITIES OF THE GEOGRAPHICAL COMPONENTS OF MAGNETIC FORCE.

Eskdalemuir.

Mean Hourly Values, Greenwich Mean Time, for the Months, Year, and Seasons.

1914.

Table with 24 columns (1-23, Midt.) and 13 rows (Month and Season, J.F.M.A.M.J.J.A.S.O.N.D., Y., W., Eq., S.). Section XLIX.—NORTH COMPONENT (all days except Jan. 1, April 6, July 9, 10, 29, Dec. 28). Values are in degrees (γ) and minutes (').

—ΔY (or ΔW). L.—WEST COMPONENT (all days except Jan. 1, April 6, July 9, 10, 29, Dec. 28).

Table with 24 columns and 13 rows (J.F.M.A.M.J.J.A.S.O.N.D., Y., W., Eq., S.). Section L.—WEST COMPONENT (all days except Jan. 1, April 6, July 9, 10, 29, Dec. 28). Values are in degrees (γ) and minutes (').

ΔZ (or ΔV). LI.—VERTICAL COMPONENT (all days except Jan. 1, April 6, July 9, 10, 29, Sept. 30, Dec. 28).

Table with 24 columns and 13 rows (J.F.M.A.M.J.J.A.S.O.N.D., Y., W., Eq., S.). Section LI.—VERTICAL COMPONENT (all days except Jan. 1, April 6, July 9, 10, 29, Sept. 30, Dec. 28). Values are in degrees (γ) and minutes (').

x and n mark respectively the mean maximum and minimum hourly values in each month or season. The - over the n denotes that the value to which the letter is prefixed is to be taken with the minus sign.



LII.-LIV.—DIURNAL INEQUALITIES OF THE MAGNETIC COMPONENTS, DECLINATION (D.), INCLINATION (I.), AND HORIZONTAL FORCE (H).

(Corrected for the effect of the north Force on the West Magnetograph and vice versa, and also for the effect of the Horizontal Force on the V.F. Balance.)

Eskdalemuir.

Mean Hourly Values, Greenwich Mean Time, for the Months, Year, and Seasons.

1914.

Table LII.—DECLINATION (measured positive towards the West) (all days except Jan. 1, April 6, July 9, 10, 29, Dec. 28). Columns: 1-23, Midt. Rows: Month and Season (J.F.M.A.M.J.J.A.S.O.N.D.), Y., W., Eq., S.

Table LIII.—INCLINATION (all days except Jan. 1, April 6, July 9, 10, 29, Sept. 30, Dec. 28). Columns: 1-23, Midt. Rows: Month and Season (J.F.M.A.M.J.J.A.S.O.N.D.), Y., W., Eq., S.

Table LIV.—HORIZONTAL FORCE (all days except Jan. 1, April 6, July 9, 10, 29, Dec. 28). Columns: 1-23, Midt. Rows: Month and Season (J.F.M.A.M.J.J.A.S.O.N.D.), Y., W., Eq., S.

x and n mark respectively the mean maximum and minimum hourly values in each month or season.

LV.-LVII.—INTERNATIONAL QUIET DAYS—DIURNAL INEQUALITIES OF THE GEOGRAPHICAL COMPONENTS OF MAGNETIC FORCE.

Eskdalemuir.

Mean Hourly Values, Greenwich Mean Time, for the Months, Year, and Seasons.

1914.

Table LV.—NORTH COMPONENT. Columns: 1-23, Midt. Rows: Month and Season (J.F., M.A.M., J.A.S., O.N.D., Y., W., Eq., S.). Values: ΔX (or ΔN).

Table LVI.—WEST COMPONENT. Columns: 1-23, Midt. Rows: Month and Season (J.F., M.A.M., J.A.S., O.N.D., Y., W., Eq., S.). Values: -ΔY (or ΔW).

Table LVII.—VERTICAL COMPONENT. Columns: 1-23, Midt. Rows: Month and Season (J.F., M.A.M., J.A.S., O.N.D., Y., W., Eq., S.). Values: ΔZ (or ΔV).

x and n̄ mark respectively the mean maximum and minimum hourly values in each month or season.

LVIII.-LX.—INTERNATIONAL QUIET DAYS—DIURNAL INEQUALITIES.

(Corrected for the effect of the North Force on the West Magnetograph and vice versa, and also for the effect of the Horizontal Force on the V.F. Balance.)

Eskdalemuir.

Mean Hourly Values, Greenwich Mean Time, for the Months, Year, and Seasons.

1914.

Table with columns for Month and Season, 24 hours, and Midt. Section: LVIII.—DECLINATION (measured positive towards the West).

Table with columns for Month and Season, 24 hours, and Midt. Section: LIX.—INCLINATION.

Table with columns for Month and Season, 24 hours, and Midt. Section: LX.—HORIZONTAL FORCE.

x and n mark respectively the mean maximum and minimum hourly values in each month or season.

LXI.-LXII.—INTERNATIONAL QUIET DAYS—DIURNAL INEQUALITIES OF DECLINATION AND HORIZONTAL FORCE.

Kew.

Mean Hourly Values, Greenwich Mean Time, for the Months, Year, and Seasons.

1914.

Month and Season.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	Noon.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	Midt.
ΔD. LXI.—DECLINATION (measured positive towards the West).																								
J.	-0.02	-0.12	-0.29	-0.27	-0.27	-0.39	-0.62	0.64	-0.20	0.08	0.47	0.99	1.21	0.94	0.72	0.76	0.34	-0.13	-0.43	-0.49	-0.43	-0.36	-0.38	-0.38
F.	-0.24	-0.47	-0.89	-0.56	-0.74	-0.90	-0.83	-0.69	-0.70	-0.44	0.67	2.03	2.21	1.88	1.18	0.49	0.51	0.36	0.16	-0.20	-0.31	-0.75	1.04	-0.80
M.	-0.91	-1.18	-1.33	-1.12	-1.17	-0.80	-1.76	-2.63	2.92	-1.41	1.08	3.51	4.74	4.45	3.10	1.27	0.24	-0.08	-0.07	-0.38	-0.33	-0.60	-0.75	-1.02
A.	-0.22	-0.61	-0.75	-0.58	-1.14	-1.32	-2.41	3.51	-3.42	-2.22	0.29	3.41	4.97	4.82	3.46	2.57	1.37	0.12	-0.28	-0.78	-0.75	-0.83	-1.20	-0.88
M.	0.21	-0.36	-1.07	-1.21	-1.98	-2.67	-3.92	4.09	-2.94	-0.54	1.95	3.92	4.13	3.30	2.10	1.21	0.64	0.49	0.30	0.27	0.01	0.36	0.05	-0.16
J.	-0.22	-0.74	-1.49	-1.68	-2.93	-3.77	-4.34	4.65	-3.64	-1.12	1.59	3.78	4.53	4.80	3.78	2.97	2.00	1.27	0.51	0.14	0.23	0.04	-0.52	-0.51
J.	-0.44	-0.94	-0.88	-1.48	-2.56	-3.27	-3.29	3.45	-2.49	-0.87	1.45	2.99	4.05	3.97	3.33	2.21	1.33	0.41	0.30	0.24	-0.04	0.06	-0.16	-0.40
A.	-0.93	-1.54	-1.72	-1.43	-1.96	-2.79	-3.25	3.38	-2.29	-0.28	1.92	4.17	4.92	4.62	3.67	2.10	0.89	0.19	-0.34	-0.33	-0.18	-0.72	-0.77	-0.64
S.	-0.51	-0.64	-1.54	-1.35	-1.83	-2.30	-3.10	3.57	-2.07	0.46	3.52	4.49	4.80	3.76	1.97	0.67	0.14	0.28	0.15	0.07	-0.52	-0.86	-1.09	-0.91
O.	-0.61	-0.86	-1.03	-0.97	-0.54	-0.59	-0.64	-1.29	1.95	-1.48	0.25	2.46	3.31	3.18	1.87	0.87	0.52	-0.01	0.20	-0.19	-0.41	-0.56	-0.79	-0.70
N.	0.10	-0.23	-0.05	0.04	-0.24	-0.27	-0.63	-1.20	1.60	-0.41	1.33	2.50	2.49	1.69	0.72	0.48	0.37	-0.05	-0.08	-0.68	-1.07	-1.35	-1.38	-0.56
D.	-0.11	-0.49	-0.28	-0.08	-0.25	-0.27	-0.66	-0.88	0.91	-0.01	0.88	1.74	2.18	1.49	0.71	0.58	0.18	-0.01	-0.39	-0.56	-0.90	0.91	-0.57	-0.40
Y.	-0.33	-0.68	-0.94	-0.89	-1.30	-1.61	-2.12	2.50	-2.09	-0.69	1.28	3.00	3.63	3.24	2.22	1.35	0.71	0.24	0.00	-0.24	-0.39	-0.54	-0.72	-0.61
W.	-0.07	-0.33	-0.38	-0.22	-0.38	-0.46	-0.69	0.85	0.85	-0.20	0.84	1.82	2.02	1.50	0.83	0.58	0.35	0.04	-0.18	-0.48	-0.68	-0.84	-0.84	-0.53
Eq.	-0.56	-0.82	-1.16	-1.01	-1.17	-1.25	-1.98	2.75	-2.59	-1.16	1.28	3.47	4.45	4.05	2.60	1.34	0.57	0.08	0.00	-0.32	-0.50	-0.71	-0.96	-0.88
S.	-0.35	-0.90	-1.29	-1.45	-2.36	-3.13	-3.70	3.89	-2.84	-0.70	1.73	3.72	4.41	4.17	3.22	2.12	1.22	0.59	0.19	0.08	0.01	-0.07	-0.35	-0.43

ΔH.

LXII.—HORIZONTAL FORCE.

J.	2.6	3.1	3.5	2.1	0.8	0.7	2.1	4.3	5.8	3	1.3	0.1	1.5	1.6	3.1	2.8	1.6	0.2	1.2	1.2	0.7	0.5	0.2	1.4
F.	3.9	4.7	5.1	2.6	0.4	0.4	2.3	5.0	4.2	1.2	2.5	3.2	3.3	0.3	0.7	0.5	1.0	1.8	3.3	3.0	3.2	1.2	-0.2	1.4
M.	0.3	1.2	3.0	1.5	2.2	0.7	3.2	0.8	5.4	14.5	17.1	12.5	4.3	3.8	6.0	5.8	5.9	5.0	6.7	5.4	5.3	6.5	4.2	3.2
A.	3.2	0.1	1.9	1.7	0.5	1.9	4.7	0.6	6.1	15.5	19.5	18.0	13.5	6.1	0.5	3.1	5.0	8.1	9.9	10.9	9.8	8.5	7.9	7.9
M.	6.4	1.9	0.3	0.3	0.7	4.6	7.7	15.3	17.9	19.0	15.7	11.2	7.2	0.8	3.9	5.5	10.1	13.7	14.1	12.8	10.0	8.7	6.5	6.9
J.	3.4	2.0	2.9	4.8	3.3	0.9	6.1	11.2	19.9	25.8	24.1	13.1	6.8	0.3	2.2	7.2	8.5	9.3	2.5	14.9	13.9	10.0	7.0	6.1
J.	3.4	1.3	1.3	3.0	2.2	3.9	9.6	16.1	20.2	19.9	15.2	12.5	10.2	7.1	2.2	7.3	12.3	14.6	16.3	15.6	12.5	9.5	7.1	5.9
A.	5.3	1.7	1.4	0.2	1.8	2.6	9.7	17.6	21.7	19.1	16.8	10.1	3.4	1.1	2.8	5.9	10.0	13.9	13.9	11.7	11.1	9.3	8.6	7.4
S.	2.8	2.4	0.4	0.2	1.4	2.0	4.8	12.1	18.0	19.2	18.1	10.8	1.2	2.1	2.7	6.0	6.9	9.0	12.3	11.1	10.4	8.5	8.2	5.8
O.	0.4	1.4	0.0	0.1	1.0	2.7	3.7	2.7	1.5	9.5	13.8	10.1	6.5	1.4	1.4	1.4	8.3	5.9	6.7	5.3	4.0	2.9	2.5	
N.	1.8	1.8	1.5	0.8	2.3	4.0	3.8	1.8	4.1	11.4	14.2	10.0	1.4	2.5	2.1	5.0	5.0	5.4	4.2	1.7	1.4	3.1	2.3	0.5
D.	2.6	2.5	3.0	0.8	0.8	1.9	3.8	0.8	1.4	6.3	7.5	4.8	1.7	0.6	2.0	2.2	2.5	3.5	3.3	4.1	3.1	3.2	0.6	-0.2
Y.	1.1	0.5	1.3	0.0	0.3	0.3	1.2	4.7	8.8	12.8	13.6	9.7	5.1	0.8	1.7	3.8	5.6	7.7	8.6	8.3	7.2	6.1	4.6	3.6
W.	2.7	3.0	3.3	1.2	0.3	1.8	3.0	3.0	1.1	2.8	5.7	4.5	2.0	0.5	0.4	1.0	1.7	2.7	3.0	2.5	2.1	2.0	0.7	-0.6
Eq.	1.5	0.1	1.3	0.8	1.0	0.5	1.7	2.0	7.8	14.7	17.1	12.9	6.4	0.4	2.0	4.0	4.8	7.6	8.7	8.5	7.7	6.9	5.8	4.9
S.	4.6	1.7	0.6	1.9	1.7	3.0	8.3	15.0	19.9	21.0	18.0	11.7	6.9	2.3	2.8	6.5	10.2	12.9	14.2	13.8	11.9	9.4	7.3	6.6

x and n̄ mark respectively the mean maximum and minimum hourly values in each month or season.

LXIII.—RANGE OF THE MEAN DIURNAL INEQUALITIES OF MAGNETIC FORCE AND NON-CYCLIC CHANGE (24h—0h) FOR THE MONTHS, YEAR, AND SEASONS OF 1914, AT TWO OBSERVATORIES.

Table with columns for Eskdalemuir and Kew observatories, showing magnetic force inequalities across various months (J.F.M., A.M., J.A.S., O.N.D., Y., W.Eg., S.). Sub-headers include 'All days except Jan. 1, Apr. 6, July 9, 10, 29, Dec. 28, for X, -Y, and Z, and, in addition, Sept. 30 for Z.' and 'International quiet Days.'

LXIV.—HARMONIC COMPONENTS OF THE DIURNAL INEQUALITY OF THE GEOGRAPHICAL COMPONENTS OF TERRESTRIAL MAGNETIC FORCE.

The formula \* used is—Inequality = a1 cos 15t° + b1 sin 15t° + a2 cos 30t° + b2 sin 30t° + . . . = c1 sin (15t° + a1) + c2 sin (30t° + a2) + . . . t being time of day measured in hours from midnight G.M.T.

Eskdalemuir. (Eskdalemuir Observatory is 13 minutes of time West of Greenwich.) 1914.

Table with 3 main columns: North Component (ΔX), West Component (ΔY), and Vertical Component (ΔZ). Each column includes sub-headers for 'All days except Jan. 1, Apr. 6, July 9, 10, 29, Dec. 28.' and 'Corrected for Effect of West Component on North Magnetograph.' etc.

LXV. AND LXVI.—RESULTS OF ESKDALEMUIR CURVE MEASUREMENTS AT 2-MINUTE INTERVALS ON 21ST AUGUST 1914, A DAY OF SOLAR ECLIPSE.

The entries represent the excess above the lowest reading observed between 10h and 16h, viz. 15970 γ in N, 5108 γ in W, and 45184 γ in V. At Eskdalemuir the times of Commencement, Greatest Phase, and Termination were respectively 10h 52m, 12h 3m, 13h 13m.

Table showing magnetic force measurements at 2-minute intervals from 0m to 58m for directions N, W, V on days 10, 11, 12, 13, and 14.

Mean Hourly Values— 10h, 11h, 12h, 13h, 14h, 15h.

Small table showing mean hourly values for N, W, V directions at 10h, 11h, 12h, 13h, 14h, and 15h.

\* In the volumes for 1911 and 1912, a and b were interchanged.

LXVII.—MEAN MONTHLY AND ANNUAL VALUES OF TERRESTRIAL MAGNETIC ELEMENTS AT  
METEOROLOGICAL OFFICE OBSERVATORIES.

1914.	KEW (quiet days D and H, absolute observations I. See p. 65).				ESKDALEMUIR * (all days except those noted in monthly tables).				VALENCIA (2 absolute observations per month).			
	North.	West.	Vertical.	Total.	North.	West.	Vertical.	Total.	North.	West.	Vertical.	Total.
January .. ..	17820	4952	43403	47179	16007	5149	45186	48213	16794	6202	44614	48072
February .. ..	17823	4951	43413	47190	16005	5143	45190	48216	16805	6195	44586	48049
March .. ..	17820	4947	43408	47183	16004	5139	45197	48222	16794	6191	44593	48051
April .. ..	17817	4936	43414	47187	16001	5134	45206	48228	16779	6184	44558	48012
May .. ..	17820	4935	43408	47182	16007	5130	45201	48226	16772	6184	44502	47953
June .. ..	17822	4936	43398	47174	16010	5126	45194	48219	16769	6170	44482	47936
July .. ..	17821	4930	43402	47176	16007	5122	45190	48215	16795	6180	44589	48046
August .. ..	17813	4923	43412	47182	16002	5119	45189	48211	16790	6185	44581	48033
September .. ..	17812	4918	43416	47184	15999	5114	45181	48203	16783	6176	44587	48039
October .. ..	17814	4913	43390	47161	15999	5110	45182	48202	16820	6161	44654	48113
November .. ..	17817	4907	43396	47167	15996	5104	45167	48187	16800	6172	44635	48090
December .. ..	17822	4905	43407	47179	16003	5102	45167	48189	16825	6170	44636	48099
Year 1914 .. ..	17818	4929	43406	47179	16003	5124	45188	48211	16794	6181	44585	48042
Year 1913 .. ..	17822	4982	43449	47226	16006	5174	45282†	48306†	16778	6215	44628	48081
Year 1910 .. ..	17781	5117	43546	47313	15976	5311	45343	48368	16732	6337	44771	48215
Year 1905 .. ..	17743	5272	43742	47496	..	..	..	..	16640	6447	44893	48313
1914.	Declination (West).	Inclination (North).	Horizontal Force.	Declination (West).	Inclination (North).	Horizontal Force.	Declination (West).	Inclination (North).	Horizontal Force.			
January .. ..	15 31.8	66 55.2	18495	17 49.8	69 35.4	16814	20 16.2	68 8.1	17903			
February .. ..	15 31.4	66 55.3	18498	17 48.8	69 35.7	16811	20 14.1	68 6.9	17910			
March .. ..	15 31.0	66 55.4	18494	17 48.1	69 36.0	16809	20 14.1	68 7.8	17899			
April .. ..	15 29.1	66 56.0	18488	17 47.3	69 36.5	16804	20 13.9	68 8.0	17882			
May .. ..	15 28.8	66 55.6	18491	17 46.2	69 36.1	16809	20 14.3	68 6.9	17876			
June .. ..	15 28.8	66 55.2	18493	17 45.2	69 35.8	16811	20 12.1	68 6.9	17868			
July .. ..	15 27.9	66 55.5	18490	17 44.7	69 36.0	16807	20 12.2	68 7.9	17896			
August .. ..	15 26.9	66 56.4	18481	17 44.4	69 36.3	16801	20 13.3	68 7.9	17893			
September .. ..	15 26.1	66 56.7	18478	17 43.6	69 36.4	16796	20 12.2	68 8.7	17883			
October .. ..	15 25.2	66 55.9	18479	17 42.7	69 36.5	16795	20 7.0	68 8.5	17913			
November .. ..	15 23.9	66 56.0	18480	17 41.9	69 36.5	16791	20 10.3	68 9.0	17898			
December .. ..	15 23.2	66 56.0	18485	17 41.1	69 36.1	16796	20 8.3	68 7.5	17921			
Year 1914 .. ..	15 27.8	66 55.8	18488	17 45.3	69 36.1	16804	20 12.3	68 7.8	17895			
Year 1913 .. ..	15 37.0	66 55.8	18505	17 54.9	69 37.3†	16822	20 19.6	68 9.2	17892			
Year 1910 .. ..	16 3.2	66 58.7	18503	18 23.3	69 37.8	16836	20 44.6	68 13.0	17892			
Year 1905 .. ..	16 32.9	67 3.8	18510	..	..	..	21 10.4	68 19.2	17848			

\* The Inclination, Vertical Force and Total Force results for 1914 are based on observations with the Schulze Inductor No. 103. If the Dover Circle No. 74, previously in use, had been employed, the Annual Means for 1914 would have been larger, the Inclination by 0.9, the Vertical Force by 38 γ, and the Total Force by 36 γ.

† From first 5 and last 5 months of the year.



## LXIX.-LXXIV.—NORMALS FOR THE MONTHS OF THE HOURLY VALUES OF THE METEOROLOGICAL ELEMENTS

## LXIX.—PRESSURE IN MILLIBARS

(The Mean Values are corrected)

Hour, G.M.T.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	Noon.
<b>JANUARY.</b>	mb.	mb.	mb.	mb.	mb.	mb.	mb.	mb.	mb.	mb.	mb.	mb.
Aberdeen, Normal. 1000+	7·51	7·49	7·40	7·27	7·13	7·12	7·17	7·41	7·63	7·81	7·83	7·64
Difference for 1914	+ 6·22	+ 6·44	+ 6·57	+ 6·68	+ 6·69	+ 6·64	+ 6·59	+ 6·39	+ 6·11	+ 6·03	+ 5·77	+ 5·61
Eskdalemuir, 1914. 980+	9·86	10·00	10·09	10·05	9·95	9·94	10·25	10·02	10·09	10·03	9·81	9·48
Valencia, Normal. 1000+	12·84	12·72	12·73	12·57	12·44	12·37	12·43	12·64	12·91	13·19	13·34	13·18
Difference for 1914	+ 5·08	+ 4·94	+ 4·84	+ 4·86	+ 4·79	+ 4·70	+ 4·66	+ 4·55	+ 4·46	+ 4·40	+ 4·31	+ 4·27
Kew, Normal. 1000+	16·26	16·29	16·22	16·07	15·95	15·97	16·11	16·39	16·62	16·83	16·82	16·46
Difference for 1914	+ 4·18	+ 4·20	+ 4·11	+ 4·07	+ 4·00	+ 4·01	+ 4·05	+ 4·04	+ 4·06	+ 4·25	+ 4·21	+ 4·19
Falmouth, Normal. 1000+	10·65	10·61	10·59	10·45	10·29	10·27	10·38	10·66	10·93	11·20	11·32	10·99
<b>FEBRUARY.</b>												
Aberdeen, Normal. 1000+	7·98	7·89	7·68	7·55	7·47	7·48	7·57	7·80	7·92	8·04	8·12	8·07
Difference for 1914	-14·54	-14·50	-14·42	-14·54	-14·61	-14·48	-14·34	-14·00	-13·77	-13·68	-13·65	-13·53
Eskdalemuir, 1914. 960+	10·23	10·15	9·96	9·93	10·03	10·27	10·46	10·86	11·09	11·19	11·36	11·51
Valencia, Normal. 1000+	12·16	12·00	11·85	11·64	11·61	11·66	11·72	11·99	12·19	12·40	12·50	12·53
Difference for 1914	-15·63	-15·57	-15·50	-15·51	-15·61	-15·56	-15·43	-15·47	-15·37	-15·50	-15·57	-15·58
Kew, Normal. 1000+	14·96	14·85	14·62	14·52	14·51	14·53	14·60	14·93	15·05	15·17	15·22	15·00
Difference for 1914	- 8·62	- 8·60	- 8·53	- 8·48	- 8·41	- 8·24	- 8·03	- 7·86	- 7·80	- 7·65	- 7·64	- 7·64
Falmouth, Normal. 1000+	9·40	9·27	9·07	8·92	8·90	8·93	9·01	9·35	9·52	9·71	9·87	9·78
<b>MARCH.</b>												
Aberdeen, Normal. 1000+	7·16	7·03	6·79	6·67	6·63	6·70	6·80	6·98	7·06	7·17	7·19	7·15
Difference for 1914	-12·54	-12·44	-12·42	-12·42	-12·46	-12·55	-12·60	-12·63	-12·69	-12·80	-12·90	-12·80
Eskdalemuir, 1914. 970+	0·80	0·71	0·41	0·21	0·16	0·18	0·30	0·48	0·63	0·69	0·73	0·79
Valencia, Normal. 1000+	11·93	11·80	11·56	11·35	11·32	11·39	11·51	11·73	11·86	12·03	12·07	12·07
Difference for 1914	-10·67	-10·45	-10·39	-10·40	-10·42	-10·50	-10·67	-10·91	-10·93	-10·90	-10·90	-10·79
Kew, Normal. 1000+	13·08	12·92	12·70	12·62	12·63	12·76	12·95	13·15	13·27	13·32	13·26	13·10
Difference for 1914	- 9·66	- 9·72	- 9·85	-10·11	-10·24	-10·46	-10·58	-10·69	-10·83	-10·73	-10·66	-10·43
Falmouth, Normal. 1000+	8·06	7·90	7·61	7·47	7·45	7·55	7·70	7·95	8·11	8·27	8·34	8·30
<b>APRIL.</b>												
Aberdeen, Normal. 1000+	9·26	9·11	8·92	8·82	8·82	8·99	9·12	9·27	9·34	9·41	9·38	9·38
Difference for 1914	+ 1·49	+ 1·53	+ 1·61	+ 1·56	+ 1·53	+ 1·52	+ 1·47	+ 1·38	+ 1·28	+ 1·22	+ 1·07	+ 1·00
Eskdalemuir, 1914. 980+	7·45	7·33	7·11	6·99	6·87	7·05	7·16	7·21	7·19	7·08	6·89	6·85
Valencia, Normal. 1000+	11·12	10·90	10·72	10·59	10·55	10·68	10·85	11·01	11·08	11·21	11·24	11·22
Difference for 1914	+ 4·29	+ 4·40	+ 4·49	+ 4·54	+ 4·62	+ 4·65	+ 4·74	+ 4·79	+ 4·83	+ 4·83	+ 4·70	+ 4·69
Kew, Normal. 1000+	12·39	12·24	12·11	12·02	12·07	12·30	12·46	12·54	12·58	12·56	12·44	12·24
Difference for 1914	+ 5·86	+ 5·87	+ 5·87	+ 5·80	+ 5·77	+ 5·82	+ 5·86	+ 5·95	+ 5·94	+ 6·00	+ 5·93	+ 5·91
Falmouth, Normal. 1000+	6·91	6·70	6·51	6·37	6·33	6·54	6·72	6·89	7·00	7·16	7·21	7·15
<b>MAY.</b>												
Aberdeen, Normal. 1000+	11·76	11·62	11·46	11·40	11·44	11·57	11·66	11·77	11·79	11·82	11·83	11·81
Difference for 1914	+ 2·09	+ 2·06	+ 1·93	+ 1·90	+ 1·83	+ 1·77	+ 1·70	+ 1·62	+ 1·57	+ 1·54	+ 1·47	+ 1·49
Eskdalemuir, 1914. 980+	9·50	9·40	9·20	9·12	9·12	9·22	9·32	9·36	9·30	9·22	9·05	9·08
Valencia, Normal. 1000+	13·99	13·79	13·61	13·45	13·43	13·59	13·71	13·86	13·93	13·99	14·05	14·07
Difference for 1914	+ 5·53	+ 5·54	+ 5·51	+ 5·54	+ 5·64	+ 5·63	+ 5·68	+ 5·61	+ 5·69	+ 5·63	+ 5·65	+ 5·61
Kew, Normal. 1000+	14·84	14·71	14·58	14·53	14·64	14·82	14·93	15·01	14·97	14·90	14·81	14·63
Difference for 1914	+ 3·38	+ 3·42	+ 3·44	+ 3·56	+ 3·61	+ 3·72	+ 3·72	+ 3·70	+ 3·78	+ 3·72	+ 3·70	+ 3·71
Falmouth, Normal. 1000+	9·54	9·34	9·16	9·05	9·12	9·33	9·49	9·69	9·75	9·86	9·91	9·89
<b>JUNE.</b>												
Aberdeen, Normal. 1000+	12·11	11·97	11·81	11·79	11·81	11·91	12·00	12·10	12·09	12·11	12·11	12·09
Difference for 1914	+ 2·83	+ 2·84	+ 2·79	+ 2·78	+ 2·69	+ 2·63	+ 2·64	+ 2·62	+ 2·61	+ 2·58	+ 2·54	+ 2·56
Eskdalemuir, 1914. 980+	10·17	10·02	9·86	9·84	9·79	9·88	9·91	9·97	9·95	9·88	9·81	9·84
Valencia, Normal. 1000+	14·41	14·22	14·01	13·89	13·91	14·06	14·17	14·34	14·42	14·49	14·54	14·58
Difference for 1914	+ 5·18	+ 5·19	+ 5·21	+ 5·27	+ 5·28	+ 5·24	+ 5·28	+ 5·19	+ 5·25	+ 5·13	+ 5·08	+ 5·04
Kew, Normal. 1000+	15·21	15·06	14·95	14·97	15·07	15·21	15·33	15·42	15·37	15·32	15·27	15·11
Difference for 1914	+ 1·32	+ 1·31	+ 1·34	+ 1·33	+ 1·37	+ 1·43	+ 1·45	+ 1·45	+ 1·47	+ 1·37	+ 1·32	+ 1·33
Falmouth, Normal. 1000+	10·26	10·06	9·86	9·81	9·86	10·04	10·19	10·39	10·44	10·53	10·60	10·62

Notes.—The Geographical Co-ordinates of the Observatories are as follows:—

	Lat.	Long.	G.M.T. of Local Mean Noon.	Height of Barometer Cistern above M.S.L. in metres.
Aberdeen	57° 10' N.	2° 6' W.	12 <sup>h</sup> 8 <sup>m</sup>	26·8
Eskdalemuir	55° 19' N.	3° 12' W.	12 <sup>h</sup> 13 <sup>m</sup>	237·3
Valencia	51° 56' N.	10° 15' W.	12 <sup>h</sup> 41 <sup>m</sup>	13·7
Kew	51° 28' N.	0° 19' W.	12 <sup>h</sup> 1 <sup>m</sup>	10·4
Falmouth	50° 9' N.	5° 4' W.	12 <sup>h</sup> 20 <sup>m</sup>	55·9



AT THE FIVE OBSERVATORIES WITH DIFFERENCES BETWEEN THE NORMALS AND THE VALUES FOR 1914.

JANUARY TO JUNE.

the formula  $\frac{1}{24}\{1 + \dots + 23 + \frac{1}{2}(0+24)\}$ .

13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	Midt.	Mean.	Hour, G.M.T.
mb. 7.39 + 5.27 9.02 12.83 + 4.17 16.10 + 4.14 10.59	mb. 7.31 + 4.95 8.75 12.56 + 4.09 15.90 + 4.06 10.34	mb. 7.29 + 4.74 8.63 12.51 + 3.91 15.91 + 4.03 10.33	mb. 7.41 + 4.60 8.57 12.58 + 3.85 16.01 + 4.08 10.43	mb. 7.47 + 4.38 8.68 12.67 + 3.86 16.10 + 3.98 10.50	mb. 7.60 + 4.30 8.71 12.82 + 3.97 16.24 + 3.96 10.70	mb. 7.64 + 4.28 8.68 12.93 + 4.03 16.35 + 3.91 10.80	mb. 7.75 + 4.36 8.73 13.05 + 3.94 16.46 + 3.81 10.93	mb. 7.75 + 4.48 8.68 13.10 + 4.04 16.48 + 3.76 10.94	mb. 7.76 + 4.67 8.63 13.12 + 4.02 16.49 + 3.80 10.98	mb. 7.68 + 4.92 8.70 13.09 + 3.94 16.46 + 3.73 10.91	mb. 7.64 + 5.13 8.90 13.05 + 3.90 16.38 + 3.73 10.84	mb. 7.505 + 5.510 9.363 12.819 + 4.340 16.287 + 4.025 10.698	JANUARY. Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.
7.84 -13.60 11.29 12.27 -15.51 14.69 - 7.71 9.47	7.72 -13.60 11.13 12.01 -15.68 14.42 - 7.65 9.18	7.60 -13.66 11.03 11.78 -15.53 14.32 - 7.76 9.03	7.67 -13.48 10.96 11.74 -15.48 14.34 - 7.71 9.04	7.74 -13.50 10.83 11.77 -15.34 14.46 - 8.00 9.12	7.98 -13.57 10.97 11.98 -15.30 14.74 - 8.03 9.38	8.05 -13.71 10.83 12.17 -15.19 14.88 - 8.15 9.51	8.14 -13.79 10.70 12.23 -15.14 14.98 - 8.26 9.58	8.13 -13.79 10.65 12.22 -15.01 15.05 - 8.40 9.60	8.17 -14.04 10.57 12.26 -15.03 15.10 - 8.32 9.63	8.12 -14.18 10.47 12.20 -15.13 15.05 - 8.41 9.55	8.11 -14.25 10.48 12.19 -15.22 15.05 - 8.50 9.54	7.868 -13.970 10.702 12.046 -15.424 14.797 - 8.102 9.345	FEBRUARY. Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.
6.99 -12.70 0.60 11.93 -10.65 12.81 -10.31 8.11	6.83 -12.56 0.48 11.73 -10.61 12.54 -10.19 7.88	6.72 -12.44 0.43 11.52 -10.58 12.37 -10.06 7.71	6.72 -12.34 0.44 11.49 -10.48 12.30 - 9.97 7.62	6.78 -12.36 0.48 11.49 -10.49 12.39 -10.17 7.64	7.02 -12.36 0.72 11.67 -10.59 12.67 -10.07 7.86	7.19 -12.44 0.85 11.88 -10.64 12.89 - 9.96 8.03	7.33 -12.52 1.03 12.06 -10.79 13.08 - 9.85 8.22	7.33 -12.49 1.08 12.15 -10.80 13.15 - 9.76 8.27	7.36 -12.53 1.19 12.23 -11.02 13.19 - 9.58 8.33	7.29 -12.42 1.17 12.19 -11.08 13.16 - 9.55 8.26	7.27 -12.34 1.16 12.16 -11.20 13.11 - 9.53 8.19	7.007 -12.539 0.649 11.795 -10.698 12.894 -10.127 7.946	MARCH. Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.
9.31 + 0.95 6.80 11.15 + 4.60 12.07 + 5.82 7.08	9.25 + 0.83 6.72 11.09 + 4.49 11.83 + 5.77 6.98	9.11 + 0.78 6.59 10.90 + 4.42 11.62 + 5.71 6.77	9.09 + 0.77 6.63 10.80 + 4.29 11.53 + 5.69 6.69	9.09 + 0.73 6.64 10.76 + 4.17 11.58 + 5.66 6.66	9.25 + 0.76 6.83 10.84 + 4.09 11.75 + 5.66 6.74	9.42 + 0.85 7.04 10.93 + 4.16 12.01 + 5.65 6.83	9.68 + 1.11 7.47 11.15 + 4.23 12.41 + 5.70 7.15	9.71 + 1.21 7.68 11.32 + 4.37 12.55 + 5.73 7.26	9.71 + 1.36 7.65 11.36 + 4.32 12.63 + 5.77 7.27	9.63 + 1.44 7.72 11.29 + 4.41 12.64 + 5.75 7.19	9.56 + 1.54 7.80 11.25 + 4.46 12.60 + 5.75 7.13	9.274 + 1.203 7.110 11.000 + 4.479 12.215 + 5.804 6.885	APRIL. Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.
11.76 + 1.54 8.90 14.04 + 5.58 14.46 + 3.68 9.83	11.73 + 1.52 8.81 14.03 + 5.50 14.30 + 3.63 9.77	11.63 + 1.54 8.67 13.93 + 5.53 14.13 + 3.59 9.62	11.58 + 1.57 8.63 13.86 + 5.55 14.02 + 3.52 9.54	11.53 + 1.59 8.56 13.82 + 5.57 13.97 + 3.43 9.44	11.62 + 1.65 8.73 13.83 + 5.54 14.09 + 3.38 9.44	11.73 + 1.71 8.95 13.91 + 5.55 14.29 + 3.39 9.50	11.95 + 1.83 9.25 14.04 + 5.58 14.65 + 3.38 9.67	12.08 + 1.82 9.52 14.27 + 5.75 14.94 + 3.31 9.91	12.14 + 1.91 9.72 14.37 + 5.68 15.05 + 3.34 9.95	12.07 + 1.92 9.65 14.30 + 5.84 15.07 + 3.36 9.85	11.99 + 1.87 9.58 14.21 + 5.85 15.00 + 3.31 9.75	11.738 + 1.732 9.163 13.920 + 5.609 14.639 + 3.533 9.592	MAY. Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.
12.00 + 2.58 9.69 14.56 + 4.96 14.94 + 1.27 10.58	11.98 + 2.44 9.60 14.51 + 4.95 14.77 + 1.14 10.55	11.89 + 2.36 9.42 14.46 + 4.95 14.63 + 1.04 10.46	11.84 + 2.39 9.40 14.40 + 4.88 14.48 + 1.02 10.38	11.76 + 2.40 9.33 14.33 + 4.88 14.41 + 1.02 10.26	11.84 + 2.51 9.45 14.33 + 4.85 14.49 + 1.02 10.27	11.92 + 2.49 9.64 14.40 + 4.87 14.64 + 1.02 10.31	12.08 + 2.59 9.89 14.49 + 4.80 14.91 + 1.12 10.42	12.27 + 2.67 10.19 14.65 + 4.90 15.25 + 1.16 10.67	12.36 + 2.66 10.31 14.82 + 4.77 15.38 + 1.23 10.75	12.32 + 2.69 10.28 14.74 + 4.74 15.41 + 1.21 10.66	12.26 + 2.73 10.19 14.64 + 4.70 15.33 + 1.26 10.54	12.018 + 2.612 9.851 14.390 + 5.033 15.039 + 1.250 10.354	JUNE. Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.

The values for 1914 are given by the excess or defect from the normal; + indicates excess, - defect.  
The pressures are for station level, corrected for temperature and gravity.  
The normals are for the period 1871-1910. The observations at Eskdalemuir are in the fourth year of publication.

LXIX.-LXXIV.—NORMALS FOR THE MONTHS OF THE HOURLY VALUES OF THE METEOROLOGICAL ELEMENTS

LXIX.—continued—PRESSURE IN MILLIBARS.

The Mean Values are corrected to accord with

Table with columns for Hour, G.M.T., 1-11, and Noon, and rows for months JULY, AUGUST, SEPTEMBER, OCTOBER, NOVEMBER, DECEMBER, and YEAR. Each row contains station names, normal values, and differences for 1914.

AT THE FIVE OBSERVATORIES WITH DIFFERENCES BETWEEN THE NORMALS AND THE VALUES FOR 1914.

JULY TO DECEMBER AND YEAR.

the formula  $\frac{1}{24}\{1 + \dots + 23 + \frac{1}{2}(0 + 24)\}$ .

13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	Midt.	Mean.	Hour, G.M.T.
mb. 9.45 - 2.59 2.27 14.17 - 3.91 14.23 - 3.18 10.39	mb. 9.44 - 2.57 2.22 14.17 - 3.87 14.09 - 3.14 10.36	mb. 9.37 - 2.58 2.16 14.13 - 3.78 13.96 - 3.16 10.28	mb. 9.30 - 2.57 2.11 14.06 - 3.78 13.81 - 3.14 10.20	mb. 9.24 - 2.59 2.09 14.01 - 3.74 13.73 - 3.18 10.10	mb. 9.31 - 2.58 2.14 14.02 - 3.65 13.77 - 3.07 10.10	mb. 9.39 - 2.57 2.24 14.10 - 3.60 13.92 - 3.11 10.16	mb. 9.55 - 2.52 2.49 14.21 - 3.67 14.19 - 3.11 10.28	mb. 9.70 - 2.49 2.67 14.38 - 3.61 14.49 - 3.15 10.51	mb. 9.78 - 2.49 2.75 14.49 - 3.68 14.65 - 3.20 10.59	mb. 9.72 - 2.47 2.75 14.45 - 3.68 14.67 - 3.30 10.51	mb. 9.65 - 2.47 2.69 14.34 - 3.70 14.62 - 3.30 10.40	mb. 9.435 - 2.548 2.434 14.015 - 3.699 14.298 - 3.234 10.178	<p>JULY.</p> <p>Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.</p> <p>AUGUST.</p> <p>Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.</p> <p>SEPTEMBER.</p> <p>Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.</p> <p>OCTOBER.</p> <p>Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.</p> <p>NOVEMBER.</p> <p>Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.</p> <p>DECEMBER.</p> <p>Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.</p> <p>YEAR.</p> <p>Normal. Aberdeen. Diff. for 1914. „ 1914. Eskdalemuir. Normal. Valencia. Diff. for 1914. „ Normal. Kew. Diff. for 1914. „ Normal. Falmouth.</p>
8.35 + 2.65 6.60 12.85 + 0.57 13.73 + 2.08 9.58	8.32 + 2.69 6.56 12.85 + 0.53 13.57 + 2.10 9.54	8.23 + 2.68 6.60 12.76 + 0.61 13.42 + 2.21 9.41	8.16 + 2.74 6.56 12.66 + 0.62 13.29 + 2.18 9.33	8.12 + 2.72 6.58 12.61 + 0.62 13.21 + 2.26 9.25	8.19 + 2.76 6.73 12.62 + 0.67 13.29 + 2.27 9.23	8.30 + 2.80 6.92 12.68 + 0.63 13.48 + 2.23 9.30	8.54 + 2.88 7.30 12.87 + 0.67 13.86 + 2.31 9.56	8.60 + 2.96 7.49 13.03 + 0.82 14.02 + 2.49 9.70	8.62 + 3.07 7.57 13.04 + 0.73 14.14 + 2.49 9.73	8.55 + 3.08 7.57 12.98 + 0.73 14.14 + 2.55 9.62	8.47 + 3.10 7.55 12.89 + 0.71 14.07 + 2.61 9.52	8.298 + 2.755 6.837 12.686 + 0.400 13.811 + 2.221 9.360	
10.20 + 1.14 8.35 14.17 + 2.34 15.32 + 2.25 10.53	10.10 + 1.10 8.22 14.05 + 2.47 15.11 + 2.26 10.40	9.98 + 1.00 8.00 13.88 + 2.52 14.93 + 2.27 10.22	9.95 + 0.95 7.78 13.78 + 2.53 14.84 + 2.20 10.15	9.98 + 0.85 7.67 13.76 + 2.62 14.87 + 2.13 10.14	10.15 + 0.81 7.69 13.84 + 2.67 15.03 + 2.10 10.24	10.36 + 0.65 7.80 13.97 + 2.71 15.30 + 2.07 10.37	10.55 + 0.63 7.96 14.19 + 2.78 15.57 + 2.06 10.64	10.54 + 0.70 8.17 14.26 + 2.87 15.64 + 2.16 10.65	10.54 + 0.69 8.29 14.23 + 2.89 15.69 + 2.10 10.65	10.48 + 0.72 8.35 14.16 + 2.94 15.65 + 2.10 10.54	10.40 + 0.74 8.42 14.06 + 3.02 15.56 + 2.19 10.41	10.220 + 1.136 8.261 13.952 + 2.666 15.392 + 2.255 10.345	
7.00 + 6.64 8.55 10.73 + 4.77 12.23 + 2.94 7.01	6.91 + 6.64 8.36 10.58 + 4.71 12.07 + 2.77 6.87	6.81 + 6.65 8.18 10.46 + 4.69 11.98 + 2.73 6.78	6.84 + 6.68 8.12 10.46 + 4.58 12.00 + 2.69 6.79	6.95 + 6.60 8.18 10.52 + 4.60 12.15 + 2.65 6.88	7.19 + 6.58 8.28 10.72 + 4.52 12.47 + 2.43 7.16	7.24 + 6.60 8.37 10.89 + 4.52 12.60 + 2.35 7.29	7.32 + 6.61 8.43 10.96 + 4.48 12.71 + 2.22 7.38	7.30 + 6.63 8.43 11.00 + 4.46 12.81 + 2.15 7.44	7.29 + 6.64 8.44 10.83 + 4.57 12.81 + 2.10 7.44	7.19 + 6.61 8.38 10.91 + 4.39 12.73 + 2.07 7.30	7.16 + 6.57 8.32 10.81 + 4.36 12.66 + 2.01 7.20	6.993 + 6.744 8.585 10.629 + 4.865 12.425 + 2.772 7.007	
6.95 - 3.31 9.98 11.21 - 2.10 12.95 - 2.33 7.60	6.85 - 3.24 9.96 11.00 - 2.15 12.73 - 2.34 7.38	6.77 - 3.11 10.04 10.83 - 2.20 12.71 - 2.26 7.30	6.86 - 2.88 10.28 10.91 - 2.24 12.79 - 2.30 7.40	6.93 - 2.72 10.47 11.01 - 2.07 12.93 - 2.22 7.51	7.09 - 2.67 10.74 11.23 - 2.18 13.13 - 2.11 7.75	7.11 - 2.67 10.77 11.36 - 2.19 13.21 - 2.05 7.84	7.14 - 2.68 10.77 11.45 - 2.32 13.28 - 1.98 7.92	7.12 - 2.70 10.76 11.48 - 2.38 13.34 - 1.88 7.98	7.11 - 2.76 10.72 11.55 - 2.59 13.32 - 1.86 8.02	7.05 - 2.93 10.61 11.47 - 2.64 13.27 - 1.74 7.93	7.05 - 3.10 10.51 11.47 - 2.63 13.21 - 1.71 7.92	6.993 - 3.082 10.208 11.217 - 2.277 13.102 - 2.101 7.706	
4.77 -11.72 8.94 10.15 -15.86 12.91 -11.91 7.58	4.73 -11.69 8.86 9.93 -15.76 12.75 -11.22 7.37	4.71 -11.49 8.83 9.84 -15.50 12.80 -11.18 7.37	4.88 -11.50 8.84 10.00 -15.46 12.92 -11.33 7.52	4.92 -11.54 8.67 10.11 -15.34 13.01 -11.42 7.63	5.06 -11.65 8.54 10.25 -15.44 13.15 -11.61 7.80	5.10 -11.84 8.34 10.32 -15.60 13.28 -11.97 7.89	5.19 -11.92 8.35 10.40 -15.64 13.40 -12.17 8.01	5.16 -11.89 8.50 10.40 -15.68 13.43 -11.98 8.02	5.17 -11.93 8.65 10.42 -15.85 13.44 -12.07 8.04	5.12 -11.88 8.66 10.37 -16.16 13.44 -12.07 7.98	5.07 -11.93 8.80 10.37 -16.28 13.33 -11.98 7.90	4.900 -11.850 8.731 10.167 -15.849 13.130 -11.509 7.703	
8.50 - 1.93 2.58 12.51 - 1.76 13.88 - 1.05 9.03	8.43 - 1.96 2.47 12.38 - 1.78 13.68 - 1.07 8.89	8.34 - 1.96 2.38 12.25 - 1.75 13.56 - 1.06 8.77	8.36 - 1.92 2.36 12.23 - 1.76 13.53 - 1.09 8.76	8.38 - 1.96 2.35 12.24 - 1.72 13.57 - 1.16 8.76	8.53 - 1.96 2.45 12.35 - 1.74 13.73 - 1.17 8.89	8.62 - 1.99 2.53 12.46 - 1.73 13.91 - 1.22 8.99	8.77 - 1.95 2.70 12.59 - 1.75 14.13 - 1.24 9.14	8.81 - 1.91 2.82 12.69 - 1.69 14.26 - 1.20 9.25	8.84 - 1.90 2.87 12.73 - 1.76 14.32 - 1.18 9.28	8.77 - 1.88 2.86 12.68 - 1.81 14.30 - 1.18 9.19	8.72 - 1.87 2.87 12.61 - 1.83 14.25 - 1.19 9.11	8.522 - 1.858 2.658 12.386 - 1.712 14.002 - 1.100 8.928	

## LXIX.—LXXIV.—NORMALS FOR THE MONTHS OF THE HOURLY VALUES OF THE METEOROLOGICAL ELEMENTS

LXX.—TEMPERATURE (in degrees absolute).

The Mean Values are corrected to accord with

Hour, G.M.T.		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	Noon.
<b>JANUARY.</b>													
Aberdeen, Normal.	200+	76·07	76·02	76·00	75·94	75·95	75·92	75·97	75·97	76·06	76·28	76·75	77·09
Difference for 1914		+ 0·63	+ 0·64	+ 0·54	+ 0·52	+ 0·48	+ 0·22	+ 0·21	+ 0·23	+ 0·23	+ 0·31	+ 0·31	+ 0·31
Eskdalemuir, 1914.	200+	75·16	75·17	75·08	74·94	74·79	74·68	74·64	74·72	74·88	75·36	75·73	76·22
Valencia, Normal.	200+	79·82	79·76	79·77	79·73	79·74	79·70	79·72	79·70	79·78	79·95	80·31	80·61
Difference for 1914		+ 0·04	- 0·01	+ 0·07	+ 0·08	+ 0·06	+ 0·25	+ 0·20	+ 0·28	+ 0·25	+ 0·26	+ 0·16	+ 0·09
Kew, Normal.	200+	76·29	76·21	76·20	76·12	76·10	76·03	76·04	76·02	76·25	76·74	77·34	77·82
Difference for 1914		- 0·09	- 0·07	- 0·01	- 0·03	+ 0·04	- 0·01	+ 0·01	+ 0·01	- 0·19	- 0·33	- 0·36	- 0·49
Falmouth, Normal.	200+	79·18	79·10	79·13	79·06	79·07	79·03	79·05	79·04	79·24	79·58	80·03	80·25
<b>FEBRUARY.</b>													
Aberdeen, Normal,	200+	75·93	75·85	75·78	75·69	75·67	75·64	75·64	75·70	76·02	76·51	77·13	77·58
Difference for 1914		+ 2·83	+ 2·74	+ 2·72	+ 2·64	+ 2·57	+ 2·44	+ 2·06	+ 1·78	+ 1·81	+ 2·12	+ 2·08	+ 2·12
Eskdalemuir, 1914.	200+	79·96	76·80	76·69	76·44	76·15	76·17	76·06	76·03	76·27	76·93	77·60	78·25
Valencia, Normal.	200+	79·59	79·52	79·50	79·42	79·39	79·33	79·38	79·33	79·60	79·97	80·49	80·87
Difference for 1914		+ 0·97	+ 0·95	+ 1·08	+ 1·13	+ 1·29	+ 1·22	+ 1·17	+ 1·23	+ 1·23	+ 1·13	+ 0·76	+ 0·85
Kew, Normal.	200+	76·51	76·37	76·30	76·20	76·18	76·10	76·10	76·15	76·71	77·32	78·17	78·74
Difference for 1914		+ 2·54	+ 2·48	+ 2·38	+ 2·33	+ 2·25	+ 2·17	+ 2·08	+ 2·13	+ 2·33	+ 2·64	+ 3·05	+ 3·27
Falmouth, Normal.	200+	79·06	78·97	78·95	78·87	78·86	78·78	78·79	78·80	79·20	79·74	80·21	80·49
<b>MARCH.</b>													
Aberdeen, Normal.	200+	76·27	76·16	76·09	75·97	75·90	75·85	75·99	76·41	77·17	77·80	78·41	78·80
Difference for 1914		+ 0·23	+ 0·36	+ 0·25	+ 0·27	+ 0·29	+ 0·15	+ 0·17	+ 0·21	+ 0·22	+ 0·21	+ 0·32	+ 0·29
Eskdalemuir, 1914.	200+	75·02	74·84	74·57	74·58	74·43	74·18	74·21	74·81	75·55	76·46	77·24	77·65
Valencia, Normal.	200+	79·56	79·44	79·37	79·26	79·22	79·13	79·15	79·39	80·04	80·63	81·19	81·56
Difference for 1914		+ 0·56	+ 0·57	+ 0·57	+ 0·65	+ 0·86	+ 0·81	+ 0·94	+ 0·90	+ 0·76	+ 0·55	+ 0·41	+ 0·32
Kew, Normal.	200+	77·06	76·82	76·66	76·47	76·38	76·26	76·43	77·06	78·11	79·05	80·06	80·70
Difference for 1914		+ 1·43	+ 1·46	+ 1·43	+ 1·44	+ 1·57	+ 1·55	+ 1·51	+ 1·39	+ 1·32	+ 1·32	+ 1·11	+ 0·78
Falmouth, Normal.	200+	79·00	78·89	78·88	78·76	78·74	78·67	78·75	79·13	79·91	80·42	80·98	81·20
<b>APRIL.</b>													
Aberdeen, Normal.	200+	77·63	77·45	77·34	77·22	77·16	77·37	78·11	78·81	79·60	80·11	80·54	80·78
Difference for 1914		+ 2·11	+ 1·83	+ 1·63	+ 1·39	+ 1·44	+ 1·56	+ 2·02	+ 2·33	+ 2·60	+ 2·76	+ 3·02	+ 3·02
Eskdalemuir, 1914.	200+	76·26	76·05	75·79	75·67	75·42	76·13	77·52	79·82	81·63	82·75	83·23	83·99
Valencia, Normal.	200+	80·81	80·66	80·58	80·42	80·36	80·28	80·67	81·26	82·04	82·59	83·20	83·55
Difference for 1914		+ 0·62	+ 0·47	+ 0·42	+ 0·47	+ 0·36	+ 0·39	+ 0·75	+ 1·36	+ 1·76	+ 1·79	+ 1·87	+ 1·72
Kew, Normal.	200+	79·05	78·76	78·54	78·29	78·17	78·31	79·16	80·16	81·38	82·30	83·31	83·91
Difference for 1914		+ 1·47	+ 1·19	+ 0·87	+ 0·94	+ 1·10	+ 1·00	+ 1·42	+ 1·69	+ 2·22	+ 2·29	+ 2·50	+ 2·52
Falmouth, Normal.	200+	80·48	80·31	80·25	80·11	80·07	80·07	80·70	81·40	82·17	82·60	83·16	83·33
<b>MAY.</b>													
Aberdeen, Normal.	200+	79·80	79·59	79·41	79·26	79·63	80·31	81·08	81·70	82·22	82·59	82·95	83·17
Difference for 1914		+ 0·28	+ 0·15	- 0·05	0·00	+ 0·05	+ 0·30	+ 0·61	+ 0·55	+ 0·71	+ 0·72	+ 1·09	+ 1·10
Eskdalemuir, 1914.	200+	78·56	78·38	78·14	78·02	78·12	78·86	79·71	80·98	81·80	82·61	83·17	83·64
Valencia, Normal.	200+	82·60	82·42	82·29	82·14	82·10	82·29	83·14	83·90	84·72	85·16	85·69	85·95
Difference for 1914		+ 0·27	+ 0·30	+ 0·35	+ 0·13	+ 0·14	+ 0·22	- 0·02	- 0·14	- 0·31	- 0·35	- 0·58	- 0·61
Kew, Normal.	200+	81·58	81·18	80·95	80·67	80·86	81·43	82·68	83·72	84·86	85·66	86·52	87·04
Difference for 1914		+ 0·79	+ 0·67	+ 0·60	+ 0·65	+ 0·61	+ 0·52	+ 0·59	+ 0·58	+ 0·58	+ 0·65	+ 0·77	+ 0·82
Falmouth, Normal.	200+	82·38	82·22	82·14	82·00	82·01	82·33	83·46	84·18	84·97	85·28	85·78	85·90
<b>JUNE.</b>													
Aberdeen, Normal.	200+	82·59	82·35	82·20	82·17	82·76	83·62	84·41	84·87	85·33	85·66	86·00	86·09
Difference for 1914		+ 0·94	+ 0·70	+ 0·41	+ 0·32	+ 0·13	+ 0·13	+ 0·72	+ 0·62	+ 0·73	+ 0·89	+ 0·88	+ 0·96
Eskdalemuir, 1914.	200+	81·64	81·84	81·11	81·11	81·56	83·01	84·26	85·48	86·20	87·13	87·46	88·10
Valencia, Normal.	200+	85·13	84·97	84·87	84·74	84·77	85·11	85·88	86·50	87·21	87·66	88·17	88·43
Difference for 1914		- 0·01	- 0·22	- 0·10	+ 0·02	- 0·05	+ 0·12	+ 0·13	+ 0·09	- 0·06	+ 0·12	+ 0·18	+ 0·13
Kew, Normal.	200+	84·98	84·59	84·28	84·02	84·49	85·10	86·15	87·10	88·22	88·97	89·88	90·43
Difference for 1914		+ 0·27	+ 0·18	+ 0·07	- 0·01	- 0·14	- 0·13	- 0·06	+ 0·04	+ 0·15	+ 0·44	+ 0·53	+ 0·59
Falmouth, Normal.	200+	85·20	85·06	84·98	84·88	84·96	85·48	86·44	87·18	87·96	88·35	88·74	88·84

The Temperature is obtained photographically from a mercurial thermometer with a large cylindrical bulb 4 inches (0·10 metre) long, and a long stem. The column of mercury in the stem is broken at a convenient point by a small air space, which moves up or down with the rise or fall of temperature. The bulb is exposed in a louvred screen attached to the wall of the Observatory, except at Eskdalemuir, where the screen stands in the open, and the stem is bent twice at right angles so that whilst one vertical portion containing the air speck is within the room where the photographic record is obtained, the other with the bulb itself is in the open air and at least 2 feet (0·61 metre) from the wall. Two such thermometers are in the screen, one being used as a dry bulb and the other as a wet bulb, with two thermometers having bulbs of the same size as standards.







## LXIX.-LXXIV.—NORMALS FOR THE MONTHS OF THE HOURLY VALUES OF THE METEOROLOGICAL ELEMENTS

## LXXI.—RELATIVE HUMIDITY.

The Mean Values are corrected to accord with

Hour, G.M.T.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	Noon.
<b>JANUARY.</b>												
Aberdeen, Normal.	80.8	80.8	81.0	81.1	81.4	81.6	81.5	81.5	81.4	80.7	79.5	78.3
Difference for 1914	0.0	0.0	+ 0.6	+ 0.1	- 1.4	- 1.2	- 1.9	- 0.9	- 0.4	- 1.7	- 0.9	- 2.3
Eskdalemuir, 1914.	83.2	83.8	84.7	83.8	83.7	85.6	85.2	85.0	87.8	84.1	85.4	84.1
Valencia, Normal.	86.6	87.1	87.1	87.3	87.2	87.3	87.4	87.2	86.9	86.9	86.2	85.4
Difference for 1914	- 0.6	- 1.1	- 1.5	- 2.7	- 2.4	- 2.6	- 2.5	- 1.6	- 1.5	- 1.8	- 0.7	- 1.0
Kew, Normal.	86.6	86.9	86.8	86.8	86.5	87.1	87.0	87.1	86.4	85.6	82.9	81.6
Difference for 1914	- 4.6	- 4.8	- 4.5	- 4.1	- 4.1	- 4.3	- 3.9	- 4.2	- 3.4	- 3.1	- 2.7	- 3.0
Falmouth, Normal.	84.9	84.9	85.0	85.1	85.3	85.3	85.3	85.4	85.0	83.9	82.2	81.2
<b>FEBRUARY.</b>												
Aberdeen, Normal.	80.5	80.6	80.8	81.0	80.9	81.1	81.1	80.7	80.2	78.9	77.3	75.8
Difference for 1914	+ 5.1	+ 5.4	+ 6.6	+ 5.4	+ 4.7	+ 3.3	+ 3.9	+ 4.5	+ 3.2	+ 2.4	+ 3.3	+ 1.2
Eskdalemuir, 1914.	90.9	91.0	91.4	90.4	90.3	88.5	90.2	90.1	91.3	87.4	87.7	86.6
Valencia, Normal.	87.2	87.3	87.5	87.4	87.5	87.6	87.0	87.4	87.1	86.4	84.5	82.7
Difference for 1914	+ 0.1	+ 0.5	+ 1.2	+ 1.6	- 0.2	- 0.2	+ 0.9	+ 1.4	+ 0.6	+ 1.0	+ 2.5	+ 3.2
Kew, Normal.	84.7	85.2	85.2	85.7	85.4	85.9	85.4	85.6	84.0	82.1	78.5	76.4
Difference for 1914	+ 3.2	+ 3.8	+ 2.7	+ 2.2	+ 3.2	+ 3.0	+ 3.2	+ 3.3	+ 3.2	+ 2.9	+ 2.5	+ 1.3
Falmouth, Normal.	83.6	83.5	83.7	83.7	83.9	84.0	83.9	83.9	83.2	81.4	79.4	77.9
<b>MARCH.</b>												
Aberdeen, Normal.	82.1	82.2	82.5	82.7	82.9	83.0	82.9	81.0	79.3	76.4	74.9	72.9
Difference for 1914	+ 3.8	+ 1.4	+ 0.9	+ 0.1	- 0.3	+ 0.8	+ 0.5	+ 2.0	- 0.3	+ 1.6	+ 1.0	+ 2.1
Eskdalemuir, 1914.	86.0	86.2	86.5	85.6	85.6	86.0	86.2	86.5	86.9	81.7	81.6	80.3
Valencia, Normal.	86.6	86.9	87.2	87.3	87.3	87.4	87.5	86.9	85.2	83.0	80.7	79.1
Difference for 1914	- 0.1	+ 0.1	- 0.3	+ 0.7	- 1.2	- 0.8	- 1.2	- 0.5	+ 0.3	+ 1.1	+ 2.2	+ 2.9
Kew, Normal.	85.4	86.7	86.6	87.1	86.8	87.3	86.4	85.0	81.0	77.8	73.1	70.8
Difference for 1914.	+ 1.5	+ 0.8	+ 0.5	+ 0.7	+ 0.5	+ 0.4	+ 1.3	+ 1.4	+ 1.4	+ 2.4	+ 3.2	+ 2.9
Falmouth, Normal.	84.4	84.8	84.9	84.9	85.2	85.4	85.6	84.2	81.6	79.1	77.1	75.7
<b>APRIL.</b>												
Aberdeen, Normal.	83.6	84.0	84.3	84.5	84.7	84.0	82.4	79.5	76.3	73.7	72.3	71.2
Difference for 1914	- 6.1	- 5.1	- 3.9	- 2.5	- 2.7	- 2.9	- 5.8	- 5.7	- 5.9	- 4.9	- 5.7	- 5.8
Eskdalemuir, 1914.	83.2	83.5	84.8	84.0	85.4	84.0	82.8	79.7	75.6	69.0	68.1	64.5
Valencia, Normal.	86.2	86.6	86.5	86.8	86.8	86.9	86.4	84.9	81.9	79.5	77.0	76.1
Difference for 1914	- 0.4	+ 0.3	- 0.3	- 0.4	+ 0.6	+ 0.8	+ 0.5	- 0.8	- 2.7	- 2.2	- 0.9	- 1.4
Kew, Normal.	84.4	85.7	86.1	87.1	86.9	86.8	83.8	80.1	75.3	70.4	66.6	63.7
Difference for 1914	+ 1.1	+ 1.1	+ 1.9	+ 2.0	+ 1.6	+ 2.3	+ 1.9	+ 0.8	- 2.5	- 2.5	- 3.1	- 1.7
Falmouth, Normal.	84.6	84.9	85.4	85.6	85.6	85.4	83.5	80.5	77.3	74.9	73.5	72.6
<b>MAY.</b>												
Aberdeen, Normal.	85.0	85.3	85.9	86.3	85.7	83.7	80.5	78.0	75.9	74.4	73.1	72.1
Difference for 1914	- 1.6	- 1.9	- 1.7	- 2.7	- 2.0	- 1.9	- 4.7	- 5.2	- 5.4	- 4.9	- 5.6	- 4.6
Eskdalemuir, 1914.	86.4	87.0	86.8	86.9	87.7	86.4	85.3	79.9	77.6	73.4	72.6	71.5
Valencia, Normal.	87.0	87.0	87.4	87.7	87.8	87.4	85.3	81.9	78.7	76.9	75.1	74.2
Difference for 1914	- 1.3	+ 0.5	0.0	+ 1.1	+ 1.3	+ 1.1	+ 3.0	+ 2.8	+ 3.8	+ 2.9	+ 4.2	+ 4.2
Kew, Normal.	84.6	86.3	86.8	87.6	86.8	85.3	81.1	76.2	71.1	67.8	65.0	62.8
Difference for 1914	- 2.3	- 1.4	- 0.7	- 1.2	- 1.6	- 1.8	- 3.4	- 3.0	- 2.1	- 2.0	- 2.5	- 2.9
Falmouth, Normal.	87.2	87.5	87.6	88.0	88.1	86.5	83.0	78.8	75.6	73.9	73.1	72.4
<b>JUNE.</b>												
Aberdeen, Normal.	85.2	86.0	86.2	86.5	85.2	82.0	78.8	76.2	74.5	73.3	72.3	72.0
Difference for 1914	- 2.5	- 1.6	- 0.6	- 0.1	0.0	+ 0.2	- 2.2	- 0.7	- 1.0	- 1.3	- 2.3	- 3.2
Eskdalemuir, 1914.	86.0	85.4	86.0	85.9	86.3	83.6	80.7	77.6	75.3	72.5	71.5	69.7
Valencia, Normal.	87.2	87.9	87.9	88.2	88.1	87.2	85.2	82.4	79.6	77.6	76.2	75.6
Difference for 1914	- 0.7	- 0.9	- 1.0	- 1.4	- 0.5	- 0.7	0.0	- 0.4	- 0.2	- 1.1	- 1.3	- 0.9
Kew, Normal.	84.3	85.8	87.1	87.6	85.7	83.7	79.7	75.7	71.3	67.9	64.8	62.3
Difference for 1914	+ 2.7	+ 2.6	+ 2.6	+ 3.2	+ 2.5	+ 2.7	+ 1.4	+ 0.7	+ 0.4	- 0.8	- 0.5	0.0
Falmouth, Normal.	89.1	89.4	89.8	89.8	89.9	87.9	84.0	79.7	76.6	75.0	74.2	73.8

The Relative Humidity of the air for each hour is deduced from the readings of the dry and wet bulb thermometers (see note to Table LXX.) by means of Glaisher's factors; complete saturation being taken as 100.

The normals for humidity are obtained from the observations for 25 years, 1886-1910.



AT THE FIVE OBSERVATORIES WITH DIFFERENCES BETWEEN THE NORMALS AND THE VALUES FOR 1914.

JANUARY TO JUNE.

the formula  $\frac{1}{24}\{1 + \dots + 23 + \frac{1}{2}(0+24)\}$ .

13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	Midt.	Mean.	Hour, G.M.T.	
													<b>JANUARY.</b>	
%	%	%	%	%	%	%	%	%	%	%	%	%	Normal. Aberdeen.	
77.8	77.6	78.1	79.4	80.1	80.4	80.8	80.9	80.8	80.8	80.8	80.8	80.6	80.3	Diff. for 1914. „
-0.8	+1.4	+0.7	+1.2	-0.3	+0.4	+0.2	+0.7	+1.0	+0.2	-0.2	+0.8	+1.3	+1.3	1914. Eskdalemuir.
83.4	83.7	83.8	84.8	85.9	87.0	87.3	87.3	87.0	85.4	84.4	84.3	85.0	85.0	Normal. Valencia.
84.4	84.1	84.3	84.7	85.6	86.1	86.3	86.4	86.7	86.5	86.5	86.7	86.3	86.3	Diff. for 1914. „
-0.8	-0.3	-0.6	+0.1	-1.2	-1.4	-0.4	-0.9	-1.7	0.0	-0.3	+0.6	-1.1	-1.1	Normal. Kew.
79.7	79.5	79.6	81.5	82.7	84.0	84.6	85.4	85.4	86.2	86.1	86.1	86.7	84.7	Diff. for 1914. „
-1.7	-2.6	-2.1	-3.5	-3.9	-3.2	-4.0	-3.7	-3.3	-3.4	-3.3	-3.6	-3.6	-3.6	Normal. Falmouth.
80.7	80.3	81.1	82.1	83.2	83.9	84.3	84.1	84.2	84.6	84.6	84.8	83.8	83.8	
													<b>FEBRUARY.</b>	
75.4	75.1	75.4	76.5	78.2	79.4	79.9	79.9	79.9	80.0	80.2	80.5	79.2	79.2	Normal. Aberdeen.
+3.0	+2.5	+2.2	+2.3	+2.6	+2.7	+3.3	+4.5	+4.9	+6.0	+6.0	+4.9	+3.9	+3.9	Diff. for 1914. „
85.4	84.5	85.8	87.1	88.5	89.9	89.8	90.5	91.5	90.1	90.6	91.1	89.2	89.2	1914. Eskdalemuir.
81.4	81.0	81.2	81.8	83.2	84.8	85.3	86.2	86.1	86.4	87.0	87.2	85.5	85.5	Normal. Valencia.
+3.4	+4.1	+5.5	+5.3	+4.0	+3.0	+2.4	+0.2	+2.2	+1.1	-0.2	-0.6	+1.8	+1.8	Diff. for 1914. „
74.6	73.7	73.7	74.7	77.1	79.8	81.2	82.7	83.2	84.0	84.3	84.8	81.6	81.6	Normal. Kew.
0.0	+0.6	+1.2	+1.8	+1.7	+1.8	+2.1	+2.2	+2.7	+3.0	+3.3	+3.0	+2.4	+2.4	Diff. for 1914. „
77.1	76.7	77.2	77.9	79.7	81.4	82.2	82.9	83.4	83.5	83.8	83.8	81.7	81.7	Normal. Falmouth.
													<b>MARCH.</b>	
72.5	72.2	72.6	73.4	75.2	77.4	79.3	80.1	80.6	81.2	81.3	81.5	78.8	78.8	Normal. Aberdeen.
+3.1	+2.3	+1.6	+4.0	+2.3	+1.4	+0.4	+1.5	+3.0	+1.6	+2.7	+3.0	+1.7	+1.7	Diff. for 1914. „
79.2	79.2	79.4	80.1	81.7	85.3	86.0	86.6	87.6	86.5	85.7	85.5	84.2	84.2	1914. Eskdalemuir.
77.9	78.0	77.7	78.4	79.4	81.2	83.5	84.8	85.0	85.6	86.0	86.6	83.7	83.7	Normal. Valencia.
+4.8	+3.8	+4.4	+4.6	+5.3	+3.7	+1.6	+0.4	+0.2	+0.2	+0.5	-0.3	+1.4	+1.4	Diff. for 1914. „
68.4	67.1	67.0	67.7	69.9	73.5	76.8	79.9	81.2	83.4	84.3	85.5	79.1	79.1	Normal. Kew.
+3.5	+4.1	+3.6	+5.4	+5.3	+5.4	+4.1	+2.1	+2.1	+1.0	+1.2	+0.9	+2.3	+2.3	Diff. for 1914. „
74.9	74.7	74.9	75.7	77.2	79.1	81.8	82.8	83.5	83.9	84.2	84.7	81.3	81.3	Normal. Falmouth.
													<b>APRIL.</b>	
70.9	71.1	71.4	72.0	73.4	75.0	77.3	79.6	80.5	81.5	82.5	83.1	78.3	78.3	Normal. Aberdeen.
-6.9	-7.1	-7.4	-8.0	-9.0	-9.0	-8.5	-7.0	-4.9	-5.5	-5.3	-6.6	-5.9	-5.9	Diff. for 1914. „
63.9	63.5	63.2	66.0	67.1	70.6	75.8	79.1	82.4	82.9	83.7	83.0	76.1	76.1	1914. Eskdalemuir.
75.8	75.3	75.5	75.7	77.0	78.6	80.9	83.3	84.5	85.2	85.7	85.9	82.0	82.0	Normal. Valencia.
-1.3	-0.5	-0.6	-1.1	-1.4	-1.2	-0.9	-1.1	-1.6	+0.3	-0.4	-0.1	-0.7	-0.7	Diff. for 1914. „
62.3	61.0	61.0	61.3	62.9	65.7	69.9	74.3	77.4	79.9	81.9	83.2	74.9	74.9	Normal. Kew.
-3.4	-2.9	-2.9	-2.8	-3.1	-2.9	-3.0	-3.3	-2.9	-2.1	-1.2	+0.6	-1.1	-1.1	Diff. for 1914. „
72.3	72.1	72.4	73.0	74.1	75.8	79.5	82.1	83.1	83.9	84.1	84.3	79.6	79.6	Normal. Falmouth.
													<b>MAY.</b>	
72.3	72.3	72.6	73.1	73.6	74.6	76.7	79.1	81.1	82.5	83.8	84.5	78.8	78.8	Normal. Aberdeen.
-5.8	-6.8	-7.6	-7.6	-6.0	-3.8	-4.2	-3.9	-3.7	-4.5	-2.9	-2.3	-4.2	-4.2	Diff. for 1914. „
70.1	69.3	70.9	71.5	71.1	72.4	77.8	80.2	82.9	84.1	85.9	85.6	79.3	79.3	1914. Eskdalemuir.
74.1	73.7	74.1	74.0	74.2	76.5	78.6	81.4	83.6	85.0	86.0	86.6	81.0	81.0	Normal. Valencia.
+3.9	+4.3	+3.4	+3.3	+2.5	+2.6	+1.1	+0.8	-0.4	-0.6	-1.2	-1.3	+1.8	+1.8	Diff. for 1914. „
60.9	60.0	59.5	59.6	60.7	62.6	66.6	71.9	75.6	79.0	81.1	83.3	73.4	73.4	Normal. Kew.
-2.8	-1.4	0.0	+0.1	-0.1	0.0	+0.3	-0.8	-1.7	-3.3	-3.0	-2.8	-1.7	-1.7	Diff. for 1914. „
72.2	71.9	72.2	72.6	73.2	75.0	78.4	82.3	85.1	86.3	86.8	87.2	80.2	80.2	Normal. Falmouth.
													<b>JUNE.</b>	
71.5	71.4	72.3	72.7	72.8	74.0	75.6	77.9	80.4	82.3	83.7	84.4	78.2	78.2	Normal. Aberdeen.
-1.9	-2.8	-3.1	-2.5	-1.4	0.0	-0.1	-1.9	-2.4	-1.9	-1.7	-1.4	-1.5	-1.5	Diff. for 1914. „
68.1	66.6	66.8	68.2	70.2	72.1	75.0	78.8	82.1	84.2	85.6	86.5	77.7	77.7	1914. Eskdalemuir.
75.1	75.1	75.1	74.4	74.5	76.9	78.9	81.4	84.1	85.4	86.1	86.9	81.5	81.5	Normal. Valencia.
+0.2	-0.6	+0.1	+0.3	-0.2	+0.4	+0.5	+1.3	+0.3	+0.7	0.0	-0.2	-0.2	-0.2	Diff. for 1914. „
60.4	59.3	58.6	58.8	59.8	61.9	65.5	70.6	74.9	78.3	80.7	83.1	72.8	72.8	Normal. Kew.
-0.8	-1.2	-2.1	-2.7	-0.1	+0.4	-2.2	-2.0	-1.0	+0.2	+0.9	+2.5	+0.4	+0.4	Diff. for 1914. „
73.2	72.9	72.9	73.4	74.2	75.8	78.7	82.9	86.0	87.5	88.2	88.8	81.4	81.4	Normal. Falmouth.

The values for 1914 are given by the excess or defect from the normal ; + indicates excess, - defect.

## LXIX.-LXXIV.—NORMALS FOR THE MONTHS OF THE HORULY VALUES OF THE METEOROLOGICAL ELEMENTS

LXXI.—continued—RELATIVE HUMIDITY.

The Mean Values are corrected to accord with

Hour, G.M.T.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
<b>JULY.</b>												
Aberdeen, Normal.	% 84.9	% 85.6	% 85.8	% 86.3	% 85.0	% 82.6	% 79.6	% 76.8	% 74.5	% 72.9	% 71.7	% 71.7
Difference for 1914	+ 2.9*	+ 2.4*	+ 2.2*	+ 2.1*	+ 2.5*	+ 3.6*	+ 5.0*	+ 3.8*	+ 6.5*	+ 6.6*	+ 5.8*	+ 4.3*
Eskdalemuir, 1914.	87.4	87.7	87.9	87.5	87.9	86.6	84.8	80.6	77.2	74.9	73.9	72.7
Valencia, Normal.	88.4	88.7	89.1	89.2	89.7	89.0	87.6	85.4	83.0	81.0	79.3	78.6
Difference for 1914	+ 0.1	+ 0.5	- 0.7	+ 0.6	0.0	+ 1.0	+ 1.3	+ 3.3	+ 4.5	+ 6.3	+ 6.8	+ 5.3
Kew, Normal.	85.1	86.4	87.2	88.1	87.1	85.3	80.8	75.9	70.7	67.0	63.4	61.5
Difference for 1914	+ 1.3	+ 1.0	+ 1.8	+ 2.0	+ 1.5	+ 1.3	+ 1.7	+ 2.6	+ 2.4	+ 4.6	+ 3.5	+ 3.4
Falmouth, Normal.	89.6	90.0	90.1	90.1	90.2	89.0	85.5	81.1	77.0	75.2	73.8	72.8
<b>AUGUST.</b>												
Aberdeen, Normal.	85.4	86.1	86.4	87.0	87.0	85.5	82.2	79.5	75.8	74.0	72.4	71.3
Difference for 1914	+ 0.6	- 0.6	0.0	- 0.1	- 0.1	+ 0.5	+ 1.6	+ 1.1	+ 1.7	+ 0.5	+ 2.1	+ 3.2
Eskdalemuir, 1914.	90.5	90.2	90.6	91.0	91.8	91.7	89.9	86.4	82.3	77.4	75.4	74.0
Valencia, Normal.	88.7	89.3	89.1	89.3	89.3	89.3	88.7	86.8	84.4	82.2	80.4	79.2
Difference for 1914	+ 3.3	+ 3.6	+ 3.0	+ 3.0	+ 3.4	+ 3.8	+ 3.5	+ 3.1	+ 3.1	+ 4.9	+ 3.8	+ 4.8
Kew, Normal.	86.8	87.7	88.5	89.0	89.0	88.2	84.9	80.2	74.3	69.9	65.4	63.0
Difference for 1914	+ 3.0	+ 3.9	+ 4.1	+ 4.1	+ 4.7	+ 4.8	+ 5.4	+ 5.5	+ 5.4	+ 4.7	+ 4.3	+ 3.1
Falmouth, Normal.	89.7	89.9	90.1	90.3	90.7	90.6	87.8	83.9	79.7	77.1	75.6	74.3
<b>SEPTEMBER</b>												
Aberdeen, Normal.	85.6	85.9	86.1	86.5	86.6	86.6	85.2	82.5	79.0	75.8	73.7	72.7
Difference for 1914	- 1.6	- 0.9	- 1.7	- 1.7	- 2.6	- 3.4	- 2.8	- 2.7	- 4.8	- 2.3	- 3.2	- 2.9
Eskdalemuir, 1914.	86.6	87.1	86.8	87.0	87.7	87.5	88.8	85.5	83.9	78.0	75.3	73.1
Valencia, Normal.	88.0	87.9	88.3	88.4	88.2	88.4	88.1	87.3	84.8	82.3	79.9	78.8
Difference for 1914	- 2.4	- 1.9	- 1.4	- 1.8	- 1.7	- 1.9	- 1.4	- 1.2	- 0.3	0.0	+ 0.8	+ 0.6
Kew, Normal.	88.4	89.5	89.6	90.1	90.0	90.4	88.5	85.0	80.0	75.1	70.7	67.6
Difference for 1914	- 1.9	- 1.9	- 1.7	- 1.2	- 0.5	- 0.4	- 0.5	- 1.6	- 2.6	- 3.1	- 6.9	- 6.5
Falmouth, Normal.	88.8	89.2	89.4	89.4	89.8	90.0	88.9	86.2	82.9	80.1	78.0	76.5
<b>OCTOBER.</b>												
Aberdeen, Normal.	85.5	85.6	85.7	85.6	85.7	85.9	85.8	84.8	82.9	80.1	77.8	76.3
Difference for 1914.	+ 2.5	+ 2.5	+ 3.2	+ 2.3	+ 2.8	+ 1.9	+ 2.0	+ 0.8	+ 2.5	+ 1.9	+ 0.6	+ 0.7
Eskdalemuir, 1914.	90.7	90.5	90.8	90.5	89.8	90.3	90.9	90.7	88.8	84.8	83.9	81.9
Valencia, Normal.	86.6	86.9	86.9	86.8	86.9	86.7	87.0	86.7	85.7	84.0	81.5	80.2
Difference for 1914	+ 1.9	+ 2.3	+ 2.5	+ 2.8	+ 2.3	+ 3.2	+ 2.8	+ 3.1	+ 2.4	+ 3.0	+ 2.4	+ 0.2
Kew, Normal.	89.9	90.7	90.6	91.3	91.1	91.3	90.6	89.3	85.9	82.5	78.2	75.2
Difference for 1914	- 1.7	- 1.7	- 1.9	- 2.3	- 1.7	- 2.4	- 1.3	- 1.4	- 1.1	- 3.4	- 3.7	- 4.1
Falmouth, Normal.	89.9	90.5	90.6	91.2	91.2	91.3	90.6	89.3	86.1	82.8	79.1	76.5
<b>NOVEMBER.</b>												
Aberdeen, Normal.	83.7	83.7	83.6	83.5	83.6	83.6	83.8	83.4	82.8	81.3	80.1	78.8
Difference for 1914	+ 3.1	+ 2.3	+ 2.4	+ 3.3	+ 4.8	+ 4.8	+ 3.6	+ 3.2	+ 3.2	+ 5.3	+ 2.7	+ 4.4
Eskdalemuir, 1914.	87.3	88.3	86.3	86.4	86.1	87.2	87.3	86.9	88.0	84.2	84.3	83.3
Valencia, Normal.	86.9	87.3	87.4	87.5	87.7	87.8	87.9	87.8	87.3	86.5	85.0	83.5
Difference for 1914	- 1.0	- 0.9	+ 0.3	- 0.9	- 1.7	- 1.7	- 2.0	- 0.9	- 0.5	- 2.1	- 3.3	- 3.7
Kew, Normal.	89.2	89.7	89.7	89.8	89.4	90.0	89.6	89.6	87.9	86.4	83.6	81.3
Difference for 1914	- 2.9	- 3.4	- 4.1	- 4.3	- 4.2	- 4.4	- 3.9	- 3.8	- 3.2	- 3.0	- 4.1	- 3.9
Falmouth, Normal.	85.7	85.6	85.4	85.7	85.9	85.5	85.9	85.8	84.8	83.2	81.3	79.7
<b>DECEMBER.</b>												
Aberdeen, Normal.	82.9	83.0	83.3	83.3	83.2	82.8	83.0	82.9	82.5	82.2	81.5	80.5
Difference for 1914	+ 0.1	0.0	- 1.3	- 0.7	- 0.2	- 0.8	+ 0.2	- 0.5	- 0.5	+ 0.4	- 2.1	- 0.1
Eskdalemuir, 1914.	86.5	85.2	86.6	87.6	86.2	86.4	86.5	87.6	87.7	86.0	86.0	84.8
Valencia, Normal.	88.1	87.6	87.8	88.0	87.5	87.9	87.9	87.8	87.7	87.6	86.4	86.1
Difference for 1914	- 2.6	- 1.5	- 2.9	- 2.6	- 1.3	- 1.0	- 1.2	- 0.5	- 1.6	- 1.7	- 2.1	- 2.0
Kew, Normal.	87.4	88.0	87.6	88.0	87.8	88.1	87.4	87.9	87.1	86.4	84.4	83.0
Difference for 1914	- 1.2	- 1.1	- 0.8	- 0.4	- 0.9	+ 0.6	+ 1.0	- 0.5	- 1.0	- 1.9	- 1.6	- 1.9
Falmouth, Normal.	85.0	84.8	85.0	85.0	85.1	84.7	85.2	85.1	84.9	84.2	82.8	81.5
<b>YEAR.</b>												
Aberdeen, Normal.	83.8	84.1	84.3	84.5	84.3	83.5	82.2	80.6	78.8	77.0	75.6	74.5
Difference for 1914	+ 0.5	+ 0.3	+ 0.6	+ 0.5	+ 0.6	+ 0.4	0.0	- 0.1	- 0.1	+ 0.3	- 0.4	- 0.3
Eskdalemuir, 1914.	87.1	87.2	87.4	87.6	87.4	87.0	86.5	84.7	83.5	79.5	78.6	77.2
Valencia, Normal.	87.3	87.5	87.7	87.8	87.8	87.7	87.2	86.0	84.4	82.8	81.0	80.0
Difference for 1914	- 0.3	+ 0.2	- 0.1	0.0	0.0	+ 0.1	+ 0.3	+ 0.7	+ 0.5	+ 0.9	+ 1.2	+ 1.0
Kew, Normal.	86.4	87.4	87.7	88.2	87.7	87.5	85.4	83.1	79.6	76.7	73.1	70.8
Difference for 1914	- 0.1	0.0	- 0.1	0.0	+ 0.1	+ 0.1	+ 0.3	0.0	- 0.3	- 0.6	- 1.0	- 1.1
Falmouth, Normal.	86.9	87.1	87.3	87.4	87.6	87.1	85.8	83.7	81.2	79.2	77.5	76.2

\* Means for 29 days only ; values for the 1st and 2nd not available.

AT THE FIVE OBSERVATORIES WITH DIFFERENCES BETWEEN THE NORMALS AND THE VALUES FOR 1914.

JULY TO DECEMBER AND YEAR.

the formula  $\frac{1}{24}(1 + \dots + 23 + \frac{1}{2}(0+24))$ .

13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	Midt.	Mean.	Hour, G.M.T.
													JULY.
%	%	%	%	%	%	%	%	%	%	%	%	%	Normal. Aberdeen.
71.0	71.2	71.6	72.5	73.3	74.5	76.3	78.9	81.4	82.9	83.7	84.6	78.3	Diff. for 1914. "
+ 3.6*	+ 3.3*	+ 3.9*	+ 3.0*	+ 3.2*	+ 4.5*	+ 3.7*	+ 3.3*	+ 4.2*	+ 3.1*	+ 3.9*	+ 3.6*	+ 3.9*	1914. Eskdalemuir.
71.5	70.7	70.1	72.1	73.5	75.7	79.2	83.6	84.8	86.3	88.3	87.6	80.5	Normal. Valencia.
77.8	77.4	77.0	77.1	76.9	79.0	81.2	83.8	86.0	87.1	87.8	88.3	83.7	Diff. for 1914. "
+ 4.5	+ 5.5	+ 4.6	+ 3.7	+ 2.4	+ 3.8	+ 3.3	+ 2.1	+ 0.5	+ 0.4	- 0.1	+ 0.9	+ 2.5	Normal. Kew.
59.4	58.3	57.8	58.1	59.2	61.4	65.1	70.9	75.9	79.3	81.7	84.0	72.9	Diff. for 1914. "
+ 2.3	+ 3.6	+ 4.1	+ 4.4	+ 3.3	+ 3.7	+ 1.8	+ 1.0	+ 0.4	+ 1.1	+ 1.7	+ 0.7	+ 2.3	Normal. Falmouth.
72.4	72.2	72.4	72.8	73.6	75.3	78.6	83.0	86.6	88.0	88.9	89.3	81.6	
													AUGUST.
70.9	70.6	71.4	72.3	74.0	75.9	78.6	81.2	82.4	83.5	84.1	84.9	79.2	Normal. Aberdeen.
+ 4.1	+ 3.9	+ 2.1	+ 0.7	- 1.0	- 0.4	- 1.1	- 1.6	+ 0.2	+ 0.1	+ 0.9	+ 1.1	+ 0.9	Diff. for 1914. "
72.4	71.7	71.9	73.1	74.6	78.5	83.9	86.2	88.5	89.2	90.1	90.9	83.4	1914. Eskdalemuir.
78.5	78.0	78.2	78.7	79.0	81.0	83.2	85.4	86.8	87.7	88.0	88.1	84.6	Normal. Valencia.
+ 3.6	+ 4.0	+ 3.1	+ 3.6	+ 2.9	+ 4.1	+ 2.8	+ 2.7	+ 2.2	+ 2.3	+ 2.5	+ 3.2	+ 3.3	Diff. for 1914. "
61.0	59.9	59.7	59.9	61.7	64.9	70.4	75.9	79.5	82.4	84.1	85.9	75.5	Normal. Kew.
+ 1.3	+ 0.8	+ 1.3	+ 0.6	+ 0.8	+ 0.5	+ 0.6	0.0	- 0.2	+ 0.5	+ 1.6	+ 2.1	+ 2.6	Diff. for 1914. "
73.5	73.4	73.4	74.4	75.7	78.1	82.0	85.9	87.8	88.3	89.0	89.5	82.9	Normal. Falmouth.
													SEPTEMBER.
72.1	72.3	72.9	74.1	76.0	78.5	81.0	82.4	83.5	84.2	84.7	85.2	80.5	Normal. Aberdeen.
- 3.1	- 3.3	- 5.4	- 5.3	- 5.5	- 4.0	- 5.0	- 4.8	- 4.7	- 4.2	- 3.9	- 3.8	- 3.4	Diff. for 1914. "
72.3	72.1	72.9	72.1	75.5	80.2	83.7	85.1	86.4	85.5	85.4	85.8	81.8	1914. Eskdalemuir.
77.9	77.7	77.7	78.7	79.7	82.4	84.4	85.7	86.4	86.8	87.4	87.6	84.3	Normal. Valencia.
+ 1.2	+ 1.7	+ 2.4	+ 2.3	+ 1.6	+ 2.4	+ 0.4	+ 0.8	+ 0.1	+ 1.0	- 0.7	- 0.4	0.0	Diff. for 1914. "
65.4	64.3	64.1	65.3	68.1	73.2	78.0	81.5	83.4	85.3	86.4	87.8	79.5	Normal. Kew.
- 7.6	- 9.1	- 9.0	- 9.4	- 9.3	- 8.7	- 6.4	- 5.3	- 5.1	- 3.1	- 1.7	- 1.8	- 4.4	Diff. for 1914. "
76.0	75.8	76.5	77.3	79.2	82.0	85.2	86.6	87.3	87.7	88.2	88.5	84.2	Normal. Falmouth.
													OCTOBER.
75.8	75.0	76.3	77.8	80.4	82.1	83.6	83.8	84.4	84.7	84.9	85.3	82.3	Normal. Aberdeen.
+ 1.0	+ 1.8	+ 1.1	+ 0.7	+ 1.2	+ 1.9	+ 2.8	+ 3.1	+ 3.0	+ 3.5	+ 3.1	+ 3.1	+ 2.1	Diff. for 1914. "
80.2	78.8	79.7	81.6	83.9	85.9	87.2	88.0	90.2	90.5	90.7	90.9	87.1	1914. Eskdalemuir.
79.4	79.0	79.1	80.2	81.6	83.7	84.3	84.9	85.3	86.0	86.1	86.6	84.3	Normal. Valencia.
+ 0.4	- 0.8	- 1.2	- 0.4	+ 1.0	+ 2.3	+ 1.1	+ 1.4	+ 1.7	+ 1.3	+ 2.0	+ 1.9	+ 1.6	Diff. for 1914. "
73.3	72.2	72.8	75.0	79.1	83.1	85.2	87.3	87.6	88.6	89.1	90.0	84.6	Normal. Kew.
- 4.6	- 4.5	- 4.0	- 4.8	- 4.3	- 4.7	- 3.9	- 4.2	- 3.3	- 2.7	- 3.1	- 2.6	- 3.1	Diff. for 1914. "
74.8	73.9	74.4	76.6	80.3	83.9	85.9	87.7	87.9	88.7	89.2	89.9	85.2	Normal. Falmouth.
													NOVEMBER.
78.5	78.6	79.7	80.5	81.6	82.0	82.5	82.5	82.9	82.9	83.2	83.3	82.1	Normal. Aberdeen.
+ 4.3	+ 3.6	+ 4.0	+ 2.3	+ 2.1	+ 2.4	+ 2.0	+ 2.1	+ 1.9	+ 2.9	+ 2.6	+ 3.1	+ 3.2	Diff. for 1914. "
83.3	83.3	83.8	84.6	86.3	84.9	86.6	86.8	88.4	89.4	88.8	87.4	86.2	1914. Eskdalemuir.
82.5	82.1	82.5	83.7	84.9	85.5	85.7	86.4	86.4	86.7	86.8	87.0	86.0	Normal. Valencia.
- 3.3	- 3.1	- 2.6	- 2.8	- 1.9	- 2.4	- 1.3	- 0.9	- 1.9	- 2.0	- 1.7	- 1.4	- 1.9	Diff. for 1914. "
79.4	78.9	79.2	81.9	84.0	85.6	86.3	87.4	87.7	88.5	88.7	89.2	86.4	Normal. Kew.
- 4.8	- 5.1	- 5.5	- 5.2	- 4.7	- 4.1	- 3.9	- 3.7	- 2.3	- 2.8	- 3.1	- 3.9	- 4.0	Diff. for 1914. "
79.2	79.2	80.0	81.3	83.4	84.2	84.4	84.4	84.5	84.9	85.4	85.2	83.8	Normal. Falmouth.
													DECEMBER.
79.9	79.7	80.8	81.2	81.7	82.0	82.4	82.2	82.3	82.4	82.5	82.4	82.1	Normal. Aberdeen.
+ 0.3	+ 0.7	- 0.6	- 0.2	- 0.7	+ 0.8	+ 0.8	+ 0.6	+ 1.7	+ 0.6	- 0.5	+ 1.4	- 0.1	Diff. for 1914. "
84.7	85.0	86.4	87.6	89.7	88.4	89.0	89.3	88.6	88.4	88.5	87.5	87.1	1914. Eskdalemuir.
85.5	85.3	85.5	86.5	86.9	87.1	87.2	87.6	88.0	87.9	88.0	87.8	87.2	Normal. Valencia.
- 2.2	- 2.8	- 4.3	- 4.2	- 4.2	- 3.9	- 3.5	- 4.5	- 4.4	- 4.8	- 3.3	- 1.3	- 2.7	Diff. for 1914. "
81.8	81.1	81.9	84.0	85.0	86.1	86.2	86.8	86.8	87.4	87.3	87.9	86.1	Normal. Kew.
- 0.9	- 0.7	- 1.1	- 0.7	- 1.5	- 0.8	- 0.3	- 1.1	- 0.5	- 1.5	- 1.5	- 1.5	- 0.9	Diff. for 1914. "
81.2	81.1	82.0	83.1	84.0	84.2	84.6	84.4	84.7	84.8	84.8	85.0	84.1	Normal. Falmouth.
													YEAR.
74.1	73.9	74.6	75.5	76.7	78.0	79.5	80.7	81.7	82.4	83.0	83.4	79.8	Normal. Aberdeen.
0.0	0.0	- 0.8	- 0.8	- 1.0	- 0.4	- 0.5	- 0.3	+ 0.3	+ 0.2	+ 0.3	+ 0.6	+ 0.1	Diff. for 1914. "
76.3	75.7	76.2	77.4	79.0	80.9	83.4	85.1	86.7	86.9	87.3	87.2	83.2	1914. Eskdalemuir.
79.2	78.9	79.0	79.5	80.2	81.9	83.3	84.8	85.7	86.4	86.8	87.1	84.2	Normal. Valencia.
+ 1.2	+ 1.3	+ 1.2	+ 1.2	+ 0.9	+ 1.1	+ 0.6	+ 0.1	- 0.2	0.0	- 0.3	+ 0.1	+ 0.5	Diff. for 1914. "
68.9	67.9	67.9	69.0	70.9	73.5	76.3	79.6	81.6	83.5	84.6	86.0	79.3	Normal. Kew.
- 1.6	- 1.5	- 1.4	- 1.3	- 1.4	- 1.1	- 1.2	- 1.6	- 1.3	- 1.1	- 0.6	- 0.6	- 0.7	Diff. for 1914. "
75.6	75.4	75.8	76.7	78.2	79.9	82.1	84.1	85.3	86.0	86.4	86.8	82.5	Normal. Falmouth.

\* Means for 29 days only ; values for the 1st and 2nd not available.

LXIX.-LXXIV.—NORMALS FOR THE MONTHS OF THE HOURLY VALUES  
WITH DIFFERENCES BETWEEN THE NORMALS

## LXXII.—WIND VELOCITY (in Metres per second).

The mean values are corrected to accord with

Hour, G.M.T.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	Noon.
<b>JANUARY.</b>	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.
Aberdeen, Normal.	4.43	4.43	4.43	4.38	4.43	4.52	4.47	4.60	4.65	4.60	4.65	4.87
Difference for 1914	- 0.77	- 0.67	- 1.05	- 0.83	- 0.94	- 0.99	- 1.09	- 1.11	- 1.09	- 1.07	- 1.03	- 1.28
Eskdalemuir, 1914.	4.94	4.91	4.49	4.76	4.63	4.68	4.54	4.87	5.24	6.02	6.56	7.15
Valencia, Normal.	6.48	6.44	6.35	6.30	6.35	6.30	6.35	6.35	6.48	6.39	6.30	6.92
Difference for 1914	- 1.13	- 0.75	- 0.31	- 0.23	- 0.36	- 0.49	- 0.41	- 0.24	- 0.35	- 0.41	- 0.35	- 0.94
Kew, Normal.	3.26	3.31	3.31	3.26	3.35	3.35	3.31	3.40	3.49	3.76	4.20	4.34
Difference for 1914	+ 0.64	+ 0.63	+ 0.59	+ 0.56	+ 0.39	+ 0.27	+ 0.28	+ 0.39	+ 0.29	+ 0.26	- 0.09	+ 0.04
Falmouth, Normal.	5.01	5.01	5.01	5.01	4.96	4.92	4.92	4.92	5.01	5.05	5.59	5.77
<b>FEBRUARY.</b>												
Aberdeen, Normal.	4.34	4.29	4.34	4.29	4.25	4.34	4.34	4.43	4.47	4.60	4.87	5.19
Difference for 1914	- 0.32	- 0.68	- 0.50	- 0.08	- 0.03	- 0.33	- 0.54	- 0.73	- 0.53	- 0.40	- 0.30	- 0.56
Eskdalemuir, 1914.	7.20	7.08	7.41	7.45	6.81	6.82	6.49	6.75	6.68	7.62	7.98	8.64
Valencia, Normal.	6.08	6.04	6.08	5.95	5.99	5.95	5.91	5.86	5.95	5.91	5.91	6.62
Difference for 1914	+ 0.63	+ 1.27	+ 1.20	+ 1.14	+ 0.93	+ 0.74	+ 0.94	+ 1.06	+ 1.14	+ 1.29	+ 1.53	+ 1.06
Kew, Normal.	3.31	3.31	3.26	3.26	3.26	3.31	3.31	3.40	3.76	4.07	4.69	4.87
Difference for 1914	+ 1.30	+ 1.25	+ 1.22	+ 0.97	+ 0.89	+ 0.62	+ 0.54	+ 0.33	+ 0.20	+ 0.27	+ 0.11	+ 0.23
Falmouth, Normal.	4.92	4.92	4.83	4.83	4.74	4.74	4.74	4.87	4.96	5.28	5.72	5.81
<b>MARCH.</b>												
Aberdeen, Normal.	4.11	4.07	4.16	4.11	4.20	4.20	4.34	4.52	4.78	5.01	5.28	5.54
Difference for 1914	- 0.53	- 0.22	- 0.16	- 0.05	- 0.08	- 0.13	+ 0.38	+ 0.14	+ 0.07	+ 0.30	+ 0.52	+ 0.36
Eskdalemuir, 1914.	4.61	4.76	4.35	4.48	4.36	4.60	4.92	5.14	5.49	5.95	6.59	6.90
Valencia, Normal.	5.45	5.36	5.28	5.19	5.14	5.28	5.19	5.36	5.63	5.86	5.95	6.62
Difference for 1914	+ 1.75	+ 1.94	+ 1.52	+ 1.37	+ 1.86	+ 1.34	+ 1.60	+ 1.71	+ 1.54	+ 1.50	+ 2.14	+ 1.33
Kew, Normal.	3.13	3.13	3.04	3.09	3.09	3.13	3.26	3.62	4.25	4.65	5.10	5.19
Difference for 1914	+ 0.36	+ 0.34	+ 0.40	+ 0.20	+ 0.53	+ 0.66	+ 0.76	+ 0.46	+ 0.09	+ 0.23	+ 0.13	+ 0.20
Falmouth, Normal.	4.52	4.56	4.52	4.43	4.43	4.43	4.47	4.65	5.05	5.45	5.91	5.99
<b>APRIL.</b>												
Aberdeen, Normal.	3.26	3.40	3.35	3.31	3.35	3.40	3.67	4.20	4.60	4.92	5.14	5.36
Difference for 1914	- 0.53	- 0.82	- 0.91	- 0.85	- 0.84	- 0.94	- 0.77	- 0.58	- 0.57	- 0.78	- 0.30	- 0.55
Eskdalemuir, 1914.	3.85	3.79	3.71	4.00	3.96	4.06	4.47	5.34	6.12	7.17	7.57	7.93
Valencia, Normal.	4.69	4.65	4.60	4.60	4.60	4.69	4.78	5.10	5.45	5.77	5.86	6.44
Difference for 1914	+ 0.20	+ 0.19	+ 0.17	+ 0.12	+ 0.06	- 0.57	- 0.31	- 0.56	- 0.59	- 0.20	- 0.03	- 0.17
Kew, Normal.	2.68	2.68	2.60	2.60	2.55	2.77	3.26	3.80	4.25	4.65	5.01	5.19
Difference for 1914	- 0.43	- 0.55	- 0.59	- 0.42	- 0.27	- 0.41	- 0.41	- 0.53	- 0.17	- 0.03	- 0.16	- 0.02
Falmouth, Normal.	3.93	3.98	4.02	3.98	3.89	3.89	4.07	4.56	5.01	5.32	5.72	5.63
<b>MAY.</b>												
Aberdeen, Normal.	2.73	2.68	2.68	2.77	2.86	3.04	3.44	3.98	4.34	4.56	4.74	4.87
Difference for 1914	- 0.08	- 0.02	- 0.13	- 0.27	- 0.38	- 0.37	- 0.35	- 0.34	- 0.44	- 0.69	- 0.73	- 0.43
Eskdalemuir, 1914.	3.37	3.63	3.23	3.21	3.31	3.74	4.04	4.46	5.22	5.38	5.51	5.34
Valencia, Normal.	4.16	4.16	4.16	4.16	4.16	4.16	4.38	4.69	5.14	5.45	5.54	6.04
Difference for 1914	- 0.20	- 0.37	- 0.29	- 0.50	- 0.16	- 0.20	- 0.19	- 0.19	- 0.29	- 0.08	- 0.02	0.00
Kew, Normal.	2.33	2.28	2.24	2.24	2.24	2.60	3.17	3.62	4.02	4.29	4.65	4.69
Difference for 1914	- 0.23	- 0.09	- 0.15	- 0.05	+ 0.01	+ 0.11	- 0.15	0.00	- 0.24	+ 0.21	- 0.26	- 0.03
Falmouth, Normal.	3.40	3.49	3.40	3.44	3.31	3.35	3.84	4.29	4.56	4.87	5.14	5.10
<b>JUNE.</b>												
Aberdeen, Normal.	2.37	2.37	2.41	2.46	2.55	2.77	3.13	3.49	3.80	4.02	4.34	4.47
Difference for 1914	+ 0.20	+ 0.17	- 0.08	+ 0.15	+ 0.24	+ 0.06	- 0.19	- 0.35	- 0.10	+ 0.19	- 0.10	- 0.05
Eskdalemuir, 1914.	2.71	2.74	3.21	3.24	3.74	4.13	4.78	5.65	5.76	6.17	6.18	5.99
Valencia, Normal.	3.71	3.62	3.62	3.62	3.62	3.76	3.98	4.34	4.74	5.01	5.23	5.63
Difference for 1914	- 0.10	- 0.47	- 0.18	- 0.18	- 0.24	- 0.71	- 0.40	- 0.43	- 0.28	- 0.23	- 0.01	- 0.36
Kew, Normal.	2.06	2.01	1.97	1.92	2.06	2.50	2.95	3.26	3.58	3.80	4.16	4.16
Difference for 1914	- 0.07	- 0.09	- 0.24	- 0.14	- 0.01	- 0.34	- 0.54	- 0.65	- 0.59	- 0.38	- 0.70	- 0.51
Falmouth, Normal.	3.13	3.09	3.09	3.00	2.95	3.17	3.58	3.89	4.25	4.47	4.78	4.74

At Aberdeen, Valencia, Kew, and Falmouth, the velocity of the wind is obtained from the records of a Robinson cup-anemometer having cups 9 inches (0.23 metre) in diameter carried on arms measuring 2 feet (0.61 metre) from the centre of the cup to the spindle. The hourly velocity is the travel of the cups in the sixty minutes centering at the hour G.M.T., reduced to miles per hour by multiplying by the factor 2.2, and converted to metres per second.

At Eskdalemuir the velocities are obtained from the records of a Dines' pressure-tube anemometer. They represent mean values for sixty minutes centering at the hour G.M.T.

OF THE METEOROLOGICAL ELEMENTS AT THE FIVE OBSERVATORIES AND THE VALUES FOR 1914.

JANUARY TO JUNE.

the formula  $\frac{1}{24}\{1 + \dots + 23 + \frac{1}{2}(0+24)\}$ .

13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	Midt.	Mean.	Hour, G.M.T.
													JANUARY.
m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	Normal. Aberdeen.
4.92	4.92	4.78	4.74	4.69	4.65	4.65	4.65	4.52	4.47	4.47	4.47	4.60	Diff. for 1914. „
- 0.56	- 0.92	- 0.67	- 0.87	- 1.00	- 0.53	- 0.54	- 0.68	- 0.94	- 0.47	- 0.25	- 0.66	- 0.84	1914. Eskdalemuir.
6.96	7.04	6.79	6.39	5.56	5.49	6.10	6.11	6.22	6.42	5.90	5.27	5.71	Normal. Valencia.
7.15	7.20	7.15	6.88	6.70	6.53	6.48	6.35	6.44	6.57	6.62	6.57	6.57	Diff. for 1914. „
- 0.92	- 0.75	- 0.81	- 0.41	- 0.43	- 0.53	- 0.89	- 0.69	- 0.84	- 1.18	- 0.98	- 0.98	- 0.64	Normal. Kew.
4.34	4.34	4.11	3.80	3.76	3.67	3.71	3.67	3.58	3.53	3.40	3.40	3.65	Diff. for 1914. „
+ 0.10	+ 0.24	+ 0.24	+ 0.57	+ 0.46	+ 0.32	+ 0.48	+ 0.60	+ 0.53	+ 0.51	+ 0.57	+ 0.69	+ 0.40	Normal. Falmouth.
5.95	5.86	5.77	5.45	5.32	5.14	5.10	5.10	5.14	5.01	5.01	5.10	5.21	
													FEBRUARY.
5.19	5.23	5.01	4.74	4.47	4.43	4.38	4.34	4.38	4.38	4.29	4.34	4.54	Normal. Aberdeen.
- 0.45	- 0.32	- 0.43	- 0.88	- 0.60	- 0.66	- 0.48	- 0.41	- 0.52	- 0.37	- 0.49	- 0.54	- 0.47	Diff. for 1914. „
9.38	9.48	9.38	9.26	8.69	8.64	8.39	8.00	8.09	8.17	7.63	7.68	7.90	1914. Eskdalemuir.
6.92	6.97	7.02	6.79	6.57	6.17	6.08	5.99	6.08	6.17	6.12	6.12	6.22	Normal. Valencia.
+ 0.82	+ 0.95	+ 0.87	+ 0.70	+ 0.62	+ 0.78	+ 0.87	+ 1.12	+ 0.60	+ 0.32	+ 0.46	+ 0.71	+ 0.90	Diff. for 1914. „
4.96	4.87	4.74	4.43	4.02	3.80	3.76	3.62	3.62	3.44	3.40	3.31	3.82	Normal. Kew.
+ 0.48	+ 0.69	+ 0.44	+ 0.28	+ 0.21	+ 0.35	+ 0.44	+ 0.35	+ 0.43	+ 0.78	+ 0.80	+ 1.18	+ 0.61	Diff. for 1914. „
5.91	5.95	5.81	5.63	5.32	4.96	4.96	5.01	4.96	4.92	4.87	4.87	5.15	Normal. Falmouth.
													MARCH.
5.50	5.41	5.36	5.14	4.69	4.43	4.25	4.11	4.11	4.11	4.16	4.16	4.57	Normal. Aberdeen.
+ 0.58	+ 0.59	+ 0.27	- 0.11	+ 0.08	- 0.08	- 0.34	- 0.30	- 0.56	- 0.32	- 0.21	- 0.40	- 0.01	Diff. for 1914. „
7.26	7.32	6.71	6.79	6.36	5.78	5.06	4.85	4.61	4.64	4.67	4.35	5.44	1914. Eskdalemuir.
6.84	6.92	6.84	6.75	6.53	6.17	5.86	5.68	5.63	5.54	5.45	5.45	5.83	Normal. Valencia.
+ 1.23	+ 0.97	+ 0.82	+ 0.82	+ 0.59	+ 0.62	+ 0.64	+ 0.77	+ 1.07	+ 1.01	+ 1.17	+ 0.85	+ 1.26	Diff. for 1914. „
5.23	5.23	5.05	4.92	4.47	3.93	3.67	3.53	3.53	3.26	3.17	3.13	3.91	Normal. Kew.
+ 0.35	+ 0.38	+ 0.52	+ 0.50	+ 0.68	+ 0.47	+ 0.27	+ 0.10	+ 0.04	+ 0.21	+ 0.19	+ 0.25	+ 0.35	Diff. for 1914. „
6.08	6.12	5.99	5.86	5.54	5.05	4.74	4.56	4.52	4.56	4.52	4.47	5.02	Normal. Falmouth.
													APRIL.
5.41	5.36	5.28	5.10	4.74	4.38	3.84	3.49	3.49	3.35	3.31	3.31	4.13	Normal. Aberdeen.
- 0.49	- 0.20	- 0.12	- 0.17	- 0.05	- 0.03	- 0.01	- 0.10	- 0.42	- 0.66	- 0.49	- 0.52	- 0.49	Diff. for 1914. „
7.87	8.01	7.80	7.65	7.01	6.20	5.11	4.90	4.46	4.77	4.74	3.87	5.59	1914. Eskdalemuir.
6.66	6.66	6.66	6.66	6.44	6.08	5.59	5.14	4.96	4.78	4.74	4.74	5.43	Normal. Valencia.
- 0.07	- 0.10	- 0.20	- 0.46	- 0.54	- 0.73	- 0.45	- 0.23	- 0.25	+ 0.02	+ 0.39	+ 0.26	- 0.16	Diff. for 1914. „
5.23	5.23	5.23	5.14	4.83	4.29	3.84	3.44	3.26	3.00	2.86	2.68	3.79	Normal. Kew.
+ 0.15	+ 0.45	+ 0.32	+ 0.52	+ 0.48	+ 0.36	+ 0.10	- 0.06	- 0.28	- 0.02	- 0.31	- 0.27	- 0.10	Diff. for 1914. „
5.72	5.72	5.68	5.54	5.32	4.92	4.38	4.16	4.07	4.02	3.93	3.98	4.64	Normal. Falmouth.
													MAY.
4.96	4.96	4.83	4.69	4.43	4.16	3.62	3.17	2.95	2.82	2.77	2.73	3.70	Normal. Aberdeen.
- 0.50	- 0.63	- 0.50	- 0.34	- 0.50	- 0.55	- 0.20	- 0.26	- 0.05	+ 0.08	- 0.19	- 0.15	- 0.33	Diff. for 1914. „
5.36	5.56	5.65	5.76	5.76	5.46	4.62	3.23	2.93	2.83	3.08	3.32	4.34	1914. Eskdalemuir.
6.25	6.30	6.30	6.25	6.08	5.72	5.23	4.74	4.38	4.20	4.20	4.20	5.00	Normal. Valencia.
+ 0.01	- 0.03	+ 0.10	- 0.03	+ 0.16	+ 0.03	+ 0.13	+ 0.28	+ 0.41	+ 0.43	+ 0.24	+ 0.01	- 0.03	Diff. for 1914. „
4.83	4.69	4.74	4.69	4.52	4.11	3.62	3.13	2.86	2.64	2.50	2.37	3.46	Normal. Kew.
- 0.32	- 0.01	- 0.40	- 0.12	- 0.45	+ 0.07	+ 0.22	+ 0.16	- 0.27	- 0.34	- 0.14	+ 0.19	- 0.08	Diff. for 1914. „
5.23	5.19	5.14	5.05	4.83	4.52	4.16	3.67	3.53	3.40	3.35	3.40	4.15	Normal. Falmouth.
													JUNE.
4.52	4.47	4.43	4.20	3.98	3.67	3.31	2.86	2.55	2.46	2.37	2.37	3.31	Normal. Aberdeen.
- 0.30	- 0.07	- 0.37	- 0.64	- 0.64	- 0.79	- 0.52	- 0.23	- 0.29	- 0.29	- 0.26	- 0.21	- 0.19	Diff. for 1914. „
6.17	6.35	6.31	6.42	6.48	5.95	5.04	4.37	3.71	3.42	2.94	2.52	4.74	1914. Eskdalemuir.
5.86	5.95	5.95	5.81	5.68	5.36	4.92	4.43	4.11	3.84	3.76	3.76	4.60	Normal. Valencia.
- 0.08	- 0.10	- 0.35	- 0.42	- 0.69	- 0.56	- 0.29	- 0.09	- 0.43	- 0.37	- 0.21	- 0.13	- 0.31	Diff. for 1914. „
4.20	4.29	4.34	4.25	4.16	3.89	3.40	2.86	2.68	2.46	2.28	2.15	3.14	Normal. Kew.
- 0.81	- 0.55	- 0.75	- 0.29	- 0.44	- 0.44	- 0.21	- 0.11	- 0.27	- 0.46	- 0.45	- 0.33	- 0.39	Diff. for 1914. „
4.87	4.87	4.87	4.74	4.60	4.34	3.93	3.40	3.17	3.09	3.09	3.13	3.84	Normal. Falmouth.

The heights of the anemometers (centres of cups of Robinson anemometers) above the general surface of the ground are:—Aberdeen, 22.9 metres; Eskdalemuir, 15.0 metres; Valencia, 13.9 metres; Kew, 19.8 metres, and Falmouth, 12.5 metres. The heights above the roofs of the buildings on which the instruments are erected are:—Aberdeen, 3.7 metres; Eskdalemuir, 6.7 metres; Valencia, 2.1 metres; Kew, 2.1 metres; Falmouth, 4.0 metres.

The normals for wind velocity are for the 30 years, 1881-1910.

The values for 1914 are given by the excess or defect from the normal; + indicates excess, - defect.

LXIX.-LXXIV—NORMALS FOR THE MONTHS OF THE HOURLY VALUES  
WITH DIFFERENCES BETWEEN THE NORMALS

LXXII.—continued—WIND VELOCITY (in Metres per Second)

The Mean Values are corrected to accord with

Hour, G.M.T.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	Noon.
<b>JULY.</b>	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.
Aberdeen, Normal.	2.37	2.37	2.37	2.37	2.37	2.55	2.95	3.35	3.71	3.89	4.16	4.20
Difference for 1914	+ 0.01	- 0.06	+ 0.17	+ 0.10	+ 0.21	+ 0.17	- 0.13	- 0.02	- 0.01	+ 0.05	- 0.22	- 0.29
Eskdalemuir, 1914.	2.54	2.54	2.65	2.56	2.58	3.07	3.74	4.01	3.90	4.50	4.55	4.76
Valencia, Normal.	3.67	3.71	3.67	3.67	3.62	3.67	3.89	4.25	4.69	4.92	5.05	5.54
Difference for 1914	+ 1.52	+ 1.30	+ 1.29	+ 1.11	+ 1.05	+ 1.14	+ 1.07	+ 0.98	+ 0.58	+ 0.58	+ 0.85	+ 0.43
Kew, Normal.	1.88	1.83	1.79	1.79	1.79	2.19	2.64	3.04	3.40	3.67	3.93	3.98
Difference for 1914	0.00	- 0.06	- 0.14	- 0.14	- 0.14	- 0.11	- 0.24	- 0.12	- 0.16	- 0.35	- 0.32	- 0.26
Falmouth, Normal.	3.04	3.09	3.04	2.91	2.91	3.00	3.44	3.89	4.25	4.52	4.92	4.92
<b>AUGUST.</b>												
Aberdeen, Normal	2.50	2.46	2.46	2.46	2.41	2.55	2.82	3.31	3.67	3.93	4.16	4.34
Difference for 1914	- 0.51	- 0.41	- 0.48	- 0.60	- 0.47	- 0.53	- 0.74	- 0.83	- 0.91	- 0.70	- 0.69	- 0.65
Eskdalemuir, 1914.	2.13	2.37	2.41	2.71	2.54	2.67	3.08	3.48	4.20	4.75	4.68	5.06
Valencia, Normal.	4.16	4.07	4.02	4.02	4.02	3.93	4.07	4.43	4.87	5.10	5.23	5.72
Difference for 1914	- 1.17	- 1.10	- 0.89	- 0.80	- 0.65	- 0.42	- 0.57	- 0.58	- 0.67	- 1.01	- 0.62	- 1.11
Kew, Normal.	2.01	1.92	1.88	1.88	1.88	2.06	2.50	3.09	3.53	3.80	4.11	4.16
Difference for 1914	- 0.36	- 0.25	- 0.31	+ 0.04	0.00	+ 0.01	- 0.21	- 0.04	- 0.37	- 0.16	- 0.37	+ 0.08
Falmouth, Normal.	3.17	3.22	3.13	3.13	3.04	3.09	3.40	3.93	4.43	4.74	5.10	5.14
<b>SEPTEMBER.</b>												
Aberdeen, Normal.	2.77	2.77	2.82	2.82	2.82	2.86	2.95	3.31	3.62	3.89	4.20	4.34
Difference for 1914.	+ 0.69	+ 0.31	+ 0.24	+ 0.17	0.00	- 0.16	- 0.28	- 0.12	- 0.24	+ 0.02	- 0.24	- 0.17
Eskdalemuir, 1914.	3.66	3.60	3.76	3.39	3.28	3.14	3.36	3.91	4.88	5.29	5.57	6.14
Valencia, Normal.	4.20	4.29	4.29	4.38	4.34	4.34	4.34	4.43	4.83	5.05	5.14	5.72
Difference for 1914	+ 0.32	- 0.28	- 0.27	- 0.24	- 0.05	- 0.24	- 0.21	- 0.23	- 0.16	- 0.48	- 0.06	- 0.42
Kew, Normal.	1.83	1.79	1.88	1.88	1.83	1.92	2.10	2.60	3.09	3.53	3.93	3.93
Difference for 1914	+ 0.28	+ 0.34	+ 0.24	+ 0.37	+ 0.33	+ 0.16	+ 0.09	+ 0.10	+ 0.21	+ 0.29	+ 0.55	+ 0.63
Falmouth, Normal.	3.09	3.09	3.04	3.04	2.95	3.00	3.09	3.53	4.02	4.29	4.74	4.78
<b>OCTOBER.</b>												
Aberdeen, Normal.	3.89	3.89	3.84	3.84	3.80	3.80	3.89	4.02	4.25	4.47	4.65	4.83
Difference for 1914	- 0.84	- 0.91	- 0.76	- 0.91	- 0.62	- 0.49	- 0.28	- 0.34	- 0.63	- 0.46	- 0.63	- 0.43
Eskdalemuir, 1914.	2.64	2.77	2.90	3.07	3.10	3.05	2.69	2.68	3.34	3.79	3.86	4.28
Valencia, Normal.	5.05	5.10	5.05	5.14	5.14	5.14	5.10	5.19	5.32	5.50	5.63	6.17
Difference for 1914	- 1.90	- 1.82	- 2.20	- 2.10	- 1.90	- 1.70	- 1.69	- 2.15	- 2.05	- 2.02	- 1.87	- 1.86
Kew, Normal.	2.37	2.41	2.37	2.37	2.41	2.46	2.55	2.73	3.22	3.58	4.16	4.29
Difference for 1914	- 0.63	- 0.46	- 0.42	- 0.27	- 0.46	- 0.29	- 0.51	- 0.33	- 0.79	- 0.59	- 0.76	- 0.40
Falmouth, Normal.	3.93	3.93	3.89	3.89	3.89	3.84	3.80	3.93	4.34	4.78	5.23	5.19
<b>NOVEMBER.</b>												
Aberdeen, Normal.	4.16	4.11	4.07	4.07	4.07	4.11	4.16	4.29	4.34	4.34	4.52	4.69
Difference for 1914	+ 0.13	+ 0.41	+ 0.51	+ 0.67	+ 0.15	+ 0.14	- 0.14	+ 0.01	- 0.17	+ 0.16	+ 0.18	- 0.06
Eskdalemuir, 1914.	5.66	5.74	6.02	6.04	6.12	5.88	5.95	6.18	6.60	6.81	6.77	6.63
Valencia, Normal.	5.81	5.63	5.72	5.63	5.68	5.59	5.68	5.63	5.72	5.68	5.63	6.25
Difference for 1914	- 0.10	- 0.10	- 0.11	+ 0.11	- 0.11	- 0.16	- 0.39	- 0.35	- 0.51	- 0.65	- 0.26	- 0.39
Kew, Normal.	2.95	2.95	2.95	3.00	2.95	2.86	2.91	2.95	3.26	3.44	4.02	4.20
Difference for 1914	+ 0.30	+ 0.79	+ 0.69	+ 1.00	+ 1.08	+ 1.32	+ 1.09	+ 1.48	+ 0.89	+ 1.35	+ 1.20	+ 1.41
Falmouth, Normal.	4.47	4.56	4.47	4.52	4.43	4.38	4.43	4.43	4.56	4.78	5.19	5.32
<b>DECEMBER.</b>												
Aberdeen, Normal.	4.34	4.38	4.38	4.38	4.38	4.34	4.38	4.47	4.47	4.47	4.52	4.65
Difference for 1914	+ 1.42	+ 1.61	+ 1.58	+ 1.17	+ 1.14	+ 0.89	+ 0.87	+ 0.45	+ 0.47	+ 0.69	+ 0.81	+ 1.12
Eskdalemuir, 1914.	6.24*	6.78*	6.12*	6.00*	6.41*	6.53*	6.46*	6.68*	6.55*	6.99*	7.50*	7.68*
Valencia, Normal.	6.48	6.48	6.53	6.44	6.44	6.39	6.30	6.25	6.30	6.17	6.12	6.66
Difference for 1914	+ 1.09	+ 0.68	+ 1.13	+ 1.16	+ 1.25	+ 0.76	+ 1.05	+ 1.28	+ 0.92	+ 0.41	+ 0.97	+ 0.61
Kew, Normal.	3.35	3.40	3.31	3.40	3.35	3.40	3.44	3.49	3.62	3.71	4.11	4.29
Difference for 1914	+ 1.18	+ 1.28	+ 1.12	+ 0.85	+ 0.74	+ 0.76	+ 0.81	+ 0.96	+ 0.37	+ 0.71	+ 0.54	+ 0.62
Falmouth, Normal.	5.14	5.19	5.14	5.14	5.10	5.14	5.05	5.10	5.01	5.19	5.59	5.72
<b>YEAR.</b>												
Aberdeen, Normal.	3.44	3.44	3.44	3.44	3.44	3.53	3.71	3.98	4.25	4.38	4.60	4.78
Difference for 1914	- 0.09	- 0.11	- 0.13	- 0.11	- 0.05	- 0.21	- 0.27	- 0.30	- 0.37	- 0.21	- 0.22	- 0.25
Eskdalemuir, 1914.	4.13	4.23	4.19	4.24	4.24	4.36	4.54	4.93	5.33	5.87	6.12	6.38
Valencia, Normal.	5.01	4.96	4.96	4.92	4.92	4.92	5.01	5.14	5.41	5.54	5.63	6.21
Difference for 1914	+ 0.06	+ 0.04	+ 0.08	+ 0.09	+ 0.15	+ 0.04	+ 0.03	+ 0.14	- 0.04	- 0.08	+ 0.19	- 0.17
Kew, Normal.	2.60	2.60	2.55	2.55	2.55	2.73	2.95	3.26	3.62	3.89	4.34	4.43
Difference for 1914	+ 0.19	+ 0.25	+ 0.20	+ 0.26	+ 0.27	+ 0.21	+ 0.13	+ 0.16	- 0.02	+ 0.17	- 0.01	+ 0.18
Falmouth, Normal.	3.98	3.98	3.98	3.93	3.89	3.89	4.07	4.34	4.60	4.87	5.28	5.32

\* Mean for 29 days only. Record defective on December 19th and 20th.

OF THE METEOROLOGICAL ELEMENTS AT THE FIVE OBSERVATORIES  
AND THE VALUES FOR 1914.

JULY TO DECEMBER AND YEAR.

the formula  $\frac{1}{24}\{1 + \dots + 23 + \frac{1}{2}(0+24)\}$ .

13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	Midt.	Mean.	Hour, G.M.T.
													JULY.
m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	m/s.	Normal. Aberdeen.
4.29	4.29	4.25	4.07	3.80	3.53	3.09	2.73	2.46	2.33	2.37	2.37	3.18	Diff. for 1914. „
- 0.12	- 0.29	- 0.21	- 0.42	- 0.32	- 0.13	+ 0.08	- 0.01	- 0.08	- 0.08	- 0.07	- 0.18	- 0.08	1914. Eskdalemuir.
5.27	5.39	5.19	4.82	4.95	4.69	4.15	3.03	2.79	3.08	2.81	2.90	3.77	Normal. Valencia.
5.72	5.81	5.81	5.63	5.54	5.28	4.87	4.34	3.98	3.80	3.71	3.76	4.53	Diff. for 1914. „
+ 0.82	+ 1.03	+ 0.96	+ 1.16	+ 0.90	+ 1.14	+ 0.96	+ 1.13	+ 1.32	+ 1.40	+ 1.46	+ 1.47	+ 1.06	Normal. Kew.
4.07	4.16	4.11	4.07	3.93	3.58	3.17	2.68	2.41	2.24	2.06	1.97	2.93	Diff. for 1914. „
- 0.26	- 0.12	- 0.07	- 0.22	- 0.13	- 0.07	- 0.26	+ 0.04	+ 0.15	+ 0.09	- 0.01	- 0.03	- 0.12	Normal. Falmouth.
4.96	5.01	4.96	4.87	4.74	4.43	3.93	3.40	3.22	3.13	3.09	3.09	3.86	
													AUGUST.
4.34	4.29	4.16	3.98	3.71	3.35	2.95	2.73	2.68	2.64	2.55	2.50	3.21	Normal. Aberdeen.
- 0.76	- 0.76	- 0.66	- 0.65	- 0.81	- 0.61	- 0.58	- 0.64	- 0.80	- 0.69	- 0.77	- 0.68	- 0.67	Diff. for 1914. „
5.57	5.50	5.44	5.11	4.62	4.01	3.48	2.94	2.73	2.60	2.25	2.09	3.61	1914. Eskdalemuir.
5.95	5.95	5.99	5.86	5.63	5.28	4.74	4.38	4.20	4.11	4.11	4.11	4.75	Normal. Valencia.
- 1.10	- 0.82	- 1.19	- 1.32	- 1.51	- 1.26	- 0.99	- 1.00	- 1.12	- 0.94	- 1.02	- 1.10	- 0.96	Diff. for 1914. „
4.25	4.29	4.29	4.16	3.98	3.58	3.00	2.64	2.50	2.28	2.15	2.10	3.00	Normal. Kew.
+ 0.01	+ 0.14	- 0.45	- 0.10	- 0.47	- 0.44	- 0.24	- 0.01	- 0.14	+ 0.15	- 0.07	- 0.21	- 0.16	Diff. for 1914. „
5.19	5.23	5.23	5.01	4.78	4.43	3.76	3.31	3.26	3.22	3.13	3.17	3.97	Normal. Falmouth.
													SEPTEMBER.
4.34	4.38	4.25	3.98	3.53	3.13	2.91	2.91	2.82	2.91	2.82	2.82	3.33	Normal. Aberdeen.
- 0.24	- 0.36	- 0.01	+ 0.10	+ 0.22	+ 0.08	+ 0.09	+ 0.08	+ 0.16	+ 0.21	+ 0.62	+ 0.84	+ 0.08	Diff. for 1914. „
6.26	6.15	5.86	5.66	5.01	4.15	3.97	3.80	3.87	3.77	3.59	3.59	4.40	1914. Eskdalemuir.
5.95	5.81	5.86	5.68	5.41	4.92	4.56	4.34	4.34	4.29	4.29	4.29	4.80	Normal. Valencia.
- 0.30	- 0.28	- 0.43	- 0.18	- 0.33	- 0.33	+ 0.05	+ 0.08	+ 0.13	- 0.07	- 0.10	+ 0.18	- 0.17	Diff. for 1914. „
4.02	4.07	3.93	3.71	3.35	2.82	2.46	2.41	2.28	2.15	2.01	1.88	2.73	Normal. Kew.
+ 0.39	+ 0.30	+ 0.41	+ 0.46	+ 0.29	+ 0.36	+ 0.62	+ 0.32	+ 0.39	+ 0.11	+ 0.19	+ 0.34	+ 0.32	Diff. for 1914. „
4.83	4.83	4.69	4.52	4.11	3.67	3.31	3.26	3.22	3.22	3.17	3.17	3.69	Normal. Falmouth.
													OCTOBER.
4.78	4.74	4.52	4.11	3.89	3.76	3.71	3.76	3.80	3.80	3.84	3.89	4.07	Normal. Aberdeen.
- 0.37	- 0.24	- 0.26	- 0.25	- 0.03	- 0.12	- 0.06	- 0.10	- 0.26	- 0.35	- 0.17	- 0.60	- 0.42	Diff. for 1914. „
4.54	4.39	4.10	3.68	3.56	3.00	2.83	2.78	2.52	2.54	2.54	2.62	3.23	1914. Eskdalemuir.
6.30	6.35	6.35	6.08	5.77	5.50	5.28	5.23	5.14	5.14	5.14	5.10	5.45	Normal. Valencia.
- 1.81	- 1.50	- 1.80	- 2.03	- 2.22	- 2.19	- 1.71	- 1.94	- 1.71	- 1.71	- 1.69	- 1.82	- 1.89	Diff. for 1914. „
4.29	4.16	3.89	3.53	3.09	2.86	2.73	2.64	2.60	2.55	2.50	2.41	3.01	Normal. Kew.
- 0.51	- 0.71	- 0.73	- 0.65	- 0.80	- 0.46	- 0.55	- 0.25	- 0.25	- 0.31	- 0.42	- 0.31	- 0.50	Diff. for 1914. „
5.23	5.14	4.96	4.69	4.29	4.11	3.98	3.98	3.93	3.89	3.93	3.93	4.28	Normal. Falmouth.
													NOVEMBER.
4.69	4.52	4.38	4.20	4.20	4.25	4.20	4.25	4.16	4.16	4.11	4.20	4.26	Normal. Aberdeen.
+ 0.20	+ 0.37	+ 0.42	+ 0.33	+ 0.02	+ 0.14	+ 0.30	- 0.10	0.00	- 0.03	+ 0.06	+ 0.13	+ 0.16	Diff. for 1914. „
6.42	6.50	5.70	5.16	4.94	5.49	5.39	5.41	5.15	5.59	5.46	5.71	5.89	1914. Eskdalemuir.
6.39	6.44	6.35	6.12	5.95	5.91	5.91	5.91	5.81	5.86	5.86	5.86	5.88	Normal. Valencia.
0.00	- 0.17	- 0.23	- 0.24	- 0.42	- 0.38	- 0.38	- 0.33	+ 0.18	+ 0.49	+ 0.16	+ 0.22	- 0.18	Diff. for 1914. „
4.25	4.20	3.93	3.53	3.35	3.31	3.26	3.22	3.17	3.09	3.04	2.95	3.32	Normal. Kew.
+ 1.18	+ 1.13	+ 0.96	+ 0.70	+ 0.49	+ 0.70	+ 0.12	+ 0.48	+ 0.06	+ 0.28	+ 0.46	+ 0.48	+ 0.82	Diff. for 1914. „
5.41	5.36	5.10	4.74	4.60	4.47	4.47	4.52	4.47	4.43	4.38	4.47	4.67	Normal. Falmouth.
													DECEMBER.
4.60	4.47	4.43	4.34	4.34	4.25	4.34	4.34	4.34	4.38	4.34	4.38	4.40	Normal. Aberdeen.
+ 1.37	+ 1.29	+ 1.34	+ 1.47	+ 1.58	+ 2.00	+ 1.79	+ 1.72	+ 1.44	+ 1.47	+ 1.02	+ 1.00	+ 1.25	Diff. for 1914. „
7.70*	7.83*	7.40*	7.09*	6.96*	7.03*	7.33*	7.04*	7.00*	6.68*	6.36*	6.39*	6.86*	1914. Eskdalemuir.
6.84	6.84	6.70	6.62	6.53	6.44	6.48	6.39	6.48	6.53	6.48	6.57	6.48	Normal. Valencia.
+ 0.46	+ 0.53	+ 0.66	+ 0.48	+ 0.01	+ 0.05	+ 0.22	+ 0.45	+ 0.56	+ 0.54	+ 0.92	+ 1.07	+ 0.72	Diff. for 1914. „
4.34	4.20	3.93	3.67	3.62	3.62	3.58	3.53	3.58	3.49	3.44	3.49	3.64	Normal. Kew.
+ 0.34	+ 0.72	+ 0.67	+ 0.58	+ 0.83	+ 0.79	+ 0.61	+ 1.09	+ 0.94	+ 1.25	+ 1.15	+ 0.99	+ 0.83	Diff. for 1914. „
5.77	5.72	5.45	5.23	5.05	5.05	4.96	5.01	5.10	5.10	5.10	5.10	5.26	Normal. Falmouth.
													YEAR.
4.78	4.74	4.65	4.43	4.20	3.98	3.76	3.62	3.53	3.49	3.44	3.44	3.94	Normal. Aberdeen.
- 0.12	- 0.11	- 0.11	- 0.19	- 0.16	- 0.09	- 0.03	- 0.09	- 0.20	- 0.13	- 0.09	- 0.14	- 0.16	Diff. for 1914. „
6.56	6.62	6.36	6.15	5.83	5.49	5.16	4.71	4.50	4.54	4.30	4.19	5.12	1914. Eskdalemuir.
6.39	6.44	6.44	6.25	6.08	5.77	5.50	5.23	5.14	5.05	5.05	5.05	5.46	Normal. Valencia.
- 0.07	- 0.04	- 0.16	- 0.15	- 0.27	- 0.27	- 0.15	- 0.02	- 0.02	+ 0.01	+ 0.06	+ 0.14	- 0.02	Diff. for 1914. „
4.52	4.47	4.34	4.16	3.93	3.62	3.35	3.13	3.00	2.86	2.73	2.64	3.37	Normal. Kew.
+ 0.07	+ 0.23	+ 0.11	+ 0.18	+ 0.09	+ 0.17	+ 0.10	+ 0.21	+ 0.12	+ 0.22	+ 0.16	+ 0.26	+ 0.16	Diff. for 1914. „
5.41	5.41	5.32	5.10	4.87	4.60	4.29	4.11	4.02	3.98	3.93	3.98	4.46	Normal. Falmouth.

\* Mean for 29 days only. Record defective on December 19th and 20th.

LXIX.-LXXIV.—NORMALS FOR THE MONTHS OF THE HOURLY VALUES  
WITH DIFFERENCES BETWEEN THE NORMALS

## LXIII.—RAINFALL IN MILLIMETRES.

Hour, G.M.T.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	Noon.
<b>JANUARY.</b>												
Aberdeen, Normal.	0.06	0.08	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.07	0.06	0.07
Difference for 1914.	+ 0.01	+ 0.01	0.00	- 0.04	- 0.04	- 0.06	- 0.07	- 0.07	- 0.06	+ 0.08	- 0.01	- 0.03
Eskdalemuir, 1914.	0.08*	0.05*	0.07*	0.07*	0.05*	0.09*	0.11*	0.16*	0.10*	0.18*	0.21*	0.21*
Valencia, Normal.	0.21	0.19	0.20	0.21	0.21	0.18	0.20	0.20	0.22	0.19	0.16	0.18
Difference for 1914	- 0.05	- 0.06	- 0.14	- 0.16	- 0.09	- 0.08	- 0.09	- 0.11	- 0.18	- 0.09	- 0.10	- 0.10
Kew, Normal.	0.05	0.06	0.07	0.07	0.06	0.06	0.06	0.07	0.07	0.07	0.05	0.05
Difference for 1914	0.00	- 0.01	- 0.03	- 0.05	- 0.02	- 0.04	- 0.04	- 0.05	- 0.05	- 0.05	- 0.04	- 0.04
Falmouth, Normal.	0.16	0.17	0.16	0.17	0.16	0.15	0.17	0.16	0.15	0.15	0.13	0.16
Difference for 1914.	- 0.08	- 0.13	- 0.15	- 0.15	- 0.14	- 0.08	- 0.10	- 0.03	- 0.07	- 0.09	- 0.07	- 0.12
<b>FEBRUARY.</b>												
Aberdeen, Normal.	0.10	0.09	0.08	0.08	0.09	0.08	0.08	0.08	0.10	0.11	0.07	0.08
Difference for 1914	- 0.04	- 0.03	+ 0.01	+ 0.05	+ 0.01	+ 0.05	0.00	- 0.03	- 0.07	- 0.08	- 0.01	0.00
Eskdalemuir, 1914.	0.28	0.32	0.39	0.22	0.24	0.28	0.24	0.16	0.15	0.15	0.20	0.34
Valencia, Normal.	0.20	0.20	0.20	0.20	0.19	0.17	0.17	0.17	0.16	0.17	0.18	0.18
Difference for 1914	- 0.05	0.00	+ 0.14	+ 0.30	+ 0.45	+ 0.07	+ 0.17	+ 0.16	+ 0.18	+ 0.28	+ 0.28	+ 0.15
Kew, Normal.	0.06	0.07	0.06	0.06	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05
Difference for 1914	+ 0.14	+ 0.01	+ 0.04	- 0.02	+ 0.01	+ 0.04	+ 0.03	+ 0.08	0.00	- 0.05	- 0.02	+ 0.03
Falmouth, Normal.	0.15	0.14	0.16	0.13	0.14	0.14	0.12	0.15	0.15	0.14	0.10	0.11
Difference for 1914	+ 0.09	- 0.02	+ 0.02	+ 0.06	+ 0.05	- 0.08	+ 0.12	- 0.01	- 0.01	+ 0.05	+ 0.10	+ 0.06
<b>MARCH.</b>												
Aberdeen, Normal.	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.12	0.12	0.07	0.07
Difference for 1914	+ 0.01	+ 0.02	+ 0.08	+ 0.01	- 0.02	+ 0.02	+ 0.08	+ 0.13	- 0.05	- 0.03	- 0.01	+ 0.04
Eskdalemuir, 1914.	0.19	0.24	0.19	0.25	0.27	0.20	0.28	0.42	0.30	0.20	0.24	0.29
Valencia, Normal.	0.17	0.16	0.18	0.16	0.18	0.18	0.18	0.18	0.15	0.15	0.12	0.13
Difference for 1914	+ 0.08	+ 0.15	+ 0.07	- 0.05	+ 0.11	+ 0.20	+ 0.24	+ 0.24	+ 0.12	+ 0.23	+ 0.15	+ 0.04
Kew, Normal.	0.04	0.05	0.05	0.05	0.05	0.07	0.06	0.05	0.05	0.05	0.04	0.05
Difference for 1914	+ 0.10	+ 0.10	+ 0.11	+ 0.08	+ 0.18	+ 0.14	+ 0.20	+ 0.08	+ 0.06	+ 0.09	+ 0.10	+ 0.15
Falmouth, Normal.	0.13	0.13	0.13	0.12	0.10	0.11	0.12	0.12	0.12	0.12	0.10	0.09
Difference for 1914	+ 0.39	+ 0.47	+ 0.28	+ 0.03	+ 0.06	+ 0.05	+ 0.18	+ 0.17	+ 0.29	+ 0.19	+ 0.04	+ 0.20
<b>APRIL.</b>												
Aberdeen, Normal.	0.07	0.07	0.07	0.07	0.09	0.09	0.09	0.10	0.08	0.07	0.06	0.06
Difference for 1914	- 0.07	- 0.06	- 0.04	- 0.06	- 0.08	- 0.09	- 0.09	- 0.09	- 0.02	+ 0.02	- 0.03	- 0.03
Eskdalemuir, 1914.	0.10	0.09	0.12	0.17	0.15	0.10	0.10	0.04	0.12	0.10	0.13	0.19
Valencia, Normal.	0.16	0.14	0.15	0.16	0.16	0.16	0.15	0.15	0.15	0.13	0.12	0.14
Difference for 1914	+ 0.05	0.00	- 0.05	- 0.13	- 0.14	- 0.15	- 0.12	- 0.12	- 0.13	- 0.07	- 0.02	+ 0.01
Kew, Normal.	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05
Difference for 1914	+ 0.07	+ 0.04	+ 0.02	- 0.04	- 0.02	- 0.05	- 0.03	- 0.03	- 0.06	- 0.06	- 0.05	- 0.04
Falmouth, Normal.	0.12	0.11	0.12	0.12	0.12	0.13	0.13	0.14	0.11	0.09	0.07	0.10
Difference for 1914	+ 0.13	+ 0.01	- 0.10	- 0.11	- 0.09	- 0.09	- 0.09	- 0.08	- 0.04	- 0.01	- 0.05	- 0.07
<b>MAY.</b>												
Aberdeen, Normal.	0.08	0.06	0.07	0.07	0.08	0.09	0.07	0.06	0.06	0.05	0.05	0.07
Difference for 1914	+ 0.01	0.00	+ 0.03	+ 0.05	+ 0.02	0.00	- 0.03	- 0.02	- 0.01	+ 0.02	- 0.04	+ 0.01
Eskdalemuir, 1914.	0.11	0.10	0.06	0.14	0.17	0.14	0.08	0.07	0.05	0.14	0.10	0.12
Valencia, Normal.	0.11	0.12	0.14	0.14	0.13	0.13	0.14	0.12	0.12	0.11	0.07	0.10
Difference for 1914	- 0.07	- 0.03	- 0.11	- 0.08	- 0.06	- 0.08	- 0.10	- 0.03	- 0.10	- 0.10	- 0.03	- 0.03
Kew, Normal.	0.04	0.04	0.06	0.05	0.06	0.07	0.06	0.06	0.06	0.06	0.05	0.06
Difference for 1914	+ 0.05	- 0.02	- 0.03	- 0.03	- 0.08	- 0.07	- 0.06	- 0.06	- 0.06	- 0.05	- 0.02	+ 0.02
Falmouth, Normal.	0.08	0.09	0.10	0.09	0.09	0.08	0.09	0.10	0.09	0.08	0.06	0.07
Difference for 1914	- 0.03	- 0.07	- 0.09	- 0.07	- 0.05	- 0.07	- 0.07	- 0.04	- 0.05	- 0.02	- 0.02	- 0.02
<b>JUNE.</b>												
Aberdeen, Normal.	0.05	0.06	0.06	0.06	0.07	0.07	0.07	0.06	0.06	0.08	0.07	0.07
Difference for 1914	- 0.05	- 0.06	- 0.05	- 0.05	- 0.02	- 0.05	- 0.03	- 0.05	- 0.05	- 0.07	- 0.01	- 0.04
Eskdalemuir, 1914.	0.03	0.02	0.02	0.03	0.05	0.10	0.16	0.05	0.01	0.04	0.04	0.09
Valencia, Normal.	0.14	0.14	0.13	0.15	0.15	0.14	0.16	0.15	0.15	0.11	0.09	0.10
Difference for 1914	- 0.11	- 0.05	- 0.08	- 0.11	- 0.12	- 0.14	- 0.14	- 0.15	- 0.15	- 0.10	- 0.09	- 0.08
Kew, Normal.	0.07	0.07	0.06	0.07	0.08	0.08	0.08	0.07	0.06	0.07	0.08	0.09
Difference for 1914	- 0.05	- 0.05	+ 0.01	- 0.04	- 0.05	- 0.07	- 0.07	- 0.04	- 0.05	- 0.07	- 0.04	- 0.06
Falmouth, Normal.	0.07	0.09	0.12	0.10	0.10	0.11	0.09	0.09	0.08	0.07	0.07	0.07
Difference for 1914	+ 0.30	0.00	- 0.07	+ 0.09	+ 0.10	- 0.01	+ 0.07	- 0.05	+ 0.09	- 0.04	- 0.05	+ 0.01

The hourly amounts of rainfall are obtained at each observatory from the autographic records of a Beckley rain-gauge.

The heights of the receiving surfaces of the gauges above the ground and also above M.S.L., are as follows :—

	Height above Ground.	Height above M.S.L.
Aberdeen	0.6 metre	14.6 metres
Eskdalemuir	0.4 "	242.3 "
Valencia	0.6 "	13.2 "
Kew	0.5 "	6.0 "
Falmouth	0.6 "	51.4 "

\* Mean of 29 days only.



OF THE METEOROLOGICAL ELEMENTS AT THE FIVE OBSERVATORIES  
AND THE VALUES FOR 1914.

JANUARY TO JUNE.

13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	Midt.	Day.	Hour, G.M.T.
													<b>JANUARY.</b>
mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	Normal. Aberdeen.
0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.08	0.07	0.08	0.07	1.72	Normal. Aberdeen.
0.00	+ 0.01	0.00	0.00	- 0.03	- 0.06	- 0.05	- 0.04	- 0.03	0.00	- 0.03	- 0.02	- 0.53	Diff. for 1914. "
0.27*	0.24*	0.25*	0.23*	0.17*	0.17*	0.24*	0.30*	0.24*	0.11*	0.17*	0.14*	4.09†	1914. Eskdalemuir.
0.18	0.20	0.20	0.16	0.17	0.21	0.18	0.20	0.22	0.23	0.21	0.22	4.73	Normal. Valencia.
- 0.05	- 0.04	- 0.08	- 0.08	- 0.08	- 0.05	- 0.10	- 0.14	- 0.08	- 0.03	- 0.01	+ 0.17	- 1.82	Diff. for 1914. "
0.05	0.06	0.07	0.06	0.06	0.06	0.07	0.06	0.06	0.05	0.06	0.06	1.46	Normal. Kew.
- 0.05	- 0.06	- 0.07	- 0.05	- 0.06	- 0.05	- 0.06	- 0.05	- 0.05	- 0.03	- 0.01	- 0.05	- 1.01	Diff. for 1914. "
0.16	0.19	0.17	0.17	0.18	0.15	0.15	0.14	0.16	0.17	0.16	0.19	3.88	Normal. Falmouth.
- 0.14	- 0.17	- 0.11	- 0.12	- 0.15	- 0.08	- 0.10	- 0.09	- 0.08	- 0.01	- 0.08	- 0.09	- 2.43	Diff. for 1914. "
													<b>FEBRUARY.</b>
0.08	0.08	0.09	0.09	0.08	0.07	0.08	0.07	0.06	0.06	0.07	0.09	1.96	Normal. Aberdeen.
- 0.01	- 0.08	- 0.07	- 0.09	- 0.06	- 0.07	- 0.02	+ 0.06	+ 0.07	+ 0.18	+ 0.24	+ 0.11	+ 0.10	Diff. for 1914. "
0.34	0.24	0.25	0.35	0.22	0.54	0.52	0.63	0.38	0.30	0.45	0.39	7.58	1914. Eskdalemuir.
0.15	0.16	0.17	0.19	0.21	0.18	0.18	0.21	0.20	0.20	0.20	0.21	4.45	Normal. Valencia.
+ 0.36	+ 0.39	+ 0.38	+ 0.34	+ 0.26	+ 0.56	+ 0.56	+ 0.27	+ 0.36	+ 0.18	+ 0.04	- 0.04	+ 5.49	Diff. for 1914. "
0.06	0.07	0.05	0.05	0.06	0.05	0.05	0.04	0.05	0.05	0.04	0.06	1.36	Normal. Kew.
+ 0.08	+ 0.05	+ 0.09	+ 0.08	- 0.01	- 0.03	+ 0.02	- 0.01	+ 0.09	+ 0.03	+ 0.09	+ 0.09	+ 0.86	Diff. for 1914. "
0.13	0.13	0.13	0.13	0.12	0.14	0.15	0.14	0.16	0.17	0.16	0.16	3.35	Normal. Falmouth.
+ 0.03	+ 0.12	+ 0.09	- 0.04	+ 0.05	+ 0.16	+ 0.12	+ 0.26	+ 0.14	+ 0.14	+ 0.10	+ 0.10	+ 1.70	Diff. for 1914. "
													<b>MARCH.</b>
0.08	0.07	0.08	0.08	0.08	0.09	0.08	0.08	0.07	0.06	0.07	0.07	1.96	Normal. Aberdeen.
- 0.01	+ 0.03	+ 0.03	+ 0.15	+ 0.10	- 0.01	0.00	+ 0.02	- 0.03	0.00	- 0.04	- 0.02	+ 0.50	Diff. for 1914. "
0.12	0.16	0.19	0.29	0.26	0.20	0.13	0.21	0.18	0.13	0.11	0.13	5.18	1914. Eskdalemuir.
0.15	0.14	0.12	0.11	0.11	0.12	0.12	0.14	0.13	0.12	0.12	0.15	3.47	Normal. Valencia.
+ 0.16	+ 0.13	+ 0.15	+ 0.27	+ 0.16	+ 0.08	+ 0.11	+ 0.05	+ 0.02	+ 0.18	+ 0.28	+ 0.08	+ 3.25	Diff. for 1914. "
0.05	0.05	0.06	0.05	0.05	0.06	0.05	0.06	0.06	0.06	0.06	0.05	1.27	Normal. Kew.
+ 0.09	+ 0.13	+ 0.05	+ 0.14	+ 0.11	+ 0.12	+ 0.04	0.00	- 0.03	- 0.02	- 0.03	0.00	+ 1.99	Diff. for 1914. "
0.10	0.11	0.10	0.10	0.12	0.12	0.11	0.10	0.12	0.10	0.11	0.10	2.68	Normal. Falmouth.
+ 0.06	+ 0.12	+ 0.04	+ 0.08	+ 0.01	+ 0.04	+ 0.14	+ 0.17	+ 0.04	+ 0.19	+ 0.46	+ 0.45	+ 4.15	Diff. for 1914. "
													<b>APRIL.</b>
0.07	0.08	0.08	0.08	0.08	0.08	0.06	0.06	0.06	0.07	0.07	0.08	1.79	Normal. Aberdeen.
- 0.01	- 0.07	- 0.07	- 0.07	- 0.08	- 0.07	- 0.01	- 0.03	- 0.05	- 0.03	- 0.02	- 0.06	- 1.21	Diff. for 1914. "
0.14	0.11	0.14	0.08	0.15	0.14	0.05	0.05	0.09	0.08	0.14	0.08	2.66	1914. Eskdalemuir.
0.13	0.13	0.12	0.13	0.13	0.14	0.13	0.15	0.13	0.12	0.14	0.12	3.34	Normal. Valencia.
- 0.01	+ 0.03	- 0.03	0.00	+ 0.01	- 0.01	- 0.10	- 0.14	- 0.10	- 0.05	- 0.14	+ 0.07	- 1.34	Diff. for 1914. "
0.06	0.07	0.06	0.07	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	1.36	Normal. Kew.
- 0.03	- 0.07	- 0.03	- 0.07	- 0.05	0.00	- 0.02	- 0.02	- 0.03	- 0.05	- 0.02	+ 0.04	- 0.60	Diff. for 1914. "
0.09	0.08	0.07	0.08	0.08	0.10	0.09	0.10	0.09	0.09	0.09	0.10	2.41	Normal. Falmouth.
- 0.07	- 0.04	- 0.06	- 0.08	- 0.06	- 0.07	+ 0.05	- 0.01	+ 0.16	+ 0.23	+ 0.25	+ 0.09	- 0.20	Diff. for 1914. "
													<b>MAY.</b>
0.07	0.08	0.10	0.09	0.11	0.11	0.08	0.07	0.08	0.09	0.08	0.08	1.85	Normal. Aberdeen.
0.00	- 0.03	+ 0.06	+ 0.06	0.00	+ 0.05	+ 0.05	+ 0.04	+ 0.05	+ 0.01	- 0.02	0.00	+ 0.31	Diff. for 1914. "
0.11	0.12	0.11	0.04	0.05	0.05	0.03	0.09	0.19	0.15	0.09	0.03	2.34	1914. Eskdalemuir.
0.09	0.08	0.10	0.09	0.10	0.09	0.10	0.10	0.09	0.10	0.09	0.11	2.57	Normal. Valencia.
+ 0.19	- 0.01	- 0.05	- 0.09	- 0.09	- 0.06	- 0.05	- 0.05	- 0.02	- 0.02	- 0.01	- 0.04	- 1.12	Diff. for 1914. "
0.05	0.06	0.08	0.09	0.08	0.06	0.06	0.04	0.04	0.03	0.04	0.05	1.37	Normal. Kew.
- 0.02	+ 0.24	- 0.05	+ 0.23	+ 0.02	0.00	+ 0.01	+ 0.09	+ 0.07	- 0.02	- 0.04	- 0.04	+ 0.08	Diff. for 1914. "
0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.08	0.09	0.08	0.08	0.09	1.87	Normal. Falmouth.
+ 0.02	- 0.04	- 0.04	- 0.03	+ 0.06	+ 0.08	+ 0.04	- 0.02	0.00	- 0.04	- 0.06	- 0.07	- 0.70	Diff. for 1914. "
													<b>JUNE.</b>
0.08	0.07	0.08	0.08	0.09	0.08	0.06	0.06	0.07	0.06	0.05	0.05	1.61	Normal. Aberdeen.
- 0.06	- 0.07	- 0.08	- 0.08	- 0.09	+ 0.14	- 0.04	- 0.03	- 0.07	- 0.01	- 0.02	- 0.05	- 0.99	Diff. for 1914. "
0.06	0.01	0.04	0.04	0.38	0.02	0.00	0.03	0.05	0.01	0.04	0.02	1.34	1914. Eskdalemuir.
0.09	0.09	0.11	0.11	0.12	0.13	0.11	0.12	0.11	0.11	0.14	0.15	3.00	Normal. Valencia.
- 0.08	- 0.09	- 0.07	- 0.10	- 0.09	- 0.11	- 0.08	- 0.01	+ 0.06	+ 0.05	+ 0.10	- 0.04	- 1.78	Diff. for 1914. "
0.08	0.08	0.09	0.09	0.11	0.09	0.10	0.09	0.09	0.10	0.07	0.06	1.93	Normal. Kew.
- 0.02	+ 0.04	+ 0.04	+ 0.18	+ 0.50	+ 0.07	- 0.10	+ 0.20	- 0.06	- 0.07	- 0.02	- 0.01	+ 0.03	Diff. for 1914. "
0.09	0.09	0.09	0.08	0.08	0.07	0.06	0.08	0.08	0.08	0.09	0.10	2.05	Normal. Falmouth.
- 0.09	- 0.06	+ 0.04	- 0.05	+ 0.03	- 0.06	- 0.04	- 0.01	- 0.04	- 0.03	- 0.02	+ 0.04	+ 0.15	Diff. for 1914. "

The normals for rainfall are based upon the hourly tabulations of rainfall during the period of 40 years, 1871-1910.

The values for 1914 are given by the excess or defect from the normal; + indicates excess, - defect.

Amounts of snow or rain which cannot be distributed among the actual hours of fall are omitted from the hourly means. In preparing the normals, however, an approximate allocation of such falls to their proper hours has been made.

\* Mean of 29 days.

† Mean of 31 days.

LXIX.-LXXIV.—NORMALS FOR THE MONTHS OF THE HOURLY VALUES  
WITH DIFFERENCES BETWEEN THE NORMALS

LXXIII.—continued—RAINFALL IN MILLIMETRES.

Hour, G.M.T.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	Noon.
<b>JULY.</b>												
Aberdeen, Normal.	mm. 0.08	mm. 0.08	mm. 0.08	mm. 0.10	mm. 0.09	mm. 0.08	mm. 0.07	mm. 0.08	mm. 0.07	mm. 0.08	mm. 0.07	mm. 0.10
Difference for 1914	+ 0.02	+ 0.06	+ 0.12	- 0.02	+ 0.13	+ 0.03	+ 0.20	+ 0.26	+ 0.18	+ 0.19	+ 0.13	+ 0.23
Eskdalemuir, 1914.	0.00	0.02	0.07	0.38	0.22	0.15	0.01	0.15	0.03	0.14	0.05	0.12
Valencia, Normal.	0.14	0.15	0.16	0.16	0.15	0.16	0.16	0.17	0.16	0.13	0.11	0.12
Difference for 1914	+ 0.16	+ 0.28	+ 0.15	+ 0.34	+ 0.20	+ 0.12	+ 0.05	+ 0.42	+ 0.05	0.00	+ 0.09	- 0.06
Kew, Normal.	0.07	0.07	0.07	0.06	0.06	0.06	0.08	0.06	0.05	0.06	0.08	0.09
Difference for 1914	+ 0.03	- 0.03	0.00	- 0.04	- 0.02	+ 0.04	+ 0.17	- 0.01	+ 0.01	- 0.06	+ 0.03	- 0.04
Falmouth, Normal.	0.11	0.12	0.15	0.13	0.12	0.14	0.11	0.10	0.11	0.10	0.06	0.09
Difference for 1914	+ 0.13	+ 0.13	+ 0.05	- 0.05	+ 0.02	- 0.12	- 0.07	- 0.06	- 0.08	- 0.01	+ 0.05	0.00
<b>AUGUST.</b>												
Aberdeen, Normal.	0.11	0.10	0.11	0.12	0.11	0.11	0.11	0.11	0.09	0.10	0.07	0.08
Difference for 1914	- 0.08	- 0.07	0.00	- 0.05	- 0.07	- 0.05	- 0.08	- 0.09	- 0.07	- 0.07	- 0.02	- 0.02
Eskdalemuir, 1914.	0.16	0.18	0.15	0.22	0.22	0.28	0.18	0.16	0.10	0.12	0.14	0.21
Valencia, Normal.	0.18	0.16	0.16	0.20	0.23	0.21	0.21	0.18	0.20	0.17	0.14	0.15
Difference for 1914	+ 0.14	+ 0.11	- 0.10	- 0.02	+ 0.07	+ 0.43	- 0.01	+ 0.13	+ 0.01	+ 0.17	+ 0.05	- 0.03
Kew, Normal.	0.06	0.08	0.07	0.05	0.06	0.04	0.06	0.06	0.07	0.07	0.06	0.10
Difference for 1914	+ 0.08	- 0.08	- 0.06	- 0.05	- 0.06	- 0.02	- 0.01	- 0.01	+ 0.01	- 0.03	+ 0.03	0.00
Falmouth, Normal.	0.12	0.12	0.14	0.12	0.13	0.16	0.11	0.11	0.12	0.12	0.12	0.11
Difference for 1914	- 0.01	- 0.03	- 0.07	- 0.06	- 0.08	- 0.09	0.00	- 0.08	- 0.10	- 0.11	- 0.09	- 0.06
<b>SEPTEMBER.</b>												
Aberdeen, Normal.	0.08	0.07	0.06	0.08	0.08	0.10	0.12	0.11	0.11	0.11	0.09	0.08
Difference for 1914	- 0.05	- 0.03	+ 0.01	- 0.04	- 0.05	- 0.05	- 0.11	- 0.10	- 0.09	- 0.09	- 0.09	+ 0.01
Eskdalemuir, 1914.	0.10	0.06	0.07	0.07	0.09	0.16	0.11	0.09	0.09	0.04	0.12	0.25
Valencia, Normal.	0.16	0.16	0.18	0.17	0.17	0.15	0.16	0.16	0.17	0.12	0.14	0.14
Difference for 1914	+ 0.04	+ 0.06	+ 0.05	- 0.05	- 0.03	- 0.03	- 0.01	+ 0.01	+ 0.12	+ 0.04	0.00	- 0.12
Kew, Normal.	0.09	0.07	0.08	0.09	0.10	0.06	0.06	0.06	0.07	0.06	0.06	0.06
Difference for 1914	- 0.08	- 0.02	0.00	- 0.08	- 0.10	- 0.06	- 0.06	0.00	+ 0.12	- 0.04	- 0.02	- 0.04
Falmouth, Normal.	0.16	0.16	0.15	0.14	0.13	0.13	0.14	0.13	0.14	0.13	0.09	0.11
Difference for 1914	- 0.08	+ 0.27	+ 0.11	+ 0.10	+ 0.07	- 0.11	- 0.10	- 0.11	- 0.10	- 0.13	- 0.08	- 0.09
<b>OCTOBER.</b>												
Aberdeen, Normal.	0.08	0.10	0.11	0.12	0.11	0.13	0.12	0.12	0.12	0.12	0.09	0.09
Difference for 1914	+ 0.04	+ 0.03	- 0.05	- 0.08	- 0.06	- 0.08	- 0.07	- 0.07	- 0.05	- 0.10	- 0.07	- 0.05
Eskdalemuir, 1914.	0.02	0.04	0.05	0.07	0.04	0.04	0.04	0.03	0.01	0.01	0.06	0.04
Valencia, Normal.	0.18	0.20	0.21	0.20	0.20	0.21	0.19	0.18	0.18	0.19	0.17	0.19
Difference for 1914	+ 0.46	+ 0.38	0.00	- 0.06	- 0.06	+ 0.28	+ 0.18	+ 0.09	- 0.14	- 0.11	- 0.03	- 0.19
Kew, Normal.	0.10	0.10	0.10	0.09	0.09	0.11	0.09	0.10	0.10	0.09	0.08	0.11
Difference for 1914	- 0.08	- 0.05	- 0.03	+ 0.02	- 0.04	- 0.07	- 0.04	- 0.08	- 0.10	- 0.09	- 0.05	+ 0.04
Falmouth, Normal.	0.22	0.20	0.21	0.22	0.22	0.21	0.19	0.22	0.18	0.19	0.14	0.17
Difference for 1914	- 0.13	- 0.12	- 0.19	- 0.14	- 0.19	- 0.16	- 0.15	- 0.19	- 0.06	- 0.14	- 0.04	- 0.07
<b>NOVEMBER.</b>												
Aberdeen, Normal.	0.12	0.12	0.11	0.14	0.13	0.12	0.11	0.11	0.11	0.10	0.10	0.10
Difference for 1914	+ 0.10	+ 0.15	+ 0.07	+ 0.01	+ 0.05	+ 0.09	+ 0.03	- 0.07	- 0.04	- 0.03	+ 0.25	+ 0.05
Eskdalemuir, 1914.	0.39	0.42	0.38	0.41	0.35	0.31	0.40	0.30	0.39	0.43	0.37	0.36
Valencia, Normal.	0.23	0.20	0.22	0.21	0.22	0.19	0.23	0.22	0.18	0.18	0.18	0.18
Difference for 1914	- 0.12	- 0.03	+ 0.07	- 0.08	- 0.05	- 0.15	+ 0.01	- 0.04	- 0.06	+ 0.03	+ 0.04	- 0.05
Kew, Normal.	0.08	0.09	0.08	0.08	0.08	0.08	0.07	0.07	0.06	0.07	0.06	0.07
Difference for 1914	+ 0.02	0.00	- 0.05	- 0.05	- 0.06	- 0.07	- 0.05	- 0.01	- 0.02	+ 0.01	+ 0.03	+ 0.05
Falmouth, Normal.	0.18	0.17	0.20	0.22	0.17	0.19	0.18	0.21	0.18	0.18	0.16	0.18
Difference for 1914	- 0.06	+ 0.03	- 0.01	- 0.04	- 0.06	- 0.02	- 0.13	- 0.08	+ 0.14	- 0.11	- 0.04	- 0.10
<b>DECEMBER.</b>												
Aberdeen, Normal.	0.10	0.11	0.13	0.13	0.13	0.12	0.12	0.11	0.10	0.12	0.10	0.10
Difference for 1914	+ 0.03	+ 0.08	- 0.01	- 0.01	+ 0.16	+ 0.12	- 0.01	- 0.01	+ 0.14	- 0.06	+ 0.04	+ 0.04
Eskdalemuir, 1914.	0.21	0.18	0.17	0.25	0.22	0.23	0.31	0.40	0.64	0.29	0.29	0.28
Valencia, Normal.	0.21	0.21	0.23	0.25	0.22	0.23	0.23	0.22	0.21	0.19	0.18	0.20
Difference for 1914	+ 0.31	+ 0.23	+ 0.26	+ 0.20	+ 0.64	+ 0.16	+ 0.26	+ 0.26	+ 0.02	- 0.01	+ 0.01	+ 0.18
Kew, Normal.	0.07	0.08	0.08	0.08	0.08	0.07	0.06	0.07	0.07	0.06	0.06	0.06
Difference for 1914	+ 0.13	+ 0.18	+ 0.08	+ 0.12	+ 0.15	+ 0.09	+ 0.22	+ 0.10	+ 0.03	+ 0.11	+ 0.12	+ 0.13
Falmouth, Normal.	0.20	0.23	0.21	0.23	0.21	0.20	0.20	0.20	0.19	0.22	0.18	0.18
Difference for 1914	- 0.04	+ 0.26	+ 0.36	+ 0.20	+ 0.25	+ 0.14	+ 0.07	+ 0.16	+ 0.42	+ 0.14	+ 0.14	+ 0.06
<b>YEAR.</b>												
Aberdeen, Normal.	0.08	0.08	0.08	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.07	0.08
Difference for 1914.	0.00	+ 0.01	+ 0.02	- 0.02	0.00	- 0.01	- 0.02	- 0.01	- 0.01	- 0.01	+ 0.02	+ 0.02
Eskdalemuir, 1914.	0.14	0.14	0.15	0.19	0.17	0.17	0.17	0.17	0.17	0.15	0.16	0.21
Valencia, Normal.	0.17	0.17	0.18	0.18	0.18	0.18	0.18	0.18	0.17	0.15	0.14	0.15
Difference for 1914	+ 0.07	+ 0.09	+ 0.02	+ 0.01	+ 0.08	+ 0.05	+ 0.04	+ 0.07	- 0.02	+ 0.03	+ 0.03	- 0.02
Kew, Normal.	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.07	0.06	0.07
Difference for 1914	+ 0.03	+ 0.01	0.00	- 0.02	- 0.01	- 0.01	+ 0.02	0.00	0.00	- 0.03	+ 0.01	+ 0.02
Falmouth, Normal.	0.14	0.14	0.15	0.15	0.14	0.14	0.14	0.14	0.13	0.13	0.11	0.12
Difference for 1914	+ 0.05	+ 0.07	+ 0.02	- 0.01	0.00	- 0.05	- 0.02	- 0.03	+ 0.04	- 0.02	- 0.01	- 0.02



LXIX.-LXXIV.—NORMALS FOR THE MONTHS OF THE HOURLY VALUES OF THE METEOROLOGICAL ELEMENTS AT THE FIVE OBSERVATORIES WITH DIFFERENCES BETWEEN THE NORMALS AND THE VALUES FOR 1914.

LXXIV.—DURATION OF BRIGHT SUNSHINE (in hours arranged according to Local Apparent Time). JANUARY TO JUNE.

Table with columns for Hour, L.A.T. (4-20) and Day, and rows for months JANUARY through JUNE, listing Normal and Difference for 1914 values for Aberdeen, Eskdalemuir, Valencia, Kew, and Falmouth.

The hourly duration of sunshine is obtained from the records of the Campbell-Stokes recorder, in which instrument the sun's rays are focussed through a 4-inch (0.10 m.) spherical lens of crown glass upon a strip of blue card exposed in a metal bowl, the duration of sunshine being shown by the length of the scorch on the card. The hourly amounts are measured from 30 minutes before to 30 minutes after each hour of Local Apparent Time. The height of the recorder above the ground at the several stations is as follows:—

- Aberdeen 20.7 metres,
Eskdalemuir 1.5 ,,
Valencia 12.8 ,,
Kew 13.3 ,,
Falmouth 10.4 ,,

The values for 1914 are given by the excess or defect from the normal: + indicates excess, - defect. The normals for sunshine are based upon the hourly tabulations of sunshine in the period of 30 years, from 1881-1910.



LXXV.—DIURNAL INEQUALITIES OF POTENTIAL GRADIENT IN THE OPEN, IN VOLTS PER METRE.

Kew. MEAN HOURLY VALUES, GREENWICH MEAN TIME, FOR THE MONTHS, YEAR, AND SEASONS. 1914.

Table with 27 columns (1-24, Midt., 24-0, No. of Days Used, Mean Values) and 13 rows (J.F.M., A.M., J.J.A.S.O.N.D., Y., W., Eq., S.).

LXXVI.—DIURNAL INEQUALITIES OF POTENTIAL GRADIENT IN THE OPEN, IN VOLTS PER METRE.

Eskdalemuir. MEAN HOURLY VALUES, GREENWICH MEAN TIME, FOR THE MONTHS, YEAR, AND SEASONS (0,a DAYS ONLY). 1914.

Table with 27 columns (1-24, Midt., 24-0, No. of Days Used, Mean Values) and 13 rows (J.F.M., A.M., J.J.A.S.O.N.D., Y., W., Eq., S.).

LXXVII.—DIURNAL INEQUALITIES OF POTENTIAL GRADIENT IN THE OPEN, IN VOLTS PER METRE.

Eskdalemuir. MEAN HOURLY VALUES, GREENWICH MEAN TIME, FOR THE MONTHS, YEAR, AND SEASONS (1,a and 2,a DAYS ONLY). 1914.

Table with 27 columns (1-24, Midt., 24-0, No. of Days Used, Mean Values) and 13 rows (J.F.M., A.M., J.J.A.S.O.N.D., Y., W., Eq., S.).

NOTES ON THE MANAGEMENT AND MANIPULATION OF  
THE INSTRUMENTS AT KEW OBSERVATORY AND  
THE CORRESPONDING TABLES. BY DR. C. CHREE,  
Sc.D., LL.D., F.R.S., SUPERINTENDENT.

*Terrestrial Magnetism.*—The magnetographs were in continuous operation throughout the year. The vertical force magnet was, however, replaced from March 24 to April 2 by one made by Mr. P. Adie for the Agincourt Observatory (near Toronto), to enable the working of the latter to be more carefully scrutinised.

Before commencing registration with the declination magnetograph, after its restoration in the end of December 1913 to its normal position in the magnetograph room, careful measurements were made with a view to redetermine the scale value. The result obtained, 1 mm.=0'87, was in exact agreement with the previously accepted value. Several changes were made in the sensitiveness of the horizontal force magnetograph. The scale value was

From January 1 to March 2 . . . . .	1 mm.=6.8 $\gamma$
„ March 3 „ August 5 . . . . .	1 mm.=5.25 $\gamma$
„ August 6 „ November 30 . . . . .	1 mm.=5.9 $\gamma$
„ December . . . . .	1 mm.=6.0 $\gamma$

The base line values of the curves were determined by observations taken usually once a week with the Jones unifilar magnetometer, using collimator magnet K.C.I. and declinometer magnet K.O. 90, and the Barrow inclinometer No. 33, with 3½-inch needles. In September, Mr. Dover redivided and resilvered the horizontal scale, which had become very difficult to read. The work was very satisfactorily done, and there was no indication of any discontinuity in either horizontal force or declination observations.

In the absolute observations of horizontal force use was made, as of late years, of three deflection distances, viz. 22.5, 30, and 40 cms., and values were calculated for the two constants P and Q of the deflection formula from all the observations of the year combined. The values thus obtained have been

Year.	P.	Q.
1910	+0.882	—1354
1911	+0.832	—1377
1912	+0.749	—1286
1913	+1.504	—1528
1914	+1.226	—1343

The horizontal force data published for the year 1914 in the *Geophysical Journal*—including the daily maxima and minima—were based on calculations which employed the values of P and Q applying to the year 1913. The mean values of  $1 + Pr^{-2} + Qr^{-4}$  for the three deflection distances calculated from the 1913 and 1914 observations are, however, so nearly alike that no correction is required.

Particulars of the magnetic character of individual days on the international scale "0," "1," and "2" ("0" representing quiet, "1" moderately disturbed, and "2" more highly disturbed days) were contributed quarterly, as in recent years, to Prof. van Everdingen at De Bilt, for inclusion in the international lists. The accompanying table gives an abstract showing the number of days in each month to which the characters "0," "1," "2" were allotted at Kew. It also gives for each month the mean of the character numbers treated as if ordinary arithmetical quantities. As there is a wide range of disturbance included under any one character figure, these monthly means should be regarded as giving only a general indication of the disturbance prevailing.

1914.	Number of Days having Magnetic "Character."			Mean of "Character" Figures.
	"0."	"1."	"2."	
January . . . . .	24	6	1	0.26
February . . . . .	16	11	1	0.46
March . . . . .	12	16	3	0.71
April . . . . .	18	10	2	0.47
May . . . . .	22	8	1	0.32
June . . . . .	18	8	4	0.53
July . . . . .	17	10	4	0.58
August . . . . .	16	13	2	0.55
September . . . . .	16	13	1	0.50
October . . . . .	15	14	2	0.58
November . . . . .	17	10	3	0.53
December . . . . .	20	10	1	0.39
Year . . . . .	211	129	25	0.49

The declination and horizontal force curves were tabulated on the five quiet days a month selected under international auspices at De Bilt, particulars of which are given in the accompanying table:—

*List of Magnetic Quiet Days for 1914, as issued by the International Commission of Terrestrial Magnetism.*

January	9, 10, 24, 25, 26	July	2, 8, 13, 17, 19
February	1, 10, 11, 21, 25	August	9, 10, 14, 16, 22
March	5, 22, 28, 29, 30	September	2, 7, 14, 21, 26
April	12, 15, 26, 29, 30	October	12, 14, 24, 25, 26
May	9, 10, 14, 19, 20	November	9, 20, 21, 22, 23
June	12, 13, 16, 17, 23	December	2, 13, 15, 21, 26

A temperature correction has been applied as usual to the horizontal force curves, the value applied being 3.1 $\gamma$  per 1° C. The curves were smoothed in the way customary at the Observatory, and allowance was made so far as possible for all irregularities which were clearly due to artificial electric currents. The non-cyclic changes in the 24 hours were eliminated in the usual way, *i.e.* they were assumed to come in at a uniform rate throughout the day.

Tables LXI. and LXII. give the diurnal inequalities of declination and horizontal force, after elimination of the non-cyclic change, for each month of the year,



for the year as a whole, and three seasons—Winter, Equinox, and Summer,—defined as in previous years. Table LXIII. gives under the heading “range” the algebraic difference of the extreme hourly values, and under the heading “24-0” the mean algebraic excess of the value of the element at hour 24 over that at hour 0. The units employed throughout are 1' in the case of declination and  $1\gamma$  (or  $1 \times 10^{-5}$  C.G.S.) in the case of horizontal force. In the case of declination + denotes that the magnet is to the *west* of its mean position for the day.

The disturbance in the vertical force curves, due to artificial electric currents, is such that the curves have not been tabulated on quiet days since 1902. They are now used mainly in connection with the verification of dip circles, but they also serve to show fairly accurately the larger movements connected with magnetic storms.

The dip observations are generally taken in the afternoon at a time when the departure from the mean value for the day is naturally small, and allowance is made for this departure by reference to inequality data from earlier years. Values have been obtained for the vertical force by combining the values of dip thus corrected with the corresponding horizontal force data derived from the curves.

Table LXVII. gives mean monthly values of declination and horizontal force derived from the curves of the international quiet days, and mean values of inclination and vertical force obtained in the way just described. It also gives values for the total force and the north and west components deduced from the values obtained for the other elements. The mean annual values from the earlier years are intended to show the nature of the secular change. The rapid fall of westerly declination, characteristic of recent years, continues. Horizontal force, which had been nearly stationary for some years, after a prolonged period of steady increase, shows a decided fall. The percentage diminutions in horizontal and vertical force during the year were so nearly equal that the dip—whose rate of fall has been gradually decreasing for some time—appears stationary.

Table LXVIII. gives a list of values of the magnetic elements at the observatories whose publications are received at Kew, including the latest year available. The information contained in publications has been supplemented in several cases by information due to the personal courtesy of directors. Owing to the War, the sources of recent information have been more restricted than usual.

*Atmospheric Electricity.*—The instruments in regular use have been the Kelvin water-dropping electrograph—giving a continuous record of the potential at the spot where the jet breaks up into drops,—the Kelvin portable electrometer No. 53, an Ebert aspiration apparatus, and a Wilson universal electrometer. The Kelvin portable electrometer is used to assist in converting the readings from the electrograms into true potential gradient in the open. The apparatus for the absolute observations consists essentially of a long horizontal insulated rod carrying a lighted fuse at the end, the rod being connected to the terminal of the portable electrometer. Readings are taken with the fuse at 1 metre and at 2 metres above the ground, the grass on which is kept short. The site is in the observatory garden.

If no change occurred in the discharging tube of the water-dropper or in its environment, a constant ratio would naturally persist between the potential

shown by the electrograph and the corresponding potential obtained with the portable electrometer. But the assumption of a constant ratio cannot be safely made, at least at Kew Observatory. The discharge tube is long, and a slight shift in the position of the discharging nozzle is a possibility not to be neglected. Again, the tube occasionally freezes and may be split, and a new tube may have to be fitted. In view of the various possibilities, the practice has been to take observations with the portable electrometer on all convenient fine days shortly after 10 h. A factor is determined from the observations of each month, treated separately, and is given in the *Geophysical Journal*.

Table LXXV. gives the diurnal inequalities of the potential gradient for individual months, three seasons, and the year. The seasons include the same months as in previous years. The inequalities and mean monthly and annual values are based on the curves of "quiet" days selected from those entirely free of negative potential. Other objects in the selection of quiet 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 except in March, July, and December. In March only 7, and in July only 9 suitable days could be found. In December, an abnormally wet month, there were only 4 days, in the usual sense of the term, free from negative electricity. As this appeared an undesirably small number on which to base inequalities, recourse was had to a special expedient. It was found possible to select four other periods of 24 consecutive hours free from negative potential, all starting at 14 h. This gave 8 "days," 4 commencing as usual at 0 h., and the other 4 at 14 h. Non-cyclic corrections were calculated and applied for each group separately, and the mean of the resulting inequalities was accepted for the month.

The non-cyclic changes in Table LXXV. represent, of course, means from the selected quiet days for the month. No value is given for December, as the mean from the two groups of days mentioned above would have no physical significance. As in the other tables, the maximum and minimum values are distinguished by the symbols  $x$  and  $\bar{n}$ . The range thence deduced is much less than the mean of the individual daily ranges. The mean value and the inequality derived from any single month are largely dependent on the weather that happens to prevail. Fully representative data can only be obtained by combining the results of a number of years.

The mean value for the year is the highest yet recorded. The excess above previous years is mainly due to the abnormally high mean values obtained for two of the winter months, viz. January and December.

The Ebert apparatus has been used to determine the total charges per c.c. carried by the positive and negative ions of which the apparatus takes cognisance. The Wilson apparatus has been used for measuring the vertical air-earth current. In both cases there is some uncertainty as to the exact significance of the numerical results obtained. These results have been published in the *Geophysical Journal*.

*Seismology.*—Records have continued to be taken with the old pattern Milne seismograph, having its boom oriented north and south and measuring tilting in the east-west direction. The instrument was restored to its original position

in the basement after the conclusion of the building operations at the end of 1913. In the somewhat numerous cases when doubt existed as to whether small movements recorded were really seismic, recourse was had for confirmation or otherwise to the Eskdalemuir register. Particulars of the movements whose seismic character was confirmed have been communicated to Shide for inclusion in the data published by the British Association Committee. The larger movements are enumerated in a list which appears in the Annual Supplement to the *Geophysical Journal*. The largest movements recorded were on January 30, May 26, and August 4, when the maximum amplitudes, as shown by the trace, were respectively 8.7 mm., 8.6 mm., and 6.5 mm.

*Meteorology.*—After the completion of the building operations in 1913, all the instruments which had been displaced were restored to their old positions, and during the year they have operated under normal conditions. During the building operations a well was excavated in the basement, going down to below the level of underground water. A float, with attached wire, moves up and down with the water, and thus enables a continuous record to be obtained of the water level.

Hourly means of barometric pressure, temperature, relative humidity, wind (direction and velocity), rainfall, and duration of bright sunshine will be found above (pp. 40–61).

*The Geophysical Journal* gives the barometric pressure, air temperature, pressure of aqueous vapour, and relative humidity, as well as the direction and velocity of the wind at hours 9 and 21 (9 p.m.). It also gives the amount of cloud at hours 10 and 22 (10 p.m.), the total daily duration of bright sunshine, the reading of the grass minimum thermometer, and the reading at 10 h. of earth thermometers at depths of 0.3 and 1.2 meters (1 and 4 feet). The readings of solar radiation taken with the Ångström pyrheliometer are likewise included.

Reference will be made here to only a few of the outstanding meteorological phenomena of the year.

*Barometric Pressure.*—The barometric pressure varied throughout the year from 1035.3 millibars (30.574 in.) on April 26 to 966.6 millibars (28.542 in.) on February 22.

*Temperature.*—The temperature in the shade varied from 304°·7 A. (89°·0 F.) on July 1 to 265°·9 A. (19°·3 F.) on January 24. The highest reading given by the solar radiation thermometer was 336°·5 A. (146°·3 F.) on July 14.

The lowest temperature on the grass during the year was 260°·9 A. (10°·3 F.) on January 24.

The readings of the earth thermometer at 0.3 metres (1 foot) varied from 292°·5 A. (67.1 F.) on July 2 to 274°·6 A. (34°·9 F.) on January 24 and 25. At 1.2 metres (4 feet) the readings varied from 288°·5 A. (59°·9 F.), from July 21 to 26, to 278°·6 A. (42°·0 F.) on January 29.

*Solar Radiation.*—The highest reading from the Ångström pyrheliometer was 0.086 watts per square centimetre (1.23 gramme calories per square centimetre per minute), on June 3 and June 30.

*Duration of Bright Sunshine.*—A total of 1579.0 hours of bright sunshine was shown by the Campbell-Stokes recorder. The longest duration on any one day was 15.0 hours on June 30.

*Wind.*—The highest mean hourly velocity for the year was 14·1 metres per second (31·5 miles per hour) on December 4.

*Cloud.*—The mean amount of cloud for the year—scale 0 to 10—was 6·4, the monthly means varying from 4·1 in April to 8·3 in January.

*Rainfall.*—The total rainfall for the year was 688·1 mm. (27·09 in.). December, with 161·6 mm. (6·36 in.), and January with 13·7 mm. (0·54 in.) were respectively the wettest and driest months. The greatest daily fall was 35·8 mm. (1·41 in.) on December 9.

NOTES ON THE MANAGEMENT AND MANIPULATION OF  
THE MAGNETIC INSTRUMENTS AT ESKDALEMUIR  
AND ON THE CORRESPONDING TABLES. BY L. F.  
RICHARDSON, B.A., SUPERINTENDENT.

The magnetic force is expressed in terms of three components, X, Y, Z, in three directions mutually at right angles. Of these, X is positive for a force towards the North, Y is positive for a force towards the East, and Z is positive for a force downwards. In England for the normal terrestrial magnetic state X is positive, Y is negative, and Z is positive. In the southern magnetic hemisphere Z is negative, the direction of the magnetic force being upwards. A magnetic force is taken to be along the line in which a magnetic needle subject to it sets itself, and in the direction from the S-seeking to the N-seeking pole of the magnet.

The Magnetographs recording the North and West Components were, as in the previous year, the Adie bifilar set. The vertical force balance \* lent by Prof. Watson continued in operation throughout the year.

	North.	West.	Vertical.
Time scale . . . . .	1 hour to 15.6 mm.		
Time marks . . . . .	every two hours, end of interruption is exact hour.		
Error of time marks . . . . .	seldom as much as $\pm 1$ minute.		
Scale values . . . . .	see below.		
Complete periods of vibration . . . . .	8.7 secs.	10.5 secs.	$6 \pm 1$ secs.
Damping; amplitude sinks to a half in . . . . .	about 24 secs.	about 15 secs.	..
Apparent $\frac{N}{W}$ force due to unit $\frac{W}{N}$ force . . . . .	-0.009	+0.007	..
Change in $\left\{ \begin{array}{l} \text{azimuth} \\ \text{tilt} \end{array} \right\}$ of magnet for 1 mm. on the paper . . . . .	.00032 <sub>0</sub> radian.	.00032 <sub>6</sub> radian.	.0003 radian.
Twist of bifilar suspension . . . . .	35°	7°	..
Length of bifilar $\div$ mean breadth . . . . .	51	66	..
Temperature coefficient . . . . .	-9 $\gamma$ per 1° C.	-2 $\gamma$ per 1° C.	+26 $\gamma$ per 1° C.
Marked pole points . . . . .	West	North	..
Azimuth of magnet . . . . .	..	..	N 14° W.
Apparent V force due to unit H force . . . . .	..	..	see below.

The Scale Values were determined fortnightly in the manner described in last year's notes. The smoothed results are set out on the accompanying table. The moment of the test magnet was determined at intervals of about three months.

\* See *Terrestrial Magnetism*, December 1901, for a description of this type of instrument.

## Scale Values.

North.		West.		Vertical.	
Date. 1914.	$\gamma$ per mm.	Date. 1914.	$\gamma$ per mm.	Date. 1914.	$\gamma$ per mm.
January . . .	8.80	January . . .	8.72	January . . .	3.91
February . . .	8.80	February . . .	8.72	February . . .	3.92
March . . .	8.78	March . . .	8.70	March . . .	3.93
April . . .	8.78	April . . .	8.70	April . . .	3.94
May . . .	8.78	May . . .	8.70	May . . .	3.92
June . . .	8.78	June . . .	8.70	June . . .	3.89
July . . .	8.78	July . . .	8.70	July . . .	3.88
August . . .	8.79	August . . .	8.73	August . . .	3.86
September . . .	8.80	September . . .	8.74	September . . .	3.85
October . . .	8.81	October . . .	8.72	October :—	
				before 14d 9h } { 3.83	
				after 14d 9h } { 3.86	
November . . .	8.83	November . . .	8.72	November . . .	3.90
December :—		December . . .	8.72	December . . .	3.90
1st–15th } { 8.81					
16th–31st } { 8.78					

The Effect of a West Magnetic Force on the North Magnetograph (and *vice versa*) is due to two causes, which, if the instrument were in perfect adjustment, would compensate each other. (1) A temporary increase or decrease in the magnetic moment due to the permeability of the magnet. (2) A small component of the applied magnetic force perpendicular to the magnetic axis of magnet due to the azimuth of this axis differing slightly from the west line.

An attempt to correct the azimuths was made on 1st January; an improvement was effected, but the mark was overshoot.

North Instrument.		West Instrument.	
Date.	Apparent North Force due to Unit West Force.	Date.	Apparent West Force due to Unit North Force.
1914 March 31 . . .	— .012	1914 April 7 . . .	+ .004
1914 April 5 . . .	— .008	1914 April 8 . . .	+ .009
1914 December 31 . . .	— .008	1914 December 31 . . .	+ .008
	} mean — .010		} mean + .006

The values adopted for 1914 have been obtained by smoothing the above data, and are :—

$$\begin{aligned} \text{Apparent north force due to unit west force} & . . . . . - .009 \\ \text{Apparent west force due to unit north force} & . . . . . + .007 \end{aligned}$$

Consequently, if  $n'$  and  $w'$  are the north and west inequalities printed herewith, then the corrected values,  $n$  and  $w$ , along the geographical directions are, for 1914 :—

$$\begin{aligned} n &= n' + 0.009 w' \\ w &= w' - 0.007 n'. \end{aligned}$$

The Apparent Downward Force indicated by the Watson balance when unit north force was applied to it formed the subject of an experiment in December

1914. By reference to the height of the trace above the base line it has been possible to calculate the quantity for the months previous to the experiment. In this way it was found that a unit positive magnetic force directed horizontally towards N. 14° W. produced apparent downward forces as follows: January +·002, February +·003, March +·003, April and May +·004, June +·003, July +·001, August -·002, September -·003, October 1st to 13th -·006, October 13th to 31st +·008, November +·009, December +·010. The azimuth N. 14° W. is that of the magnets of the Watson instrument, and in applying these small corrections it may be taken to coincide with the magnetic meridian.

**The Inequalities of Declination, Horizontal Force and Dip**, were computed from those of the geographical components by the following formulæ:—

$$\begin{aligned}\delta D &= \frac{3438^*}{N} \cos D \left\{ -\sin D \delta N + \cos D \delta W \right\}, \\ \delta H &= \cos D \delta N + \sin D \delta W, \\ \delta I &= \frac{3438}{H} \cos I \left\{ -\sin I \delta H + \cos I \delta V \right\};\end{aligned}$$

here N, W, D and I are taken as fixed quantities equal to the means for the year, or in some cases for a shorter period.

In finding the inequalities of declination, horizontal force and inclination, corrections have been inserted for the effect of the north component on the west magnetograph, and *vice versa*, and also for the effect of the horizontal force on the vertical magnetograph (see p. 35, *ante*).

The inequalities and the ranges have been worked to one place beyond the last figure published, and subsequently rounded off. Consequently, if one should attempt to check, say, the ranges, by using the published figures for the inequalities, occasional discrepancies of a unit in the last place would occur.

**The Harmonic Components** (Fourier Coefficients), which are printed in Table LXIV., have been obtained from the inequalities by means of the formulæ, which are set out, for example, in the Greenwich *Magnetical and Meteorological Observations*, 1908, p. xxxii. The inequalities employed in this calculation went to one decimal place beyond the last printed figure. The Harmonic Components have been corrected for the effect of a north force on the west magnetograph, and *vice versa*, and also for the effects of north and west forces on the vertical force balance (see p. 37, *ante*).

**Eclipse Data.**—At the request of Dr L. A. Bauer, measurements were made of the magnetic curves on August 21, the day of the solar eclipse, at 2-minute intervals, from 10 h. to 15h. The results appear in Tables LXV. and LXVI. The magnitude of the eclipse was 0·70.

**Absolute Magnetic Observations** were made in the East hut, as a rule weekly. The **declination** and **horizontal force** were determined by the magnetometer Elliot 60 placed on the central pier (No. 5). The azimuth of the fixed mark, as seen from this pier, was taken to be 8° 12' 30" W. of S., as in previous years. The constants for the lengths on the deflection bar, for the induction coefficient and for the moment of inertia of the collimator, were the same as those printed at the end of

\* 3478 = 180 × 60/π; δD and δI being measured in minutes of arc.

the 1911 issue of these notes (p. 74). Some spots of rust were to be seen on the collimator in the autumn of 1913, and it has therefore been kept since then, when not in use, in a dessicator over solid sodium hydrate.

With the beginning of 1914 a new system for taking observations came into force, on the recommendation of the Assistant Director of Observatories, Dr Chree. The chief changes have been the following: (1) The torsion of the silk fibre used in the declination experiment is now observed both before and after the declination. (2) Four declination observations, two erect and two inverted, are now made instead of two; and the mean observed declination is taken to correspond to the mean curve reading, time corrections being eliminated. (3) The observations of deflection are now made in the following order: Magnet on east arm at 35 cms., 30 cms., 25 cms.; on west arm at 25 cms., 30 cms., 35 cms. The object of this order is to concentrate the observations at 25 cms.; and to preserve the same mean time for each distance. The horizontal force is calculated as  $H = \sqrt{mH_v \times \frac{H_R}{m}}$  where  $mH_v$  is obtained from the vibrations and  $\frac{H_R}{m}$  from the deflections made at a different time on the same day.  $\frac{H_R}{m}$  is corrected for the distribution of magnetism in the magnets. Measurements are made of the mean curve readings of the north component during the 25 cms. deflections and during the vibrations separately, and the sum of these means divided by 2 is taken to correspond to the observed value of  $H$ . The same is done for the west component. In this way time corrections are avoided. The correcting factor  $(1 + P/25^2 + Q/25^4)$  is derived for each month from the observations in the group of seven co-central months. Latterly a troublesome calculation has been avoided by the use of an isopleth-graph giving  $\log(1 + P/25^2 + Q/25^4)$  as a function of the differences between  $\log \frac{m'}{H'}$  at 25, 30, and 35 cms.

**The Absolute Values of Inclination** have been obtained from the new Schulze inductor No. 103. Before despatch from Germany this instrument was inspected and compared by the Potsdam Observatory, and the correction of No. 103 to the Potsdam standard was found to be  $-0'11$ ,  $-0'21$ , and  $+0'16$  in three successive observations. No correction has been applied. The instrument is used in conjunction with a Broca galvanometer supplied by the Cambridge Scientific Instrument Company. The galvanometer was fitted at the observatory with a specially weak control magnet of negligible stray field.

Comparisons between this inductor and the Dip Circle (Dover No. 74), which has previously served as the observatory standard instrument, were carried out by more or less simultaneous observations. At first the inductor was in the West hut and the dip circle in the East hut. On May 12 the stations were exchanged and the comparison continued. The results, after reduction to base values of the V.F. magnetograph (whereby differences in time are eliminated), are set out on Plate I. There is no significant difference between the stations. In January there was the large difference of  $60\gamma$  between the values of the vertical force as determined with the inductor in use and with the needles, the



needles making the dip and therefore the vertical force greater. This difference gradually decreased to  $20\gamma$  in April and rose to  $40\gamma$  in September, for no assignable reason. The inductor and dip circle have been tested for magnetism by a specially sensitive astatic magnetometer, and they have been found to be free from anything which could affect any component of force by  $2\gamma$ .

**The Times of the Absolute Observations** are published in the monthly tables in an abbreviated form, in order to save space. The published value of the horizontal force corresponds with the means of the curve readings at the times of the declination observations. Due allowance is made for the difference between the curve readings at the times of the deflection and vibration observations and at the times of the declination observations.

**The Base Values** were worked up on computing forms like the specimen bound in with last year's issue of these notes.

In computing hourly values the same base value has been assigned to each of the hours 0 h. to 24 h. of one day, the change in base value being made between 24 h. of one day and 0 h. of the next, hours separated only in the tabulations. In preparing the tables of diurnal inequalities the drift of base value during the day has been removed, together with any other non-cyclic change by applying a correction proportional to the interval to or from noon.\*

**The Figures for the Magnetic Character of the Days of 1914 at Eskdalemuir** were assigned with the primary object of aiding in the selection made at De Bilt of international quiet days for measurement and of storms for reproduction. The figures are printed in Tables IV., VIII., etc.

That one of the three components which was most disturbed was principally considered. A day was called "0" if the regular diurnal inequality was conspicuous, "1" if it was recognisable throughout the day, "2" if it was not recognisable throughout a part or the whole of the day.

Thus the measure of disturbance is not absolute but relative to the range of the diurnal inequality, and this changes greatly with the seasons.

In deciding the character of the day as much weight was given to disturbances near midnight as to those at other times.

As the published values are hourly means, small oscillations, which would be smoothed out in taking the mean over an hour, were ignored in deciding whether to place a day in the "0" or the "1" class.

Character-figures having been assigned on these principles, the numbers of 0's, 1's, and 2's were counted up in the quarters of the year January–March, April–June, July–September, and October–December. It has been suggested from De Bilt that in any such quarter of the year at least six days should have a character of "2," and that not more than two-thirds of all the days should be placed in any one of the three classes. When the numbers did not fit with this suggestion, sufficient borderland cases were removed from one class to another to redress the balance. The character-figures for individual days are given, month by month, in the *Geophysical Journal*.

**Copies of Disturbed Curves.**—Plates II. and III. at the end of this volume

\* The diurnal range of temperature is too small to affect the inequalities appreciably. *Vide* Notes 1911, p. 86; 1913, p. 72.

contain reproductions of the curves from the magnetographs at Eskdalemuir for the days doubly starred in the international list, namely, April 6-7, July 5, September 27-28, and October 28. Descriptions of the starred days will be found in the notes which accompany the monthly tables, pp. 9, 11, etc., *ante*.

**The Exclusion of Moisture from the N and W Magnetographs.** — Small beakers of  $\text{CaCl}_2$ , or the like, have for long been kept inside the cases, but, in spite of this precaution, the magnets and the suspending steel wires have become very rusty. Damp air must have entered partly by diffusion and partly at each increase of barometric pressure. On December 28 the joints in the cases were sealed with vaseline. From this date also a special opening has been provided whereby air can enter, but in doing so it must pass first over drying agents, then through a plug of cotton-wool, and must finally enter the case through a sheet of stiff blotting-paper, of about  $60 \text{ cm.}^2$  area. The object of the porous paper is to prevent the formation of a jet of air which might disturb the magnet when doors are suddenly opened or when the barometric pressure changes rapidly. The beakers of  $\text{CaCl}_2$  have been maintained inside the cases.

No attempt was made to scrape the rust off the magnets, for fear of disturbing their magnetic moments.

ANNUAL REVIEW OF MAGNETIC DISTURBANCE AT  
ESKDALEMUIR, 1914. BY L. F. RICHARDSON, B.A.

The division of disturbances into classes K and L, as set out in the 1913 volume, has been abundantly confirmed by an examination of the days "starred" by De Bilt.

*Class K.*—The statement made in last year's notes that the directions of class K disturbances form a broad flat sheaf lying in a plane sloping slightly upwards to the north has been entirely confirmed. Directions lying in the octants  $\pm$  (N, E, up) were in 1914 very rare in comparison with those  $\pm$  (N, W, up). Examples  $\pm$  (N, E, up) were noted on February 6 d 22 h and December 19 d 20 h, but the whole number of this kind cannot have amounted to 5 per cent. of the total. In the Monthly Notes the measurements are given of seven sudden motions ("commencements" and the like) of the K class. The direction corresponding to the mean of their components is  $\pm$  (N  $33^\circ$  W ;  $3^\circ\cdot4$  up).

As the direction of the magnetic field is nearly fixed relative to the earth it seems probable that the orbits of the electric currents producing the field are also nearly fixed relative to the earth. One is tempted to identify the orbit with Birkeland's\* ring at a great height above the earth in the plane of the magnetic equator; and in order to explain the small angular elevation of the vector ( $0^\circ$  to  $6^\circ$ ) further to postulate earth currents flowing round the parallels of magnetic latitude. Two days, May 5 and July 16, have afforded evidence somewhat tending to confirm the view that the currents in question are nearer the equator than the pole. (See Monthly Notes.)

To explain the fact that the K disturbances are more marked on the side of the earth corresponding to 10 h to 18 h local time we may imagine the outer orbit to be nearer the earth on this side.

Class K disturbances may be divided into two kinds, although the demarkation between them is not always clear:—

(1) *Sudden or serrated*, including sudden commencements and other disturbances similar to sudden commencements, except that no storm follows. Here would also be grouped the irregular serrated K disturbances which often accompany an increase of downward force during the middle of the day.

(2) *Wave-like*, including pulsations and wave-like motions of class K of longer period. When the period is as much as 30 minutes or more, the shape of the wave

\* Birkeland, *The Norwegian Aurora Polaris Expedition*, 1902–1903, vol. i.

often reminds one of that of a sea wave, because it is not sinusoidal, but has sharp crests and flat hollows, or *vice versa*. When of this form it is sometimes doubtful whether it is really a wave or only a succession of independent serrations.

The following list of serrations during 1914, and of wave-like disturbances during 1913 and 1914, includes all the wave-like disturbances mentioned in the Monthly Notes for the two years. Those measured were selected at random from among the more distinctly wave-like K disturbances.

Frequency of Occurrence of Disturbances of Class K.					
Serrations.		Wave-like Disturbances.			
1914.		1913.		1914.	
Period. (Minutes.)	Number of Cases Observed.	Period. (Minutes.)	Number of Cases Observed.	Period. (Minutes.)	Number of Cases Observed.
17	1	3	1	3.7	1
20	1	4	3	4	3
31	1	5	2	5	5
38	1	6	1	6	3
50	1	8	3	6.5	2
54	1	6	1	7	1
62	1	10	6	7.5	1
65	1	11	1	10	6
80	1	12	4	11	2
93	1	13.5	1	12	3
95	2	15	2	14	2
98	1	18.5	1	15	2
160	2	19	1	16	1
..	..	23	1	18	1
..	..	26	1	19	2
..	..	27	1	28	1
..	..	28	2	30	1
..	..	30	2	32	1
..	..	38	1	34	1
..	..	60	1	36	1
..	..	66	1	39	1
..	..	74	1	45	2
..	..	78	1	70	1
..	..	80	2	74	1
..	..	85	1	85	1
..	..	95	1	100	2
..	..	100	1	140	1
..	..	109	1	..	..
..	..	148	1	..	..
..	..	155	1	..	..
..	..	180	1	..	..

Periods of less than 4 minutes are commonly in evidence, but they have been disregarded because they cannot be measured accurately on traces running 15 mm. to the hour.

Bearing in mind that the measurements of periods are uncertain by, say, 10 per cent. on account of irregularities in the curves, we may suspect that there are isolated periods of 10 minutes, 12 minutes, 14.5 minutes, and 18.7 minutes. There is also apparently a band of periods near 30 minutes, a broad band centering at 85 minutes, and a suggestion of a band near 160 minutes.

While the more rapid oscillations of, say, 5-minutes' period, frequently persisted for as many as four complete wave-lengths, the slower oscillations of 30 or more minutes' period seldom persisted for more than one or two wave-lengths. The disappearance of the oscillations did not take place by a regular exponential diminution of amplitude such as would be produced by damping acting alone. The traces suggest rather that the cessation is due to the vibrating system receiving other shocks from the outside, or to it being inherently unstable.

The oscillating system may be either in the sun or near the earth. In connection with the latter hypothesis it may be noted that the motion of electric charges round an electrified and magnetised nucleus has been investigated mathematically by Størmer, Nicholson, Conway, Hicks, and G. W. Walker.\* If the periods noted above could be brought into relation with this theory matters of interest might come to light. In particular, one might hope to obtain a measure of the electric field outside the earth's atmosphere.

**The After-Effect of Magnetic Storms** may be seen most easily by reference to the hourly values printed herewith. Van Bemmelen † has shown that its direction is more or less parallel to the local magnetic meridian, so that in this respect it resembles the Eskdalemuir K disturbance. He also gives (*l.c.*, p. 124) figures equivalent to an inclination at Pavlosk of  $8^\circ$  down to S, which is only just outside the limits  $0^\circ$  to  $6^\circ$  found for Eskdalemuir. There is thus a presumption that the after-effect may be due to currents in the same position as those which produce the pulsations, "sudden commencements," and other K disturbances.

*Class L.*—A rotating disturbance was noted on January 22. Sufficient attention has not been given to class L disturbances to make any statistics possible this year.

**The Vertical Force Inequality on Disturbed Days and Allied Phenomena.**—On almost every "starred day" in the year the downward force has had a maximum in the afternoon or evening followed by a minimum between 0 h and 6 h (an exception is noted on June 25). An inequality more or less of this type would be produced by an electric current in a straight line passing from the sun through a point above the north polar regions, provided the moving charges were positive. ‡ The mean inequalities for the difference between disturbed and quiet days have been studied by Chree § for Kew, and the signs of the N and W "difference inequalities" which he finds are in general harmony with such an explanation, but the line would pass a little in advance of the sun. On the contrary, the signs of the very slow horizontal disturbances noted at Eskdalemuir for September 27, October 28, and November 11, would require the current to lie to the South of Eskdalemuir and to consist of negative charges if moving away from the sun.

**Relations between K and L Disturbances and Vertical Force Inequality on Disturbed Days.**—On many stormy days it has been noted that the large increase

\* Størmer, *Kristiania Forh., Vid. selsk.*, 1907, and *Comptes Rendus*, vol. clvi. pp. 450, 536. G. W. Walker, *Proc. Roy. Soc.*, February 1915. W. M. Hicks, *Proc. Roy. Soc.*, April 1915.

† *Terrestrial Magnetism*, vol. v. p. 123.

‡ C. P. Størmer, *Terrestrial Magnetism*, March 1915.

§ *Studies in Terrestrial Magnetism*, Chapter VI.

in the downward force during the middle of the day is accompanied by disturbances of class K, and that, at the time when the downward force attains its maximum, disturbances of class L appear, and, further, that they persist during the decrease of the downward force. On five occasions in May it was noted that this simultaneous change occurred, although the time of its occurrence varied between 17 h and 20½ h. (See Notes for May, October, and November.)

NOTES ON THE ELECTROGRAPH AT ESKDALEMUIR FOR  
1913 AND 1914. BY L. F. RICHARDSON, B.A.

The installation and method of working the electrograph were substantially the same as those set out in the 1912 volume, except that the scale value was about 100 volts per cm. from the beginning of 1913 to April 1914 and about 130 volts per cm. from May 1914 onwards.

The plan adopted in preparing Table LXXVI. was to group together for each month all the days shown as (0a) in the monthly issue of the *Geophysical Journal*, whether there were many or few, and to form a diurnal inequality from them. Then all the days shown as (1a) and (2a) were together formed into another group and a separate inequality obtained.

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 one or more excursions of limited duration to the negative side of the scale.

2, denotes negative potential extending in the aggregate over about 3 hours or more.

(In the introduction to the *Geophysical Journal* for 1913 it is stated that at Eskdalemuir 2 denotes negative potential extending in the aggregate over at least 2 hours. This is incorrect.)

“a,” denotes that within the 25 hourly periods for which an estimate of the mean potential has to be made in the process of tabulation there was in no case a range of potential gradient in the open exceeding about 1000 volts.

In forming the inequalities, only those days were used on which all the 24 hours were available. A few missing readings have been interpolated where this could be done with reasonable certainty.

The seasonal and yearly inequalities have been formed by taking the means of the monthly ones, giving equal weight to each month without regard to the number of days utilised.

Some trouble was experienced with the electrometer during the early part of 1913, owing to the spot of light returning sluggishly to zero when the system was earthed. The instrument was overhauled and a dessicator was fitted to the case. The trouble was partly, but not entirely, cured ; it is not now serious. An explanation in conformity with some of the observed facts is the presence of some viscous material, possibly varnish, adhering to the bronze strip by which the needle is suspended.

Short-circuiting of the apparatus by spiders remains one of the chief difficulties.

The standard of voltage to which all measurements have been reduced is that given by Wulf electrometer No. 3040. In July, 1913, this instrument was compared with a battery of cadmium cells. All up the scale as far as 70 volts the figures found in this way for Wulf, No. 3040, were some 8 volts lower than those given on the certificate (dated 1911) of the National Physical Laboratory. The comparison could not be carried beyond 70 volts, owing to lack of apparatus.\* It was therefore assumed that the zero had shifted by 8 volts; the values printed for 1913 of volts per meter in the open were based on this assumption.

The factor by which the potential of the electrograph needle must be multiplied to convert it to volts per meter in the open has been determined, as in previous years, by an experiment in which an observer takes a voltmeter and retires to an underground pit, closing a lid over himself. The lid is an electric conductor, and is flush with a close-cropped grass lawn. Through a small hole in the lid a slender metal pointer is protruded to a height of one metre. The potential difference between the lid and a lighted fuse on the end of the pointer is measured. The factors determined in this way varied through a range of about 10 per cent. under ordinary daylight conditions, while on calm evenings values 10 or 20 per cent. lower were obtained. The cause of these variations is unknown. The changes are too large to be attributed to errors of observation or to shifts of the jet. The only known change in the position of the jet occurred in February 1913. The values finally adopted for 1913 were 5.5 for January, 5.65 for February, 5.45 for March, and for the rest of the year a semi-conventional figure of 5.24, which coincided with the mean of a number of daylight observations; observations on calm evenings were omitted from this mean, perhaps without sufficient reason.† In 1914 some 27 observations were made in the pit to determine the value of the aforesaid factor, and in consequence the following mean values were assigned to it:—January, February, and March, 5.77; April, May, June, and July, 5.65; and 5.60 during the remainder of 1914.

\* In March 1916 a Kelvin Multicellular Voltmeter was adopted as standard.

† It may be noted that if this variation in the factor of the electrograph from day to night is confirmed, the table of diurnal inequalities will be seriously affected.



NOTES ON THE MAGNETIC OBSERVATIONS MADE AT THE  
VALENCIA OBSERVATORY, CAHIRCIVEEN, 1914. BY J. E.  
CULLUM, SUPERINTENDENT.

Absolute observations of declination, horizontal force, and inclination were taken twice a month with the Dover Unifilar No. 139 and the Dover Dip Circle No. 118.

The mean hours (G.M.T.) of observations were approximately 10 h for declination, 12 h (noon) for horizontal force, and 14 h (2 p.m.) for inclination.

Particulars of individual observations will be found in the monthly numbers of the *Geophysical Journal*. The results of the horizontal force observations given therein were based on the value obtained for the distribution constant "P" from the combined observations of the year 1913. The value obtained for P from the observations of 1914 is somewhat different, necessitating the application of the correction  $-1\gamma$  ( $-0.00001$  C.G.S.) to the values published in the *Geophysical Journal*.

Table LXVII. gives the observed mean monthly and annual values of declination, horizontal force, and inclination, and corresponding calculated values for the total force, and the north, west, and vertical components.

Mean annual values are also given for the years 1913, 1910, and 1905.

## NOTES ON THE METEOROLOGICAL SUMMARIES.

For Kew, Valencia, Falmouth, and Aberdeen, the tables give the average for the 40 years 1871–1910 of:—*a.* Barometric Pressure; *b.* Temperature of the Air; *e.* Rainfall; the averages for the 30 years 1881–1910 of:—*d.* Velocity of the Wind; *f.* Sunshine; and the averages for the 25 years 1886–1910 of:—*c.* Relative Humidity.

The averages referred to above have been adopted as normal values for the elements mentioned at the four observatories, and the values for 1914 are compared with them.

At Falmouth the photographic records ceased after June 1913, the station being no longer considered an Observatory of the First Class. Hourly Means of Wind Velocity also not being available, the differences between the normals and the values for 1913 are given for Rainfall and Sunshine only.

In the case of Eskdalemuir the values for the current year only are given.

Particulars of the methods of tabulation and of the instruments, additional to those given in the footnotes to the tables, are published in the Introduction to Part IV., Section (1) of the *British Meteorological and Magnetic Year Book for 1913*, and in the *Annual Reports of the Meteorological Office for the years 1867 and 1869*.

Tables for the reduction of the values of pressure to Mean Sea Level are also included in the Introduction referred to.

The values in the tables have been expressed throughout in units based upon the C.G.S. system, and the following table shows the actual units employed for the different elements:—

Element.	Unit.	Corresponding units used previously or in other Countries.
<i>a.</i> Barometric Pressure.	Millibars.	Inches or Millimetres of Mercury.
<i>b.</i> Temperature of the Air.	Degrees Absolute.	Degrees Fahrenheit or Centigrade.
<i>c.</i> Relative Humidity.	Percentages (100=Saturation).	Percentages (100=Saturation).
<i>d.</i> Velocity of the Wind.	Metres per Second.	Miles or Kilometres per hour.
<i>e.</i> Rainfall.	Millimetres.	Inches or Millimetres.
<i>f.</i> Sunshine.	Hours.	Hours.

Tables for the conversion from one set of units to the other were given with the notes for 1913. They will be found in the *Computer's Handbook*.

*a. Barometric Pressure.*—Millibars. A “bar,” one thousand millibars, is equal to a pressure of one million dynes per square centimetre (one megadyne per cm.<sup>2</sup>).

This is nearly equal to the normal mean pressure of the atmosphere at the surface of the earth. One millibar is approximately equal to the pressure due to  $\frac{2}{100}$  of an inch, or  $\frac{3}{4}$  of a millimetre of mercury under normal conditions.

The barometer readings are obtained from the hourly tabulations of photographic records from similar apparatus at all the observatories.

The barographs at Kew \* and Aberdeen have remained unchanged throughout the whole period. The site of Valencia Observatory was changed from Valencia Island to Cahirciveen, County Kerry, on March 23rd, 1892, the change in the height of the cistern of the barometer being from 7.0 m. to 13.7 m. The site of the observatory at Falmouth was changed in May 1885, the change in the height of the cistern of the barometer being from 64.3 m. to 55.8 m. Account has been taken of these changes of position in calculating the pressure averages for the period 1871–1910, and the values given correspond with the present positions.

In forming the monthly means of the hourly values of pressure, temperature, humidity, and wind velocity (given in the last column in Tables LXIX., LXX., LXXI., LXXII.), a correction has been applied to the tabulated values to eliminate the effect of a difference between the conditions at the beginning and end of the month.

The corrections to the individual mean hourly values are dependent upon the values for the first and second midnights. If the algebraic excess of the value at the second midnight is  $d$ , then  $d(12-n)/24$  represents the correction to be applied to the actual value obtained for the hour  $n$ . The values of  $d$  for pressure and temperature are given on p. 87.

If we examine the daily variation in the departures from the normal values of the means for 1914, we find that the mean pressure for the year was below the normal at all the observatories. The months in which pressure was above the normal at all stations were January, April, May, June, September, and October; it was everywhere below the normal in February, March, July, and December.

When the diurnal variation of pressure is analysed in a series of harmonic terms, or waves, whose periods are 24 hours and its submultiples, the 24-hour term is found to be much less regular and much more dependent on local conditions than the 12-hour term. A comparison of the values of the harmonic coefficients calculated for Aberdeen, Eskdalemuir, and Richmond (Kew) Observatories is given below, the notation being explained by the formula used, viz. :—Inequality

$$\begin{aligned} &= P_1 \sin (15t + A_1)^\circ + P_2 \sin (30t + A_2)^\circ + P_3 \sin (45t + A_3)^\circ, \\ &= P_1 \cos 15(t - T_1)^\circ + P_2 \cos 30(t - T_2)^\circ + P_3 \cos 45(t - T_3)^\circ \end{aligned}$$

where  $t$  is the time elapsed in hours since midnight, and  $T_1, T_2, T_3$ , are the times of the maxima of the three harmonic terms. The times of the corresponding minima differ from those of the maxima by twelve, six, and four hours, respectively.

\* Owing to structural alterations at Kew Observatory, the working standard barometer used for the control of the barograph readings was moved, on May 26th, 1913, to an adjacent building, where it remained until December 16th, 1913. It may be noted that the ultimate standard barometers have not been moved since they were set up in 1855 and 1860 respectively.

Observatory and Period.	Amplitudes in Millibars.			Phase, Greenwich Mean Time.									Phase, Local Mean Time.		
				24-hour term.			12-hour term.			8-hour term.					
	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	A <sub>1</sub>	Max.	Min.	A <sub>2</sub>	Max.	Min.	A <sub>3</sub>	Max.	Min.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>
Aberdeen, 1913 . . .	·103	·248	·029	174·9	18 20	6 20	137·2	10 26	4 26	351·9	2 11	6 11	177·0	141·4	358·1
„ 1914 . . .	·105	·242	·034	111·0	22 36	10 36	141·1	10 18	4 18	4·5	1 54	5 54	113·1	145·3	10·8
Normal (1871-1910)	·120	·247	·028	158·8	19 35	7 25	143·6	10 13	4 13	350·3	2 13	6 13	160·9	147·8	356·6
Eskdalemuir, 1913 . . .	·053	·270	·037	237·4	14 11	2 11	139·2	10 22	4 22	2·6	1 57	5 57	240·6	145·6	12·2
„ 1914 . . .	·102	·229	·028	63·1	1 48	13 48	136·7	10 27	4 27	44·6	1 1	5 1	66·3	143·1	54·2
Richmond (Kew) Obs.															
1913 . . .	·136	·336	·046	23·1	4 27	16 27	150·2	10 0	4 0	350·6	2 13	6 13	23·5	150·9	351·6
1914 . . .	·147	·363	·027	1·6	5 54	17 54	146·0	10 6	4 6	33·1	1 16	5 16	1·9	146·7	34·0
Normal (1871-1910)	·137	·352	·031	29·6	4 2	16 2	149·5	10 1	4 1	358·5	2 2	6 2	29·9	150·1	359·4

The non-cyclic element  $d$  has been eliminated in the way indicated above, before making the calculations. For the purposes of the calculations the hourly values were taken out to 0·001 millibar in the case of the individual years and to 0·00001 inch in the case of the 40-year period. The calculation of the amplitudes and phase angles was carried at least one figure beyond that retained, and these more exact figures were used in deducing the times of maximum and minimum. While it has been convenient to record all these times to minutes, this degree of accuracy can hardly be claimed, especially in the case of the 8-hour term. The 24-hour term has only one maximum and one minimum, separated by 12 hours. The 12-hour term has two maxima and two minima, while the 8-hour term has three maxima and three minima, the interval between successive maxima and minima being 6 hours in the former case and 4 hours in the latter.

The variability of phase in the 24-hour term is remarkably illustrated by the difference between the results for 1913 and 1914, especially at Eskdalemuir.\*

*b. Temperature of the Air.*—Degrees absolute (°A.). The value of a degree is the same as the centigrade scale, but the zero is taken to be the absolute zero of temperature, 273° C. below the normal freezing-point of water. The conversion from degrees C. to A., or *vice versâ*, is therefore a simple addition or subtraction. Tables for converting degrees F. directly into degrees A., or *vice versâ*, are given in the *Computer's Handbook*.

The values of temperature at all four observatories were obtained from the tabulation of photographic records from similar and similarly exposed mercurial thermometers. At Eskdalemuir the thermometer screen is away from the observatory building, while at the other observatories the screen is on the north wall of the building.

The tabulated values are taken directly from the curves, and are not corrected for the difference between the tabulated values at fixed hours and the results of eye-observations at those hours. The tabulating scale is so adjusted that these

\* When the average hourly values are plotted it is seen that the amplitude of the morning wave was greater than that of the afternoon wave in 1913. These conditions were reversed in 1914.

differences are always small. The actual mean differences for 1914 are shown in the table on p. 85, except in the case of Eskdalemuir, where the scale is adjusted for each curve so that no correction may be necessary. From 1915 equivalent plans have been adopted in dealing with the tabulated values from the other observatories.

An inspection of the figures for 1914 shows that the mean temperature for the year was slightly above the normal value, the excess being most marked at Kew, where January was the only month showing a defect from the normal.

*c. Relative Humidity.*—This is obtained from the tabulation of the photographic records of temperature combined with those of the wet bulb thermometer. The thermometers are similar at all the observatories; they have cylindrical bulbs about 4 inches long. The values of the humidity are calculated by the use of the Meteorological Office Tables, which are based upon Glaisher's factors.

The means for Kew, Eskdalemuir, and Valencia are obtained from the hourly values of humidity for each day; the means for Aberdeen are calculated from the mean hourly values for the month of the dry- and wet-bulb temperatures.

The means for the year show that generally the humidity was about normal. In February, March, and August the humidity at all the observatories was above the normal, but in April and December it was below it.

The values of the humidity depend chiefly on the difference between the readings of the wet- and dry-bulb thermometers, and a small error in the tabulated values of these records may produce a considerable error in the value of the humidity.

*Mean Monthly Values of the Differences between the Tabulated and the Standard Readings of the Thermometers.*

	VALENCIA.			KEW.			ABERDEEN.		
	Standard <i>minus</i> Curve.		Approx. Correction to Relative Humidity.	Standard <i>minus</i> Curve.		Approx. Correction to Relative Humidity.	Standard <i>minus</i> Curve.		Approx. Correction to Relative Humidity.
	Dry Bulb.	Wet Bulb.		Dry Bulb.	Wet Bulb.		Dry Bulb.	Wet Bulb.	
	°A.	°A.	%	°A.	°A.	%	°A.	A°.	%
January . . .	−·02	−·02	0·0	−·09	+·06	+0·4	−·08	−·06	+0·2
February . . .	−·02	−·02	0·0	−·09	+·01	+0·9	−·07	−·13	−0·7
March . . .	−·01	·00	+0·1	−·07	+·01	+0·7	−·07	−·14	−0·8
April . . .	+·02	+·03	+0·1	−·07	−·04	+0·4	+·02	−·12	−1·6
May . . .	−·02	−·01	+0·1	−·13	−·11	+0·3	−·02	0·00	+0·2
June . . .	−·03	−·02	+0·1	−·11	−·12	−0·1	−·06	−·01	+0·5
July . . .	−·06	−·06	0·0	−·17	−·18	−0·1	−·07	−·02	+0·5
August . . .	−·06	−·03	+0·4	−·13	−·18	−0·6	−·03	−·02	+0·1
September . . .	−·04	−·04	0·0	−·14	−·10	+0·5	−·06	−·06	0·0
October . . .	−·03	−·02	+0·1	−·11	−·03	+0·9	−·04	−·07	−0·3
November . . .	−·06	−·05	+0·1	−·13	−·01	+1·3	−·03	−·14	−1·2
December . . .	−·01	−·03	−0·2	−·14	−·02	+1·3	−·07	−·08	−0·1
Year . . .	−·03	−·02	+0·1	−·12	−·06	+0·5	−·05	−·07	−0·3

*d. Wind.*—The velocity and direction of the wind are obtained from the records of similar Robinson Anemographs at Kew, Valencia, Falmouth, and

Aberdeen, but at Eskdalemuir the records are made by a Dines Pressure Tube instrument.

The records from instruments of the two types, exposed at the same place, give approximately the same values for the mean velocity.

The normal daily variation of wind velocity at moderate heights shows a maximum in the middle of the day and a minimum near midnight or in the early morning. It is of some interest to examine the fluctuations from year to year in the ratio of the daily range  $\Delta V$  to the mean value of the velocity  $V$ .

The following table shows the value of the ratio  $\Delta V/V$  :—

	Valencia.	Kew.	Eskdalemuir.	Aberdeen.
Normal ratio . . . . .	.278	.585	..	.340
Ratio for 1911 . . . . .	.312	.553	.413	.350
Ratio for 1912 . . . . .	.258	.560	.432	.369
Ratio for 1913 . . . . .	.323	.531	.438	.360
Ratio for 1914 . . . . .	.265	.552	.486	.362

The ratio is larger at Kew, the most “continental” station, than at the other observatories. It is smallest at Valencia.

*e. Rainfall.*—The tables give the mean values of the hourly measurements for each month, *i.e.*, the value entered to noon is the mean of the amounts which fell between the hours of 11.30 a.m. and 12.30 p.m. during the month. The amount entered in the column headed “Day” is similarly the total amount recorded during the month, divided by the number of days in the month.

The total rainfall for 1914 was above the normal fall at all the observatories, except Aberdeen, where it was a little below.

The rainfall was below the normal at all the observatories for which normals exist in January and April, and above it in February, March, and December.

*f. Sunshine.*—The method of expressing the results is similar to that adopted for rainfall. The values are given in hours, and are obtained by dividing the totals for each month by the number of days in the month. The values in the column headed “Day” are therefore the mean number of hours of sunshine per day, and the individual day is directly comparable with the average day.

The sunshine for the year 1914 was rather above the normal, except at Valencia, where it was nearly 6 per cent. below. The average duration was exceeded at all observatories in April and June, the duration at Kew being about 50 per cent. above the normal in the latter month. In March and July the duration at all stations fell below the normal.

*Normals.*—In the case of *a*, *b*, *e*, each normal hourly value is the mean of about 1200 readings, the exact number depending of course upon the month. Within what limits such a series is sufficient to determine a normal value is a question which deserves investigation. It is not unusual for the mean value of the pressure for an individual month to differ by 15 or 20 millibars from the normal value, so that the inclusion of an extra year may affect the normal value by as much as 0.5 millibar, and the selection of a different 40-years’ period may lead to differences equally great or indeed greater. Thus, if we take the period 1854–1893, the mean value of the

pressure in London for the month of January is less by 1·7 millibars than its value for the period 1871–1910. Clearly, therefore, a period of 40 years is not sufficient to determine within 1 millibar the normal monthly value of atmospheric pressure.

Again, with reference to temperature, a month may have a mean temperature as much as 5° A. below the normal. Thus the 40-years' mean is uncertain to at least 0°·1 A., and probably to a considerably greater extent.

For rainfall a single instance will suffice to illustrate the degree of uncertainty. The total fall for the month of June at Kew for the 30 years 1871–1900 was less than double the amount for the 10 years 1901–1910, the amounts being 1501 mm. and 807 mm. respectively; while it was three times the amount for the 10 years 1861–1870, 492 mm. Thus the 40 years' average for 1861–1900 would be 50 mm., while that for the 40 years 1871–1910 would be 58 mm. It follows that the 40 years' normal for rainfall for an individual month may vary by between 10 per cent. and 20 per cent of its value.

*Accuracy of Means.*—The computation of mean hourly values for Tables LIX. to LXXIV. has been carried to one decimal place beyond the last figure given by the individual readings. On account of unknown zero errors of the thermometers and barometers and various defects of the anemometers, raingauges, and sunshine recorders, this refinement, regarded as determining the values for particular hours, is not justified. The differences between the values for different hours may in most cases be relied on.

NON-CYCLIC CHANGE (24 h.–0 h.) OF PRESSURE AND TEMPERATURE.

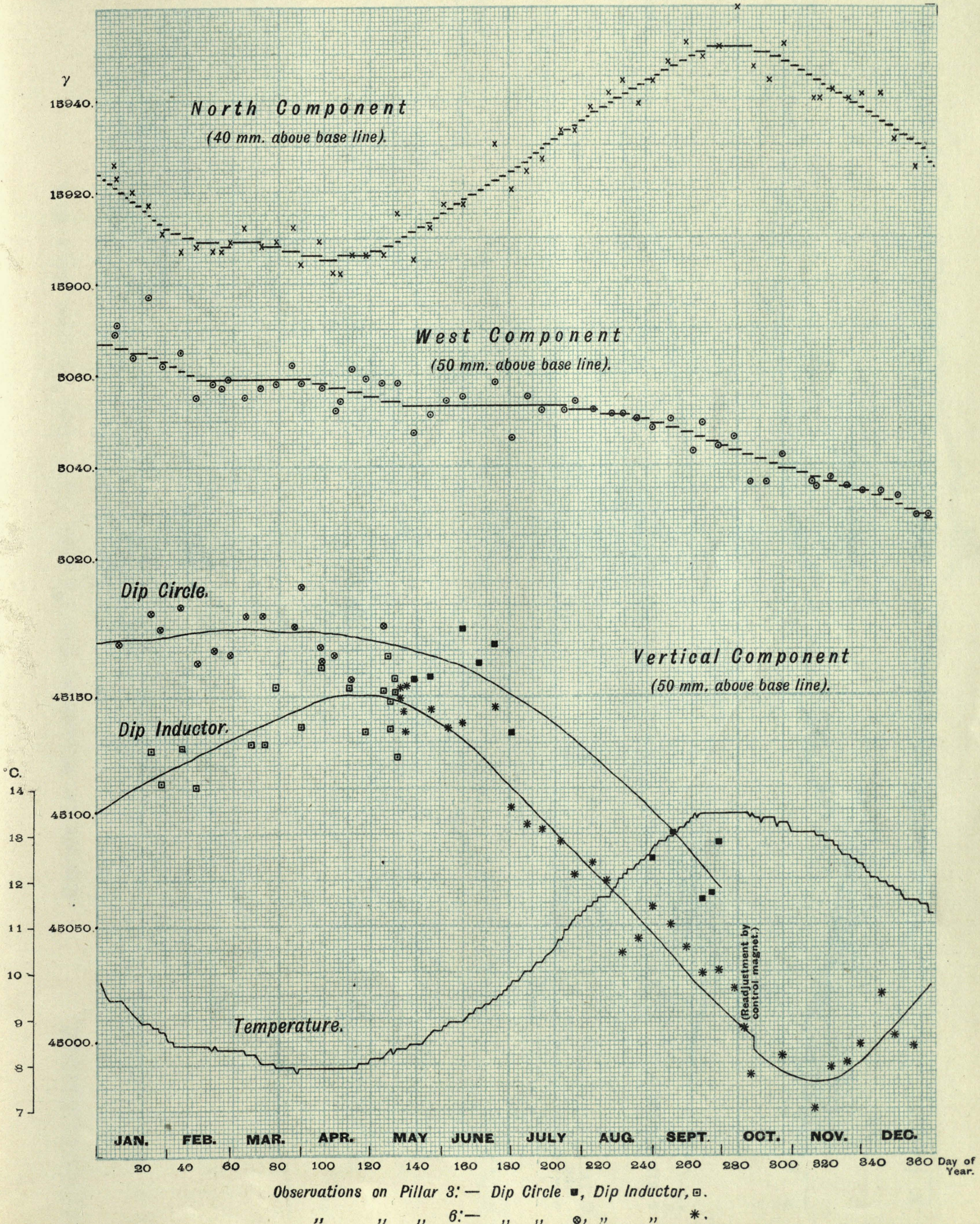
*Differences between the Normal Monthly Mean Values of Pressure and Temperature for the 2nd and 1st Midnights, and the corresponding Differences for 1914.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Pressure—Millibars.													
Aberdeen, Normal	-0·01	+0·01	-0·02	+0·12	+0·06	0·00	-0·03	-0·06	-0·04	+0·06	-0·10	+0·03	0·00
„ 1914.	-0·92	+0·15	+0·34	+0·33	-0·21	-0·16	-0·12	+0·59	-0·44	-0·40	-0·63	+0·18	-0·11
Eskdalemuir, 1914.	-0·95	+0·17	+0·23	+0·23	-0·09	-0·15	-0·18	+0·58	-0·15	-0·81	-0·28	+0·02	-0·12
Valencia, Normal	+0·05	-0·07	+0·09	0·00	+0·02	+0·04	+0·09	-0·08	-0·14	+0·04	+0·03	-0·03	0·00
„ 1914.	-1·16	+0·53	-0·19	+0·20	+0·32	-0·39	-0·33	+0·63	+0·09	-1·20	0·00	-0·44	-0·16
Kew, Normal	-0·02	-0·04	-0·04	+0·05	+0·03	+0·01	+0·05	-0·07	-0·07	+0·05	-0·06	+0·11	0·00
„ 1914.	-0·67	+0·02	+0·15	-0·09	-0·04	-0·03	-0·10	+0·46	+0·01	-1·11	+0·26	-0·10	-0·10
Falmouth, Normal	0·00	-0·04	0·00	+0·02	0·00	+0·05	+0·07	-0·05	-0·15	+0·06	-0·01	+0·05	0·00
Temperature—Degrees Absolute.													
Aberdeen, Normal	+0·01	-0·01	+0·04	+0·06	+0·07	+0·10	+0·02	-0·04	-0·03	-0·11	0·00	-0·03	0·00
„ 1914.	+0·10	+0·12	-0·03	-0·14	+0·15	+0·21	-0·04	+0·01	+0·06	-0·20	-0·14	-0·07	0·00
Eskdalemuir, 1914.	+0·21	+0·14	+0·05	-0·13	+0·01	+0·34	-0·05	0·00	-0·07	-0·07	-0·17	-0·07	+0·02
Valencia, Normal	-0·03	+0·01	+0·02	+0·05	+0·08	+0·08	+0·02	-0·02	-0·03	-0·10	-0·06	0·00	0·00
„ 1914.	+0·09	-0·03	+0·11	-0·05	+0·08	+0·10	+0·02	+0·06	-0·15	-0·08	-0·13	0·00	0·00
Kew, Normal	+0·03	-0·02	+0·06	+0·07	+0·11	+0·11	+0·01	-0·04	-0·07	-0·10	-0·11	-0·02	0·00
„ 1914.	+0·35	-0·09	-0·03	+0·02	+0·07	+0·30	-0·07	+0·06	-0·39	+0·07	+0·09	-0·31	+0·01
Falmouth, Normal	-0·03	-0·01	+0·04	+0·06	+0·11	+0·08	+0·02	-0·02	-0·05	-0·10	-0·08	-0·01	0·00



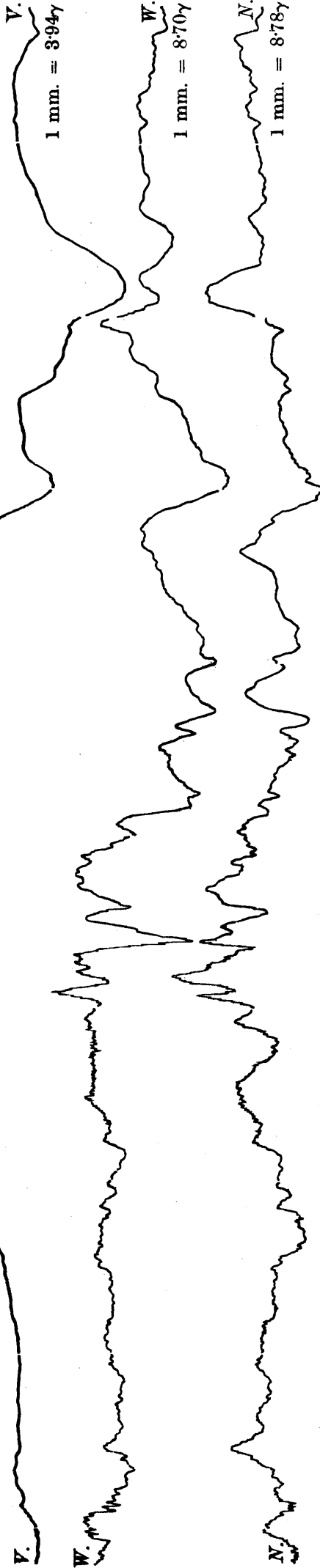


### Eskdalemuir Magnetographs,—Base Values, 1914.



6. IV. 9<sup>h</sup> 35<sup>m</sup>.—7. IV. 3<sup>h</sup> 35<sup>m</sup>.

Base values { V. 45144γ  
W. 52157  
N. 16183γ

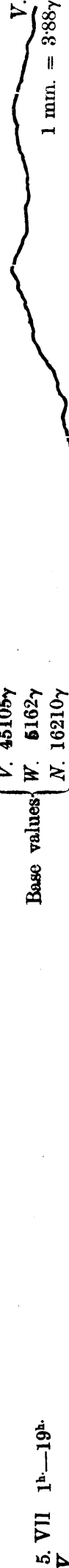


6. IV.

7. IV.

Base values { V. 45105γ  
W. 5162γ  
N. 16210γ

5. VII 1<sup>h</sup>.—19<sup>h</sup>.



5. VII

5. VII

ESKDALEMUIR. COPIES OF MAGNETIC CURVES FOR SEPTEMBER 27TH-28TH AND OCTOBER 28TH. 1914.

