

PROCEEDINGS OF  
THE ROYAL SOCIETY.

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*Price Three Shillings and Sixpence.*

SEPTEMBER 16, 1896.

*Report of the Kew Observatory Committee for the Year  
ending December 31, 1895.*

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The operations of The Kew Observatory, in the Old Deer Park, Richmond, Surrey, are controlled by the Kew Observatory Committee, which is constituted as follows:—

Mr. F. Galton, *Chairman.*

|                                       |   |
|---------------------------------------|---|
| Captain W. de W. Abney, C.B.,<br>R.E. | Mr. R. H. Scott.                          |
| Prof. W. G. Adams.                    | Mr. W. N. Shaw.                           |
| Captain E. W. Creak, R.N.             | Lieutenant-General R. Strachey,<br>C.S.I. |
| Prof. G. C. Foster.                   | General J. T. Walker, C.B.*               |
| The Earl of Rosse, K.P.               | Rear-Admiral W. J. L. Wharton,<br>C.B.    |
| Prof. A. W. Rücker.                   |   |

The title of the Committee has been changed during the year at the suggestion of the Council of the Royal Society, with the approval of the Board of Trade. The change consists in the insertion of the word "Observatory" and the omission of the word "Incorporated," so that the new title is in full "The Kew Observatory Committee of the Royal Society."

The work at the Observatory may be considered under the following heads:—

- 1st. Magnetic observations.
- 2nd. Meteorological observations.
- 3rd. Solar observations.
- 4th. Experimental, in connexion with any of the above departments.
- 5th. Verification of instruments.
- 6th. Rating of Watches and Marine Chronometers.
- 7th. Miscellaneous.

\* The Committee regret to announce that General Walker died on February 16, 1896.

## I. MAGNETIC OBSERVATIONS.

The Magnetographs have been in constant operation throughout the year, and the usual determinations of the Scale Values were made in January.

The ordinates of the various photographic curves representing Declination, Horizontal Force, and Vertical Force were then found to be as follows:—

Declinometer: 1 inch =  $0^{\circ} 22' \cdot 04$ . 1 cm. =  $0^{\circ} 8' \cdot 7$ .

Bifilar, January 15, 1895, for 1 inch  $\delta H = 0 \cdot 0280$  foot grain units.

„ 1 cm. „ =  $0 \cdot 00051$  C.G.S. units.

Balance, January 16, 1895, for 1 inch  $\delta V = 0 \cdot 0276$  foot grain units.

„ 1 cm. „ =  $0 \cdot 00050$  C.G.S. units.

With regard to magnetic disturbances no very exceptional movements have been registered during the year. Some of the principal variations that were recorded took place on the following days:—

February 8—9, 15; March 13—14; April 11—12; May 10, 29; June 2—3; September 30; October 12—14, 28—29; November 9—12; and December 7—8.

The hourly means and diurnal inequality of the magnetic elements for 1895, for the quiet days selected by the Astronomer Royal, will be found in Appendix I.

The following are the mean results for the entire year:—

|                                |                       |
|--------------------------------|-----------------------|
| Mean Westerly Declination..... | 17° 16'·8.            |
| Mean Horizontal Force.....     | 0·18278 C.G.S. units. |
| Mean Inclination .....         | 67°23'·8.             |
| Mean Vertical Force .....      | 0·43901 C.G.S. units. |

Observations of Absolute Declination, Horizontal Intensity, and Inclination have been made weekly as a rule.

A Richard Thermograph has been placed in the Magnetograph Room in order to compare its readings with the observed readings of the Thermometer under the Vertical Force shade, and also to obtain a continuous record of the temperature of the room throughout the year.

As in 1894 a Table of recent values of the Magnetic Elements at the Observatories whose publications are received at Kew was contributed to the July number of 'Science Progress.' As this seems to meet a recognised want, the Committee have decided to go further in the same direction, and to publish a similar table annually in their Report (see Appendix Ia). In some cases the results are direct

transcripts from the official publications; in others they are deduced from the recorded monthly or quarterly means. In a few instances figures have been supplied by directors of observatories in answer to special requests.

With the consent of the Committee an analysis of the Declination and Horizontal Force results for the selected "quiet days" of the five years 1890 to 1894, extracted from previous Reports, with additional results required for a complete discussion, was drawn up by the Superintendent, and appears as the Report of 'the B. A. Committee for the Comparison and Reduction of Magnetic Observations,' Ipswich, 1895.

Professor Rücker and Mr. W. Watson spent some time at the Observatory in July and October, comparing their magnetic instruments with the Kew Unifilar and Dip Circle, on behalf of the B. A. Committee for the Comparison of Magnetic Instruments (B.A. Report, 1895, p. 79).

Captain Schück visited the Observatory in June, and made a series of observations in order to compare his own instruments with those of Kew.

The Magnetic Instruments have been studied, and a knowledge of their manipulation obtained by Captain Field, Commander Cust, and Lieutenant Dawson, of the Royal Navy.

Information on matters relating to various magnetic data have been supplied to Mr. Veeder, Captain Schück, and Professor Rücker.

## II. METEOROLOGICAL OBSERVATIONS.

The several self-recording instruments for the continuous registration of Atmospheric Pressure, Temperature of Air and Wet-bulb, Wind (direction and velocity), Bright Sunshine, and Rain, have been maintained in regular operation throughout the year, and the standard eye observations for the control of the automatic records duly registered.

The tabulations of the meteorological traces have been regularly made, and these, as well as copies of the eye observations, with notes of weather, cloud, and sunshine, have been transmitted, as usual, to the Meteorological Office.

With the sanction of the Meteorological Council, data have been supplied to the Council of the Royal Meteorological Society, the Institute of Mining Engineers, and the editor of 'Symons's Monthly Meteorological Magazine.'

*Anemograph.*—A considerable number of experiments made to check the correctness of the wind vane by comparison with a flag

led to no certain conclusion. It only appeared that if any error existed it must be small.

*Electrograph.*—The performance of this instrument throughout the year has not been satisfactory. Some twenty-seven days' records were lost in January and February through stoppage by the frost, and for about forty-five days in July and August the instrument was out of action. Towards the end of the year the performance was generally unsatisfactory. After a good deal of fruitless investigation as to causes affecting the scale value, the insulation in the quadrant electrometer and the water-dropper can, the defect has been traced to a gradual deterioration in the insulation of the wire connecting the can with the electrometer. Action is contemplated which will reduce in future the chance of such a misadventure.

On June 11 the instrument was dismantled, old acid removed, and a new suspension, with almost parallel sides, fitted up in order to widen out the scale.

Determinations of the scale value were made on April 5, May 28, June 11, and November 27 by direct comparison with the Portable Electrometer, White 53.

This latter instrument was sent to White, of Glasgow, in December, 1894, to have a new torsion suspension fitted, and to be generally overhauled.

After its return from the maker the value of its scale was kindly determined by Professor Carey Foster at University College Laboratory, and the mean value for one division found to be 290 volts, and this new value has been employed in obtaining the scale-figures for the self-recording instrument.

*Inspections.*—In compliance with the request of the Meteorological Council, the following Observatories and Anemograph Stations have been visited and inspected:—Radcliffe Observatory (Oxford) by Dr. Chree; Stonyhurst, Armagh, Valencia, Fleetwood, Falmouth, and Dublin by Mr. Baker; and Yarmouth, North Shields, Alnwick Castle, Fort William, Glasgow, Aberdeen, and Deerness (Orkney) by Mr. Constable.

### III. SOLAR OBSERVATIONS.

*Sun-spots.*—Sketches of Sun-spots have been made on 159 days, and the groups numbered, after Schwabe's method.

Particulars will be found in Appendix II, Table IV.

### IV. EXPERIMENTAL WORK.

*Fog and Mist.*—The observations of a series of distant objects, referred to in the last Report, have been continued. A note is taken

of the most distant of the selected objects which is visible at each observation hour.

*Atmospheric Electricity.*—The series of eye observations commenced last year with a Portable Electrometer at certain points in the immediate neighbourhood of the Observatory have been continued. The results arrived at seem interesting in themselves, and are likely to prove of service in interpreting and checking the records obtained with the water-dropper and electrograph.

*Aneroid Barometers.*—The apparatus referred to in last Report was delivered by the maker, Mr. J. Hicks, early in the year, and a large number of experiments have been made and reduced; the results have not yet been published.

*Nocturnal Radiation.*—Regular observations of two minimum thermometers freely exposed on grass, having shown that a constant lowering of their zeros had been taking place for some years; two other minimums have been obtained, and the four instruments are now being daily observed under similar conditions. It is believed that this lowering of zero is mainly caused by the exposure of the bulbs to strong sunshine during summer.

*Thermometry.*—A set of French hard glass thermometers, standardised at the Bureau International, have been obtained, together with a hypsometer of the Sèvres pattern, constructed under the direction of Dr. Guillaume. Some preliminary comparisons have been made between the French thermometers and some Kew standards at temperatures between the freezing point of mercury and 100° C.

*Platinum Thermometry.*—This subject has of late years come into prominence mainly through the memoirs\* of Professor Callendar and Mr. E. H. Griffiths. The conclusion they have reached is that supposing "platinum temperature," *pt*, be defined so that its equal increments answer to equal increments in the electrical resistance of a pure platinum wire, the formula

$$t-pt = \delta\{(t/100)^2 - (t/100)\},$$

where *t* is temperature on the air scale, and  $\delta$  a constant—for a particular sample of wire—holds, with at least a close approach to accuracy, throughout a wide range of temperature. The convenience of platinum thermometers for measurements of high temperatures has been independently testified to by Messrs. Heycock and Neville in their extensive researches in connexion with the freezing points of metals and alloys.† Even in dealing with ordinary temperatures the advantage possessed by a platinum thermometer, that it may be read at a distance from the spot where the temperature is measured,

\* 'Phil. Trans. A.,' 1887, p. 161; 1891 pp. 43 and 119; 1893, p. 361, &c.

† 'Transactions Chemical Society,' 1895 p. 161.

would seem important in many cases, *e.g.*, in observations on earth temperatures.

Taking the above facts into consideration, the Committee decided to instal platinum thermometers at Kew, and to institute an independent series of experiments into their behaviour. Attention will in the first instance be directed more especially to the question of the fixity of the zero and of the fundamental interval. A grant of £100 was obtained from the Government Grant Committee, for the purchase of platinum thermometers, and the other necessary apparatus. A new room has been built for the purpose of the inquiry, from designs by Mr. W. N. Shaw and Mr. E. H. Griffiths, at a cost of over £120. Mr. Griffiths also kindly superintended the construction of the apparatus by the Cambridge Scientific Instrument Company, and along with Mr. C. T. Heycock he visited the Observatory for some days in October, and illustrated the use of the platinum thermometers, and the reduction of the observations. A full account of the apparatus has been given by Mr. Griffiths in 'Nature,' November 14th, 1895.

Hitherto at Kew the examination of mercury thermometers at temperatures above 100° C. has been limited to calibration. This supplies trustworthy knowledge as to the uniformity of the bore and the graduations, but throws no light on the suitability of the glass for exposure to high temperatures. It is also inapplicable to those high range thermometers in which there is gas, at high pressure, above the mercury column. The Committee hope that means will shortly be devised for direct comparison of thermometers at high temperatures, and expect that the platinum thermometers will incidentally prove useful for this purpose.

#### V. VERIFICATION OF INSTRUMENTS.

The subjoined is a list of the instruments examined in the year 1895, with the corresponding results for 1894:—

|                                    | Number tested in the year ending December 31. |        |
|------------------------------------|---|--------|
|                                    | 1894.   | 1895.  |
| Air-meters .....                   | 4   | 5      |
| Anemometers .....                  | 2   | 7      |
| Aneroids .....                     | 48  | 254    |
| Artificial horizons.....           | 31  | 15     |
| Barometers, Marine.....            | 119   | 151    |
| „    Standard .....                | 66  | 64     |
| „    Station.....                  | 12  | 25     |
| Binoculars .....                   | 417   | 376    |
| Compasses.....                     | 64  | 244    |
| Deflectors .....                   | 1   | 20     |
| Hydrometers.....                   | 289   | 187    |
| Inclinometers .....                | 3   | 4      |
| Photographic Lenses .....          | 27  | 14     |
| Magnets.....                       | 14  | 2      |
| Navy Telescopes .....              | 249   | 456    |
| Rain Gauges .....                  | 6   | 9      |
| Rain Measures.....                 | 10  | 90     |
| Scales.....                        | —   | 4      |
| Sextants.....                      | 461   | 532    |
| Sunshine Recorders.....            | 1   | 0      |
| Theodolites .....                  | 4   | 7      |
| Thermometers, Arctic.....          | 51  | 114    |
| „    A vitreous or Immisch's ..... | 28  | 39     |
| „    Chemical .....                | 64  | 34     |
| „    Clinical .....                | 15,593  | 16,699 |
| „    Deep sea.....                 | 35  | 125    |
| „    Meteorological .....          | 3,225   | 2,647  |
| „    Mountain .....                | 23  | 25     |
| „    Solar radiation .....         | 2   | 3      |
| „    Standard .....                | 74  | 81     |
| Uniflars .....                     | 7   | 4      |
| Vertical Force Instruments .....   | 6   | 34     |
|                                    | Total.....                                    | 20,936 |
|                                    |   | 22,271 |

Duplicate copies of corrections have been supplied in 46 cases.

The number of instruments rejected on account of excessive error, or for other reasons, was as follows:—

|                                   |     |
|-----------------------------------|-----|
| Thermometers, clinical .....      | 195 |
| „    ordinary meteorological..... | 48  |
| Sextants .....                    | 83  |
| Telescopes .....                  | 10  |
| Various .....                     | 38  |



Two Standard Thermometers have been supplied during the year.

There were at the end of the year in the Observatory undergoing verification, 10 Barometers, 533 Thermometers, 12 Sextants, 4 Hydrometers, 4 Anemometers, 2 Air Meters, 2 Rain Gauges, and 2 Rain Measures.

## VI. RATING OF WATCHES AND CHRONOMETERS.

The high standard of excellence to which attention was drawn in last year's Report has been fully maintained, and there has been an increase not only in the number of movements entered for the class A trial, but also in the number of watches which have obtained the highest possible form of certificate—the class A especially good—(involving the attainment of 80 per cent. of the total marks), no less than 59 being so classed.

The 746 watches received were entered for trial as below :—

For class A, 435; class B, 207; class C, 92; and 12 for the subsidiary trial. Of these 10 passed the subsidiary test, 129 failed from various causes to gain any certificate; 62 were awarded class C certificates, 190 class B, and 355 class A.

In Appendix III will be found a table giving the results of trial of the 59 watches which gained the highest number of marks during the year. The first place was taken by A. E. Fridlander, Coventry, with a keyless, going-barrel, lever-watch, No. 13,911, which obtained 87·4 marks out of a maximum of 100.

*Marine Chronometers.*—During the year 58 chronometers have been entered for the Kew A and B trials, of which 52 were certificated, and 6 failed to pass.

Considerable difficulty was experienced during the autumn in regularly maintaining the temperature of the watch oven at about 90° F., and to overcome this, a new gas boiler—by Fletcher and Company, Warrington—has been fitted up, to replace the old tubular heating apparatus, which had become much worn. The opportunity was taken to have a new water-tight cover made, and the non-conducting packing material was also renovated.

A new draw-off pipe and cap have been fitted to the refrigerator, to prevent any accumulation of water from the melting ice.

The seconds contact pieces on the mean-time standard clock having become much worn, the clock has been sent to Dent & Co., to be put in thorough order, and to have their electric contacts fitted. When ready it will be fixed in a new position in the South Hall, where the temperature is very steady.

The mean-time clock Dent 2011, kindly lent to the Committee by the Astronomer Royal, is being used during the interval.

## VII. MISCELLANEOUS.

*Paper.*—Prepared photograph paper has been supplied to the Observatories at Hong Kong, Mauritius, St. Petersburg, Oxford (Radcliffe), and Stonyhurst, and through the Meteorological Office to Aberdeen, Batavia, and Fort William.

*Anemograph and Sunshine Sheets* have also been sent to Hong Kong and Mauritius.

A portable electrometer (White, No. 77) has been procured and forwarded to Mauritius.

*Exhibition at Imperial Institute.*—A selection of photographic curves from the various self-recording instruments, along with cloud photographs and specimens of early daguerrotypes were shown during the summer at the exhibition of photography at the Imperial Institute. The chairman and superintendent were included in the Committee of Advice.

*Pendulum Apparatus.*—The apparatus sent out to Melbourne in 1892 has been returned, and is now being repaired by Mr. P. Adie. The air pump is receiving a new frame, and the dummy pendulum a new brass shaft and fittings.

*House, Grounds, and Path.*—These have been kept as usual throughout the year. The road leading from Richmond to the Observatory was extended inside the new enclosure, the fencing of which was completed early in the year. The expense was defrayed out of the balance of Extension Fund brought forward from last year.

To meet an increased demand for gas, a new and larger main has been laid between the Observatory and the building outside, which contains the platinum thermometer room and clinical thermometer testing apparatus. Simultaneously a larger meter and new gas governors were fitted up in the Observatory.

*First Assistant Director at Mauritius Observatory.*—At the request of the Colonial Office, the Committee undertook the task of selecting and recommending a candidate for the post of First Assistant Director at the Royal Alfred Observatory, Mauritius. Their choice fell on Mr. J. Folkes Claxton, previously engaged in the Meteorological and Magnetic Department of the Royal Observatory, Greenwich, and their nomination was approved by the Colonial Office. Subsequent to his appointment in December, Mr. Claxton spent a few days at the Observatory to familiarise himself with the patterns of meteorological and magnetic instruments in use at Kew.

At the request of the Acting Director of the Central Physical Observatory at St. Petersburg, submitted through the Meteorological Council, an account of the Observatory, dealing more especially with its functions as a meteorological station, along with plans

of the building and its surroundings, has been drawn up by the Librarian. This is ultimately to be contributed to the meteorological section of an exhibition to be held at Nijni Novgorod in 1896.

*Library.*—During the year the library has received publications from—

31 Scientific Societies and Institutions of Great Britain and Ireland.

114 Foreign and Colonial Scientific Establishments, as well as from several private individuals.

Sir Malcolm Fraser, in response to a request to that effect, kindly presented the library with several back numbers of the Meteorological Report for Western Australia; and M. Perrotin also presented the 'Annales' of the Nice Observatory.

Dr. Neumayer has kindly consented to forward regularly the 'Annalen der Hydrographie und Maritimen Meteorologie' of the Deutsche Seewarte, a publication which frequently contains results of magnetic interest.

On re-examining the manuscripts and papers bequeathed to the Observatory by General Sabine, several books of autograph letters written by leading foreign scientific men were found, amongst others letters from Gauss, Lamont, Regnault, Weber, &c.

The card catalogue has been proceeded with, sixty-five cards having been entered during the past year.

*Audit, &c.*—The accounts for 1895 have been audited by Mr. Keen, Chartered Accountant, on behalf of the Royal Society, and supervised by Mr. Francis Galton, on behalf of the Committee.

The change in the system of book-keeping, referred to in last year's Report, renders impossible the comparison usually made between the expenditure of the year and that of the previous one.

The Observatory has now an account with the London and County Bank only, having closed its account with the Bank of England. This renders it unnecessary to keep so large a cash balance as previously, and as the balance at the end of 1894 was unusually large, the Committee have been enabled to purchase £900 India  $3\frac{1}{2}$  per cent. stock.

A small surplus remaining from the Extension Fund, contributed by Mr. Galton for constructing a fence round the Observatory, has been transferred to the general account.

PERSONAL ESTABLISHMENT.

The staff employed is as follows :—

C. Chree, D.Sc., Superintendent.

T. W. Baker, Chief Assistant.

E. G. Constable, Observations and Rating.

W. Hugo, Verification Department.

J. Foster           "           "

T. Gunter           "           "

W. J. Boxall       "           "

E. Dagwell, Observations and Rating.

R. S. Whipple, Accounts and Library, and six other Assistants.

A Caretaker and Housekeeper are also employed.

(Signed) FRANCIS GALTON,  
*Chairman.*

*Kew Observatory. Account of Receipts and Payments for the year ending December 31st, 1895.*

| <i>Dr.</i>   | RECEIPTS.          |    | PAYMENTS. |                    | <i>Cr.</i> |
|--|--------------------|----|-----------|--------------------|------------|
|  | £                  | s. | £         | s.                 | d.         |
| To Balance from Year 1894 .....  | 1051               | 7  | 4         |                    |            |
| Foyal Society:—  |                    | £  | s.        |                    |            |
| Gassiot Trust. Annual payment .....  | 444                | 1  | 4         | 351                | 19         |
| " " Income tax returned .....  | 40                 | 8  | 8         | 56                 | 9          |
|  | 484                | 10 | 0         | 108                | 0          |
| Meteorological Council:—   |                    |    |           |                    |            |
| Allowance .....  | 400                | 0  | 0         | 75                 | 19         |
| Postages, &c. ....   | 7                  | 14 | 10        | 123                | 14         |
|  | 407                | 14 | 10        | 216                | 0          |
| Researches:—   |                    |    |           |                    |            |
| Meteorological Council .....   | 6                  | 14 | 9         | 797                | 4          |
| Government Grant Committee .....   | 100                | 0  | 0         | 167                | 15         |
|  | 106                | 14 | 9         | 648                | 5          |
| Tests:—  |                    |    |           |                    |            |
| Verifications .....  | 1434               | 10 | 5         | 1613               | 5          |
| Rating .....   | 561                | 9  | 2         |                    |            |
| Lenses .....   | 8                  | 10 | 2         |                    |            |
| Commissions executed for Colonial and Foreign Institutions, &c. ....                           | 2004               | 9  | 9         | 269                | 11         |
| Rents .....  | 310                | 8  | 3         | 108                | 0          |
| Dividends on India Stock .....   | 2                  | 3  | 0         |                    |            |
|  | 10                 | 3  | 0         | 377                | 11         |
| Commissions:—  |                    |    |           |                    |            |
| Purchase of Instruments and Photographic Paper for Colonial and Foreign Institutions, &c. .... |                    |    |           |                    |            |
| Proportion of Administration Expenditure .....   |                    |    |           |                    |            |
| Extension Fund:—   |                    |    |           |                    |            |
| Construction of Fence (balance of contract) and new roadway .....                              |                    |    |           |                    |            |
| Purchase of £900 India $\frac{3}{4}$ per cent. Stock .....                                     |                    |    |           |                    |            |
| Balance in London and County Bank .....  | 331                | 0  | 4         | 74                 | 0          |
| Cash in hand .....   | 10                 | 7  | 5         | 1039               | 4          |
|  | 341                | 7  | 9         | 841                | 7          |
|  | <u>£4377 10 11</u> |    |           | <u>£4877 10 11</u> |            |

ADMINISTRATION EXPENDITURE.

| <i>Particulars.</i>                 | £                | s. | d. | <i>Apportionment.</i> | £                | s. | d. |
|-------------------------------------|------------------|----|----|-----------------------|------------------|----|----|
| Superintendent .....                | 400              | 0  | 0  | Observatory .....     | 108              | 0  | 0  |
| First Assistant and Librarian ..... | 381              | 16 | 0  | Researches .....      | 216              | 0  | 0  |
| Rent, Fuel, &c. ....                | 83               | 18 | 11 | Tests .....           | 648              | 5  | 4  |
| Caretaker, Repairs, &c. ....        | 209              | 10 | 5  | Commissions .....     | 108              | 0  | 0  |
|                                     | <u>£1080 5 4</u> |    |    |                       | <u>£1080 5 4</u> |    |    |

Audited and found correct on behalf of the Royal Society.  
13th of January, 1896.  
(Signed) W. B. KEEN, *Chartered Accountant.*

Supervised on behalf of the Committee and approved.  
14th January, 1896.  
(Signed) FRANCIS GALTON.

ESTIMATED ASSETS.

|  | £     | s. | d. |
|--|-------|----|----|
| By Balance as per Statement .....                            | 341   | 7  | 9  |
| £900 India 3½ per cent. Stock, value on January 1, 1896..... | 1053  | 0  | 0  |
| Payments due:—   |       |    |    |
| Meteorological Council—Allowance, Postages, &c.....          | 118   | 13 | 1  |
| Test Fees.....   | 638   | 19 | 4  |
| Commissions .....  | 39    | 18 | 6  |
| Stock:—  |       |    |    |
| Blank Forms and Certificates .....                           | 52    | 16 | 8  |
| Standard Thermometers .....                                  | 79    | 14 | 6  |
|  | 132   | 11 | 2  |
|  | <hr/> |    |    |
|  | £2324 | 9  | 10 |

January 16th, 1896.

ESTIMATED LIABILITIES.

|  | £     | s. | d. |
|--|-------|----|----|
| To Administration accounts—Gas, Repairs, &c..... | 38    | 6  | 7  |
| Observatory accounts—Photographic Paper, &c..... | 7     | 2  | 5  |
| Tests accounts—Fittings, Printing, &c.....       | 29    | 6  | 0  |
| Researches account—Instruments, &c.....          | 115   | 11 | 9  |
| Building of Platinum Thermometer                 |       |    |    |
| Room .....                                       | 11    | 17 | 0  |
| Commissions .....                                | 127   | 8  | 9  |
|  | 19    | 8  | 3  |
| General Balance .....                            | 2102  | 17 | 10 |
|  | <hr/> |    |    |
|  | £2324 | 9  | 10 |

(Signed) CHARLES CHREE,  
Superintendent.

List of Instruments, Apparatus, &c., the Property of the Kew Observatory Committee, at the present date out of the custody of the Superintendent, on Loan.

| To whom lent.                                     | Articles.  | Date of loan. |
|---|--|---------------|
| G. J. Symons, F.R.S.                              | Portable Transit Instrument . . . . .  | 1869          |
| The Science and Art Department, South Kensington. | Articles specified in the list in the Annual Report for 1893. . . . .  | 1876          |
| Professor W. Grylls Adams, F.R.S.                 | Unifilar Magnetometer, by Jones, No. 101, complete. . . . .  | 1883          |
|   | Pair 9-inch Dip-Needles with Bar Magnets . . .   | 1887          |
| Lord Rayleigh, F.R.S.                             | Standard Barometer (Adie, No. 655) . . . . .   | 1885          |
| The "Jackson-Harmsworth" Polar Expedition.        | Unifilar Magnetometer, by Jones, marked N.A.B.C., complete. Dip-Circle, by Barrow, with two Needles and Bar Magnets. Two Tripod Stands . . . . . | 1894          |

APPENDIX I.

MAGNETICAL OBSERVATIONS, 1895.

Made at the Kew Observatory, Old Deer Park, Richmond, Lat.  $51^{\circ} 28' 6''$  N. and Long.  $0^{\text{h}} 1^{\text{m}} 15^{\text{s}}.1$  W.

The results given in the following tables are deduced from the magnetograph curves which have been standardised by observations of deflection and vibration. These were made with the Collimator Magnet K.C. I. and the Declinometer Magnet marked K.O. 90 in the 9-inch Unifilar Magnetometer by Jones.

The Inclination was observed with the Inclinator by Barrow, No. 33, and needles 1 and 2, which are  $3\frac{1}{2}$  inches in length.

The Declination and Force values given in Tables I to VIII are prepared in accordance with the suggestions made in the fifth report of the Committee of the British Association on comparing and reducing Magnetic Observations.

The following is a list of the days during the year 1895 which were selected by the Astronomer Royal, as suitable for the determination of the magnetic diurnal inequalities, and which have been employed in the preparation of the magnetic tables:—

|                 |                    |
|-----------------|--------------------|
| January .....   | 5, 13, 25, 26, 27. |
| February .....  | 4, 13, 22, 25, 26. |
| March .....     | 7, 11, 12, 24, 27. |
| April.....      | 2, 8, 21, 22, 29.  |
| May .....       | 4, 12, 16, 19, 23. |
| June.....       | 8, 13, 14, 15, 26. |
| July .....      | 3, 7, 19, 24, 25.  |
| August.....     | 2, 3, 7, 22, 27.   |
| September ..... | 2, 7, 8, 21, 28.   |
| October.....    | 3, 10, 18, 21, 22. |
| November .....  | 7, 14, 17, 19, 21. |
| December.....   | 4, 5, 6, 16, 29.   |



Table I.—Hourly Means of Declination, as determined from the

| Hours        | Mid. | 1.   | 2.   | 3.   | 4.   | 5.      | 6.   | 7.   | 8.   | 9.   | 10.  | 11.  |
|--------------|------|------|------|------|------|---------|------|------|------|------|------|------|
| (17° +) West |      |      |      |      |      | Winter. |      |      |      |      |      |      |
| 1895.        | '    | '    | '    | '    | '    | '       | '    | '    | '    | '    | '    | '    |
| Months.      | '    | '    | '    | '    | '    | '       | '    | '    | '    | '    | '    | '    |
| Jan. ..      | 18·3 | 18·6 | 19·0 | 19·2 | 19·4 | 19·4    | 19·2 | 18·8 | 18·7 | 18·9 | 19·5 | 20·2 |
| Feb. ..      | 17·1 | 17·7 | 17·8 | 18·2 | 17·8 | 17·5    | 17·2 | 17·6 | 17·9 | 17·2 | 18·4 | 20·6 |
| March. .     | 17·2 | 17·1 | 17·2 | 17·2 | 17·3 | 16·9    | 16·3 | 15·7 | 14·4 | 14·4 | 16·6 | 20·0 |
| Oct. ..      | 14·4 | 14·2 | 14·0 | 14·0 | 14·2 | 13·5    | 13·4 | 13·3 | 12·6 | 12·6 | 14·8 | 17·7 |
| Nov. ..      | 12·8 | 13·3 | 13·5 | 13·8 | 14·1 | 13·9    | 13·4 | 13·6 | 13·0 | 12·5 | 13·8 | 15·2 |
| Dec. ..      | 13·4 | 13·8 | 13·9 | 13·9 | 13·7 | 13·7    | 13·6 | 13·3 | 13·1 | 13·2 | 14·7 | 15·7 |
| Mean         | 15·5 | 15·8 | 15·9 | 16·0 | 16·1 | 15·8    | 15·5 | 15·4 | 14·9 | 14·8 | 16·3 | 18·2 |
| Summer.      |      |      |      |      |      |         |      |      |      |      |      |      |
| April ..     | '    | '    | '    | '    | '    | '       | '    | '    | '    | '    | '    | '    |
| May ..       | '    | '    | '    | '    | '    | '       | '    | '    | '    | '    | '    | '    |
| June ..      | '    | '    | '    | '    | '    | '       | '    | '    | '    | '    | '    | '    |
| July ..      | '    | '    | '    | '    | '    | '       | '    | '    | '    | '    | '    | '    |
| Aug. ..      | '    | '    | '    | '    | '    | '       | '    | '    | '    | '    | '    | '    |
| Sept. . .    | '    | '    | '    | '    | '    | '       | '    | '    | '    | '    | '    | '    |
| April ..     | 17·3 | 17·2 | 17·0 | 16·3 | 16·0 | 15·5    | 14·8 | 13·5 | 13·4 | 14·6 | 17·3 | 20·7 |
| May ..       | 16·7 | 16·1 | 15·4 | 15·8 | 14·9 | 13·8    | 13·3 | 13·0 | 13·8 | 15·1 | 18·0 | 21·3 |
| June ..      | 15·0 | 14·8 | 14·3 | 13·9 | 13·1 | 11·6    | 9·9  | 8·8  | 9·6  | 11·5 | 14·5 | 18·6 |
| July ..      | 15·7 | 15·8 | 15·5 | 15·1 | 14·6 | 13·9    | 12·1 | 11·6 | 12·1 | 13·7 | 15·5 | 19·0 |
| Aug. ..      | 15·5 | 15·0 | 14·4 | 14·3 | 13·6 | 12·2    | 11·9 | 11·7 | 12·2 | 13·8 | 16·1 | 19·1 |
| Sept. . .    | 15·4 | 15·5 | 15·8 | 15·4 | 15·1 | 14·4    | 13·5 | 12·4 | 12·0 | 13·0 | 15·1 | 18·0 |
| Mean         | 15·9 | 15·7 | 15·4 | 15·1 | 14·5 | 13·6    | 12·6 | 11·8 | 12·2 | 13·6 | 16·1 | 19·4 |

Table II.—Diurnal Inequality of the Kew

| Hours        | Mid. | 1.   | 2.   | 3.   | 4.   | 5.   | 6.   | 7.   | 8.   | 9.   | 10.  | 11.  |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Summer Mean. |      |      |      |      |      |      |      |      |      |      |      |      |
|              | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    |
|              | -1·0 | -1·2 | -1·5 | -1·8 | -2·4 | -3·3 | -4·3 | -5·1 | -4·7 | -3·3 | -0·8 | +2·5 |
| Winter Mean. |      |      |      |      |      |      |      |      |      |      |      |      |
|              | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    |
|              | -1·2 | -0·9 | -0·8 | -0·7 | -0·6 | -0·9 | -1·2 | -1·3 | -1·8 | -1·9 | -0·4 | +1·5 |
| Annual Mean. |      |      |      |      |      |      |      |      |      |      |      |      |
|              | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    |
|              | -1·1 | -1·1 | -1·2 | -1·2 | -1·5 | -2·1 | -2·8 | -3·2 | -3·2 | -2·6 | -0·6 | +2·0 |

NOTE.—When the sign is + the magnet

selected quiet Days in 1895. (The Mean for the Year = 17° 16'·8 west.)

| Noon    | 1.   | 2.   | 3.   | 4.   | 5.   | 6.   | 7.   | 8.   | 9.   | 10.  | 11.  | Mid. |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|
| Winter. |      |      |      |      |      |      |      |      |      |      |      |      |
| '       | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    |
| 20·5    | 21·2 | 20·7 | 20·3 | 20·5 | 20·2 | 19·6 | 19·3 | 18·9 | 18·3 | 18·4 | 18·4 | 18·9 |
| 22·2    | 23·0 | 23·0 | 22·0 | 20·5 | 19·8 | 19·7 | 19·2 | 18·5 | 18·0 | 17·7 | 17·6 | 17·2 |
| 22·7    | 24·3 | 24·5 | 22·0 | 20·4 | 19·1 | 18·5 | 17·8 | 17·6 | 17·6 | 17·6 | 17·0 | 17·0 |
| 19·7    | 20·2 | 18·9 | 17·9 | 16·1 | 15·5 | 15·4 | 15·1 | 14·7 | 14·4 | 14·4 | 14·2 | 13·9 |
| 16·5    | 16·9 | 16·6 | 16·2 | 15·4 | 15·0 | 14·9 | 14·2 | 13·9 | 13·4 | 12·6 | 13·0 | 12·6 |
| 16·6    | 16·9 | 15·9 | 15·7 | 14·8 | 14·4 | 13·7 | 13·4 | 13·0 | 13·0 | 13·1 | 13·4 | 13·4 |
| 19·7    | 20·4 | 19·9 | 19·0 | 17·9 | 17·3 | 17·0 | 16·5 | 16·1 | 15·8 | 15·6 | 15·6 | 15·5 |
| Summer. |      |      |      |      |      |      |      |      |      |      |      |      |
| '       | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    |
| 24·2    | 25·7 | 25·3 | 23·6 | 21·6 | 19·2 | 18·4 | 18·3 | 18·4 | 18·4 | 18·2 | 17·7 | 17·1 |
| 23·6    | 24·0 | 23·1 | 21·7 | 20·0 | 19·0 | 18·1 | 17·5 | 17·1 | 17·2 | 17·0 | 16·5 | 15·8 |
| 22·0    | 23·5 | 23·7 | 22·8 | 21·5 | 19·5 | 18·0 | 16·9 | 16·3 | 16·1 | 16·3 | 15·7 | 15·3 |
| 22·1    | 24·1 | 24·2 | 22·2 | 20·4 | 19·1 | 18·5 | 18·1 | 17·6 | 17·5 | 17·4 | 16·8 | 16·5 |
| 22·3    | 23·9 | 22·9 | 20·1 | 17·7 | 16·2 | 15·8 | 15·9 | 16·1 | 15·6 | 15·9 | 15·9 | 15·2 |
| 20·9    | 22·0 | 20·7 | 19·2 | 17·3 | 16·0 | 15·2 | 15·4 | 15·3 | 15·4 | 15·2 | 15·3 | 15·3 |
| 22·5    | 23·9 | 23·3 | 21·6 | 19·7 | 18·2 | 17·3 | 17·0 | 16·8 | 16·7 | 16·7 | 16·3 | 15·9 |

Declination as derived from Table I.

| Noon         | 1.   | 2.   | 3.   | 4.   | 5.   | 6.   | 7.   | 8.   | 9.   | 10.  | 11.  | Mid. |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Summer Mean. |      |      |      |      |      |      |      |      |      |      |      |      |
| '            | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    |
| +5·6         | +7·0 | +6·4 | +4·7 | +2·8 | +1·3 | +0·4 | +0·1 | -0·1 | -0·2 | -0·2 | -0·6 | -1·0 |
| Winter Mean. |      |      |      |      |      |      |      |      |      |      |      |      |
| '            | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    |
| +3·0         | +3·7 | +3·2 | +2·3 | +1·2 | +0·6 | +0·3 | -0·2 | -0·6 | -0·9 | -1·1 | -1·1 | -1·2 |
| Annual Mean. |      |      |      |      |      |      |      |      |      |      |      |      |
| '            | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    |
| +4·3         | +5·3 | +4·8 | +3·5 | +2·0 | +0·9 | +0·3 | -0·1 | -0·4 | -0·6 | -0·7 | -0·9 | -1·1 |

points to the west of its mean position.

Table III.—Hourly Means of the Horizontal Force in C.G.S. units (corrected)  
(The Mean for the

| Hours             | Mid. | 1.  | 2.  | 3.  | 4.  | 5.  | 6.  | 7.  | 8.  | 9.  | 10. | 11. |
|-------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0·18000 + Winter. |      |     |     |     |     |     |     |     |     |     |     |     |
| 1895.<br>Months.  |      |     |     |     |     |     |     |     |     |     |     |     |
| Jan. ..           | 267  | 266 | 269 | 270 | 271 | 273 | 276 | 276 | 272 | 267 | 264 | 262 |
| Feb. ..           | 274  | 274 | 275 | 275 | 277 | 279 | 281 | 279 | 277 | 271 | 263 | 261 |
| March. .          | 278  | 275 | 278 | 278 | 278 | 279 | 278 | 276 | 270 | 259 | 250 | 250 |
| Oct. ..           | 278  | 275 | 274 | 275 | 276 | 277 | 275 | 274 | 267 | 259 | 252 | 252 |
| Nov. ..           | 268  | 271 | 274 | 274 | 274 | 277 | 278 | 278 | 275 | 268 | 262 | 260 |
| Dec. ..           | 282  | 283 | 285 | 287 | 290 | 290 | 292 | 291 | 288 | 283 | 280 | 275 |
| Mean              | 275  | 274 | 276 | 277 | 278 | 279 | 280 | 279 | 275 | 268 | 262 | 260 |
| Summer.           |      |     |     |     |     |     |     |     |     |     |     |     |
| April. .          | 285  | 284 | 282 | 280 | 278 | 278 | 276 | 269 | 261 | 250 | 237 | 238 |
| May ..            | 288  | 287 | 282 | 280 | 280 | 279 | 277 | 271 | 262 | 256 | 252 | 256 |
| June ..           | 290  | 288 | 285 | 286 | 285 | 283 | 279 | 270 | 261 | 256 | 251 | 256 |
| July ..           | 298  | 295 | 295 | 295 | 292 | 289 | 284 | 279 | 272 | 264 | 260 | 260 |
| Aug. ..           | 291  | 290 | 288 | 285 | 285 | 283 | 279 | 274 | 265 | 259 | 254 | 256 |
| Sept. .           | 279  | 279 | 279 | 279 | 279 | 280 | 279 | 273 | 263 | 255 | 252 | 255 |
| Mean              | 289  | 287 | 285 | 284 | 283 | 282 | 279 | 273 | 264 | 257 | 251 | 254 |

Table IV.—Diurnal Inequality of the Kew

| Hours        | Mid.    | 1.      | 2.      | 3.      | 4.      | 5.      | 6.      | 7.      | 8.      | 9.      | 10.     | 11.     |
|--------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Summer Mean. |         |         |         |         |         |         |         |         |         |         |         |         |
|              | +·00008 | +·00006 | +·00004 | +·00003 | +·00002 | +·00001 | -·00002 | -·00008 | -·00017 | -·00024 | -·00030 | -·00027 |
| Winter Mean. |         |         |         |         |         |         |         |         |         |         |         |         |
|              | ·00000  | -·00001 | +·00001 | +·00002 | +·00003 | +·00004 | +·00005 | +·00004 | ·00000  | -·00007 | -·00013 | -·00015 |
| Annual Mean. |         |         |         |         |         |         |         |         |         |         |         |         |
|              | +·00004 | +·00003 | +·00003 | +·00003 | +·00003 | +·00003 | +·00002 | -·00002 | -·00008 | -·00015 | -·00022 | -·00021 |

NOTE.—When the sign is + the

for Temperature) as determined from the selected quiet Days in 1895.  
Year = 0.18278.)

| Noon.   | 1.  | 2.  | 3.  | 4.  | 5.  | 6.  | 7.  | 8.  | 9.  | 10. | 11. | Mid. |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Winter. |     |     |     |     |     |     |     |     |     |     |     |      |
| 262     | 265 | 267 | 268 | 266 | 268 | 270 | 271 | 269 | 271 | 271 | 271 | 272  |
| 266     | 270 | 273 | 276 | 275 | 277 | 282 | 283 | 285 | 285 | 283 | 281 | 281  |
| 255     | 261 | 266 | 271 | 273 | 276 | 279 | 280 | 283 | 284 | 284 | 283 | 283  |
| 259     | 266 | 270 | 273 | 273 | 276 | 279 | 278 | 278 | 279 | 279 | 280 | 283  |
| 263     | 266 | 271 | 274 | 275 | 279 | 278 | 280 | 279 | 278 | 276 | 275 | 274  |
| 277     | 279 | 278 | 280 | 282 | 282 | 285 | 285 | 284 | 284 | 285 | 286 | 285  |
| 264     | 268 | 271 | 274 | 274 | 276 | 279 | 280 | 280 | 280 | 280 | 279 | 280  |
| Summer. |     |     |     |     |     |     |     |     |     |     |     |      |
| 252     | 261 | 271 | 277 | 283 | 285 | 289 | 289 | 291 | 292 | 292 | 292 | 289  |
| 267     | 276 | 279 | 285 | 291 | 295 | 298 | 301 | 297 | 293 | 291 | 291 | 289  |
| 267     | 274 | 286 | 292 | 298 | 302 | 304 | 305 | 305 | 306 | 300 | 298 | 296  |
| 269     | 281 | 291 | 297 | 300 | 304 | 308 | 308 | 307 | 307 | 306 | 305 | 304  |
| 266     | 275 | 284 | 285 | 285 | 285 | 290 | 294 | 296 | 294 | 290 | 292 | 290  |
| 264     | 272 | 275 | 277 | 277 | 281 | 283 | 286 | 286 | 285 | 286 | 286 | 285  |
| 264     | 273 | 281 | 286 | 289 | 292 | 295 | 297 | 297 | 296 | 294 | 294 | 292  |

Horizontal Force as deduced from Table III.

| Noon         | 1.     | 2.     | 3.     | 4.     | 5.     | 6.     | 7.     | 8.     | 9.     | 10.    | 11.    | Mid.   |
|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Summer Mean. |        |        |        |        |        |        |        |        |        |        |        |        |
| -00017       | -00008 | 00000  | +00005 | +00008 | +00011 | +00014 | +00016 | +00016 | +00015 | +00013 | +00013 | +00011 |
| Winter Mean. |        |        |        |        |        |        |        |        |        |        |        |        |
| -00011       | -00007 | -00004 | -00001 | -00001 | +00001 | +00004 | +00005 | +00005 | +00005 | +00005 | +00004 | +00005 |
| Annual Mean. |        |        |        |        |        |        |        |        |        |        |        |        |
| -00014       | -00007 | -00002 | +00002 | +00004 | +00006 | +00009 | +00011 | +00011 | +00010 | +00009 | +00009 | +00008 |

reading is above the mean.

Table V.—Hourly Means of the Kew Vertical Force in C.G.S. units (corrected)  
(The Mean for the

| Hours             | Mid. | 1.  | 2.  | 3.  | 4.  | 5.  | 6.  | 7.  | 8.  | 9.  | 10. | 11. |
|-------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0·43000 + Winter. |      |     |     |     |     |     |     |     |     |     |     |     |
| 1895.<br>Months.  |      |     |     |     |     |     |     |     |     |     |     |     |
| Jan. ..           | 895  | 895 | 894 | 894 | 895 | 895 | 895 | 894 | 893 | 892 | 890 | 889 |
| Feb. ..           | 941  | 939 | 937 | 938 | 937 | 936 | 936 | 937 | 938 | 937 | 934 | 930 |
| March. .          | 931  | 933 | 932 | 931 | 931 | 932 | 932 | 935 | 936 | 931 | 926 | 923 |
| Oct. ..           | 845  | 847 | 848 | 849 | 852 | 853 | 853 | 854 | 856 | 854 | 848 | 846 |
| Nov. ..           | 842  | 841 | 841 | 840 | 840 | 840 | 839 | 838 | 839 | 837 | 833 | 835 |
| Dec. ..           | 890  | 890 | 890 | 889 | 890 | 889 | 888 | 886 | 886 | 884 | 882 | 883 |
| Mean              | 891  | 891 | 890 | 890 | 891 | 891 | 891 | 891 | 891 | 889 | 886 | 884 |
| Summer.           |      |     |     |     |     |     |     |     |     |     |     |     |
| April ..          | 924  | 924 | 923 | 924 | 926 | 927 | 929 | 929 | 926 | 921 | 915 | 909 |
| May ..            | 932  | 932 | 932 | 935 | 937 | 939 | 939 | 939 | 935 | 929 | 923 | 918 |
| June ..           | 902  | 901 | 902 | 905 | 908 | 911 | 910 | 908 | 903 | 897 | 890 | 885 |
| July ..           | 934  | 934 | 934 | 934 | 936 | 938 | 938 | 936 | 932 | 927 | 923 | 918 |
| Aug. ...          | 915  | 915 | 914 | 916 | 916 | 918 | 917 | 916 | 914 | 909 | 901 | 900 |
| Sept. ...         | 875  | 876 | 877 | 879 | 880 | 882 | 884 | 885 | 882 | 878 | 871 | 867 |
| Mean              | 914  | 914 | 914 | 916 | 917 | 919 | 920 | 919 | 915 | 910 | 904 | 900 |

Table VI.—Diurnal Inequality of the Kew

| Hours        | Mid.     | 1.       | 2.       | 3.       | 4.       | 5.       | 6.       | 7.       | 8.       | 9.       | 10.      | 11.      |
|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Summer Mean. |          |          |          |          |          |          |          |          |          |          |          |          |
|              | + '00002 | + '00062 | + '00002 | + '00004 | + '00005 | + '00007 | + '00008 | + '00007 | + '00003 | - '00002 | - '00008 | - '00012 |
| Winter Mean. |          |          |          |          |          |          |          |          |          |          |          |          |
|              | + '00001 | + '00001 | '00000   | '00000   | + '00001 | + '00001 | + '00001 | + '00001 | + '00001 | - '00001 | - '00004 | - '00006 |
| Annual Mean. |          |          |          |          |          |          |          |          |          |          |          |          |
|              | + '00001 | + '00001 | + '00001 | + '00002 | + '00003 | + '00004 | + '00004 | + '00004 | + '00002 | - '00002 | - '00006 | - '00009 |

NOTE.—When the sign is + the

for Temperature), as determined from the selected quiet Days in 1895.  
Year = 0.43901.)

| Noon.   | 1.  | 2.  | 3.  | 4.  | 5.  | 6.  | 7.  | 8.  | 9.  | 10. | 11. | Mid. |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Winter. |     |     |     |     |     |     |     |     |     |     |     |      |
| 889     | 889 | 892 | 891 | 891 | 893 | 894 | 894 | 893 | 892 | 891 | 890 | 889  |
| 928     | 928 | 933 | 937 | 938 | 941 | 939 | 939 | 938 | 937 | 937 | 937 | 937  |
| 921     | 923 | 927 | 931 | 934 | 933 | 931 | 930 | 929 | 929 | 930 | 927 | 927  |
| 845     | 849 | 853 | 859 | 862 | 862 | 861 | 861 | 861 | 860 | 860 | 859 | 859  |
| 835     | 837 | 841 | 843 | 843 | 842 | 840 | 839 | 839 | 837 | 837 | 838 | 838  |
| 884     | 886 | 890 | 890 | 891 | 891 | 890 | 889 | 887 | 886 | 885 | 885 | 885  |
| 884     | 885 | 889 | 892 | 893 | 894 | 893 | 892 | 891 | 890 | 890 | 889 | 889  |
| Summer. |     |     |     |     |     |     |     |     |     |     |     |      |
| 908     | 910 | 916 | 924 | 927 | 927 | 928 | 925 | 925 | 924 | 923 | 922 | 921  |
| 913     | 916 | 924 | 932 | 936 | 940 | 942 | 941 | 940 | 939 | 939 | 938 | 937  |
| 882     | 883 | 889 | 894 | 899 | 902 | 904 | 905 | 903 | 902 | 900 | 899 | 898  |
| 916     | 920 | 929 | 933 | 936 | 940 | 938 | 937 | 935 | 934 | 932 | 931 | 931  |
| 897     | 900 | 905 | 915 | 918 | 918 | 917 | 915 | 914 | 914 | 912 | 913 | 912  |
| 866     | 870 | 875 | 878 | 879 | 880 | 878 | 877 | 875 | 874 | 874 | 874 | 874  |
| 897     | 900 | 906 | 913 | 916 | 918 | 918 | 917 | 915 | 914 | 913 | 913 | 912  |

Vertical Force as deduced from Table V.

| Noon         | 1.     | 2.     | 3.     | 4.     | 5.     | 6.     | 7.     | 8.     | 9.     | 10.    | 11.    | Mid.   |
|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Summer Mean. |        |        |        |        |        |        |        |        |        |        |        |        |
| -00015       | -00012 | -00006 | +00001 | +00004 | +00006 | +00006 | +00005 | +00003 | +00002 | +00001 | +00001 | -00000 |
| Winter Mean. |        |        |        |        |        |        |        |        |        |        |        |        |
| -00006       | -00005 | -00001 | +00002 | +00003 | +00004 | +00003 | +00002 | +00001 | -00000 | -00000 | -00001 | -00001 |
| Annual Mean. |        |        |        |        |        |        |        |        |        |        |        |        |
| -00011       | -00009 | -00003 | +00001 | +00003 | +00005 | +00004 | +00003 | +00002 | +00001 | -00000 | -00000 | -00001 |

reading is above the mean.

Table VII.—Hourly Means of the Inclination, calculated from the Horizontal

| Hours            | Mid. | 1.   | 2.   | 3.   | 4.   | 5.   | 6.   | 7.   | 8.   | 9.   | 10.  | 11.  |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| 67° + Winter.    |      |      |      |      |      |      |      |      |      |      |      |      |
| 1895.<br>Months. | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    | '    |
| Jan....          | 24·3 | 24·4 | 24·2 | 24·1 | 24·1 | 23·9 | 23·7 | 23·7 | 23·9 | 24·2 | 24·4 | 24·5 |
| Feb....          | 25·1 | 25·1 | 25·0 | 25·0 | 24·8 | 24·7 | 24·5 | 24·7 | 24·8 | 25·2 | 25·7 | 25·7 |
| March..          | 24·6 | 24·8 | 24·6 | 24·6 | 24·6 | 24·5 | 24·6 | 24·8 | 25·3 | 25·9 | 26·3 | 26·2 |
| Oct....          | 22·2 | 22·4 | 22·5 | 22·5 | 22·5 | 22·5 | 22·6 | 22·7 | 23·2 | 23·7 | 24·0 | 24·0 |
| Nov....          | 22·8 | 22·5 | 22·3 | 22·3 | 22·3 | 22·1 | 22·0 | 22·0 | 22·2 | 22·6 | 22·9 | 23·1 |
| Dec....          | 23·2 | 23·1 | 23·0 | 22·8 | 22·6 | 22·6 | 22·5 | 22·5 | 22·7 | 22·9 | 23·1 | 23·5 |
| Mean             | 23·7 | 23·7 | 23·6 | 23·6 | 23·5 | 23·4 | 23·3 | 23·4 | 23·7 | 24·1 | 24·4 | 24·5 |
| Summer.          |      |      |      |      |      |      |      |      |      |      |      |      |
| April..          | 23·9 | 24·0 | 24·1 | 24·3 | 24·4 | 24·5 | 24·7 | 25·1 | 25·6 | 26·2 | 26·9 | 26·7 |
| May....          | 23·9 | 24·0 | 24·3 | 24·6 | 24·6 | 24·7 | 24·9 | 25·3 | 25·8 | 26·0 | 26·1 | 25·7 |
| June...          | 23·0 | 23·1 | 23·3 | 23·3 | 23·5 | 23·7 | 23·9 | 24·5 | 24·9 | 25·1 | 25·2 | 24·8 |
| July...          | 23·3 | 23·5 | 23·5 | 23·5 | 23·8 | 24·0 | 24·4 | 24·7 | 25·0 | 25·4 | 25·6 | 25·4 |
| Aug...           | 23·3 | 23·3 | 23·4 | 23·7 | 23·7 | 23·9 | 24·1 | 24·4 | 25·0 | 25·2 | 25·4 | 25·2 |
| Sept...          | 23·0 | 23·0 | 23·0 | 23·1 | 23·1 | 23·1 | 23·2 | 23·6 | 24·2 | 24·7 | 24·7 | 24·3 |
| Mean             | 23·4 | 23·5 | 23·6 | 23·8 | 23·9 | 24·0 | 24·2 | 24·6 | 25·1 | 25·4 | 25·7 | 25·4 |

Table VIII.—Diurnal Inequality of the

| Hours        | Mid. | 1.   | 2.   | 3.   | 4.   | 5.   | 6.   | 7.   | 8.   | 9.   | 10.  | 11.  |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Summer Mean. |      |      |      |      |      |      |      |      |      |      |      |      |
|              | -0·5 | -0·4 | -0·3 | -0·1 | 0·0  | +0·1 | +0·3 | +0·7 | +1·2 | +1·5 | +1·8 | +1·5 |
| Winter Mean. |      |      |      |      |      |      |      |      |      |      |      |      |
|              | 0·0  | 0·0  | -0·1 | -0·1 | -0·2 | -0·3 | -0·4 | -0·3 | 0·0  | +0·4 | +0·7 | +0·8 |
| Annual Mean. |      |      |      |      |      |      |      |      |      |      |      |      |
|              | -0·2 | -0·2 | -0·2 | -0·1 | -0·1 | -0·1 | 0·0  | +0·2 | +0·6 | +1·0 | +1·3 | +1·2 |

NOTE.—When the sign is +

and Vertical Forces (Tables III and V). (The Mean for the Year = 67° 23'.8)

| Noon.     | 1.        | 2.        | 3.        | 4.        | 5.        | 6.        | 7.        | 8.        | 9.        | 10.       | 11.       | Mid.      |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Winter.   |           |           |           |           |           |           |           |           |           |           |           |           |
| '<br>24.5 | '<br>24.3 | '<br>24.2 | '<br>24.1 | '<br>24.3 | '<br>24.2 | '<br>24.1 | '<br>24.0 | '<br>24.1 | '<br>24.0 | '<br>23.9 | '<br>23.9 | '<br>23.8 |
| '<br>25.3 | '<br>25.0 | '<br>25.0 | '<br>24.9 | '<br>25.0 | '<br>24.9 | '<br>24.5 | '<br>24.5 | '<br>24.3 | '<br>24.3 | '<br>24.4 | '<br>24.6 | '<br>24.6 |
| '<br>25.8 | '<br>25.5 | '<br>25.3 | '<br>25.1 | '<br>25.0 | '<br>24.8 | '<br>24.5 | '<br>24.4 | '<br>24.2 | '<br>24.1 | '<br>24.2 | '<br>24.1 | '<br>24.1 |
| '<br>23.5 | '<br>23.1 | '<br>22.9 | '<br>22.9 | '<br>23.0 | '<br>22.8 | '<br>22.6 | '<br>22.6 | '<br>22.6 | '<br>22.5 | '<br>22.5 | '<br>22.5 | '<br>22.3 |
| '<br>22.9 | '<br>22.8 | '<br>22.5 | '<br>22.4 | '<br>22.3 | '<br>22.0 | '<br>22.1 | '<br>21.9 | '<br>22.0 | '<br>22.0 | '<br>22.1 | '<br>22.2 | '<br>22.3 |
| '<br>23.3 | '<br>23.3 | '<br>23.5 | '<br>23.3 | '<br>23.2 | '<br>23.2 | '<br>23.0 | '<br>23.0 | '<br>23.0 | '<br>22.9 | '<br>22.8 | '<br>22.8 | '<br>22.8 |
| '<br>24.2 | '<br>24.0 | '<br>23.9 | '<br>23.8 | '<br>23.8 | '<br>23.7 | '<br>23.5 | '<br>23.4 | '<br>23.4 | '<br>23.3 | '<br>23.3 | '<br>23.4 | '<br>23.3 |
| Summer.   |           |           |           |           |           |           |           |           |           |           |           |           |
| '<br>25.7 | '<br>25.1 | '<br>24.6 | '<br>24.5 | '<br>24.1 | '<br>24.0 | '<br>23.8 | '<br>23.7 | '<br>23.5 | '<br>23.5 | '<br>23.4 | '<br>23.4 | '<br>23.6 |
| '<br>24.8 | '<br>24.3 | '<br>24.3 | '<br>24.1 | '<br>23.9 | '<br>23.7 | '<br>23.6 | '<br>23.3 | '<br>23.6 | '<br>23.8 | '<br>23.9 | '<br>23.9 | '<br>24.0 |
| '<br>24.0 | '<br>23.5 | '<br>22.9 | '<br>22.6 | '<br>22.4 | '<br>22.1 | '<br>22.1 | '<br>22.1 | '<br>22.0 | '<br>21.9 | '<br>22.3 | '<br>22.4 | '<br>22.5 |
| '<br>24.8 | '<br>24.1 | '<br>23.7 | '<br>23.4 | '<br>23.3 | '<br>23.1 | '<br>22.8 | '<br>22.7 | '<br>22.8 | '<br>22.7 | '<br>22.7 | '<br>22.8 | '<br>22.8 |
| '<br>24.4 | '<br>23.9 | '<br>23.5 | '<br>23.7 | '<br>23.8 | '<br>23.8 | '<br>23.4 | '<br>23.1 | '<br>22.9 | '<br>23.0 | '<br>23.3 | '<br>23.2 | '<br>23.3 |
| '<br>23.7 | '<br>23.3 | '<br>23.2 | '<br>23.2 | '<br>23.2 | '<br>23.0 | '<br>22.8 | '<br>22.5 | '<br>22.5 | '<br>22.5 | '<br>22.5 | '<br>22.5 | '<br>22.5 |
| '<br>24.6 | '<br>24.0 | '<br>23.7 | '<br>23.6 | '<br>23.5 | '<br>23.3 | '<br>23.1 | '<br>22.9 | '<br>22.9 | '<br>22.9 | '<br>23.0 | '<br>23.0 | '<br>23.1 |

Inclination as deduced from Table VII.

| Noon         | 1.        | 2.        | 3.        | 4.        | 5.        | 6.        | 7.        | 8.        | 9.        | 10.       | 11.       | Mid.      |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Summer Mean. |           |           |           |           |           |           |           |           |           |           |           |           |
| '<br>+0.7    | '<br>+0.1 | '<br>-0.2 | '<br>-0.3 | '<br>-0.4 | '<br>-0.6 | '<br>-0.8 | '<br>-1.0 | '<br>-1.0 | '<br>-1.0 | '<br>-0.9 | '<br>-0.9 | '<br>-0.8 |
| Winter Mean. |           |           |           |           |           |           |           |           |           |           |           |           |
| '<br>+0.5    | '<br>+0.3 | '<br>+0.2 | '<br>+0.1 | '<br>+0.1 | '<br>0.0  | '<br>-0.2 | '<br>-0.3 | '<br>-0.3 | '<br>-0.4 | '<br>-0.4 | '<br>-0.3 | '<br>-0.4 |
| Annual Mean. |           |           |           |           |           |           |           |           |           |           |           |           |
| '<br>+0.6    | '<br>+0.2 | '<br>0.0  | '<br>-0.1 | '<br>-0.1 | '<br>-0.3 | '<br>-0.5 | '<br>-0.6 | '<br>-0.6 | '<br>-0.7 | '<br>-0.6 | '<br>-0.6 | '<br>-0.6 |

the reading is above the mean.



## APPENDIX 1A.

MEAN VALUES, for the years specified, of the Magnetic Elements at Observatories whose Publications are received at Kew Observatory.

| Place.                          | Latitude. | Longitude. | Year. | Declination. | Inclination.                   | Horizontal Force.<br>C. G. S.<br>Units. | Vertical Force.<br>C. G. S.<br>Units. |
|---------------------------------|-----------|------------|-------|--------------|--------------------------------|---|---------------------------------------|
| Pawlofsk .....                  | 59 41 N.  | 30 29 E.   | 1893  | 0 4' 4 E.    | 70 43' 9 N.                    | 16446                                   | 47046                                 |
| Katharinenburg                  | 56 49 N.  | 60 38 E.   | 1893  | 9 34' 6 E.   | 70 39' 1 N.                    | 17801                                   | 50694                                 |
| Kasan .....                     | 55 47 N.  | 49 8 E.    | 1892  | 7 30' 8 E.   | 68 36' 2 N.                    | 18551                                   | 47345                                 |
| Copenhagen ...                  | 55 41 N.  | 12 34 E.   | 1893  | 10 47' 7 W.  | 68 51' 0 N.                    | 17358                                   | 44868                                 |
| Stonyhurst ....                 | 53 51 N.  | 2 28 W.    | 1894  | 18 44' 1 W.  | 69 2' 2 N.                     | 17133                                   | 44719                                 |
| Hamburg.....                    | 53 34 N.  | 10 3 E.    | 1894  | 11 49' 1 W.  | 67 45' 7 N.                    | 17994                                   | 44009                                 |
| Wilhelmshaven                   | 53 32 N.  | 8 9 E.     | 1892  | 13 10' 1 W.  | 67 57' 3 N.                    | 17917                                   | 44245                                 |
| Potsdam .....                   | 52 23 N.  | 13 4 E.    | 1891  | 10 42' 2 W.  | 66 44' 1 N.                    | 18635                                   | 43342                                 |
| Irkutsk .....                   | 52 16 N.  | 104 16 E.  | 1893  | 2 9' 4 E.    | 70 9' 4 N.                     | 20117                                   | 55744                                 |
| Utrecht .....                   | 52 5 N.   | 5 11 E.    | 1893  | 14 28' 5 W.  | 67 12' 2 N.                    | 18397                                   | 43772                                 |
| Kew .....                       | 51 28 N.  | 0 19 W.    | 1895  | 17 16' 8 W.  | 67 23' 8 N.                    | 18278                                   | 43901                                 |
| Greenwich*....                  | 51 28 N.  | 0 0        | 1894  | 17 4' 6 W.   | { 67 18' 7 N.<br>67 17' 3 N. } | 18287                                   | { 43742<br>43691 }                    |
| Uccle (Brussels)                | 50 48 N.  | 4 20 E.    | 1893  | 14 48' 7 W.  | 66 28' 4 N.                    | 1877                                    | 4311                                  |
| Falmouth .....                  | 50 9 N.   | 5 5 W.     | 1894  | 19 0' 8 W.   | 67 2' 4 N.                     | 18511                                   | 43694                                 |
| Prague .....                    | 50 5 N.   | 14 25 E.   | 1894  | 9 36' 7 W.   | —                              | 19805                                   | —                                     |
| Parc St. Maur<br>(Paris) .....  | 48 49 N.  | 2 29 E.    | 1893  | 15 21' 1 W.  | 65 7' 1 N.                     | 19621                                   | 42304                                 |
| Vienna.....                     | 48 15 N.  | 16 21 E.   | 1894  | 8 43' 6 W.   | 63 12' 1 N.                    | 20740                                   | 41061                                 |
| O'Gyalla (near<br>Buda Pesth).. | —         | —          | 1894  | 7 58' 2 W.   | —                              | 21054                                   | —                                     |
| Pola (on Adri-<br>atic).....    | 44 52 N.  | 13 51 E.   | 1894  | 9 52' 6 W.   | 60 37' 3 N.                    | 22004                                   | 39086                                 |
| Nice.....                       | 43 43 N.  | 7 16 E.    | 1893  | 12 32' 7 W.  | 60 26' 4 N.                    | 22198                                   | 39139                                 |
| Toronto .....                   | 43 40 N.  | 79 30 W.   | 1894  | 4 43' 9 W.   | 74 35' 0 N.                    | 16624                                   | 60286                                 |
| Perpignan .....                 | 42 42 N.  | 2 53 E.    | 1893  | 14 10' 5 W.  | 60 11' 9 N.                    | 22304                                   | 38944                                 |
| Rome.....                       | 41 54 N.  | 12 27 E.   | 1891  | 10 45' 0 W.  | 58 4' 6 N.                     | 2324                                    | 3730                                  |
| Tiflis .....                    | 41 43 N.  | 44 48 E.   | 1893  | 1 38' 0 E.   | 55 45' 7 N.                    | 25692                                   | 37751                                 |
| Madrid .....                    | 40 25 N.  | 3 40 W.    | 1893  | 16 14' 2 W.  | —                              | —                                       | —                                     |
| Coimbra .....                   | 40 12 N.  | 8 25 W.    | 1893  | 17 51' 7 W.  | 59 50' 5 N.                    | 22518                                   | 38752                                 |
| Washington .....                | 38 53 N.  | 77 0 W.    | 1891  | 4 9' 7 W.    | 71 5' 1 N.                     | 19855                                   | 57940                                 |
| Lisbon .....                    | 38 43 N.  | 9 9 W.     | 1893  | 17 49' 4 W.  | 58 24' 6 N.                    | 23270                                   | 37840                                 |
| Zi-ka-wei .....                 | 31 12 N.  | 121 26 E.  | 1893  | 2 17' 0 W.   | 45 59' 7 N.                    | 32585                                   | 33736                                 |
| Hong Kong....                   | 22 18 N.  | 114 10 E.  | 1894  | 0 29' 2 E.   | 31 53' 1 N.                    | 36450                                   | 22675                                 |
| Colaba .....                    | 18 54 N.  | 72 49 E.   | 1894  | 0 38' 6 E.   | 20 40' 7 N.                    | 37426                                   | 14126                                 |
| Manila .....                    | 14 35 N.  | 127 11 E.  | 1894  | 0 50' 4 E.   | 16 54' 3 N.                    | 37740                                   | 11470                                 |
| Batavia .....                   | 6 11 S.   | 106 49 E.  | 1893  | 1 30' 6 E.   | 29 6' 2 S.                     | 36741                                   | 20451                                 |
| Mauritius .....                 | 20 6 S.   | 57 33 E.   | 1893  | 10 2' 1 W.   | 54 44' 3 S.                    | 23989                                   | 33929                                 |
| Melbourne....                   | 37 50 S.  | 144 58 E.  | 1893  | 8 9' 6 E.    | 67 17' 0 S.                    | 23432                                   | 55968                                 |

\* Of the two values of the Inclination and Vertical Force, the first is based on observations with 3-inch dip needles only, the second on combined observations with needles of 3, 6, and 9 inches.

APPENDIX II.—Table I.

Mean Monthly Results of Temperature and Pressure. Kew Observatory.  
1895.

| Months.      | Thermometer. |           |      |                    |       | Barometer.* |       |                    |           |        | Mean vapour-tension. |           |        |           |           |        |            |          |           |      |      |
|--------------|--------------|-----------|------|--------------------|-------|-------------|-------|--------------------|-----------|--------|----------------------|-----------|--------|-----------|-----------|--------|------------|----------|-----------|------|------|
|              | Mean.        | Means of— |      | Absolute Extremes. |       |             | Mean. | Absolute Extremes. |           |        |                      |           |        |           |           |        |            |          |           |      |      |
|              |              | Max.      | Min. | Max.               | Date. | Min.        |       | Date.              | Max.      | Date.  |                      |           |        |           |           |        |            |          |           |      |      |
| 1895.        | 34.1         | 37.8      | 29.7 | 33.8               | 51.8  | 20 2 P.M.   | 20.6  | d. h.              | 29 4 A.M. | ins.   | 29.705               | ins.      | 30.473 | d. h.     | 30 6 P.M. | ins.   | 28.943     | d. h.    | 14 NOON.  | in.  | .165 |
| Jan....      | 29.4         | 34.5      | 23.8 | 29.2               | 44.9  | 28 3 "      | 10.8  | 7 7 "              | 7 7 "     | 30.098 | 30.532               | 17 2 A.M. | 29.574 | 11 5 A.M. | 30.532    | 30.424 | 15 9 "     | 28 NOON. | 28.869    | .221 |      |
| Feb....      | 42.8         | 50.1      | 36.6 | 43.4               | 62.0  | 22 5 "      | 26.1  | 3 8 "              | 3 8 "     | 29.750 | 30.424               | 15 9 "    | 29.313 | 7 3 A.M.  | 30.408    | 30.408 | 12 9 "     | 28 NOON. | 29.313    | .263 |      |
| March..      | 48.3         | 55.8      | 41.6 | 48.7               | 64.1  | 20 1 & 2 "  | 29.7  | 1 6 "              | 1 6 "     | 30.087 | 30.629               | 2 NOON.   | 29.574 | 18 5 "    | 30.629    | 30.629 | 2 NOON.    | 29.574   | 18 5 "    | .296 |      |
| April..      | 55.3         | 64.9      | 45.8 | 55.4               | 83.7  | 30 3 "      | 36.8  | 2 4 "              | 2 4 "     | 30.076 | 30.460               | 41.8      | 41.8   | 13 5 "    | 30.076    | 30.460 | 24 11 P.M. | 29.625   | 18 8 P.M. | .340 |      |
| May...       | 60.6         | 70.7      | 50.5 | 60.6               | 80.6  | 26 2 "      | 48.9  | 7 4 "              | 7 4 "     | 29.885 | 30.278               | 48.9      | 48.9   | 7 4 "     | 29.885    | 30.278 | 6 7 A.M.   | 29.417   | 20 3 "    | .386 |      |
| June...      | 62.2         | 70.6      | 54.3 | 62.5               | 80.4  | 17 4 "      | 46.4  | 25 5 "             | 25 5 "    | 29.923 | 30.312               | 46.4      | 46.4   | 25 5 "    | 29.923    | 30.312 | 25 11 "    | 29.325   | 4 4 A.M.  | .420 |      |
| July...      | 61.6         | 69.7      | 54.1 | 61.9               | 77.7  | 22 3 "      | 38.6  | 22 6 "             | 22 6 "    | 30.158 | 30.425               | 38.6      | 38.6   | 21 9 "    | 30.158    | 30.425 | 21 9 "     | 29.775   | 11 4 "    | .408 |      |
| Aug....      | 60.5         | 71.4      | 51.2 | 61.3               | 80.2  | 24 8 "      | 25.1  | 28 6 "             | 28 6 "    | 29.855 | 30.564               | 25.1      | 25.1   | 1 7 P.M.  | 29.855    | 30.564 | 18 10 "    | 29.058   | 9 6 "     | .268 |      |
| Sept....     | 46.0         | 52.9      | 38.6 | 45.8               | 70.9  | 1 1 "       | 29.9  | 18 8 "             | 18 8 "    | 29.895 | 30.501               | 29.9      | 29.9   | 1 7 P.M.  | 29.895    | 30.501 | 1 7 P.M.   | 29.143   | 12 2 P.M. | .279 |      |
| Oct....      | 47.6         | 52.3      | 41.7 | 47.0               | 61.6  | 16 1 "      | 26.1  | 11 6 "             | 11 6 "    | 29.813 | 30.451               | 26.1      | 26.1   | 28 2 A.M. | 29.813    | 30.451 | 28 2 A.M.  | 29.123   | 16 5 A.M. | .213 |      |
| Nov....      | 40.4         | 44.5      | 35.6 | 40.1               | 56.2  | 5 2 "       | ..    | ..                 | ..        | ..     | ..                   | ..        | ..     | ..        | ..        | ..     | ..         | ..       | ..        | ..   | .280 |
| Dec....      | 49.1         | 56.3      | 42.0 | 49.1               | ..    | ..          | ..    | ..                 | ..        | 29.930 | ..                   | ..        | ..     | ..        | ..        | ..     | ..         | ..       | ..        | ..   | ..   |
| Yearly Means | 49.1         | 56.3      | 42.0 | 49.1               | ..    | ..          | ..    | ..                 | ..        | 29.930 | ..                   | ..        | ..     | ..        | ..        | ..     | ..         | ..       | ..        | ..   | ..   |

\* Reduced to 32° at M.S.L.

This Table is compiled from "Hourly Means," vol. 1895, of the Meteorological Office.

Meteorological Observations.—Table II.  
Kew Observatory.

| Months.           | Mean amount of cloud (0=clear, 10=over-cast). |            | Rainfall.* |       | Weather. Number of days on which were registered |       |                    |            |                 |      | Wind.† Number of days on which it was |      |    |      |    |      |    |      |      |    |
|-------------------|---|------------|------------|-------|--|-------|--------------------|------------|-----------------|------|---------------------------------------|------|----|------|----|------|----|------|------|----|
|                   | Total.  | Maxi- mum. | Date.      | Rain. | Snow.  | Hail. | Thun- der- storms. | Clear sky. | Over- cast sky. | Gale | N.                                    | N.E. | E. | S.E. | S. | S.W. | W. | N.W. | Calm |    |
|                   | ins.  | ins.       |            | †     |  |       |                    |            |                 |      |                                       |      |    |      |    |      |    |      |      |    |
| 1895.             |   |            |            |       |  |       |                    |            |                 |      |                                       |      |    |      |    |      |    |      |      |    |
| January           | 6.5   | 1.435      | 0.605      | 17    | 12   | ..    | 1                  | 3          | 12              | 0    | 11                                    | 2    | 2  | 3    | 3  | 3    | 3  | 5    | 4    | 4  |
| February          | 5.8   | 0.090      | 0.040      | 3     | 3  | ..    | ..                 | 8          | 10              | 3    | 6                                     | 12   | 1  | ..   | .. | ..   | 2  | 2    | 5    | 5  |
| March             | 6.7   | 1.235      | 0.380      | 17    | 4  | 2     | ..                 | 4          | 15              | 2    | 3                                     | 1    | 1  | 3    | .. | 11   | 6  | 4    | 3    | 3  |
| April             | 7.0   | 1.625      | 0.410      | 12    | ..   | ..    | 1                  | 13         | 13              | ..   | 4                                     | 4    | 2  | 2    | 10 | 3    | 2  | 2    | 2    | 1  |
| May               | 4.7   | 0.445      | 0.125      | 7     | 1  | ..    | 1                  | 8          | 8               | 1    | 8                                     | 5    | 2  | 3    | 2  | 1    | 2  | 4    | 8    | 8  |
| June              | 6.2   | 0.230      | 0.155      | 11    | ..   | ..    | 2                  | 5          | 12              | ..   | 5                                     | 8    | 1  | 2    | 1  | 8    | 3  | 2    | 6    | 6  |
| July              | 6.8   | 4.515      | 0.845      | 18    | ..   | ..    | 3                  | 3          | 15              | ..   | 2                                     | 2    | 1  | ..   | 3  | 13   | 6  | 4    | 5    | 5  |
| August            | 5.5   | 2.880      | 1.005      | 17    | ..   | ..    | 3                  | 6          | 7               | ..   | 1                                     | 2    | 1  | 6    | 6  | 13   | 6  | 4    | 8    | 8  |
| September         | 3.0   | 1.535      | 1.385      | 5     | ..   | 1     | 2                  | 19         | 2               | ..   | 2                                     | 2    | .. | ..   | 1  | 7    | 5  | 3    | 12   | 12 |
| October           | 6.6   | 3.000      | 1.405      | 14    | ..   | ..    | ..                 | 2          | 9               | ..   | 4                                     | 2    | 3  | 1    | 1  | 6    | 11 | 3    | 10   | 10 |
| November          | 7.3   | 3.405      | 0.650      | 16    | ..   | ..    | ..                 | 2          | 16              | 7    | ..                                    | 2    | 8  | 2    | 5  | 9    | 3  | 1    | 1    | 1  |
| December          | 7.5   | 1.965      | 0.325      | 12    | 3  | 1     | ..                 | 3          | 17              | 3    | 1                                     | 5    | 2  | 2    | 7  | 8    | 2  | 2    | 3    | 3  |
| Totals and means. | 6.1   | 22.360     |            | 142   | 23   | 4     | 11                 | 71         | 136             | 16   | 47                                    | 45   | 42 | 19   | 30 | 88   | 59 | 35   | 66   | 66 |

\* Measured at 10 A.M. daily by gauge 1.75 feet above ground.

† The number of rainy days are those on which 0.01 inch rain or melted snow was recorded.

† As registered by the anemograph.

Meteorological Observations.—Table III.  
Kew Observatory.

| Months.                | Bright Sunshine.                |                                       |                        | Maximum temperature in sun's rays. (Black bulb <i>in vacuo</i> .) |          |         | Minimum temperature on the ground. |         |            | Horizontal movement of the air.* |                           |            |
|------------------------|---------------------------------|---------------------------------------|------------------------|---|----------|---------|------------------------------------|---------|------------|----------------------------------|---------------------------|------------|
|                        | Total number of hours recorded. | Mean percentage of possible sunshine. | Greatest daily record. | Mean.   | Highest. | Date. † | Mean.                              | Lowest. | Date. †    | Average hourly velocity.         | Greatest hourly velocity. | Date.      |
|                        | h. m.                           |                                       | h. m.                  | deg.  | deg.     |         | deg.                               | deg.    |            | miles.                           | miles.                    |            |
| 1895.                  |                                 |                                       |                        |   |          |         |                                    |         |            |                                  |                           |            |
| January .....          | 51 18                           | 20                                    | 5 36                   | 63  | 83       | 18      | 24                                 | 13      | { 11<br>29 | 11.4                             | 34                        | 31         |
| February .....         | 39 36                           | 14                                    | 5 18                   | 62  | 94       | 28      | 16                                 | 0       | 8          | 10.3                             | 38                        | 11         |
| March .....            | 116 18                          | 32                                    | 10 42                  | 96  | 109      | 22      | 31                                 | 13      | 4          | 11.0                             | 45                        | 24         |
| April .....            | 127 12                          | 31                                    | 11 54                  | 104   | 128      | 19      | 35                                 | 23      | { 1<br>5   | 11.2                             | 32                        | 14         |
| May .....              | 245 0                           | 51                                    | 13 48                  | 117   | 140      | 30      | 41                                 | 31      | 2          | 9.7                              | 35                        | 7          |
| June .....             | 235 42                          | 48                                    | 14 18                  | 128   | 141      | 23      | 44                                 | 32      | 15         | 7.8                              | 25                        | { 6<br>7   |
| July .....             | 183 24                          | 37                                    | 14 18                  | 127   | 139      | 18      | 49                                 | 40      | { 7<br>13  | 10.2                             | 33                        | 20         |
| August .....           | 223 0                           | 50                                    | 13 6                   | 128   | 138      | 21      | 48                                 | 37      | 25         | 9.1                              | 29                        | { 11<br>27 |
| September .....        | 214 0                           | 56                                    | 11 42                  | { 118<br>2  | 130      | 7       | 44                                 | 32      | 22         | 5.8                              | 21                        | { 11<br>29 |
| October .....          | 79 0                            | 24                                    | 7 24                   | 90  | 122      | 1       | 34                                 | 16      | 28         | 6.9                              | 30                        | 3          |
| November .....         | 46 18                           | 17                                    | 6 30                   | 75  | 98       | 14      | 36                                 | 23      | 3          | 13.5                             | 46                        | 16         |
| December .....         | 31 36                           | 13                                    | 5 30                   | 62  | 81       | 13      | 30                                 | 19      | 8          | 13.2                             | 39                        | 5          |
| Totals and Means ..... | 1592 24                         | 33                                    | ..                     | 97  | ..       | ..      | 36                                 | ..      | ..         | 10.0                             | ..                        | ..         |

\* As indicated by a Robinson's anemograph, 70 feet above the general surface of the ground.  
† Read at 10 A.M., and entered to previous day.  
‡ Read at 10 A.M., and entered to same day.

Table IV.

Summary of Sun-spot Observations made at the Kew Observatory.

| Months.              | Days of observation. | Number of new groups enumerated. | Days apparently without spots. |
|----------------------|----------------------|----------------------------------|--------------------------------|
| 1895.                |                      |                                  |                                |
| January .....        | 13                   | 12                               | —                              |
| February.....        | 10                   | 14                               | —                              |
| March.....           | 17                   | 11                               | —                              |
| April.....           | 12                   | 12                               | —                              |
| May.....             | 21                   | 15                               | —                              |
| June .....           | 15                   | 8                                | —                              |
| July.....            | 8                    | 10                               | —                              |
| August .....         | 17                   | 14                               | --                             |
| September.....       | 17                   | 14                               | ---                            |
| October.....         | 10                   | 9                                | ---                            |
| November.....        | 12                   | 10                               | ---                            |
| December .....       | 7                    | 15                               | --                             |
| Totals for 1895 .... | 159                  | 144                              | ---                            |

APPENDIX III.—Table I.

RESULTS OF WATCH TRIALS. Performance of the 59 Watches which obtained the highest number of marks during the year.

| Watch deposited by            | Number of watch. | Balance spring, escapement, &c.                 | Mean daily rate. |                |               |          | Mean variation of daily rate. $\pm$ | Mean change of rate for I R. | Difference between extreme gaining and losing rates. | Marks awarded for |                          |                               | Total Marks. |
|-------------------------------|------------------|---|------------------|----------------|---------------|----------|-------------------------------------|------------------------------|--|-------------------|--------------------------|-------------------------------|--------------|
|                               |                  |   | Pendant up.      | Pendant right. | Pendant left. | Dial up. |                                     |                              |  | Dial down.        | Daily variation of rate. | Change of rate with position. |              |
| A. E. Fridlander, Coventry    | 13911            | Single overcoil, s.r., g.b. centre seconds      | +0.6             | -1.7           | -1.2          | +0.5     | +0.2                                | 0.02                         | 5.0  | 31.4              | 37.1                     | 18.9                          | 87.4         |
| A. E. Fridlander, Coventry    | 52761            | Single overcoil, d.r., g.b. centre seconds      | -0.7             | -0.8           | -1.5          | -1.6     | -2.4                                | 0.02                         | 4.7  | 30.1              | 37.9                     | 18.5                          | 86.5         |
| Baume & Co., London           | 103031           | Single overcoil, g.b., "fourbillon" chronometer | +0.1             | +0.0           | +0.6          | -0.1     | +4.5                                | 0.02                         | 6.2  | 32.8              | 34.5                     | 18.7                          | 86.0         |
| A. E. Fridlander, Coventry    | 13762            | Single overcoil, s.r., g.b. ....                | +2.3             | +1.9           | +3.6          | +4.5     | +2.4                                | 0.02                         | 5.0  | 30.7              | 36.4                     | 18.9                          | 86.0         |
| S. Smith & Son, London        | 8071             | Single overcoil, s.r., g.b., "Karrusel"         | +1.2             | +0.9           | +0.6          | +2.3     | -2.2                                | 0.04                         | 6.5  | 31.3              | 35.6                     | 18.4                          | 85.3         |
| Jos. White & Son, Coventry    | 35440            | Single overcoil, s.r., g.b., "Karrusel"         | +2.3             | +1.5           | +2.6          | +3.7     | +6.4                                | 0.01                         | 8.0  | 30.7              | 35.2                     | 19.3                          | 85.2         |
| S. Ycomans, Coventry          | 71624            | Single overcoil, s.r., g.b., "Karrusel"         | +1.7             | +1.3           | +2.6          | +0.3     | +3.1                                | 0.06                         | 5.2  | 28.4              | 36.6                     | 19.8                          | 84.8         |
| L. Rozat, Chaux-de-Fonds      | 2365             | Single overcoil, g.b., "fourbillon"             | +3.0             | +3.3           | +2.3          | +3.7     | +2.7                                | 0.05                         | 6.2  | 29.1              | 36.3                     | 19.0                          | 84.4         |
| Carley & Co., London          | 49729            | Single overcoil, s.r., g.b., "Karrusel"         | -0.8             | -1.4           | -1.0          | +0.4     | +1.0                                | 0.06                         | 4.3  | 31.8              | 36.2                     | 16.3                          | 84.3         |
| T. Russell & Son, Liverpool   | 89861            | Single overcoil, s.r., g.b., "Karrusel"         | -0.6             | -0.2           | -0.2          | +1.0     | +1.0                                | 0.05                         | 4.0  | 30.3              | 37.4                     | 16.6                          | 84.3         |
| Jos. White & Son, Coventry    | 35344            | Single overcoil, s.r., g.b. ....                | +5.2             | +4.7           | +1.2          | +3.8     | +3.2                                | 0.02                         | 6.7  | 30.2              | 35.6                     | 18.5                          | 84.3         |
| Jos. White & Son, Coventry    | 14109            | Single overcoil, s.r., g.b. centre seconds      | +2.1             | +1.7           | +1.0          | +0.5     | +3.0                                | 0.05                         | 6.0  | 30.1              | 37.1                     | 17.1                          | 84.3         |
| A. E. Fridlander, Coventry    | 157327           | Single overcoil, s.r., g.b. chronograph         | +4.8             | +2.5           | +5.0          | +3.7     | +2.4                                | 0.03                         | 4.7  | 30.2              | 36.1                     | 17.9                          | 84.2         |
| Stauffer, Son, & Co., London  | 28348            | Single overcoil, s.r., g.b., "Karrusel"         | +8.5             | +9.0           | +8.1          | +7.1     | +9.2                                | 0.05                         | 6.4  | 29.1              | 35.1                     | 17.5                          | 84.1         |
| Usher & Cole, London          | 52899            | Single overcoil, s.r., g.b., "Karrusel"         | -0.8             | -1.4           | -1.0          | +0.3     | +4.1                                | 0.05                         | 4.5  | 31.9              | 35.1                     | 17.0                          | 84.0         |
| A. E. Fridlander, Coventry    | 52899            | Single overcoil, s.r., g.b., "Karrusel"         | +4.1             | +3.9           | +3.9          | +4.3     | +4.1                                | 0.02                         | 6.5  | 29.9              | 35.1                     | 17.6                          | 83.8         |
| Newsome & Co., Coventry       | 123220           | Single overcoil, s.r., g.b., "Karrusel"         | +0.3             | +0.1           | -2.4          | +0.4     | +0.1                                | 0.05                         | 4.8  | 29.1              | 37.1                     | 17.6                          | 83.7         |
| Stauffer, Son, & Co., London  | 52825            | Single overcoil, s.r., g.b., "Karrusel"         | +1.8             | -0.8           | -1.0          | +1.6     | +1.7                                | 0.04                         | 7.5  | 31.9              | 36.6                     | 15.6                          | 83.6         |
| Jos. White & Son, Coventry    | 35365            | Single overcoil, s.r., g.b., "Karrusel"         | +3.0             | +2.4           | +4.5          | +2.9     | +4.3                                | 0.05                         | 6.0  | 29.3              | 36.9                     | 17.2                          | 83.4         |
| Usher & Cole, London          | 28341            | Single overcoil, d.r., g.b., "Karrusel"         | +3.0             | -0.9           | -0.6          | -0.6     | -0.7                                | 0.06                         | 5.2  | 27.3              | 37.5                     | 18.6                          | 83.4         |
| Jos. White & Son, Coventry    | 34938            | Single overcoil, s.r., g.b. ....                | +2.6             | -0.9           | -0.9          | -2.1     | +0.6                                | 0.03                         | 6.2  | 28.7              | 36.2                     | 17.4                          | 83.2         |
| Jos. White & Son, Coventry    | 34843            | Single overcoil, s.r., g.b., "Karrusel"         | -1.7             | -2.0           | -0.9          | -2.1     | +2.6                                | 0.05                         | 4.8  | 30.5              | 35.6                     | 17.9                          | 83.1         |
| Jos. W. White & Co., Coventry | 125317           | Single overcoil, s.r., g.b., "Karrusel"         | +0.7             | -0.1           | -0.2          | +2.7     | +3.5                                | 0.04                         | 4.5  | 28.0              | 37.4                     | 17.7                          | 83.1         |
| Newsome & Co., Coventry       | 35421            | Single overcoil, s.r., g.b., "fourbillon"       | +2.2             | +1.6           | +1.5          | +2.7     | +3.5                                | 0.04                         | 4.5  | 28.0              | 37.4                     | 17.7                          | 83.1         |

Table I—continued.

| Watch deposited by               | Number of watch. | Balance spring, escapement, &c.                  | Mean daily rate. |                |               |            | Mean variation of daily rate, ± | Mean change of rate for 10 F. | Difference between extreme gaining and losing rates. | Marks awarded for |       |   |                           | Total Marks. |
|----------------------------------|------------------|--|------------------|----------------|---------------|------------|---------------------------------|-------------------------------|--|-------------------|-------|---|---------------------------|--------------|
|                                  |                  |  | Pendant up.      | Pendant right. | Pendant left. | Dial up.   |                                 |                               |  | Dial down.        | Rate. | Change of rate with change of position. | Temperature compensation. |              |
| Deher & Cole, London.....        | 28389            | Single overcoil, s.r., g.b., "Karrusel".....     | secs. -2.5       | secs. -2.2     | secs. -2.6    | secs. -0.1 | secs. -2.8                      | secs. 0.5                     | secs. 5.5  | 0-40              | 36.9  | 0-20                                    | 16.6                      | 83.0         |
| A. E. Fridlander, Coventry.....  | 13629            | Single overcoil, s.r., g.b., centre seconds..... | -0.9             | -2.1           | -4.2          | -2.8       | -2.4                            | 0.6                           | 6.5  | 29.5              | 36.7  | 18.0                                    | 18.0                      | 82.8         |
| S. Smith & Son, London.....      | 14154            | Single overcoil, s.r., g.b., "Karrusel".....     | -1.5             | +0.4           | -1.3          | -1.2       | -1.2                            | 0.7                           | 5.0  | 0.05              | 37.8  | 18.5                                    | 18.5                      | 82.3         |
| Newsome & Co., Coventry.....     | 159-1896         | Double overcoil, d.r., g.b., chronograph.....    | +2.3             | +4.2           | +6.2          | +2.5       | +3.9                            | 0.6                           | 7.2  | 0.005             | 27.1  | 35.4                                    | 19.7                      | 82.2         |
| A. E. Fridlander, Coventry.....  | 52617            | Single overcoil, s.r., fusee, "Karrusel".....    | -2.9             | +0.4           | -1.2          | 0.0        | -1.7                            | 0.6                           | 0.04   | 0.04              | 28.3  | 36.6                                    | 17.2                      | 82.1         |
| A. E. Fridlander, Coventry.....  | 89360            | Single overcoil, d.r., fusee, "Karrusel".....    | +1.7             | -0.2           | -2.7          | +0.4       | +2.5                            | 0.5                           | 7.7  | 0.03              | 29.4  | 34.3                                    | 18.3                      | 82.0         |
| V. Kullberg, London.....         | 5851             | Double overcoil, d.r., g.b., "Karrusel".....     | +0.7             | +1.4           | +1.4          | +1.3       | +4.6                            | 0.1                           | 8.0  | 0.04              | 20.3  | 35.6                                    | 17.1                      | 82.0         |
| Usher & Cole, London.....        | 1512             | Single overcoil, s.r., g.b., "Karrusel".....     | +2.6             | +1.1           | +4.3          | +2.6       | -0.1                            | 0.6                           | 6.2  | 0.02              | 28.6  | 34.9                                    | 18.5                      | 82.0         |
| Jos. White & Son, Coventry.....  | 35524            | Single overcoil, s.r., fusee.....                | +0.7             | +3.6           | +0.5          | 0.2        | -3.2                            | 0.6                           | 8.0  | 0.03              | 28.5  | 33.7                                    | 19.8                      | 82.0         |
| Richardson, Coventry.....        | 9455             | Single overcoil, s.r., g.b., "Karrusel".....     | -1.9             | -0.6           | -0.4          | +1.2       | -0.1                            | 0.4                           | 10.7   | 0.10              | 27.8  | 37.1                                    | 17.0                      | 81.9         |
| R. Crook, London.....            | 4445             | Double overcoil, s.r., g.b., "Karrusel".....     | +1.1             | +1.9           | +2.4          | +1.1       | +0.2                            | 0.4                           | 7.7  | 0.10              | 31.1  | 37.4                                    | 13.2                      | 81.7         |
| Jos. White & Co., Coventry.....  | 34406            | Double overcoil, d.r., g.b., "Karrusel".....     | +1.9             | +5.6           | +4.7          | +4.1       | +1.6                            | 0.5                           | 7.2  | 0.03              | 29.2  | 34.2                                    | 18.3                      | 81.7         |
| Newsome & Co., Coventry.....     | 123622           | Single overcoil, s.r., g.b., "Karrusel".....     | +1.7             | +2.4           | +1.3          | +2.1       | +4.7                            | 0.7                           | 7.0  | 0.01              | 26.6  | 36.6                                    | 19.6                      | 81.7         |
| John Adams, Coventry.....        | 6241             | Single overcoil, s.r., g.b., "Karrusel".....     | +2.7             | +1.6           | +2.5          | +2.1       | +4.7                            | 0.7                           | 7.0  | 0.01              | 25.7  | 36.9                                    | 19.1                      | 81.7         |
| Jos. White & Son, Coventry.....  | 33683            | Single overcoil, s.r., g.b., "Karrusel".....     | -3.0             | -2.7           | -3.4          | -1.6       | +1.0                            | 0.5                           | 8.2  | 0.03              | 34.2  | 18.1                                    | 18.1                      | 81.6         |
| Newsome & Co., Coventry.....     | 123621           | Single overcoil, s.r., g.b., centre seconds..... | +0.3             | +0.8           | +0.7          | +3.6       | +2.3                            | 0.6                           | 8.0  | 0.04              | 28.1  | 35.6                                    | 17.7                      | 81.6         |
| Newsome & Co., Coventry.....     | 95045            | Single overcoil, s.r., g.b., "Karrusel".....     | +1.1             | +0.9           | +0.6          | +2.8       | +3.5                            | 0.6                           | 6.5  | 0.05              | 28.9  | 35.6                                    | 16.8                      | 81.3         |
| Bonniksen, Coventry.....         | 52840            | Single overcoil, s.r., g.b., "Karrusel".....     | -0.8             | +0.4           | -3.6          | -1.1       | -0.4                            | 0.6                           | 5.2  | 0.03              | 27.5  | 36.0                                    | 17.7                      | 81.3         |
| Staufier, Son & Co., London..... | 157225           | Single overcoil, s.r., g.b., "Karrusel".....     | +0.3             | +0.3           | +0.8          | +4.9       | +1.9                            | 0.6                           | 6.8  | 0.03              | 28.6  | 34.4                                    | 18.0                      | 81.0         |
| S. Smith & Son, London.....      | 6166             | Double overcoil, d.r., g.b., chronograph.....    | +2.6             | +3.8           | +0.9          | +4.2       | +1.7                            | 0.6                           | 6.0  | 0.03              | 27.2  | 35.5                                    | 18.1                      | 80.9         |
| John Adams, Coventry.....        | 36693            | Double overcoil, d.r., g.b., repeater.....       | -2.1             | -4.0           | -2.7          | +1.2       | -3.3                            | 0.5                           | 7.5  | 0.02              | 29.2  | 34.5                                    | 17.0                      | 80.7         |
| C. J. Hill, Coventry.....        | 149006           | Single overcoil, s.r., g.b., "Karrusel".....     | +9.2             | +9.3           | +8.6          | +6.7       | +8.5                            | 0.6                           | 8.5  | 0.08              | 28.9  | 37.2                                    | 14.6                      | 80.7         |
| A. E. Fridlander, Coventry.....  | 52897            | Single overcoil, s.r., g.b., "Karrusel".....     | +1.7             | +3.0           | +3.5          | +4.3       | +6.2                            | 0.6                           | 6.0  | 0.05              | 26.6  | 35.2                                    | 16.9                      | 80.7         |
| A. E. Fridlander, Coventry.....  | 52631            | Single overcoil, d.r., g.b., "Karrusel".....     | -0.3             | +0.5           | +0.7          | -0.7       | -2.7                            | 0.5                           | 6.2  | 0.10              | 30.7  | 36.2                                    | 13.7                      | 80.6         |
| C. J. Hill, Coventry.....        | 149172           | Single overcoil, s.r., g.b., "Karrusel".....     | +2.5             | +3.2           | +0.6          | +2.9       | +1.0                            | 0.6                           | 5.0  | 0.05              | 28.2  | 36.0                                    | 16.4                      | 80.6         |
|                                  |                  |  | +1.2             | +0.6           | +0.8          | +2.3       | +3.9                            | 0.7                           | 5.2  | 0.02              | 26.3  | 35.7                                    | 18.5                      | 80.5         |

Table I—continued.

| Watch deposited by               | Number of watch. | Balance spring, escapement, &c.              | Mean daily rate. |                |               |            |            | Mean variation of daily rate. ± | Mean change of rate for 10 f. | Difference between extreme gaining and losing rates. | Marks awarded for        |   |                           | Total Marks. |
|----------------------------------|------------------|--|------------------|----------------|---------------|------------|------------|---------------------------------|-------------------------------|--|--------------------------|---|---------------------------|--------------|
|                                  |                  |  | Pendant up.      | Pendant right. | Pendant left. | Dial up.   | Dial down. |                                 |                               |  | Daily variation of rate. | Change of rate with change of position. | Temperature compensation. |              |
| C. J. Hill, Coventry.....        | 149005           | Single overcoil, s.r., g.b., "Karrusel"..... | secs. -1.3       | secs. -2.4     | secs. -2.2    | secs. +1.8 | secs. +2.3 | secs. 0.5                       | secs. 0.04                    | secs. 7.2  | 0-40                     | 0-20                                    | 0-100.                    |              |
| Jos. White & Son, Coventry.....  | 35159            | Single overcoil, s.r., g.b. ....             | +2.0             | -0.1           | 0.8           | +3.2       | +0.3       | 0.5                             | 0.06                          | 6.2  | 32.3                     | 17.2                                    | 80.4                      |              |
| J. Player & Son, Coventry.....   | 35245            | Single overcoil, d.r., g.b., "Karrusel"..... | +1.5             | +2.6           | +2.3          | +1.5       | +0.3       | 0.6                             | 0.03                          | 6.0  | 34.6                     | 16.1                                    | 80.4                      |              |
| A. E. Fridlander, Coventry.....  | 52812            | Single overcoil, d.r., g.b. ....             | -0.1             | +2.5           | -0.3          | +0.3       | +5.9       | 0.5                             | 0.02                          | 8.5  | 37.4                     | 15.7                                    | 80.4                      |              |
| A. E. Fridlander, Coventry.....  | 13819            | Single overcoil, s.r., g.b. ....             | -1.9             | 1.0            | 1.5           | +1.7       | 3.6        | 0.7                             | 0.03                          | 7.2  | 30.0                     | 18.2                                    | 80.3                      |              |
| A. E. Fridlander, Coventry.....  | 52866            | Single overcoil, d.r., g.b. ....             | 3.2              | 2.2            | 3.9           | -2.9       | -4.6       | 0.6                             | 0.09                          | 6.7  | 28.6                     | 34.8                                    | 80.2                      |              |
| T. Russell & Son, Liverpool..... | 89326            | Single overcoil, s.r., g.b., "Karrusel"..... | -5.4             | -3.6           | -2.5          | -1.5       | -2.2       | 0.6                             | 0.06                          | 5.0  | 37.2                     | 14.1                                    | 80.2                      |              |
| Jos. White & Son, Coventry.....  | 35343            | Single overcoil, s.r., g.b. ....             | +0.7             | -1.5           | +1.8          | +2.4       | +1.8       | 0.6                             | 0.05                          | 6.7  | 27.9                     | 35.4                                    | 80.1                      |              |
| Rotherhams, Coventry.....        | 17170            | Single overcoil, s.r. g.b., chronograph..... | -2.0             | -0.4           | -3.7          | -1.2       | -1.3       | 0.6                             | 0.03                          | 6.5  | 27.1                     | 36.4                                    | 80.1                      |              |

In the above List, the following abbreviations are used, viz. :—s.r. for single roller; d.r. for double roller; g. b. for going barrel; + for gaining rate; - for losing rate.



