RESULTS

OF THE

MAGNETICAL AND METEOROLOGICAL

OBSERVATIONS

MADE AT

THE ROYAL OBSERVATORY, GREENWICH,

IN THE YEAR

1889:

UNDER THE DIRECTION OF

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ASTRONOMER ROYAL.

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Page (vi), Table V. Temperature on April 20, *for* 62°·4, *read* 63°·4.

MAGNETICAL AND METEOROLOGICAL OBSERVATIONS, 1880.

Page (viii), Table X. Temperature on September 28, *for* 67°·1, *read* 67°·0.

MAGNETICAL AND METEOROLOGICAL OBSERVATIONS, 1888.

INTRODUCTION.—Page *xlviii*, line 5, *for* 1887, *read* 1888.

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ROYAL OBSERVATORY, GREENWICH.

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GREENWICH MAGNETICAL AND METEOROLOGICAL OBSERVATIONS,

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INTRODUCTION.

§ 1. *Personal Establishment and Arrangements.*

During the year 1889 the establishment of Assistants in the Magnetical and Meteorological Department of the Royal Observatory consisted of William Ellis, Superintendent, and William Carpenter Nash, Assistant, aided by five Computers. The Computers employed during the year were, Ernest E. McClellan, Edward Finch, Francis H. W. Hope, Richard R. Tweed, and George A. Allworth.

Mr. Ellis controls and superintends the whole of the work of the Department. Mr. Nash is charged generally with the instrumental adjustments, the determination of the values of instrumental constants, and the more delicate magnetic observations. He also specially superintends the Meteorological Reductions. The routine magnetical and meteorological observations are in general made by the Computers.

§ 2. *General Description of the Buildings and Instruments of the Magnetical and Meteorological Observatory.*

The Magnetical and Meteorological Observatory was erected in the year 1838. Its northern face is distant about 170 feet south-south-east from the nearest point of the South-East Dome, and about 35 feet south from the carpenters' workshop. On its east stands the New Library (erected at the end of the year 1881), in the construction of which non-magnetic bricks were used, and every care was taken to exclude iron. The Magnetical and Meteorological Observatory is based on concrete and built of wood, united for the most part by pegs of bamboo ; no iron was intentionally admitted in its construction, or in subsequent alterations. Its form is that of a cross, the arms of the cross being nearly in the direction of the cardinal magnetic points as they were in 1838. The northern arm is longer than the others, and is separated from them by a partition, and used as a computing room ; the stove which warms this room, and its flue, are of copper. The remaining portion, consisting of the eastern, southern, and western arms, is known as the Upper Magnet Room. The upper declination magnet and its theodolite, for determination of absolute declination, are placed in the southern arm, an opening in the roof allowing circumpolar stars to be observed by the theodolite for determination of its reading for the astronomical meridian. Both the magnet and its theodolite are supported on piers built from the ground. In the eastern arm is placed the Thomson electrometer for photographic record of the variations of atmospheric electricity, its water cistern rests on four glass insulators supported by a platform fixed to the western side of the southern arm, near the ceiling. The Standard barometer is suspended near the junction of the southern and western arms. The sidereal clock, Grimalde and Johnson, is fixed at the junction of the eastern and southern arms, and there is in addition a mean solar chronometer, McCabe No. 649, for general use. A mean solar clock (Molyneux), transferred from the Astronomical Department, was set up in the northern arm during the year 1883.

Until the year 1863 the horizontal and vertical force magnets were also located in the Upper Magnet Room, the upper declination magnet being up to that time employed for photographic record of the variations of declination, as well as for absolute measure of the element. But experience having shown that the horizontal and vertical force magnets were exposed in the upper room to large variations of temperature, a room known as the Magnet Basement (in which the variations of temperature are very much smaller) was excavated in the year 1864 below the Upper Magnet Room, and the horizontal and vertical force magnets, as well as a new declination magnet for photographic record of declination, were mounted therein. The Magnet Basement is of the same dimensions as the Upper Magnet Room. The lower declination magnet and the horizontal force and vertical force magnets, as now located in the Basement, are used entirely for record of the variations of the respective magnetic elements. The declination magnet is suspended in the southern arm, immediately under the upper declination magnet, to avoid mutual interference; the horizontal and vertical force magnets are placed in the eastern and western arms respectively, in positions nearly underneath those which they occupied when in the Upper Magnet Room. All are mounted on or suspended from supports carried by piers built from the ground. A photographic barometer is fixed to the northern wall of the Basement, and an apparatus for photographic registration of earth currents is placed near the southern wall of the eastern arm. A mean solar clock of peculiar construction for interruption of the photographic traces at each hour is fixed to the pier which supports the upper declination theodolite. Another mean solar clock is attached to the western wall of the southern arm. For better ascertaining the variations of temperature of the Basement a Richard metallic thermograph was added in February, 1886. It is placed on the pier carrying the horizontal force magnet, and gives a continuous register of temperature on a scale of 5° to 1 inch, the scale for time being 24 hours to $5\frac{1}{3}$ inches. On the northern wall, near the photographic barometer, is fixed the Sidereal Standard clock of the Astronomical Observatory, Dent 1906, communicating with the chronograph and with clocks of the Astronomical Department by means of underground wires. This clock is placed in the Magnet Basement, because of its nearly uniform temperature.

The Basement is warmed when necessary by a gas stove (of copper), and ventilated by means of a large copper tube nearly two feet in diameter, which receives the flues from the stove and all gas-lights and passes through the Upper Magnet Room to a revolving cowl above the roof. In January of the year 1889 two additional gas stoves were provided with the object of maintaining a higher temperature during the winter and so rendering the Basement temperature more uniform throughout the year. One of these stoves was placed in the northern corner of the eastern arm, and the other in the middle of the western wall of the western arm. Each of the arms of the Basement has a well window facing the south, but these wells are usually closely stopped up with bags packed with straw or jute. In January 1886 a line of 9-inch pipes was laid underground from the Basement southward to a distance of about 155 feet, at which point there is an inlet from the atmosphere, for the purpose of ventilating the Basement by air which has acquired the temperature of the soil at a depth of several feet below the surface, and of thus obtaining greater uniformity of temperature. The depth of the line of pipes below the surface varies from five feet at the inlet in the south ground to 11 feet 6 inches at the entrance to the Basement.

A platform erected above the roof of the Magnet House is used for the observation of meteors. The sunshine instrument and a rain gauge are placed on a table on this platform, and there are also thermometers (placed in a louvre-boarded shed or screen, with free circulation of air) for observation of the temperature of the air in an exposed situation at a height of 20 feet above the ground.

An apparatus for naphthalizing the gas used for the photographic registration is mounted in a small detached zinc-built room adjacent to the computing room on its western side.

The Dip instrument and Deflexion apparatus are placed in the New Library. Each instrument rests on a heavy slate slab supported by strong wooden framework rising from brick work built into the ground.

To the south of the Magnet House, in what is known as the Magnet Ground, is an open shed, consisting principally of a roof supported on four posts, under which is placed the old photographic dry-bulb and wet-bulb thermometer apparatus, used only in case of temporary interruption of the new apparatus. On the roof of this shed there is fixed an ozone box and a rain gauge, and close to its north-western corner are placed the earth thermometers, the upper portions of which, projecting above the ground, are protected by a small wooden hut. About 25 feet to the west of the photographic thermometers is situated the revolving stand carrying the thermometers used for ordinary eye observations, and adjacent to the thermometer stand on the north side are three rain gauges. Between the rain gauges and the Magnet House are placed the thermometers for solar and terrestrial radiation; they are laid on short grass, and freely exposed to the sky. A little to the east of the thermometer stand is placed a Stevenson screen containing dry bulb, wet bulb, and maximum and minimum thermometers.

The Magnet Ground is bounded on its south side by a range of seven rooms, known as the Magnet Offices. No 1 is used as a general store room, and in it is placed the Watchman's Clock; Nos. 2, 3, and 4 are used for photographic purposes in connexion with the Photoheliograph, placed in a dome adjoining No. 3, on its south side; Nos. 5 and 6 are store rooms; No. 7 forms an ante-room and means of approach to the Lassell dome.

In the ground south of the Magnet Offices (known as the South Ground) is the new photographic dry-bulb and wet-bulb thermometer apparatus, mounted in the year 1885; it is generally similar to the old apparatus but with some important modifications, of which an account is given in the proper Section.

Two Anemometers, Osler's, giving continuous record of direction and pressure of wind, and amount of rain, and Robinson's, giving continuous record of velocity, are fixed, the former above the north-western turret of the Octagon Room (the ancient part of the Observatory), the latter above the small building on the roof of the Octagon Room.

On 1883 March 3 the iron tube of the Lassell reflecting telescope was brought into the South Ground, and on March 9 the iron supports of the same. On 1883 December 31 the iron work of the dome was brought into the same ground, and on 1884 June 26 the iron gutter of the dome, in 16 pieces, weighing together about 2 tons 6 cwt. A careful examination of the magnetic registers on each of these occasions shows that no disturbance of the declination, horizontal force, or vertical force magnets was caused by the location of these masses of iron in the South Ground, at a distance of more than 100 feet from the magnets.

In order to determine the effect of a mass of iron on the magnets, experiments were made on 1884 July 2, with 4, 8, 12, and 16 pieces of the gutter respectively, placed at a distance of 25 feet from the declination magnet in a direction south-east (magnetic) from it, so that the maximum effect would be produced. The following are the results for the deflexions of the Upper Declination magnet:—

	Mean Deflexion.	
	′	″
With 4 pieces of the iron gutter - - - - -	1	4
„ 8 pieces „ - - - - -	2	2
„ 12 pieces „ - - - - -	3	12
„ 16 pieces „ - - - - -	3	40

Each piece weighs nearly 3 cwt.

As the effect of a mass of iron on a magnet varies as the sine of twice its magnetic azimuth divided by the cube of its distance from the magnet, these experiments show that the deflexion caused by the whole of the iron in the Lassell instrument and dome (which is at a distance of 100 feet and very nearly in the magnetic meridian of the declination magnet) would be quite insensible.

Regular observation of the principal magnetical and meteorological elements was commenced in the autumn of the year 1840, and has been continued, with some additions to the subjects of observation, to the present time. Until the end of the year 1847 observations were in general made every two hours, but at the beginning of the year 1848 these were superseded by the introduction of the method of photographic registration, by which means a continuous record of the various elements is obtained.

For information on many particulars concerning the history of the Magnetical and Meteorological Observatory, especially in regard to alterations not recited in this volume, which have been made from time to time, the reader is referred to the Introduction to the Magnetical and Meteorological Observations for the year 1880 and previous years, and to the Descriptions of the Buildings and Grounds, with accompanying Plans, given in the Volumes of Astronomical Observations for the years 1845 and 1862.

§ 3. *Subjects of Observation in the year* 1889.

The observations comprise determinations of absolute magnetic declination, horizontal force, and dip; continuous photographic record of the variations of declination, horizontal force, and vertical force, and of the earth currents indicated in two distinct lines of wire; eye observations of the ordinary meteorological instruments, including the barometer, dry and wet bulb thermometers, and radiation and earth thermometers, and of thermometers placed on the roof of the Magnet House; continuous photographic record of the variations of the barometer, dry and wet bulb thermometers, and electrometer (for atmospheric electricity); continuous automatic record of the direction, pressure, and velocity of the wind, and of the amount of rain; registration of the duration of sunshine, and amount of ozone; observations of some of the principal meteor showers; general record of ordinary atmospheric changes of weather, including numerical estimation of the amount of cloud, and occasional phenomena.

From the beginning of the year 1885, Greenwich civil time, reckoning from midnight to midnight and counting from 0 to 24 hours, has been employed throughout the magnetical and meteorological sections. In previous years the time used throughout the magnetic section was Greenwich astronomical time, reckoning from noon to noon; and generally, in the meteorological section, Greenwich civil time, reckoning from midnight to midnight.

§ 4. *Magnetic Instruments.*

UPPER DECLINATION MAGNET AND ITS THEODOLITE.—The upper declination magnet, employed solely for the determination of absolute declination, is by Meyerstein of Göttingen : it is a bar of hard steel, 2 feet long, 1½ inch broad, and about ¼ inch thick, attached by a pinching screw to the magnet carrier, also by Meyerstein, but since altered by Troughton and Simms. To a stalk extending upwards from the magnet carrier is attached the torsion circle, which consists of two circular brass discs, one turning independently of the other on their common vertical axis, the lower and graduated portion being firmly fixed to the stalk of the magnet carrier ; to the upper portion carrying the vernier is attached, by a hook, the suspension skein. This is of silk, and consists of several fibres united by juxtaposition, without apparent twist ; its length is about 6 feet.

The magnet, with its suspending skein, &c., is carried by a braced wooden tripod stand, whose feet, passing through holes cut in the floor, rest on slates covering brick piers, built from the ground and rising through the Magnet Basement nearly to its ceiling. The upper end of the suspension skein is attached to a short square wooden rod, sliding in the corresponding square hole of a fixed wooden bracket. To the upper end of the rod is fixed a leather strap, which passing over two brass pulleys carried by the upper portion of the tripod stand, is attached to a cord which passes down to a small windlass fixed to the stand. Thus in raising or lowering the magnet, an operation necessary in determinations of its collimation error, no alteration is made in the length of the suspension skein. The magnet is inclosed in a double rectangular wooden box (one box within another), both boxes being covered externally and internally with gilt paper, and having holes at their south and north ends, for illumination of the magnet-collimator and for viewing the collimator with the theodolite telescope respectively. The holes in the outer box are covered with glass. The magnet-collimator is formed by a diagonally placed cobweb cross, and a lens of 13 inches focal length and nearly 2 inches aperture, carried by two sliding frames fixed by pinching screws to the south and north arms of the magnet respectively. The cobweb cross is in the principal focus of the lens, and its image in the theodolite telescope is well seen. From the lower side of the magnet carrier a rod extends downwards, terminating below the magnet box in a horizontal brass bar immersed in water, for the purpose of checking small vibrations of the magnet.

The theodolite, by which the position of the upper declination magnet is observed, is by Troughton and Simms. It is planted about 7 feet north of the magnet. The radius of its horizontal circle is 8·3 inches, and the circle is divided to 5′, and read, by three verniers, to $5''$. The theodolite has three foot-screws, which rest in brass channels let into the stone pier placed upon the brick pier which rises from the ground through the Magnet Basement. The length of the telescope is 21 inches, and the aperture of its object glass 2 inches: it is carried by a horizontal transit axis $10\frac{1}{2}$ inches long, supported on Y's carried by the central vertical axis of the theodolite. The eye-piece has one fixed horizontal wire and one vertical wire moved by a micrometer-screw, the field of view in the observation of stars being illuminated through the pivot of the transit-axis on that side of the telescope which carries the micrometer-head. The value of one division of the striding level is considered to be equal to $1''\cdot05$. The opening in the roof of the Magnet House permits of observation of circumpolar stars as high as Ursæ Minoris above the pole and as low as β Cephei below the pole. A fixed mark, consisting of a small hole in a plate of metal, placed on one of the buildings of the Astronomical Observatory, at a distance of about 270 feet from the theodolite, affords an additional check on its continued steadiness.

The inequality of the pivots of the axis of the theodolite telescope was found from several independent determinations made at different times to be very small. It appears that when the level indicates the axis to be horizontal the pivot at the illuminated end of the axis is really too low by $1^{\text{div}}\cdot3$, equivalent to $1''\cdot4$.

The value in arc of one revolution of the telescope-micrometer is $1'.\ 34''\cdot2$.

The reading for the line of collimation of the theodolite telescope was found, by ten double observations, 1889 May 11, to be $100^{\text{r}}\cdot398$, by ten double observations, 1889 September 20, $100^{\text{r}}\cdot347$, and by ten double observations, 1889 December 2, $100^{\text{r}}\cdot343$. The value used throughout the year 1889 was $100^{\text{r}}\cdot363$.

The effect of the plane glass in front of the outer box of the declination-magnet at that end of the box towards the theodolite was determined by ten double observations made on 1887 December 8, which showed that in the ordinary position of the glass the theodolite readings were diminished by $20''\cdot3$. Each of two other sets of observations, made on 1888 December 3 and 1889 December 2, gave $20''\cdot0$ and $19''\cdot4$ respectively. The mean of these, $19''\cdot9$ has been added to all readings throughout the year 1889.

The error of collimation of the magnet collimator is found by observing the position of the magnet, first with its collimator in the usual position (above the magnet), then with the collimator reversed (or with the magnet placed in its carrier with the collimator below), repeating the observations several times. The value used during the year 1889 was $26'.\ 2''\cdot4$, being the mean of determinations made on 1885 December 18, 1886 November 10, 1887 December 8, 1888 December 3, and 1889 December 4, giving respectively $26'.\ 4''\cdot3$, $26'.\ 3''\cdot5$, $26'.\ 9''\cdot5$, $26'.\ 0''\cdot6$, and $24'.\ 54''\cdot2$. With the collimator in its usual position, above the magnet, the quantity $26'.\ 2''\cdot4$ has been subtracted from all readings.

The effect of torsion of the suspending skein is eliminated by turning the lower portion of the torsion-circle until the torsion bar (an oak bar of the same size as the magnet, and weighted with lead weights to be also of equal weight), inserted in place of the magnet, rests in the plane of the magnetic meridian. The bar is thus inserted usually about once a month, and whenever the adjustment is found not to have been sufficiently close, the observed positions of the magnet are corrected for displacement of the magnet from the meridian by the torsion of the skein. Such correction is determined experimentally, with the magnet in position, by changing the reading of the torsion-circle by a definite amount, usually 90°, thus giving the skein that amount of azimuthal twist, and observing, with the theodolite, the change in the position of the magnet thereby produced, from which is derived the ratio of the couple due to torsion of the skein to the couple due to the earth's horizontal magnetic force. With the skein at present in use this ratio was, on 1882 September 13, found to be $\frac{1}{126}$, on 1883 December 12, $\frac{1}{137}$, on 1884 December 12, $\frac{1}{132}$, on 1885 December 10, $\frac{1}{137}$, on 1886 November 10, $\frac{1}{146}$, on 1887 December 8, $\frac{1}{133}$, on 1888 December 14, $\frac{1}{137}$, and on 1889 December 4, $\frac{1}{149}$. During the year 1889 the plane in which the suspension skein was free from torsion usually coincided with the magnetic meridian, but small corrections of the absolute measures of magnetic declination for deviation of the plane of no torsion were required in portions of all months excepting July and December.

The time of vibration of the upper declination magnet under the influence of terrestrial magnetism was found on 1880 December 29 to be $30^{\mathrm{s}}\cdot78$, on 1881 September 9, $31^{\mathrm{s}}\cdot30$, on 1882 September 14, $31^{\mathrm{s}}\cdot20$, on 1883 December 13, $31^{\mathrm{s}}\cdot15$, on 1884 December 11, $31^{\mathrm{s}}\cdot17$, on 1885 December 18, $31^{\mathrm{s}}\cdot15$, on 1886 November 10, $31^{\mathrm{s}}\cdot01$, on 1887 December 8, $30^{\mathrm{s}}\cdot89$, on 1888, December 14, $30^{\mathrm{s}}\cdot90$, and on 1889 December 2, $30^{\mathrm{s}}\cdot88$.

The reading of the azimuthal circle of the theodolite corresponding to the astronomical meridian is determined about once in each month by observation of the stars Polaris or δ Ursæ Minoris. The fixed mark is usually observed weekly. The concluded mean reading of the circle for the south astronomical meridian (deduced entirely from the observations of the polar stars), used from January 1 to May 23, was 27°. 4′. 52″·9, and thence to the end of the year, 27°. 4′. 47″·0.

In regard to the manner of making observations with the upper declination magnet:—The observer on looking into the theodolite telescope sees the image of the diagonal cross of the magnet collimator vibrating alternately right and left. The time of vibration of the magnet being about 30 seconds, he first applies his eye to the telescope about one minute, or two vibrations, before the prearranged time of observation, and, with the vertical wire carried by the telescope-micrometer, bisects the magnet-cross at its next extreme limit of vibration, reading the micrometer. He similarly observes the next following extreme vibration, in the opposite direction, and so on, taking in all four readings. The mean of each pair of adjacent readings of the micrometer is taken, giving three means, and the mean of these three is adopted. In practice this is done by adding the first and fourth readings to twice the second and third, and dividing the sum by 6. Should the magnet be nearly free from vibration, two bisections only of the cross are made, one at the vibration next before the pre-arranged time, the other at the vibration following. The verniers of the theodolite-circle are then read. The excess of the adopted micrometer-reading above the reading for the line of collimation of the telescope being converted into arc and applied to the mean circle-reading, and also the corrections for collimation of the magnet and for collimation of the plane glass in front of its box, the concluded circle-reading corresponding to the position of the magnet is found. The difference between this reading and the adopted reading of the circle for the south astronomical meridian gives, when, as is usually the case, no correction for torsion of the skein is necessary, the observed value of absolute declination, afterwards used for determining the value of the photographed base line on the photographic register of the lower declination magnet. The times of observation of the upper declination magnet are usually $9^h. 5^m$, $13^h. 5^m$, $15^h. 5^m$, and $21^h. 5^m$ of Greenwich civil time, reckoning from midnight.

The accuracy of the measure of absolute declination by the upper declination-magnet depends on the condition that this magnet should be vertically over the lower magnet. But the arrangements are such that with the gradual decrease of declination, the upper magnet has to be shifted more and more to the west in order that it may be viewed by its theodolite, the position of which on its pier cannot be altered. In order to determine whether the consequent change in the relative position of the two magnets has in late years increased to such an extent that any measurable mutual influence would exist, the upper magnet has on two different occasions (once in the year 1887 and once in the year 1889) been temporarily removed to the ante-room, where its influence would be quite insensible. On both occasions the photographic register of the lower magnet showed no perceptible change of position. Conversely, the removal of the lower magnet would not influence the position of the upper one, which is used for absolute measure.

LOWER DECLINATION MAGNET.—The lower declination magnet is used simply for the purpose of obtaining photographic register of the variations of magnetic declination. It is by Troughton and Simms, and is of the same dimensions as the upper declination magnet, being 2 feet long, $1\frac{1}{2}$ inch broad, and $\frac{1}{4}$ inch thick. The magnet is suspended, in the Magnet Basement, immediately below the upper declination magnet, in order that the absolute measure of declination by the upper magnet should not be affected by the proximity of the lower magnet.

The manner of suspension of the magnet is in general similar to that of the upper declination magnet, the suspension pulleys being carried by a small pier built on one of the crossed slates resting on the brick piers rising from the ground. The length of free suspending skein is about 6 feet, but, unlike the arrangement adopted for the upper magnet, the skein is itself carried over the suspension pulleys. The position of the azimuthal plane in which the torsion bar rests, when substituted for the magnet, is examined from time to time, and adjustment made as necessary, to keep this plane in or near the magnetic meridian, such exact adjustment as is required for the upper declination-magnet not being necessary in this case.

To destroy the small accidental vibrations to which the magnet would be otherwise liable, it is encircled by a damper consisting of a copper bar, about 1 inch square, which is bent into a long oval form, the plane of the oval being vertical; a lateral bend is made in the upper bar of the oval to avoid interference with the suspension piece of the magnet. The effect of the damper is to reduce the amplitude of the oscillation after every complete or double vibration of the magnet in the proportion of 5 : 2 nearly.

In regard to photographic arrangements, it may be convenient, before proceeding to speak of the details peculiar to each instrument, to remark that the general principle adopted for obtaining continuous photographic record is the same for all instruments. For the register of each indication a cylinder of ebonite is provided, the axis of the cylinder being placed parallel to the direction of the change of indication to be registered. If, as is usually the case, there are two indications whose movements are in the same direction, both may be registered on the same cylinder: thus the movements in the case of magnetic declination and horizontal magnetic force, being both horizontal, can be registered on different parts of one cylinder with axis horizontal: so also can two different galvanic earth currents. The movements in the case of vertical magnetic force, and of the barometer, being both vertical, can similarly be registered on different parts of one cylinder having its axis vertical, as also can the indications of the dry-bulb and wet-bulb thermometers. In the electrometer the movement being horizontal, a horizontal cylinder is provided.

The cylinder is in each case driven by chronometer or accurate clock-work to ensure uniform motion. The pivots of the horizontal cylinders turn on anti-friction wheels: the vertical cylinders rest each on a circular plate turning on anti-friction wheels, the driving mechanism being placed below. A sheet of sensitized paper being wrapped round the cylinder, and held by a slender brass clip, the cylinder thus prepared is placed in position, and connected with the clock-movement: it is then ready to receive the photographic record, the optical arrangements for producing which will be found explained in the special description of each particular instrument. The sheets are removed from the cylinders and fresh sheets supplied every day, usually at noon. On each sheet, a reference line is also photographed, the arrangements for which will be more particularly described in each special case. All parts of the apparatus and all parts of the paths of light are protected, as found necessary, by wood or zinc casings or tubes, blackened on the inside, in order to prevent stray light from reaching the photographic paper.

In June 1882 the photographic process employed for so many years was discarded, and a dry paper process introduced, the argentic-gelatino-bromide-paper, as prepared by Messrs. Morgan and Kidd of Richmond (Surrey), being used with ferrous oxalate development. The greater sensitiveness of this paper permits diminution of the effective surface of the magnet mirrors, and allows also the use of smaller gas flames. In the case of the vertical force magnet the old and comparatively heavy mirror has been replaced by a small and light mirror with manifest advantage, as will be seen in the description of the vertical force magnet. The new paper acts equally well at all seasons of the year, and any loss of register on account of photographic failure is now extremely rare.

Referring now specially to the lower declination magnet, there is attached to the magnet carrier, for the purpose of obtaining photographic register of the motions of the magnet, a concave mirror of speculum metal, 5 inches in diameter (reduced by a stop, on the introduction of the new photographic paper, to an effective diameter of about 1 inch), which thus partakes in all the angular movements of the magnet. The revolving ebonite cylinder is $11\frac{1}{2}$ inches long and $14\frac{1}{4}$ inches in circumference: it is supported, in an approximately east and west position, on brass uprights carried by a metal plate, the whole being planted on a firm wooden platform, the supports of which rest on blocks driven into the ground. The platform is placed midway between the declination and horizontal force magnets, in order that the variations of magnetic declination and horizontal force may both be registered on the same cylinder, which makes one complete revolution in 26 hours.

The light used for obtaining the photographic record is that given by a flame of coal gas, charged with the vapour of coal naphtha. A vertical slit about $0^{in}\cdot 3$ long and $0^{in}\cdot 01$ wide, placed close to the light, is firmly supported on the pier which carries the magnet. It stands slightly out of the straight line joining the mirror of the magnet and the registering cylinder, and its distance from the mirror is about 25 inches. The distance of the axis of the registering cylinder from the mirror is 134·4 inches. Immediately above the cylinder, and parallel to its axis, are placed two long reflecting prisms (each 11 inches in length) extending from end to end of the cylinder and facing opposite ways towards the mirrors carried by the declination and horizontal force magnets respectively. The front surface of each prism is convex, being a portion of a horizontal cylinder. The light of the declination lamp, after passing through the vertical slit, falls on the concave mirror, and is thence reflected as a converging beam to form an image of the slit on the convex surface of the reflecting prism, by the action of which it is reflected downwards to the paper on the cylinder as a small spot of light. The concave mirror can be so adjusted in azimuth on the magnet that the spot shall fall not at the centre of the cylinder but rather towards its western side, in order that the declination trace shall not interfere with that of horizontal force, which is made to fall towards the eastern side of the cylinder. The special advantage of the arrangement here described is that the registers of both magnets are made at the same part of the circumference of the cylinder, a line joining the two spots being parallel to its axis, so that when the traces on the paper are developed, the parts of the two registers which appear in juxtaposition correspond to the same Greenwich time.

By means of a small prism, fixed near the registering cylinder, the light from another lamp is made to form a spot of light on the cylinder in a fixed position, so that, as the cylinder revolves, a reference or base line is traced out on the paper, from which, in the interpretation of the records, the ordinates are measured.

A clock of special construction, arranged by Messrs. E. Dent and Co., acting upon a small shutter placed near the declination slit, cuts off the light from the mirror two minutes before each hour, and admits it again two minutes after the hour, thus producing at each hour a visible interruption in the trace, and so ensuring accuracy as regards time scale. By means of another shutter the observer occasionally cuts off the light for a few minutes, registering the times at which it was cut off and admitted again. The visible interruptions thus made at definite times in the trace obviate any possibility of error being made by wrong numeration of the hourly breaks.

The usual hour of changing the photographic sheet is noon, but on Sundays, and occasionally on other days, this rule is not strictly followed. To obviate any uncertainty that might arise on such occasions from the interference of the two ends of a trace slightly longer than 24 hours, it has been arranged that one revolution of the cylinder should be made in 26 hours. The actual length of 24 hours on the sheet is about 13·3 inches.

The scale for measurement of ordinates of the photographic curve is thus determined. The distance from the concave mirror to the surface of the cylinder, in the actual path of the ray of light through the prism, is practically the same as the horizontal distance of the centre of the cylinder from the mirror, 134·4 inches. A movement of 1° of the mirror produces a movement of 2° in the reflected ray. From this it is found that 1° of movement of the mirror, representing a change of 1° of magnetic declination, is equal to 4·691 inches on the photographic paper. A small strip of cardboard is therefore prepared, graduated on this scale to degrees and minutes. The ordinates of the curve as referred to the base line being measured for the times at which absolute values of declination were determined by the upper declination magnet, usually four times daily, the apparent value of the base line, as inferred from each observation, is found. The process assumes that the movements of the upper and lower declination magnets are precisely similar. The separate base line values being divided into groups, usually monthly, a mean base line value is adopted for use through each group. This adopted base line value is written upon every sheet. Then, with the cardboard scale, there is laid down, conveniently near to the photographic trace, a new base line, whose ordinate represents some whole number of degrees or other convenient quantity. Thus every sheet carries its own scale of magnetic measure. From the new base line the hourly ordinates (see page *xxx*) are measured.

HORIZONTAL FORCE MAGNET.—The horizontal force magnet, for measure of the variations of horizontal magnetic force, was made by Meyerstein of Göttingen, and like the two declination magnets, is 2 feet long, $1\frac{1}{2}$ inch broad, and about $\frac{1}{4}$ inch thick. For support of its suspension skein the back and sides of its brick pier rise through the eastern arm of the Magnet Basement to the upper Magnet Room, being there covered by a slate slab, to the top of which a brass plate is attached, carrying, immediately above the magnet, two brass pulleys, with their axes in the same east and west line; and at the back of the pier, and opposite to these pulleys, two others, with their axes similarly in an east and west line: these constitute the upper suspension piece, and support the upper portions of the two branches of the suspension skein. The two lower pulleys, having their axes in the same horizontal plane, and their grooves in the same vertical plane, are attached to a small horizontal bar which forms the upper portion of the torsion circle: it carries the verniers for reading the torsion circle, and can be turned independently of the lower and graduated portion of the torsion circle, below which, and in rigid connexion with it, is the magnet carrier.

The suspension skein is led under the two pulleys carried by the upper portion of the torsion circle, its two branches then rise up and pass over the front pulleys of the upper suspension piece, thence to and over the back pulleys, thence descending to a single pulley, round which the two branches are tied: from this pulley a cord goes to a small windlass fixed to the back of the pier. The effective length of each of the two branches of the suspension skein is about $7^{ft}\ 6^{in}$. The distance between the branches of the skein, where they pass over the upper pulleys, is $1^{in}\cdot14$: at the lower pulleys the distance between the branches is $0^{in}\cdot80$. The two branches are not intended to hang in one plane, but are to be so twisted that their torsion will maintain the magnet in a direction very nearly east and west magnetic, the marked end being west. In this state an increase of horizontal magnetic force draws the marked end of the magnet towards the north, whilst a diminution of horizontal force allows the marked end to recede towards the south under the influence of torsion. An oval copper bar, exactly similar to that used with the lower declination magnet, is applied also to the horizontal force magnet, for the purpose of diminishing the small accidental vibrations.

Below the magnet carrier there is attached a small plane mirror to which is directed a small telescope for the purpose of observing by reflexion the graduations of a horizontal opal glass scale, attached to the southern wall of the eastern arm of the basement. The magnet, with its plane mirror, hangs within a double rectangular box, covered with gilt paper in the same way as was described for the upper declination magnet. The numbers of the fixed scale increase from east to west, so that when the magnet is inserted in its usual position, with its marked end towards the west, increasing readings of the scale, as seen in the telescope, denote increasing horizontal force. The normal to the scale that meets the centre of the plane mirror is situated at the division 51 of the scale nearly, the distance of the scale from the centre of the plane mirror being 90·84 inches. The angle between the normal to the scale, which coincides nearly with the normal to the axis of the magnet, and the axis of the fixed telescope is about 38°, the plane of the mirror being therefore inclined about 19° to the axis of the magnet.

To adjust the magnet so that it shall be truly transverse to the magnetic meridian, which position is necessary in order that the indications of the instrument may apply truly to changes in the magnitude of horizontal magnetic force, without regard to changes of direction, the time of vibration of the magnet and the reading of the fixed scale are determined for different readings of the torsion circle. In regard to the interpretation of such experiments the following explanation may be premised.

Suppose that the magnet is suspended in its carrier with its marked end in a magnetic westerly direction, not exactly west but in any westerly direction, and suppose that, by means of the fixed telescope, the reading of the scale is taken. The position of the axis of the magnet is thereby defined. Now let the magnet be taken out of its carrier, and replaced with its marked end easterly. The terrestrial magnetic force will now act, as regards torsion, in the direction opposite to that in which it acted before, and the magnet will take up a different position. But by turning the torsion-circle so as to reverse the direction of the torsion produced by the oblique tension of the two branches of the suspending skein, the magnet may be made to take the same position as before but with poles reversed, which will be proved by the reading of the scale, as seen in the fixed telescope, being the same. We thus obtain two readings of the torsion circle corresponding to the same direction of the magnet axis, but with the marked end opposite ways, without however possessing any information as to whether the magnet axis is accurately transverse to the magnetic meridian, inasmuch as the same operation can be performed whether the magnet axis be transverse or not.

But there is another observation which will indicate whether the magnet axis is or is not accurately transverse. Let, in addition, the time of vibration be taken in each position of the magnet. Resolve the terrestrial magnetic forces acting on the poles of the magnet each into two parts, one transverse to the magnet, the other longitudinal. In the two positions of the magnet, marked end westerly and marked end easterly, the magnitude of the transversal force is the same, and the changes which the torsion undergoes in a vibration of given extent are the same, and, if there were no other force, the time of vibration would also be the same. But there is another force, the longitudinal force, and when the marked end is northerly this tends from the centre of the magnet's length, and when it is southerly it tends towards the centre of the magnet's length, and in a vibration of given extent this force, in one case increases that due to the torsion, and in the other case diminishes it. The times of vibration will therefore be different. There is only one exception to this, which is when the magnet axis is transverse to the magnetic meridian, in which case the longitudinal force vanishes, and the times of vibration in both positions of the magnet become the same.

The criterion then of the position truly transverse to the meridian is this. Find the readings of the torsion circle which, with the magnet in reversed positions, will give the same readings of the scale and the same time of vibration for the magnet. With such readings of the torsion circle the magnet is, in either position, transverse to the meridian, and the difference of circle-readings is the difference between the position in which the terrestrial magnetism acting on the magnet twists it one way and the position in which the same force twists it the opposite way, and is therefore double of the angle of torsion of the suspending lines for which, in either position, the force of terrestrial magnetism is neutralized by the torsion.

The present suspension skein was mounted on 1880 December 30. On 1889 January 1 the following observations were made for determination of the angle of torsion :—

1889, Day.	The Marked End of the Magnet.							
	West.				East.			
	Torsion-Circle Reading.	Scale Reading.	Difference of Scale Readings for change of 1° of Torsion-Circle Reading.	Mean of the Times of Vibration.	Torsion-Circle Reading.	Scale Reading.	Difference of Scale Readings for change of 1° of Torsion-Circle Reading.	Mean of the Times of Vibration.
	°	div.	div.	s	°	div.	div.	s
Jan. 1	145	49·04		21·42	229	48·29		20·54
			7·86				7·48	
	146	56·90		21·24	230	55·77		20·80
			8·00				8·40	
	147	64·90		21·00	231	64·17		21·00

From these observations it appeared that the times of vibration and scale readings were sensibly the same when the torsion circle read 146°. 57′, marked end west, and 231°. 3′, marked end east, the difference being 84°. 6′. Half this difference, or 42°. 3′, is therefore the angle of torsion when the magnet is transverse to the meridian. Another set of observations made 1889, December 31, gave 42°. 15′. The value adopted in the reduction of the observations during the year 1889 was 42°. 10′.

The adopted reading of torsion-circle, for transverse position of the magnet, the marked end being west, was 146° throughout the year.

The angle through which the magnet turns to produce a change of one division of scale reading, and the corresponding variation of horizontal force in terms of the whole horizontal force, is thus found.

The length of $30^{div}\cdot85$ of the fixed scale is exactly 12 inches, and the distance of the centre of the face of the plane mirror from the scale 90·84 inches; consequently the angle at the mirror subtended by one division of the scale is 14′. 43″·2, or for change of one division of scale-reading the magnet is turned through an angle of 7′. 21″·6.

The variation of horizontal force, in terms of the whole horizontal force, producing angular motion of the magnet corresponding to change of one division of scale reading = cotan. angle of torsion × value of one division in terms of radius. Using the numbers above given, the change of horizontal force corresponding to change of one division of scale-reading was found to be 0·002364, which value has been used throughout the year 1889 for conversion of the observed scale-readings into parts of the whole horizontal force.

In regard to the manner of making observations with the horizontal force magnet. A fine vertical wire is fixed in the field of view of the observing telescope, across which the graduations of the fixed scale, as reflected by the plane mirror carried by the magnet, are seen to pass alternately right and left as the magnet oscillates, and the scale reading for the extreme points of vibration is easily taken. The hours of observation are usually 9^h, 13^h, 15^h, and 21^h of Greenwich civil time (reckoning from midnight). Remarking that the time of vibration of the magnet is about 20 seconds, and that the observer looks into the telescope about 40 seconds before the pre-arranged time, the manner of making the observation is generally similar to that already described for the upper declination magnet.

A thermometer, the bulb of which reaches considerably below the attached scale, is so planted in a nearly upright position on the outer magnet box that the bulb projects into the interior of the inner box containing the magnet. Readings of this thermometer are usually taken at 9^h, 10^h, 11^h, 12^h, 13^h, 14^h, 15^h, 16^h, and 21^h, Greenwich civil time An index correction of $-$ 0°·3, has been applied to all readings.

The photographic record of the movements of the horizontal force magnet is made on the same revolving cylinder as is used for record of the motions of the lower declination magnet. And, as described for that magnet, there is also attached to the carrier of the horizontal force magnet a concave mirror, 4 inches in diameter, reduced by a stop (on the introduction of the new photographic paper) to an effective diameter of about 1 inch. The arrangements as regards lamp, slit, and other parts are precisely similar to those for the lower declination magnet already described, and may be perfectly understood by reference to that description (pages *xiii* and *xiv*), in which was incidentally included an explanation of some parts specially referring to register of horizontal force. The distance of the vertical slit from the concave mirror of the magnet is about 21 inches, and the distance of the axis of the registering cylinder from the concave mirror is 136·8 inches, the slit standing slightly out of the straight line joining the mirror and the registering cylinder. The same base line is used for measure of the horizontal force ordinates, and the register is similarly interrupted at each hour by the clock, and occasionally by the observer, for determination of time scale, the length of which is of course the same as that for declination.

The scale for measure of ordinates of the photographic curve is thus constructed. The distance from the concave mirror to the surface of the cylinder, in the actual path of the ray of light through the prism is (as for declination) practically the same as the horizontal distance of the centre of the cylinder from the mirror, or 136·8 inches. But, because of the reflexion at the concave mirror, the double of this measure, or 273·6 inches, is the distance that determines the extent of motion on the cylinder of the spot of light, which, in inches, for a change of 0·01 part of the whole horizontal force will therefore be 273·6 × tan. angle of torsion × 0·01. Taking for angle of torsion 42°. 0′ the movement of the spot of light on the cylinder for a change of 0·01 of horizontal force is thus found to be 2·478 inches, and with this unit the cardboard scale for measure of the ordinates was prepared. The ordinates being measured for the times at which eye observations of the scale were made, combination of the measured ordinates with the observed scale readings converted into parts of the whole horizontal force, gives an apparent value of the base line for each observation. These being divided into groups, mean base line values are adopted, written on the sheets, and new base lines laid down, from which the hourly ordinates (see page *xxx*) are measured, exactly in the same way as described for declination.

The indications of horizontal force are in a slight degree affected by the small changes of temperature to which the Magnet Basement is subject. The temperature coefficient of the magnet was determined by artificially heating the Magnet Basement to different temperatures, and observing the change of position of the magnet thereby produced. This process seems preferable to others in which was observed the effect which the magnet, when enclosed within a copper trough or box and artificially heated by hot water or hot air to different temperatures, produced on another suspended magnet, since the result obtained includes the entire effect of temperature upon all the various parts of the mounting of the magnet, as well as on the magnet itself. Referring to previous volumes for details, it is sufficient here to state that from a series of experiments made between January 3 and February 21 of the year 1868 on the principle mentioned, in temperatures ranging from 48°·2 to 61°·5, it appeared that when the marked end of the horizontal force magnet was to the west (its ordinary position) a change of 1° of temperature (Fahrenheit) produced an apparent change of ·000174 of the whole horizontal force, a smaller number of observations made with the marked end of the magnet east, in temperatures ranging from 49°·0 to 60°·9, indicating that a change of 1° of temperature produced an apparent change of ·000187 of horizontal force, increase of temperature in both cases being accompanied by decrease of magnetic force. It was concluded that an increase of 1° of temperature produces an apparent decrease of ·00018 of horizontal force. In the years 1885 and 1886 further observations on the same general plan were made, with the result that the decrease of horizontal force for increase of 1° of temperature was found to be somewhat greater at the higher than at the lower temperatures. A discussion of all the observations taken in 1885 and 1886, details of which are given at the end of the Introduction for 1886, shows that the correction for reduction to temperature 32° (expressed in terms of the horizontal force) is $(t-32) \times {\cdot}0000936 + (t-32)^2 \times {\cdot}000002074$ in which t is the temperature in degrees Fahrenheit. The decrease of horizontal force for an increase of 1° of temperature (Fahrenheit) would thus be ·00021 at 60°, ·00023 at 65°, and ·00025 at 70°.

VERTICAL FORCE MAGNET.—The vertical force magnet, for measure of the variations of vertical magnetic force, is by Troughton and Simms. It is 1 ft. 6 in. long and lozenge shaped, being broad at the centre and pointed at the ends ; it is mounted on a solid brick pier capped with stone, situated in the western arm of the basement, its position being nearly symmetrical with that of the horizontal force magnet in the eastern arm. The supporting frame consists of two pillars, connected at their bases, on whose tops are the agate planes upon which rest the extreme parts of the continuous steel knife edge, attached to the magnet carrier by clamps and pinching screws. The knife edge, eight inches long, passes through an aperture in the magnet. The axis of the magnet is approximately transverse to the magnetic meridian, its marked end being east ; its axis of vibration is thus nearly north and south magnetic. The magnet carrier is of iron ; at its southern end there is fixed a small plane mirror for use in eye observations, whose plane makes with the vertical plane through the magnet an angle of $52\frac{3}{4}^{\circ}$ nearly. A telescope fixed to the west side of the brick pier supporting the theodolite of the upper declination magnet is directed to the mirror, for observation by reflexion of the divisions of a vertical opal glass scale fixed to the pier that carries the telescope, very near to the telescope itself. The numbers of this fixed scale increase downwards, so that when the magnet is placed in its usual position with the marked end east, increasing readings of the scale, as seen in the telescope, denote increasing vertical force.

The magnet is placed excentrically between the bearing parts of its knife edge, nearer to the southern side, leaving a space of about four inches in the northern part of the iron frame, in which the concave mirror used for the photographic register is planted. Two screw stalks, carrying adjustable screw weights, are fixed to the magnet carrier, near its northern side ; one stalk is horizontal, and a change in the position of the weight affects the position of equilibrium of the magnet ; the other stalk is vertical, and change in the position of its weight affects the delicacy of the balance, and so varies the magnitude of its change of position produced by a given change in the vertical force of terrestrial magnetism.

In the year 1882 Messrs. Troughton and Simms substituted for the old mirror of 4 inches diameter a much lighter mirror of 1 inch diameter, and also lowered the position of the knife-edge bar with respect to the magnet so as to permit of a diminution of the adjustable counterpoise weights which as well as the mirror appear to largely affect the temperature correction of this balance-magnet. The use of a smaller and much lighter mirror was rendered possible by the greater sensitiveness of the new photographic paper introduced in 1882 June.

The whole is enclosed in a rectangular box, resting upon the pier before mentioned, and having apertures, covered with glass, opposite to the two mirrors carried by the magnet.

The time of vibration of the magnet in the vertical plane is observed usually about once in each week. From 64 observations made during the course of the year this was found to be $20^{s}\cdot222$.

The time of vibration of the magnet in the horizontal plane is determined by suspending the magnet with all its attached parts from a tripod stand, its broad side being in a plane parallel to the horizon, so that its moment of inertia is the same as when in observation. A telescope, with a wire in its focus, being directed to the plane mirror carried by the magnet, a scale of numbers is placed on the floor, at right angles to the long axis of the magnet, so as to be seen, by reflexion, in the fixed telescope. The magnet is observed only when swinging through a small arc.

Observations made in the way described on 1889 December 30 gave for the time of vibration of the magnet in the horizontal plane, $16^{s}\cdot934$. This value has been used throughout the year 1889.

The length of the normal to the fixed vertical scale that meets the face of the plane mirror is 186·07 inches, and $30^{div}\cdot85$ of the scale correspond to 12 inches. Consequently the angle which one division of the scale subtends, as seen from the mirror, is $7'.\ 11''\cdot2$, or the angular movement of the normal to the mirror, corresponding to a change of one division of scale reading, is $3'.\ 35''\cdot6$.

But the angular movement of the normal to the mirror is equal to the angular movement of the magnet multiplied by the sine of the angle which the plane of the mirror makes with a vertical plane through the magnet. This angle, as already stated, is $52\frac{3}{4}^{\circ}$, therefore dividing the result just obtained, $3'.\ 35''\cdot6$, by Sin. $52\frac{3}{4}^{\circ}$, the angular motion of the magnet corresponding to a change of one division of scale reading is found to be $4'.\ 30''\cdot9$.

The variation of vertical force, in terms of the whole vertical force, producing angular motion of the magnet corresponding to a change of one division of scale reading $=$ cotan. dip $\times \left(\frac{T'}{T}\right)^2 \times$ value of one division in terms of radius, in which T' is the time of vibration of the magnet in the horizontal plane, and T that in the vertical plane. Assuming $T' = 16^{s}\cdot934$, $T = 20^{s}\cdot222$, and dip $= 67^{\circ}.\ 24'$, the change of vertical force corresponding to change of one division of scale reading was found to be 0·0003834, and this value has been used throughout the year for conversion of the observed scale readings into parts of the whole vertical force.

The hours of observation of the vertical force magnet are the same as those for the horizontal force magnet, and the method of observation is precisely similar, the time of vertical vibration being substituted for that of horizontal. The wire in the fixed telescope is here horizontal, and as the magnet oscillates the divisions of the scale are seen to pass upwards and downwards in the field of view.

As in the case of the horizontal force magnet a thermometer is provided whose bulb projects into the interior of the magnet box. Readings are taken usually at 9^{h}, 10^{h}, 11^{h}, 12^{h}, 13^{h}, 14^{h}, 15^{h}, 16^{h}, and 21^{h}, Greenwich civil time. An index correction of $-0^{\circ}\cdot3$, has been applied to all readings.

The photographic register of the movements of the vertical force magnet is made on a cylinder of the same size as that used for declination and horizontal force, driven also by chronometer movement. The cylinder is here placed vertical instead of horizontal, and the variations of the barometer are also registered on it. The slit is horizontal, and other arrangements are generally similar to those already described for declination and horizontal force. The concave mirror carried by the magnet is 1 inch in diameter, and the slit is distant from it about 22 inches, being placed a little out of the straight line joining the mirror and the registering cylinder. There is a slight deviation in the further optical arrangements. Instead of falling on a reflecting prism (as for declination and horizontal force) the converging horizontal beam from the concave mirror falls on a system of plano-convex cylindrical lenses, placed in front of the cylinder, with their axes parallel to that of the cylinder. The trace is made on the western side of the cylinder, the position of the magnet being so adjusted that the spot of light shall fall on the lower part of the sheet to avoid interference with the barometer trace. A base line is photographed, and the record is interrupted at each hour by the clock, and occasionally by the observer, for establishment of time scale, in the same way as for the other magnets. The length of the time scale is the same as that for the other magnetic registers.

The scale for measure of ordinates of the photographic curve is determined as follows: — The distance from the concave mirror to the surface of the registering cylinder is 100·2 inches. But the double of this measure, or 200·4 inches, is the distance that determines the extent of motion on the cylinder of the spot of light, which, in inches, for a change of 0·01 part of the whole vertical force, will therefore be $= 200{\cdot}4 \times \tan. \text{dip} \times \left(\frac{T}{T'}\right)^2 \times 0{\cdot}01$. Using the values of T, T', and of dip, before given, (page *xxii*), the movement of the spot of light on the cylinder for a change of 0·01 of vertical force is thus found to be, 6·865 inches, and with this unit the scale for measure of the ordinates was constructed for use throughout the year. Base line values were then determined, and written on the sheets, and new base lines laid down, from which the hourly ordinates (see page *xxx*) were measured, exactly in the same way as was described for declination.

In regard to the temperature correction of the vertical force magnet, it is only necessary here to say that, according to a series of experiments made between October 17 and 23, 1882 in a similar manner to those for the horizontal force magnet (page *xx*), and in temperatures ranging from 59°·3 to 64°·9 it appeared that an increase of 1° of temperature (Fahrenheit) produced an apparent increase of 0·00020 of vertical force, a value which succeeding experiments have closely confirmed. The value of the coefficient is thus much less than was found in the old state of the magnet with the large mirror, although still not following the ordinary law of increase of temperature producing loss of magnetic power. Further observations made in the years 1885 and 1886, of which particulars are given at the end of the Introduction for 1886, showed that through the range of temperature to which the magnet is usually exposed the increase of vertical force for increase of 1° of temperature is uniformly 0·000212, no term depending on the square of the temperature being here necessary, as in the case of horizontal force.

DIP INSTRUMENT.—The instrument with which the observations of magnetic dip are made is that which is known as Airy's instrument. It was constructed by Messrs. Troughton and Simms, and is mounted in the New Library on a slate slab supported by a braced wooden stand built up from the ground independently of the floor. The plan of the instrument was arranged by Sir G. B. Airy so that the points of the needles should be viewed by microscopes and if necessary observed whilst the needles were in a state of vibration; that there should be power of employing needles of different lengths; and that the field of view of each microscope should be illuminated from the side opposite to the observer, in such way that the needle point should form a dark image in the bright field.

The instrument is adapted to the observation of needles of 9 inches, 6 inches, and 3 inches in length. The main portion of the instrument, that in which the needle under observation is placed, consists of a square box made of gun metal (carefully selected to ensure freedom from iron), with back and front of glass. Six microscopes, so planted as to command the points of the three different lengths of needles, turn on a horizontal axis so as to follow the points of the needles in the different positions which in observation they take up. The needle pivots rest on agate bearings. The object glasses and field glasses of the microscopes are within the front glass plate, their eye glasses being outside, and turning with them on the same axis. Upon the plane side of each field glass (the side next the object glass and on which the image of the needle point is formed) a scale is etched by means of which the position of the needle points is noted. And on the inner side of the front glass plate is etched the graduated circle, $9\frac{3}{4}$ inches in diameter, divided to 10′, and read by two verniers to 10″. The verniers (thin plates of metal, with notches instead of lines, for use with transmitted light) are carried by the horizontal axis, inside the front glass plate, their reading lenses, attached to the same axis, being outside. A suitable clamp with slow motion is provided. The microscopes and verniers can be illuminated by one gas lamp, the light from which falling on eight corresponding prisms is thereby directed to each separate microscope and vernier. The prisms are carried behind the back glass plate on a circular frame in such a way that, on reversion of the instrument in azimuth, the whole set of prisms can at one motion of the frame be shifted so as to bring each one again opposite to its proper microscope or vernier.

Since the instrument has been placed in the New Library artificial light has not been employed in making the observation.

The whole of the apparatus is planted upon a circular horizontal plate, admitting of rotation in azimuth : a graduated circle near the circumference of the plate is read by two fixed verniers.

A brass zenith point needle, having points corresponding in position to the three different lengths of dip needles, is used to determine the zenith point for each particular length of needle.

The instrument carries two levels, one parallel to the plane of the vertical circle, the other at right angles to that plane, by means of which the instrument is adjusted in level from time to time. The readings of the first-mentioned level are also regularly employed to correct the apparent value of dip for any small outstanding error of level: the correction seldom exceeds a very few seconds of arc.

Observations are made only in the plane of the magnetic meridian, and the following is a description of the method of proceeding. The needle to be used is first magnetised by double touch, giving it nine strokes on each of its sides : it is then placed in position in the instrument, the microscope scale readings are taken, and the verniers of the vertical graduated circle are read : the readings of the level parallel to the plane of this circle are also read. The instrument is then reversed in azimuth and a second observation made. The needle pivots are then reversed on the agate bearings, and two observations in reversed positions of the instrument again made. The needle is then removed from the instrument and re-magnetised so as to reverse the direction of its poles, and four more observations are made in the way just described. The mean of the eight partial values of dip thus found, corrected for error of level, gives the final value of dip which appears in the printed results.

The needles in regular use are of the ordinary construction ; they are two 9-inch needles, B_1 and B_2, two 6-inch needles, C_1 and C_2, and two 3-inch needles, D_1 and D_2.

The observed dip given by the 9-inch needles is as usual smaller than that given by the 6-inch needles, and that given by the 6-inch needles smaller than that given by the 3-inch needles. In the *Philosophical Magazine* for March 1891, Professor Schuster, referring to a remark of Dr. Joule's, that the flexure of a dip needle tends to diminish the apparent dip, has estimated the effect on the observed dip of the displacement of the centre of gravity by the flexure of the needle, for the Greenwich needles of 3 inches, 6 inches, and 9 inches in length, and finds that a great part of the difference observed at Greenwich could be thus accounted for. It would appear that for absolute determination of dip empirical corrections should be applied to the results found from the longer needles, but there is at present much uncertainty as to the data for computing these corrections.

DEFLEXION INSTRUMENT.—The observations of deflexion of a magnet in combination with observations of vibration of the deflecting magnet, for determination of the absolute measure of horizontal magnetic force, are made with a unifilar instrument, which, with the exception of some slight modification of the mechanical arrangements, is similar to those issued from the Kew Observatory. It is mounted in the New Library on a slate slab in the same way as the Dip instrument.

The deflected magnet, used merely to ascertain the ratio which the power of the deflecting magnet at a given distance bears to the power of terrestrial magnetism, is 3 inches long, and carries a small plane mirror, to which is directed a telescope fixed to and rotating with the frame that carries also the suspension piece of the deflected magnet: a scale fixed to the telescope is seen by reflexion at the plane mirror. The deflecting magnet is a hollow cylinder 4 inches long, containing in its internal tube a collimator, by means of which in another apparatus its time of vibration is observed. In observations of deflexion the deflecting magnet is placed on the transverse deflexion rod, carried by the rotating frame, at the distances 1·0 foot and 1·3 foot of the engraved scale from the deflected magnet, and with one end towards the deflected magnet. Observations are made at the two distances mentioned, with the deflecting magnet both east and west of the deflected magnet, and also with its poles in reversed positions. The fixed horizontal circle is 10 inches in diameter: it is graduated to 10′, and read by two verniers to 10″.

It will be convenient in this case to include with the description of the instrument an account of the method of reduction employed, in which the Kew precepts and generally the Kew notation are followed. Previous to the establishment of the instrument at the Royal Observatory the values of the various instrumental constants, as determined at the Kew Observatory, were kindly communicated by the late Professor Balfour Stewart, and these have been since used in the reduction of all observations made with the instrument at Greenwich.

The instrumental constants as thus furnished are as follows :—

The increase in the magnetic moment of the deflecting magnet produced by the inductive action of unit magnetic force in the English system of absolute measurement $= \mu = 0{\cdot}00015587$.

The correction for decrease of the magnetic moment of the deflecting magnet required in order to reduce to the temperature 35° Fahrenheit $= c = 0{\cdot}00013126\,(t-35) + 0{\cdot}000000259\,(t-35)^2$: t representing the temperature (in degrees Fahrenheit) at which the observation is made.

Moment of inertia of the deflecting magnet $= K$. At temperature 30°, log. $K = 0{\cdot}66643$: at temperature 90°, log. $K = 0{\cdot}66679$.

The distance on the deflexion rod from $1^{ft.}0$ east to $1^{ft.}0$ west of the engraved scale, at temperature 62°, is too long by 0·0034 inch, and the distance from $1^{ft.}3$ east to $1^{ft.}3$ west is too long by 0·0053 inch. The coefficient of expansion of the scale for 1° is ·00001.

The adopted value of K was confirmed in the year 1878 by a new and entirely independent determination made at the Royal Observatory, giving log. K at temperature 30° = 0·66727.

Let m = Magnetic moment of deflecting or vibrating magnet.

X = Horizontal component of Earth's magnetic force.

Then, if in the two deflexion observations, r_1, r_2, be the apparent distances of centre of deflecting magnet from deflected magnet, corrected for scale error and temperature (about 1·0 and 1·3 foot).

u_1, u_2 the observed angles of deflexion.

$$A_1 = \tfrac{1}{2} r_1^3 \sin. u_1 \left\{ 1 + \frac{2\mu}{r_1^3} + c \right\}$$

$$A_2 = \tfrac{1}{2} r_2^3 \sin. u_2 \left\{ 1 + \frac{2\mu}{r_2^3} + c \right\}$$

$$P = \frac{A_1 - A_2}{\frac{A_1}{r_1^2} - \frac{A_2}{r_2^2}}$$ [P being a constant depending on the distribution of magnetism in the deflecting and deflected magnets],

we have, using for reduction of the observations a mean value of P :—

$$\frac{m}{X} = A_1 \left(1 - \frac{P}{r_1^2}\right), \text{ from observation at distance } r_1.$$

$$\frac{m}{X} = A_2 \left(1 - \frac{P}{r_2^2}\right), \text{ from observation at distance } r_2.$$

The mean of these is adopted as the true value of $\frac{m}{X}$.

In calculating the value of P as well as the values of the four factors within brackets, the distances r_1 and r_2 are taken as being equal to 1·0 ft. and 1·3 ft. respectively. The expression for P is not convenient for logarithmic computation, and, in practice, its value for each observation has, since the year 1877, been calculated from the expression

$$\frac{\text{Log. } A_1 - \text{Log. } A_2}{\text{modulus}} \times \frac{r_1^2 \times r_2^2}{r_2^2 - r_1^2} = (\text{Log. } A_1 - \text{Log. } A_2) \times 5{\cdot}64.$$

For determination, from the observed vibrations, of the value of mX:—let T_1 = time of vibration of the deflecting magnet, corrected for rate and arc of vibration,

$\frac{H}{F}$ = ratio of the couple due to torsion of the suspending thread to the couple due to the Earth's magnetic force. [This is obtained from the formula $\frac{H}{F} = \frac{\theta}{90° - \theta}$, where θ = the angle through which the magnet is deflected by a twist of 90° in the thread.]

$$\text{Then } T^2 = T_1^2 \left\{ 1 + \frac{H}{F} + \mu \frac{X}{m} - c \right\}$$

$$\text{and } mX = \frac{\pi^2 K}{T^2}.$$

The adopted time of vibration is the mean of 100 vibrations observed immediately before, and of 100 vibrations observed immediately after the observations of deflexion.

From the combination of the values of $\frac{m}{X}$ and mX, m and X are immediately found. The computation is made with reference to English measure, taking as units of length and weight the foot and grain, but it is desirable to express X also in metric measure. If the English foot be supposed equal to α times the millimètre, and the grain equal to β times the milligramme, then for reduction to metric measure $\frac{m}{X}$ and mX must be multiplied by α^3 and $\alpha^2\beta$ respectively, or X must be multiplied by $\sqrt{\frac{\beta}{\alpha}}$. Taking the mètre as equal to 39·37079 inches, and the gramme as equal to 15·43249 grains, the factor by which X is to be multiplied in order to obtain X in metric measure is $0{\cdot}46108 = \frac{1}{2{\cdot}1689}$. The values of X in metric measure thus derived from those in English measure are given in the proper table. Values of X in terms of the centimètre and gramme, known as the C.G.S. unit (centimètre-gramme-second unit), are readily obtained by dividing those referred to the millimètre and milligramme by 10.

EARTH CURRENT APPARATUS.—For observation of the spontaneous galvanic currents which in some measure are almost always discoverable in the earth, and which are occasionally very powerful, two insulated wires having earth connexions at Angerstein Wharf (on the bank of the River Thames near Charlton) and Lady Well for one circuit; and at the Morden College end of the Blackheath Tunnel and the North Kent East Junction of the South-Eastern Railway for the other circuit, have been employed. The connecting wires, which are special and used for no other purpose, pass from the Royal Observatory to the Greenwich Station of the South-Eastern Railway, and thence, by kind permission of the Directors of the South-Eastern Railway Company, along the lines of the Railway to the respective earths, in each case a copper plate. The direct distance between the earth plates of the Angerstein Wharf—Lady Well circuit is 3 miles, and the azimuth of the line, reckoning from magnetic north towards east, 50°; in the Blackheath—North Kent East Junction circuit the direct distance is 2½ miles, and the azimuth, from magnetic north towards west, 46°. The actual lengths of wire in the circuitous courses which the wires necessarily take in order to reach the Observatory registering apparatus are about 7½ miles and 5 miles respectively. The identity of the four branches is tested from time to time as appears necessary.

In each circuit at the Royal Observatory there is placed a horizontal galvanometer, having its magnet suspended by a hair. Each galvanometer coil contains 150 turns of No. 29 copper wire, or the double coil of each instrument consists of 300 turns of wire, the resistance as found by direct measurement being 7·3 ohms. For registration of the larger earth currents, a portion only of the current is allowed to pass through the galvanometer, while the greater part flows through a shunt, consisting of a short coil of fine copper wire, the resistance of which is 1·33 ohms. The amplitude of the movement, having regard to the resistance of the external circuits, is by this reduced in the ratio of 6·3 to 1 nearly in both circuits. On a few days in each month registers on a large scale, for determination of the small diurnal inequality in earth currents, are obtained by removing the shunts, but no discussion of these registers has yet been made. The galvanometers are placed on opposite sides of the registering cylinder which is horizontal. One galvanometer stands towards one end of the cylinder, and the other towards the other end, and each carries, on a light stalk extending downwards from its magnet, a small plane mirror. Immediately above the cylinder are placed two long reflecting prisms which, except that they are each but half the length of the cylinder, and are placed end to end, are generally similar to those used for magnetic declination and horizontal force, the front convex surfaces facing opposite ways, each towards the mirror of its respective galvanometer. In each case the light of a gas lamp, passing through a vertical slit and a cylindrical lens having its axis vertical, falls upon the galvanometer mirror, which reflects the converging beam to the convex surface of the reflecting prism, by whose action it is made to form on the paper on the cylinder a small spot of light ; thus all the azimuthal motions of the galvanometer magnet are registered. The extent of trace for each galvanometer is thus confined to half the length of the cylinder, which is of the same size as those used for the magnetic registers. The arrangements for turning the cylinder, automatically determining the time scale, and forming a base line are similar to those which have been before described. When the traces on the paper are developed the parts of the registers which appear in juxtaposition correspond, as for declination and horizontal force, to the same Greenwich time, and the scale of time is of the same length as for the magnetic registers.

§ 5. *Magnetic Reductions.*

The results given in the Magnetic Section refer to the civil day, commencing at midnight.

Before the photographic records of magnetic declination, horizontal force, and vertical force are discussed, they are divided into two groups ; one including all days on which the traces show no particular disturbance, and which therefore are suitable for the determination of diurnal inequality; the other comprising days of unusual and violent disturbance, when the traces are so irregular that it appears impossible to treat them except by the exhibition of every motion of each magnet through the day. Following the principle of separation hitherto adopted, there are 2 days in the year 1889 which have been classed as days of great disturbance. These are July 17, November 1. Other days of lesser disturbance are January 20–21, March 6, 17–18, 28–29, April 7–8, June 14, August 13, September 8–9, 9–10, 10–11, 22–23, October 5–6, 18, 20–21, November 2, 26–27, 27–28, 28–29. When two days are mentioned it is to be understood that the reference is usually to one set of photographic sheets extending from noon to noon and including the last half and the first half respectively of two consecutive civil days.

Separating the 2 days of great disturbance, to be spoken of hereafter, the photographic sheets for the remaining available days, including those of lesser disturbance, were thus treated. Through each photographic trace a pencil line was drawn, representing the general form of the curve, without its petty irregularities. The ordinates of these pencil curves were then measured, with the proper pasteboard scales, at every hour, the measures being entered in a form having double argument, the vertical argument ranging through the 24 hours of the civil day (0^h to 23^h), and the horizontal argument through the days of a calendar month, the means of the numbers standing in the vertical columns giving the mean daily value of the element, and the means of the numbers in the horizontal columns the mean monthly value at each hour of the day. Tables I. and II. contain the results for declination, Tables III. to VI. those for horizontal force, with corresponding tables of temperature, and Tables VII. to X. those for vertical force, with corresponding tables of temperature. In the formation of diurnal inequalities it is unimportant whether a day omitted be a complete civil day, or the parts of two successive civil days making together a whole day, although in the latter case the results are not available for daily values. The omissions actually made on account of disturbed days, or from other causes, in the formation of Tables I. and II., for declination, are July 17, November 1; in Tables III. to VI. for horizontal force, are July 17, November 1; and in Tables VII. to X. for vertical force, are July 17, November 1, December 30, 31. Table XI. gives the collected monthly values for declination, horizontal force, and vertical force, and Table XII. the mean diurnal inequalities for the year.

The temperature of the horizontal and vertical force magnets was maintained so nearly uniform through each day that the determination of the diurnal inequalities of horizontal and vertical force should possess great exactitude. By means of the additional stoves placed in the basement at the beginning of the year, as mentioned on page *v*, the temperature of the basement has also been kept nearly constant throughout the year. In years preceding 1883 the results for horizontal and vertical force have been given uncorrected for temperature, leaving the correction to be applied when the results for series of years are collected for discussion; but from the beginning of the year 1883 it has been considered desirable to add also, in Tables III., V., VII., and IX., results corrected for temperature, in order to render them more immediately available. In Tables XI. and XII., only results corrected for temperature are given. The corrected mean daily and mean hourly values of horizontal force given in Tables III. and V. respectively are obtained by applying to the uncorrected values the correction $(t-32) \times {\cdot}0000936 + (t-32)^2 \times {\cdot}000002074$ (page *xx*) where t is the temperature in degrees Fahrenheit, and to those of vertical force, Tables VII. and IX., the correction $-(t-32) \times {\cdot}000212$ (page *xxiv*). The corrections applied are founded on the daily and hourly values of temperature given in Tables IV., VI., VIII., and X.

In regard to the formation of the tables of temperature, the hourly readings of the Richard thermograph were entered into a form having double arguments, as for the magnets, the mean hourly values deduced therefrom giving for each month the variation through the day, and the mean daily values the variation through the month. To adapt these to represent the temperature within the horizontal and vertical force magnet boxes respectively, the monthly means of the thermograph readings at 9^h, 10^h, 11^h, 12^h, 13^h, 14^h, 15^h, 16^h, and 21^h, were compared with the corresponding means of the eye readings of the thermometers whose bulbs are within the respective magnet boxes, giving corrections to the thermograph readings at these hours, which were very accordant, and from which by interpolation corrections were obtained for the remaining hours. The nine daily observations gave also the means of reducing the daily thermograph values to the temperature of the interior of the respective magnet boxes. The results are given in Tables IV., VI., VIII., and X.

In order to economise space the daily values as exhibited in Tables III. and VII., both uncorrected and corrected, have been diminished by constants. The division ═══ in these Tables and in Table XI. indicates that the instrument has been disturbed for experiment or adjustment, or that for some reason the continuity of the values has been broken, the constants deducted being different before and after each break. In the interval between two breaks the constant deducted remains the same, and that deducted in Tables III. and VII. from the corrected values differs from that deducted from the uncorrected values by some multiple of 100. In Tables II., V., IX., and XII. the separate hourly values of the different elements have been simply diminished by the smallest hourly value.

The variations of declination are given in the sexagesimal division of the circle, and those of horizontal and vertical force in terms of ·00001 of the whole horizontal and vertical forces respectively taken as units. In Tables XI. and XII. they have been also expressed in terms of ·00001 of Gauss's absolute unit, as referred to the metrical system of the millimètre-milligramme-second.

The factors for conversion from the former to the latter system of measures are as follows :—

For variation of declination, expressed in minutes, the factor is

$$\text{H.F. in metrical measure} \times \sin 1' = 1{\cdot}8210 \times \sin 1' = 0{\cdot}0005297.$$

For variation of horizontal force, the factor is

$$\text{H.F. in metrical measure} = 1{\cdot}8210.$$

and for variation of vertical force

$$\text{V.F. in metrical measure} = \text{H.F. in metrical measure} \times \tan \text{dip},$$
$$= 1{\cdot}8210 \times \tan 67^\circ.\,24' = 4{\cdot}3747.$$

The measures as referred to the millimètre-milligramme-second system are convertible into measures on the centimètre-gramme-second (C. G. S.) system by dividing by 10.

Table XIII. exhibits the diurnal range of declination and horizontal force on each separate day, as determined from the 24 hourly ordinates of each element measured from the photographic register (as explained on page *xxx*), and the monthly means of these numbers, the results for horizontal force being corrected for temperature. The first portion of Table XIV. contains the difference between the greatest and least hourly mean values in each month, for declination, horizontal force, and vertical force, as extracted from Table II., and columns *c* of Tables V. and IX. In the second portion of the table there are given for each month the numerical sums of the deviations of the 24 hourly values from the mean, taken without regard to sign.

The magnetic diurnal inequalities of declination, horizontal force, and vertical force, for each month and for the year, have been treated by the method of harmonic analysis, and the results are given in Tables XV. and XVI. The values of the coefficients contained in Table XV. have been thus computed, 0 representing the value at 0^h (midnight), 1 that at 1^h, and so on.

$$m = \frac{1}{24}\,(0+1+2\,\ldots\ldots\,22+23).$$

$$\begin{aligned} 12\,a_1 = 0-12 &+ \{(1+23)-(11+13)\}\cos 15^\circ + \{(2+22)-(10+14)\}\cos 30^\circ \\ &+ \{(3+21)-(9+15)\}\cos 45^\circ + \{(4+20)-(8+16)\}\cos 60^\circ \\ &+ \{(5+19)-(7+17)\}\cos 75^\circ. \end{aligned}$$

$$12\,b_1 = 6-18 + \{(5+7) - (17+19)\}\sin 75^\circ + \{(4+8) - (16+20)\}\sin 60^\circ$$
$$+ \{(3+9) - (15+21)\}\sin 45^\circ + \{(2+10)-(14+22)\}\sin 30^\circ$$
$$+ \{(1+11) - (13+23)\}\sin 15^\circ.$$

$$12\,a_2 = (0+12) - (6+18) + \{(1+11+13+23)-(5+7+17+19)\}\cos 30^\circ$$
$$+ \{(2+10+14+22) - (4+8+16+20)\}\cos 60^\circ.$$

$$12\,b_2 = (3+15) - (9+21) + \{(2+4+14+16) - (8+10+20+22)\}\sin 60^\circ$$
$$+ \{(1+5+13+17) - (7+11+19+23)\}\sin 30^\circ.$$

$$12\,a_3 = (0+8+16)-(4+12+20)+\{(1+7+9+15+17+23)-(3+5+11+13+19+21)\}\cos 45^\circ.$$

$$12\,b_3 = (2+10+18)-(6+14+22)+\{(1+3+9+11+17+19)-(5+7+13+15+21+23)\}\sin 45^\circ.$$

$$12\,a_4 = (0+6+12+18)-(3+9+15+21)$$
$$+ \{(1+5+7+11+13+17+19+23) - (2+4+8+10+14+16+20+22)\}\cos 60^\circ.$$

$$12\,b_4 = \{(1+2+7+8+13+14+19+20) - (4+5+10+11+16+17+22+23)\}\sin 60^\circ.$$

The values of the coefficients c_1, and of the constant angles α contained in Table XVI., are then determined by means of the following relations :—

$$\frac{a_1}{b_1} = \tan\alpha \qquad\qquad c_1 = \frac{a_1}{\sin\alpha} = \frac{b_1}{\cos\alpha}.$$

Similarly for c_2, β, &c.

Finally, the values of the angles α', β', &c. were thus found. Calling the Sun's hour angle east at mean midnight $= h$, then—

$$\alpha' = \alpha + h$$
$$\beta' = \beta + 2h$$
$$\&c. = \&c.,$$

a mean value of h for the month being employed.

The values of a_5 and b_5 for the diurnal inequalities for the year were also calculated, but could not be conveniently included in Table XV. ; they are as follows :—

1889.	a_5.	b_5.
	′	′
Declination	−0·10	−0·02
Horizontal Force......	+0·6	−1·1
Vertical Force	+0·6	+0·1

In order to give some indication of the accuracy with which the results of observation are represented by the harmonic formula, the sums of squares of residuals remaining after the introduction of m and of each successive pair of terms of the expression on page (xii), corresponding to the single terms of the expressions on page (xiii), have been calculated for the mean diurnal inequalities for the year (columns 1, 2, and 3 of Table XII). The respective sums of squares of residuals are as follows :—

SUMS OF SQUARES OF RESIDUALS OF DIURNAL INEQUALITIES.

For the Year 1889.	Declination.	Horizontal Force.	Vertical Force.
Sums of Squares of Observed Values (Table XII.)	161'·62	184331·4	11675·8
Sums of Squares of Residuals after the introduction of m	82·45	29978·5	2215·3
" " a_1 and b_1	29·85	7737·3	1257·2
" " a_2 and b_2	5·25	1968·2	169·6
" " a_3 and b_3	0·96	577·6	26·9
" " a_4 and b_4	0·12	33·1	11·0
" " a_5 and b_5	0·00	13·8	6·6

The unit in the case of horizontal and vertical force being ·00001 of the whole horizontal and vertical forces respectively, it thus appears that there would be no advantage in carrying the approximation (Table XV.) beyond the determination of a_4, b_4.

As regards Magnetic Dip, the result of each complete observation of dip with each of the six needles in ordinary use is given in Table XVII., and in Table XVIII. the concluded monthly and yearly values for each needle.

The results of the observations for Absolute Measure of Horizontal Force contained in Table XIX. require no special remark, the method of reduction and all necessary explanation having been given with the description of the instrument.

In order to facilitate the comparison of the diurnal inequalities of magnetism at the different British magnetic observatories an arrangement has been made with the Sub-Committee of the Kew Committee of the Royal Society by which five quiet days are to be selected at Greenwich in each month of every year, for adoption at all these observatories for determination of the monthly diurnal inequalities of declination, horizontal force, and vertical force; thus providing for further discussion results which should be strictly comparable. The particular days selected are given on page (xvii), and the results found for Greenwich are contained in Tables XX., XXI., and XXII., which it is interesting to compare with the values found from the records of all days, as given in Tables II., V., IX. and XII.

No numerical discussion of Earth Current records is contained in the present volume.

In the treatment of disturbed days it was formerly the custom to measure out for each element all salient points of the curves and to print the numerical values. But, since the year 1882, it has been considered preferable to give instead of these tables reduced copies of the actual photographic curves (reproduced by photo-lithography from full-sized tracings of the original photographs), adding thereto copies of the corresponding earth-current curves. The registers thus exhibited are those for the days of great and of lesser disturbance mentioned on page (*xxx*).

The list of these days for the year 1889 has been selected in concert with M. Mascart, so that the two Observatories of the Parc Saint Maur and Greenwich should publish the magnetic registers for the same days of disturbance with a view to the comparison of the results. It is proposed to follow this plan in future years, and if other magnetic observatories should eventually join in the scheme for concerted action, in regard to the publication of their registers the discussion of magnetic perturbations would be much facilitated.

The plates are preceded by a brief description of *all* other significant magnetic motions (superposed on the ordinary diurnal movement) recorded throughout the year, These, in combination with the plates, give very complete information on magnetic disturbances during the year 1889, affording thereby, it is hoped, facilities for making comparison with solar phenomena.

In regard to the plates, it may be remarked that on each day five distinct registers are usually given, viz. : declination, horizontal force, vertical force, and the two earth-currents, all necessary information for proper understanding of the plates being given in the notes on page (xxviii).

An additional plate (VII.) exhibits the registers of declination, horizontal force, and vertical force on four quiet days, which may be taken as types of the ordinary diurnal movement at four seasons of the year. These are given for the civil day as exhibiting more clearly the character of the diurnal movement. The earth currents on these days are very small.

The indications of horizontal and vertical force are given precisely as registered ; they are therefore affected, slightly as compared with the amount of motion on disturbed days, by the small recorded changes of temperature of the magnets. The recorded hourly temperatures being inserted on the plates, reference to the temperature correction of the magnets, given at page *xxxi*, will show the effect produced. Briefly, an increase of about $4\frac{1}{2}^\circ$ of temperature throws the horizontal force curve upward by 0·001 of the whole horizontal force; an increase of about 5° of temperature throws the vertical force curve downward by 0·001 of the whole vertical force.

The original photographs have been reduced in the proportion of 20 to 11 on the plates, and the corresponding scale values are :—

—	LENGTH IN INCHES					
	Of 1° of Declination.		Of 0·01 of Horizontal Force.		Of 0·01 of Vertical Force.	
	in.	mm.	in.	mm.	in.	mm.
On the Photographs	4·691	119·15	2·478	62·94	6·865	174·37
On the Plates -	2·580	65·53	1·363	34·62	3·776	95·90

The scales actually attached to the plates are, however, so arranged as to correspond with the tables of the magnetic section, that is to say, the units for horizontal force and vertical force are ·00001 of the whole horizontal and vertical forces respectively.

But the preceding scale values are not immediately comparable for the different elements, and it will therefore be desirable to refer them all to the same unit, say 0·01 of the horizontal force.

Now, the transverse force represented by a variation of 1° of Declination

$$= \cdot 0175 \text{ of Horizontal Force}$$

$$\text{and Vertical Force} = \text{Horizontal Force} \times \tan.\ \text{dip}\ [\text{dip} = 67^\circ.\ 24']$$

$$= \text{Horizontal Force} \times 2\cdot 4023$$

whence we have the following equivalent scale values for the different elements :—

—	Length of Unit, Equivalent to 0·01 of Horizontal Force.					
	For Declination Curve.		For Horizontal Force Curve.		For Vertical Force Curve.	
	in.	mm.	in.	mm.	in.	mm.
On the Photographs	2·68	68·1	2·48	62·9	2·86	72·6
On the Plates -	1·47	37·4	1·36	34·6	1·57	39·9

It may be convenient to give also comparative scale values for the different systems of absolute measurement, viz. :—

Foot-grain-second, or British unit, in terms of which Mean H. F. for 1889 = 3·9494
Millimètre-milligramme-second, or Metric unit, „ „ „ = 1·8210
Centimètre-gramme-second, or C. G. S. unit, „ „ „ = 0·18210

Dividing therefore the scale values last given by 3·9494, 1·8210, and 0·18210 respectively, the following comparative scale values for each of the elements on the photographs and on the plates as referred to 0·01 of these units respectively are found :—

Unit.	Length of 0·01 of Unit.											
	Declination.				Horizontal Force.				Vertical Force.			
	On the Photographs.		On the Plates.		On the Photographs.		On the Plates.		On the Photographs.		On the Plates.	
	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.
British - -	0·68	17·2	0·37	9·5	0·63	15·9	0·35	8·8	0·72	18·4	0·40	10·1
Metric - -	1·47	37·4	0·81	20·6	1·36	34·6	0·75	19·0	1·57	39·9	0·86	21·9
C. G. S. - -	14·7	374·	8·1	206·	13·6	346·	7·5	190·	15·7	399·	8·6	219·

The scale values for the earth-current registers have been determined by measurement of the movement on the photographic sheet produced by the current from a standard Daniell cell, through a known resistance, in combination with determinations of the resistance of each earth-current circuit by means of an electrical balance. The movement on the photographic sheet corresponding to a definite current has been, however, found to vary for both galvanometers in an unexpected way. The whole of the measures that have been made are given in the following table :—

Angerstein Wharf—Ladywell Galvanometer.

Date.	Resistance employed in ohms.	Displacement of spot of light on photographic sheet, in inches.	Current in ampères.	Current in ampères corresponding to 1 inch displacement.
1886.				
Oct. 21	900	2·00	·00117	·00059
1887.				
Sept. 29	600	2·72	·00173	·00064
29	600	2·76	·00173	·00063
29	800	2·07	·00131	·00063
1889.				
Sept. 27	400	3·58	·00257	·00072
30	800	1·69	·00131	·00078
30	800	1·69	·00131	·00078
Oct. 2	600	2·32	·00173	·00075
4	600	2·35	·00173	·00074
4	600	2·37	·00173	·00073
9	600	2·43	·00173	·00071
1890.				
Apr. 11	800	1·77	·00131	·00074
24	400	3·86	·00257	·00067
24	800	1·87	·00131	·00070
Oct. 3	600	1·03	·00173	·00168
3	600	1·02	·00173	·00170
4	600	1·00	·00173	·00173
4	800	0·79	·00131	·00166
Nov. 5	400	1·51	·00257	·00170
5	200	2·91	·00493	·00169
6	300	2·00	·00338	·00169
6	800	0·81	·00131	·00162
1891.				
Jan. 14	400	1·54	·00257	·00167
14	1200	0·59	·00088	·00149

Blackheath—North Kent East Junction Galvanometer.

Date.	Resistance employed in ohms.	Displacement of spot of light on photographic sheet, in inches.	Current in ampères.	Current in ampères corresponding to 1 inch displacement.
1886.				
Oct. 21	900	1·88	·00117	·00062
1887.				
Sept. 28	600	2·32	·00173	·00075
28	800	1·68	·00131	·00078
29	800	1·72	·00131	·00076
29	800	1·80	·00131	·00073
1889.				
Sept. 27	300	1·91	·00338	·00177
30	800	0·79	·00131	·00166
30	800	0·73	·00131	·00179
Oct. 2	600	1·00	·00173	·00173
4	600	1·03	·00173	·00168
9	600	0·98	·00173	·00177
1890.				
Apr. 11	1000	1·37	·00105	·00077
11	1000	1·39	·00105	·00076
24	800	1·61	·00131	·00081
24	800	1·68	·00131	·00078
Oct. 3	600	1·58	·00173	·00109
3	600	1·52	·00173	·00114
4	600	1·50	·00173	·00115
4	600	1·51	·00173	·00115
Nov. 6	800	1·18	·00131	·00111
6	800	1·19	·00131	·00110
1891.				
Jan. 14	600	1·63	·00173	·00106
14	600	1·61	·00173	·00107

From the numbers in the above table the following mean values are formed :—

Angerstein Wharf—Ladywell Galvanometer.

Period.	Current in ampères for 1 inch of displacement.
1886 Oct. 21 to 1890 Apr. 24 ...	·00070
1890 Oct. 3 to 1891 Jan. 14 ...	·00166

Blackheath—North Kent East Junction Galvanometer.

Period.	Current in ampères for 1 inch of displacement.
1886 Oct. 21 to 1887 Sept. 29...	·00073
1889 Sept. 27 to 1889 Oct. 9...	·00173
1890 Apr. 11 to 1890 Apr. 24...	·00078
1890 Oct. 3 to 1891 Jan. 14...	·00111

The measures made of the resistance of the external circuits, excluding in each case the registering galvanometer, are as follows :—

Date.	Angerstein Wharf—Lady Well circuit.	Blackheath—North Kent East Junction circuit.	Date.	Angerstein Wharf—Lady Well circuit.	Blackheath—North Kent East Junction circuit.
	Ohms.	Ohms.		Ohms.	Ohms.
1886 October 21	205	245	1889 October 9	176	173
1887 May 10	285	225	October 10	216	...
June 9	285	...	November 7	174	179
September 28	220	230	December 27	175	199
December 2	225	262	1890 January 24	181	195
1888 May 8	245	258	April 5	191	196
May 9	247	262	August 7	195	193
1889 April 26	231	197	August 25	194	189
April 27	252	...	October 4	202	198
May 1	238	217	November 6	145	150
September 30	208	180	November 7	146	161
October 1	214	179	1891 February 6	150	161
October 2	213	181	April 17	155	147
October 9	214	187			

The diminished resistance shown since 1890 November 6 is due to portions of both circuits having been renewed with copper wire since the previous measure of October 4.

The mean of the 11 measures of resistance of the Angerstein Wharf—Lady Well circuit made during the year 1889 is 210 ohms., and of the 9 measures of resistance of the Blackheath—North Kent East Junction circuit is 188 ohms.

We have, therefore, for determination of scale values for the year 1889 ; approximate value of resistance of the two branches of the Angerstein Wharf—Lady Well circuit 210 ohms. ; current in ampères corresponding to displacement of 1 inch of the spot of light on the photographic sheet = ·00070. For the Blackheath—North Kent East Junction branches the approximate value of resistance for 1889 is 188 ohms. But there is uncertainty in regard to the amount of current corresponding to displacement of 1 inch on the sheet. Two sets of values have therefore been calculated, one using the foregoing value of resistance in combination with the current measure determined in 1886–1887, current in ampères corresponding to displacement of 1 inch on sheet = ·00073, another using the same value of resistance in combination with the current measure determined in 1889 September–October, current in ampères corresponding to displacement of 1 inch = ·00173.

—	Displacement Corresponding to 1 Volt.											
	Angerstein Wharf—Ladywell Circuit throughout the year 1889.				Blackheath—North Kent East Junction Circuit.							
					As determined 1886—1887.				As determined 1889 Sept.—Oct.			
	Without Shunt.		With Shunt.		Without Shunt.		With Shunt.		Without Shunt.		With Shunt.	
	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.
On the Photographs -	6·6	167·	1·04	26·5	7·0	178·	1·12	28·4	3·0	75·	0·47	12·0
On the Plates - - -	—	—	0·57	14·6	—	—	0·62	15·6	—	—	0·26	6·6

The earth current registers given on the lithographed plates are in all cases those taken with the shunt in circuit, the effect of this being to reduce the amplitude of the movement in both circuits nearly in the ratio of 6·3 to 1.

Slight interruptions in the traces on the plates are due to various causes. In the originals there are breaks at each hour for time scale, so slight however that, in the copies, the traces could usually be made continuous without fear of error : in a few cases, however, this could not be done. Further, to check the numeration of hours, the observer interrupts the register at definite times for about five minutes, usually at or near 9^{h}. 30^{m}, 14^{h}. 30^{m}, and 20^{h}. 30^{m}, Greenwich civil time, and at somewhat different times on Sundays. The interruption in the earth-current registers is greater than in the other registers because of the necessity of also temporarily disconnecting the wires for determination of the instrumental zeros. A weekly clearing of the gas pipes also causes a somewhat longer interruption, usually at about 10^{h}, as on November 2. 10^{h}. Explanation in regard to other accidental interruptions will be found on page (xxviii).

The original photographic records were first traced on thin paper, the separate records on each day being arranged one under another on the same sheet, and great attention being paid to accuracy as regards the scale of time. Each sheet containing the records for two or more days was then reduced by photo-lithography, in the proportion of 20 to 11, to bring it to a convenient size for insertion in the printed volume.

§ 6. *Meteorological Instruments.*

STANDARD BAROMETER.—The standard barometer, mounted in 1840 on the southern wall of the western arm of the upper magnet room, is Newman No. 64. Its tube is $0^{in}\cdot565$ in diameter and the depression of the mercury due to capillary action is $0^{in}\cdot002$, but no correction is applied on this account. The cistern is of glass, and the graduated scale and attached rod are of brass; at its lower end the rod terminates in a point of ivory, which in observation is made just to meet the reflected image of the point as seen in the mercury. The scale is divided to $0^{in}\cdot05$, sub-divided by vernier to $0^{in}\cdot002$.

The readings of this barometer until 1866 August 20 are considered to be coincident with those of the Royal Society's flint-glass standard barometer. It then became necessary to remove the sliding rod, for repair of its slow motion screw, which was completed on August 30. Before the removal of the rod the barometer had been compared with three other barometers, one of which, during repair of the rod, was used for the daily readings. After restoration of the rod a comparison was again made with the same three barometers, from which it appeared that the readings of the standard, in its new state, required a correction of $-0^{in}\cdot006$, all three auxiliary barometers giving accordant results. This correction has been applied to every observation since 1866 August 30.

An elaborate comparison of the standard barometers of the Greenwich and Kew Observatories, made, under the direction of the Kew Committee, by Mr. Whipple, Superintendent of the Kew Observatory, in the spring of the year 1877, showed that the difference between the two barometers (after applying to the Greenwich barometer readings the correction $-0^{in}\cdot006$) did not exceed $0^{in}\cdot001$. (*Proceedings of the Royal Society*, vol. 27, page 76.)

The height of the barometer cistern above the mean level of the sea is 159 feet, being $5^{ft}\ 2^{in}$ above Mr. Lloyd's reference mark in the then transit room, now the Astronomer Royal's official room. (*Philosophical Transactions*, 1831.)

The barometer is read at 9^h, 12^h (noon), 15^h, 21^h (civil reckoning) on week days, and at 10^h, noon and 20^h on Sundays. Each reading is corrected by application of the index correction above mentioned, and reduced to the temperature 32° by means of Table II. of the "Report of the Committee of Physics" of the Royal Society. The readings thus found are used to determine the value of the instrumental base line on the photographic record.

PHOTOGRAPHIC BAROMETER.—The barometric record is made on the same cylinder as is used for magnetic vertical force, the register being arranged to fall on the upper half of the cylinder, on its eastern side. A siphon barometer fixed to the northern wall of the Magnet Basement is employed, the bore of the upper and lower extremities of the tube being about 1·1 inch, and that of the intermediate portion 0·3 inch. A metallic plunger, floating on the mercury in the shorter arm of the siphon is partly supported by a counterpoise acting on a light lever, leaving a definite part of its weight to be supported by the mercury. The lever carries at its other end a vertical plate of blackened mica, having a small horizontal slit, whose distance from the fulcrum is about eight times that of the point of connexion with the float, and whose vertical movement is therefore about four times that of the ordinary barometric column. The light of a gas lamp, passing through this slit and falling on a cylindrical lens, forms a spot of light on the paper. The barometer can, by screw action, be raised or lowered so as to keep the photographic trace in a convenient part of the sheet. A base line is traced on the sheet, and the record is interrupted at each hour by the clock and occasionally by the observer in the same way as for the magnetic registers. The length of the time scale is also the same.

The barometric scale is determined by experimentally comparing the measured movement on the paper with the observed movement of the standard barometer; one inch of barometric movement is thus found = $4^{in} \cdot 39$ on the paper. Ordinates measured for the times of observation of the standard barometer, combined with the corrected readings of the standard barometer, give apparent values of the base line, from which mean values for each day are formed; these are written on the sheets and new base lines drawn, from which the hourly ordinates (see page *liv*) are measured as for the magnetic registers. As the diurnal change of temperature in the basement is very small, no appreciable differential effect is produced on the photographic register by the expansion of the column of mercury.

DRY AND WET BULB THERMOMETERS.—The dry and wet bulb thermometers and maximum and minimum self-registering thermometers, both dry and wet, are mounted on a revolving frame planned by Sir G. B. Airy. A vertical axis fixed in the ground, in a position about 35 feet south of the southern arm of the Magnetic Observatory, carries the frame, which consists of a horizontal board as base, of a vertical board projecting upwards from it and connected with one edge of the horizontal board, and of two parallel inclined boards (separated about 3 inches) connected at the top with the vertical board and at the bottom with the other edge of the horizontal board: the outer inclined board is covered with zinc, and the air passes freely between all the boards. The dry and wet bulb thermometers are mounted near the centre of the vertical board, with their bulbs about 4 feet from the ground; the maximum and minimum thermometers for air temperature are placed towards one side of the vertical board, and those for evaporation temperature towards the other side, with their bulbs at about the same level as those of the dry and wet bulb thermometers. A small roof projecting from the frame protects the thermometers from rain. The frame is turned in azimuth several times during the day (whether cloudy or clear) so as to keep the inclined side always towards the sun. In 1878 September, a circular board 3 feet in diameter was fixed, below the frame, round the supporting post, at a height of 2 feet 6 inches above the ground, with the object of protecting the thermometers from radiation from the ground. In the summer of 1886 experiments were made on days of extreme heat with the view of determining the effect of the circular board in this respect, an account of which will be found at the end of the Introduction to the volume for the year 1887. The effect of radiation with the circular board removed was found to be insensible.

The corrections to be applied to the thermometers in ordinary use (except the earth thermometers) are determined usually once each year for the whole extent of scale actually employed, by comparison with the standard thermometer, No. 515, kindly supplied to the Royal Observatory by the Kew Committee of the Royal Society.

The dry and wet bulb thermometers are Negretti and Zambra, Nos. 45354 and 45355 respectively. The correction $-$ 0°·2 has been applied to dry bulb readings, and $-$ 0°·1 to wet bulb readings throughout.

The self-registering thermometers for temperature of air and evaporation are all by Negretti and Zambra. The maximum thermometers are on Negretti and Zambra's principle, the minimum thermometers are of Rutherford's construction. To the readings of No. 8527 for maximum temperature of the air a correction of $-$ 0°·9 has been applied, and to those of No. 38338, for minimum temperature of the air, a correction of + 0°·1 throughout. The readings of No. 44285 for maximum temperature of evaporation, and those of No. 3627 for minimum temperature of evaporation required corrections of $-$ 0°·5 and + 1°·9 until March 31. From April 1 corrections of $-$ 0°·6 and + 2°·0 were applied.

The dry and wet bulb thermometers are read at 9^h, 12^h (noon), 15^h, 21^h (civil reckoning) on week days, and at 10^h, noon, and 20^h on Sundays. Readings of the maximum and minimum thermometers are taken at 9^h and 21^h on week days, and at 10^h and 20^h on Sundays. Those of the dry and wet bulb thermometers are employed to correct the indications of the photographic dry and wet bulb thermometers.

In January 1887, three thermometers, a dry-bulb, a maximum, and a minimum, to which a wet-bulb thermometer was added in February, were mounted in a Stevenson screen, with double louvre-boarded sides, of the pattern adopted by the Royal Meteorological Society, which is fully described in the *Quarterly Journal* of the Society, Vol. X, page 92. The screen is planted 11 feet to the eastward of the revolving frame carrying the ordinary dry-bulb and wet-bulb thermometers, and its internal dimensions are, length 18 inches, width 11 inches, and height 15 inches, the bulbs of the thermometers placed in it being at a height of about 4 feet above the ground. The dry-bulb thermometer is Hicks No. 262495, to the readings of which a correction of $-$ 0°·1 has been applied. The wet-bulb is Hicks No. 268525, to the readings of which a corrections of + 0°·1 was applied until March 31, and from April 1 a correction of + 0°·2. The maximum thermometer is Hicks No. 233036, to the readings of which a correction of + 0°·1 has been applied. The minimum thermometer is Hicks No. 262739, to the readings of which, until March 31, a correction of + 0°·4 was applied; from April 1 corrections as follows were applied: below 33° 0°·0, 33° to 36° + 0°·1, 36° to 40° + 0°·2, 40° to 44° + 0°·3, 44° to 51° + 0°·4, and above 51° + 0°·5. The observation of these thermometers is omitted on Sundays and a few other days.

Experiments were made in the summer of the year 1887 on days of extreme heat to determine whether, with the door of the screen open, the thermometers were in any way influenced by radiation from external objects, an account of which will be found at the end of the Introduction to the Volume for 1887. The effect of radiation with the door of the screen open was found to be insensible.

At the beginning of the year 1886 three thermometers were mounted on the platform above the Magnet House, in a louvre-boarded shed or screen, so constructed as to give free circulation of air with protection from radiation. No. 45356, by Negretti and Zambra, is for eye observation of the temperature of the air, and required until March 31, a correction of − 0°·1 and from April 1 a correction of − 0°·2. No. 37467, also by Negretti and Zambra, is a self-registering maximum thermometer, and required a correction of − 0°·4. No. 342663, by Hicks, is a self-registering minimum thermometer, and required correction as follows: below 35° 0°·0, between 35° and 45° + 0°·1, between 45° and 55° + 0°·2, and above 55° + 0°·3. These corrections have been applied to the readings throughont the year 1889. The bulbs of all these thermometers are 4 feet above the platform, and about 20 feet above the ground. The observation of these thermometers is omitted on Sundays and a few other days.

The order of reading the thermometers on the revolving stand, in the Stevenson screen and on the roof of the Magnet House is reversed on alternate days, in order that the diurnal change may not produce any systematic difference in the comparison of the results.

PHOTOGRAPHIC DRY-BULB AND WET-BULB THERMOMETERS.—The apparatus now in use was constructed in the year 1884 by Messrs. Negretti & Zambra from designs furnished by me, and was mounted in the year 1885, but from various causes it was not brought into regular use until 1887 January 1. It is placed nearly in the centre of the South Ground under a shed 8 feet square standing upon posts about 8 feet high. This shed is open to the north and is generally similar to that provided for the old apparatus, excepting that the roof inclines somewhat towards the south and that the protecting boards (fixed as far as necessary on the eastern, southern and western sides) are double, with spaces between to ensure a free circulation of air while screening the thermometers from the direct rays of the sun. The thermometers are further protected from sky and ground radiation by boards on the thermometer stand as described below. The photographic register is received on paper placed on a vertical ebonite cylinder 11½ inches high and 14¼ inches in circumference, and I have arranged that the dry and wet bulb traces shall fall on the same part of the cylinder, as regards time-scale, a long air bubble in the wet-bulb thermometer column giving the means of registering the indications of the wet bulb (as well as of such degrees and decades of its scale as fall within the bubble), just below the trace of the dry-bulb thermometer, without any interference of the two records, an arrangement which admits of the time-scale being made equal to that of all the other registers. The stems of the thermometers are placed close together, each being covered by a vertical metal plate having a fine vertical slit, so that light passes through only at such parts of the bore of the tube as do not contain mercury. Two gas lamps, each at a distance of 21 inches, are placed at such an angle that the light from each after passing through its corresponding slit and thermometer tube falls on the photographic paper in one and the same vertical line. Degree lines etched upon the thermometer stems, and painted, interrupt the light sufficiently to produce a clear and sharp indication on the photographic sheet, the line at each tenth degree being thicker than the others as well as those at 32°, 52°, 72°, &c. The length of scale is from 0° to 120° for each thermometer, the length of 1° being about 0·1 inch, and the air bubble in the wet-bulb thermometer is about 12° in length so that it will always include one of the ten-degree lines. The bulbs, which are 2 inches long and of about ½ an inch in internal bore, are separated horizontally by 5 inches, the tubes of the thermometers having a double bend above the bulbs, which are placed about 4 feet above the ground. The thermometers are carried by a vertical frame with independent vertical adjustment for each thermometer so that the register in summer or winter can be brought to a convenient part of the photographic sheet. The revolving cylinder is driven by a pendulum clock contained within the brass case covering the whole apparatus, excepting the thermometer bulbs which project below. It makes one revolution in 26 hours, and the time-scale is the same as that for all the other registers. As the cylinder revolves the light passing through the portion of the thermometer tubes not occupied by mercury imprints on the paper a broad band of photographic trace, corresponding to the dry bulb register, whose breadth in the vertical direction varies with the height of the mercury in the tube, and a narrower band below, corresponding to the wet bulb. When these are developed the traces are seen to be crossed by thin white lines, the horizontal lines corresponding to degrees and the vertical lines to hours, the lower boundary of each trace indicating the thermometric record corresponding to the upper surface of the thermometric column.

The driving clock of the new apparatus is made to interrupt the light for a short time at each hour, producing on the sheet the hour lines above mentioned; the observer also occasionally interrupts the register for a short time for proper identification of the hourly breaks.

The bulbs of the thermometers were at first completely protected from radiation by vertical or inclined boards fixed to the thermometer stand, two on the south side, two on the north side, one at the east end, one at the west end, and one below, but with proper spaces for free circulation of air. Experiments made in the summer of the year 1886, an account of which is given at the end of the Introduction for 1887, showed that the north and south boards were unnecessary, and the two south boards and one north board were in consequence removed before commencing regular work with the instrument at the beginning of the year 1887.

For a description of the apparatus formerly employed reference may be made to the Introduction for 1887 and previous years. It was maintained in its old position during the year 1889 for use in case of temporary interruption of register by the new apparatus. A comparison of the results given by the old and new apparatus will be found at the end of the Introduction to the year 1887.

RADIATION THERMOMETERS.—These thermometers are placed in the Magnet Ground, a little south of the Magnet House. The thermometer for solar radiation is a self-registering mercurial maximum thermometer by Negretti and Zambra, No. 38592; its bulb is blackened, and the thermometer is enclosed in a glass sphere from which the air has been exhausted. The thermometer for radiation to the sky is a self-registering spirit minimum thermometer of Rutherford's construction, by Horne and Thornthwaite, No. 3120. The thermometers are laid on short grass; they require no correction for index error.

EARTH THERMOMETERS.—These thermometers were made by Adie, of Edinburgh, under the superintendence of Professor J. D. Forbes. They are placed at the north-west corner of the photographic thermometer shed.

The thermometers are four in number, placed in one hole in the ground, the diameter of which in its upper half is 1 foot and in its lower half about 6 inches, each thermometer being attached in its whole length to a slender piece of wood. The thermometer No. 1 was dropped into the hole to such a depth that the centre of its bulb was 24 French feet (25·6 English feet) below the surface, then dry sand was poured in till the hole was filled to nearly half its height. Then No. 2 was dropped in till the centre of its bulb was 12 French feet below the surface; Nos. 3 and 4 till the centres of their bulbs were respectively 6 and 3 French feet below the surface; and the hole was then completely filled with dry sand. The upper parts of the tubes carrying the scales were left projecting above the surface; No. 1 by 27·5 inches, No. 2 by 28·0 inches, No. 3 by 30·0 inches, and No. 4 by 32·0 inches. Of these lengths, 8·5, 10·0, 11·0, and 14·5 inches respectively are in each case tube with narrow bore. The length of 1° on the scales is 1·9 inch, 1·1 inch, 0·9 inch, and 0·5 inch in each case respectively. The ranges of the scales are for No. 1, 46°·0 to 55°·5; No. 2, 43°·0 to 58°·0; No. 3, 44°·0 to 62°·0; and for No. 4, 37°·0 to 68°·0.

The bulbs of the thermometers are cylindrical, 10 or 12 inches long, and 2 or 3 inches in diameter. The bore of the principal part of each tube, from the bulb to the graduated scale, is very small; in that part to which the scale is attached it is larger; the fluid in the tubes is alcohol tinged red; the scales are of opal glass.

The ranges of scale having in previous years been found insufficient, fluid has at times been removed from or added to the thermometers as necessary, corresponding alterations being made in the positions of the attached scales. Information in regard to these changes will be found in previous Introductions.

The parts of the tubes above the ground are protected by a small wooden hut fixed to the ground; the sides of the hut are perforated with numerous holes, and it has a double roof; in the north face is a plate of glass, through which the readings are taken. Within the hut are two small thermometers, one, No. 5, with bulb one inch in the ground, another, No. 6, whose bulb is freely exposed in the centre of the hut.

These thermometers are read every day at noon, and the readings are given without correction. The index errors of Nos. 1, 2, 3, and 4 are unknown; No. 5 appears to read too high by 0°·2, and No. 6 by 0°·4, but no corrections have been applied.

THAMES THERMOMETERS.—Observations of the temperature of the water of the river Thames, which had been discontinued in the year 1879 in consequence of inability to find a suitable station after the placing of the police ship "Royalist" on the river bank, were resumed in the year 1883, under the direction of the Corporation of the City of London. The thermometers are placed at the end of one of the jetties of the Foreign Cattle Market at Deptford, and the record includes observations (by means of two Six's self-registering thermometers made by Negretti and Zambra) of the maximum and minimum temperature of the water at a depth of two feet below the surface, and also near the bottom of the river, the thermometers being read daily at 9^h (civil reckoning). By arrangement with the officers of the Corporation a copy of the record is furnished weekly to the Royal Observatory, in order that the readings of the surface thermometers may be included in the tables of "Daily Results of the Meteorological Observations," page (xxx), in which the highest and lowest readings recorded each morning at 9^h are entered to the same civil day. The observations are made by Mr. G. Philcox, Clerk of the Market. The Royal Observatory authorities are however not responsible for the accuracy of the observations. The observations were suspended from June 5 to 19, from July 7 to September 10, and from September 28 to October 22, from accidental causes.

OSLER'S ANEMOMETER.—This self-registering anemometer, devised by A. Follett Osler, for continuous registration of the direction and pressure of the wind and of the amount of rain, is fixed above the north-western turret of the ancient part of the Observatory. For the direction of the wind a large vane, from which a vertical shaft proceeds down to the registering table within the turret, gives motion, by a pinion fixed at its lower end, to a rack-work carrying a pencil. A collar on the vane shaft bears upon anti-friction rollers, running in a cup of oil, rendering the vane very sensitive to changes of direction in light winds. The pencil marks a paper fixed to a board moved horizontally and uniformly by a clock, in a direction transverse to that of the motion of the pencil. The paper carries lines corresponding to the positions of N., E., S., and W. of the vane, with transversal hour-lines. The vane is 60 feet above the adjacent ground, and 215 feet above the mean level of the sea. A fixed mark on the north-eastern turret, in a known azimuth, as determined by celestial observation, is used for examining at any time the position of the direction plate over the registering table, to which reference is made by means of a direction pointer when adjusting a new sheet on the travelling board.

For the pressure of the wind the construction is as follows: At a distance of 2 feet below the vane there is placed a circular pressure plate (with its plane vertical) having an area of $1\frac{1}{3}$ square feet, or 192 square inches, which, moving with the vane in azimuth, and being thereby kept directed towards the wind, acts against a combination of springs in such way that, with a light wind, slender springs are first brought into action, but, as the wind increases, stiffer springs come into play. For a detailed account of the arrangement adopted the reader is referred to the Introduction for the year 1866. [Until 1866 the pressure plate was a square plate, 1 foot square, for which in that year a circular plate, having an area of 2 square feet, was substituted and employed until the spring of the year 1880, when the present circular plate, having an area of $1\frac{1}{3}$ square feet, was introduced.] A short flexible snake chain, fixed to a cross bar in connexion with the pressure plate, and passing over a pulley in the upper part of the shaft is attached to a brass chain (formerly a copper wire) running down the centre of the shaft to the registering table, just before reaching which the chain communicates with a short length of silk cord, which, led round a pulley, gives horizontal motion to the arm carrying the pressure pencil. The substitution, in the year 1882, of the flexible brass chain for the copper wire has greatly increased the delicacy of movement of the pressure pencil, every small movement of the pressure plate being now registered. The scale for pressure, in lbs. on the square foot, is experimentally determined from time to time as appears necessary; the pressure pencil is brought to zero by a light spiral spring.

Whilst the action of the pressure apparatus has been satisfactory for moderate winds, it is believed that the record of occasional very large pressures in years preceding 1882 was due principally to irregular action, in excessive gusts, of the connecting copper wire, but the brass chain being always in tension, the movements of the recording pencil have since been in complete sympathy with those of the pressure plate, and in this condition of the apparatus, that is since the year 1882, no pressure greater than about 30 lbs. has been recorded.

A self-registering rain gauge of peculiar construction forms part of the apparatus : this is described under the heading "Rain Gauges."

A new sheet of paper is applied to the instrument every day at noon. The scale of time is the same as that of the magnetic registers.

ROBINSON'S ANEMOMETER.—This instrument, made by Mr. Browning, is constructed on the principle described by the late Dr. Robinson in the *Transactions of the Royal Irish Academy*, Vol. XXII., for registration of the horizontal movement of the air, and is mounted above the small building on the roof of the Octagon Room. It was brought into use in 1866, October. The motion is given by the pressure of the wind on four hemispherical cups, each 5 inches in diameter, the centre of each cup being 15 inches distant from the vertical axis of rotation. The foot of the axis is a hollow flat cone bearing upon a sharp cone, which rises up from the base of a cup of oil. An endless screw acts on a train of wheels furnished with indices for reading off the amount of motion of the air in miles, and a pinion on the axis of one of the wheels draws upwards a rack, to which is attached a rod passing down to the pencil, which marks the paper placed on the vertical revolving cylinder in the chamber below. A motion of the pencil upwards through a space of one inch represents horizontal motion of the air through 100 miles. The revolving hemispherical cups are 56 feet above the adjacent ground, and 211 feet above the mean level of the sea.

The cylinder is driven by a clock in the usual way, and makes one revolution in 24 hours. A new sheet of paper is applied every day at noon. The scale of time is the same as that of Osler's Anemometer and of the magnetic registers.

It is assumed, in accordance with the experiments made by Dr. Robinson, that the horizontal motion of the air is three times the space described by the centres of the cups. To verify this conclusion experiments were made in the year 1860 in Greenwich Park with the anemometer by Negretti and Zambra, which was in use from 1859 until the introduction of the larger instrument by Browning in 1866 October. The instrument was fixed to the end of a horizontal arm, which was made to revolve round a vertical axis. For more detailed account of these experiments see the Introduction for 1880 and for previous years. With the arm revolving in the direction N., E., S., W., opposite to the direction of rotation of the cups, for movement of the instrument through one mile 1·15 was registered ; with the arm revolving in the direction N., W., S., E., in the same direction as the rotation of the cups, 0·97 was registered. This was considered to confirm sufficiently the accuracy of the assumption.

The hemispherical cups of the instrument with which the experiments were made were each $3\frac{3}{4}$ inches in diameter, the distance between the centres of the opposite cups being 13·45 inches.

From 1889 April 22 to May 8, both of the above instruments were sent to Mr. W. H. Dines, who kindly tested them on his whirling machine then erected at Hersham. The particulars of these experiments are given at the end of the Introduction. The results appear to show that the instrumental results for velocity of the wind are too great for both anemometers, but it has been thought better for the sake of continuity not to apply any corrections to the recorded values.

RAIN GAUGES.—During the year 1889 eight rain-gauges were employed, placed at different elevations above the ground, complete information in regard to which will be found at page (lxxxvi) of the Meteorological Section.

The gauge No. 1 forms part of the Osler Anemometer apparatus, and is self-registering, the record being made on the sheet on which the direction and pressure of the wind are recorded. The receiving surface is a rectangular opening 10 × 20 inches (200 square inches in area). The collected water passes into a vessel suspended by spiral springs, which lengthen as the water accumulates, until 0·25 inch is collected. The water then discharges itself by means of the following modification of the siphon. A vertical copper tube, open at both ends, is fixed in the receiver, with one end just projecting below the bottom. Over this tube a larger tube, closed at the top, is loosely placed. The accumulating water, having risen to the top of the inner tube, begins to flow off into a small tumbling bucket, fixed in a globe placed underneath, and carried by the receiver. When full the bucket falls over, throwing the water into a small exit pipe at the lower part of the globe—the only outlet. This creates a partial vacuum in the globe sufficient to cause the longer leg of the siphon to act, and the whole remaining contents of the receiver then run off, through the globe, to a waste pipe. The spiral springs at the same time shorten, and raise the receiver. The gradual descent of the water vessel as the rain falls, and the immediate ascent on discharge of the water, act upon a pencil, and cause a corresponding trace to be made on the paper fixed to the moving board of the anemometer. The rain scale on the paper was determined experimentally by passing a known quantity of water through the receiver. The continuous record thus gives complete information on the rate of the fall of rain.

Gauge No. 2 is a ten-inch circular gauge, placed close to gauge No. 1, its receiving surface being precisely at the same level. The gauge is read daily at 9^h Greenwich civil time.

Gauges Nos. 3, 4, and 5 are eight-inch circular gauges, placed respectively on the roof of the Octagon Room, over the roof of the Magnetic Observatory, and on the roof of the Photographic Thermometer Shed. All are read daily at 9^h Greenwich civil time.

Gauges Nos. 6, 7, and 8 are also eight-inch circular gauges, placed on the ground south of the Magnetic Observatory ; No. 6 is the old daily gauge, No. 7 the old monthly gauge, and No. 8 an additional gauge brought into use in July 1881, as a check on the readings of Nos. 6 and 7, the monthly amounts collected by these gauges having occasionally shown greater differences than seemed proper. The positions of these gauges were slightly shifted on April 1, 1884. No. 6 is read daily, usually at 9^h, 15^h and 21^h Greenwich civil time, and Nos. 7 and 8 at 9^h only.

The gauges are also read at midnight on the last day of each calendar month.

ELECTROMETER.—The electric potential of the atmosphere is measured by means of a Thomson self-recording electrometer, constructed by White, of Glasgow.

For a full description of the principle of the electrometer reference may be made to Sir William Thomson's "Report on Electrometers and Electrostatic Measurements," contained in the *British Association Report* for the year 1867. It will be sufficient here to give a general description of the instrument which, with its registering apparatus, is planted in the Upper Magnet Room on the slate slab which carries the suspension pulleys of the Horizontal Force Magnet. A thin flat needle of aluminium, carrying immediately above it a small light mirror, is suspended, on the bifilar principle, by two silk fibres from an insulated support within a large Leyden jar. A little strong sulphuric acid is placed in the bottom of the jar, and from the lower side of the needle depends a platinum wire, kept stretched by a weight, which connects the needle with the sulphuric acid, that is with the inner coating of the jar. A positive charge of electricity being given to the needle and jar, this charge is easily maintained at a constant potential by means of a small electric machine or replenisher forming part of the instrument, and by which the charge can be either increased or diminished at pleasure. A gauge is provided for the purpose of indicating at any moment the amount of charge. The needle hangs within four insulated quadrants, which may be supposed to be formed by cutting a circular flat brass box into quarters, and then slightly separating them. The opposite quadrants are placed in metallic connexion.

Sir William Thomson's water-dropping apparatus is used to collect the atmospheric electricity. For this purpose a rectangular cistern of copper, capable of holding above 30 gallons of water, is placed near the ceiling on the west side of the south arm of the Upper Magnet Room. The cistern rests on four pillars of glass, each one encircled and nearly completely enclosed by a glass vessel containing sulphuric acid. A pipe passing out from the cistern, through the south face of the building, extends about six feet into the atmosphere, the nozzle (about ten feet above the ground) having a very small hole, through which the water passes and breaks almost immediately into drops, The cistern is thus brought to the same electrical potential as that of the atmosphere, near the nozzle, and this potential is communicated by means of a connecting wire to one of the pairs of electrometer quadrants, the other pair being connected to earth. The varying atmospheric potential thus influences the motions of the included needle, causing it to be deflected from zero in one direction or the other, according as the atmospheric potential is greater or less than that of the earth, that is according as it is positive or negative.

The small mirror carried by the needle is used for the purpose of obtaining photographic record of its motions. The light of a gas-lamp falling, through a slit, upon the mirror, is thence reflected, and by means of a plano-convex cylindrical lens is brought to a focus at the surface of a horizontal cylinder of ebonite, nearly 7 inches long and 16 inches in circumference, which is turned by clock-work. A second fixed mirror, by means of the same gas-lamp, causes a reference line to be traced round the cylinder. The actual zero is found by cutting off the cistern communication, and placing the pairs of quadrants in metallic connexion with each other and with earth. The break of register at each hour is made by the driving-clock of the electrometer cylinder itself. Other photographic arrangements are generally similar to those which have been described for other instruments.

The scale of time is the same as that of the magnetic registers.

Interruptions sometimes occur through cobwebs making connexion between the cistern or its pipe and the walls of the building, and, in winter, from the occasional freezing of the water in the exit pipe.

The electrometer having been in use for ten years, it was removed by Messrs. Elliott on 1888 July 12 for thorough cleaning and repair. After return it was found that its indications were altogether changed. The instrument was not again brought into use during the year 1888, and it was finally sent to the maker, Mr. White of Glasgow, who restored it to its normal state, excepting that the amplitude of motion of the spot of light is considerably increased. The instrument was brought into use again in October 1889.

SUNSHINE RECORDER.—Until the end of the year 1886 the instrument with which the record given in the printed volume was made was that presented to the Royal Observatory by the late Mr. J. F. Campbell, by whom this method of record was devised. This instrument is fully described in the Introductions to previous volumes. Commencing with the year 1887 the record is that of a modification of the Campbell form of instrument, as arranged by Sir G. G. Stokes for use at the observing stations of the Meteorological Office. By employing this instrument, the manipulation of which is more simple, there is the further advantage that the Greenwich results become strictly comparable with those of the Meteorological Office Stations. A very complete account of the Campbell-Stokes instrument is given in the *Quarterly Journal* of the Royal Meteorological Society, Vol. VI., page 83. The recording cards are supported by carriers no larger than is required for keeping them in proper position ; one straight card serves for the equinoctial periods of the year, and another, curved, for the solstitial periods, the only difference between the summer and winter cards being that the summer cards are the longer : grooves are provided so that the cards are placed in position with great readiness. The daily record is transferred to a sheet of paper specially ruled with equal vertical spaces to represent hours, each sheet containing the record for one calendar month. The daily sums, and sums for each hour (reckoning from *apparent* midnight) through the month, are thus readily formed. The recorded durations are to be understood as indicating the amount of *bright* sunshine, no register being obtained when the sun shines faintly through fog or cloud or when the sun is very near the horizon. The instrument is placed on a table upon the platform above the Magnetic Observatory.

A comparison between the two instruments for one complete year, 1886 June 1 to 1887 May 31, will be found at the end of the Introduction to the Volume for the year 1887.

OZONOMETER.—This apparatus is fixed on the south-west corner of the roof of the Photographic Thermometer shed, at a height of about 10 feet from the ground. The box in which the papers are exposed is of wood : it is about 8 inches square, blackened inside, and so constructed that there is free circulation of air through the box, without exposure of the paper to light. The papers exposed at 9^h, 15^h, and 21^h, are collected respectively at 15^h, 21^h, and 9^h, and the degree of tint produced is compared with a scale of graduated tints, numbered from 0 to 10. The value of ozone for the civil day is determined by taking the degree of tint obtained at each hour of collection as proportional to the period of exposure. Thus to form the value for any given civil day, three-fourths of the value registered at 9^h, the values registered at 15^h and 21^h, and one-fourth of that registered at the following 9^h, are added together, the resulting sum (which appears in the tables of "Daily Results of the Meteorological Observations") being taken as the value referring to the civil day on a scale of 0 to 30. The means of the 9^h, 15^h, and 21^h values, as observed, are also given for each month in the foot notes.

§ 7. *Meteorological Reductions.*

The results given in the Meteorological Section refer to the civil day, commencing at midnight.

All results in regard to atmospheric pressure, temperature of the air and of evaporation with deductions therefrom, and atmospheric electricity, are derived from the photographic records, excepting that the maximum and minimum values of air temperature are those given by eye-observation of the ordinary maximum and minimum thermometers at 9^h and 21^h (civil reckoning), reference being made, however, to the photographic register when necessary to obtain the values corresponding to the civil day from midnight to midnight. The hourly readings of the photographic traces for the elements mentioned are entered into a form having double argument, the horizontal argument ranging through the 24 hours of the civil day (0^h to 23^h) and the vertical argument through the days of a calendar month. Then, for all the photographic elements, the means of the numbers standing in the vertical columns of the monthly forms, into which the values are entered, give the mean monthly photographic values for each hour of the day, the means of the numbers in the horizontal columns giving the mean daily value. It should be mentioned that before measuring out the electrometer ordinates, a pencil line was first drawn through the trace to represent the general form of the curve, in the way described for the magnetic registers (page *xxx*), excepting that no day has been omitted on account of unusual electrical disturbance, as it has been found difficult to decide on any limit of disturbance beyond which it would seem proper, as regards determination of diurnal inequality, to reject the results. In measuring the electrometer ordinates a scale of inches is used, and the values given in the tables which follow are expressed in thousandths of an inch, positive and negative potential being denoted by positive and negative numbers respectively. The scale has not been determined in terms of any electrical unit.

To correct the photographic indications of barometer and dry and wet bulb thermometers for small instrumental error, the means of the photographic readings at 9^h, 12^h (noon), 15^h, and 21^h in each month are compared with the corresponding corrected mean readings of the standard barometer and standard dry and wet bulb thermometers, as given by eye-observation. A correction applicable to the photographic reading at each of these hours is thus obtained, and, by interpolation, corrections for the intermediate hours are found. The mean of the twenty-four hourly corrections in each month is adopted as the correction applicable to each mean daily value in the month. Thus mean hourly and mean daily values of the several elements are obtained for each month. The process of correction is equivalent to giving photographic indications in terms of corrected standard barometer, and in terms of the standard dry and wet bulb thermometers exposed on the free stand. The barometer results are *not* reduced to sea level.

The mean daily temperature of the dew-point and degree of humidity are deduced from the mean daily temperatures of the air and of evaporation by use of Glaisher's

Hygrometrical Tables. The factors by which the dew-point given in these tables is calculated were found by Mr. Glaisher from the comparison of a great number of dew-point determinations obtained by use of Daniell's hygrometer, with simultaneous observations of dry and wet bulb thermometers, combining observations made at the Royal Observatory, Greenwich, with others made in India and at Toronto. The factors are given in the following table.

TABLE OF FACTORS by which the DIFFERENCE between the READINGS of the DRY-BULB and WET-BULB THERMOMETERS is to be MULTIPLIED in order to PRODUCE the CORRESPONDING DIFFERENCE between the DRY-BULB TEMPERATURE and that of the DEW-POINT.

Reading of Dry-bulb Thermometer.	Factor.	Reading of Dry-bulb Thermometer.	Factor.	Reading of Dry-bulb Thermometer.	Factor.	Reading of Dry-bulb Thermometer.	Factor.
10°	8·78	33°	3·01	56°	1·94	79°	1·69
11	8·78	34	2·77	57	1·92	80	1·68
12	8·78	35	2·60	58	1·90	81	1·68
13	8·77	36	2·50	59	1·89	82	1·67
14	8·76	37	2·42	60	1·88	83	1·67
15	8·75	38	2·36	61	1·87	84	1·66
16	8·70	39	2·32	62	1·86	85	1·65
17	8·62	40	2·29	63	1·85	86	1·65
18	8·50	41	2·26	64	1·83	87	1·64
19	8·34	42	2·23	65	1·82	88	1·64
20	8·14	43	2·20	66	1·81	89	1·63
21	7·88	44	2·18	67	1·80	90	1·63
22	7·60	45	2·16	68	1·79	91	1·62
23	7·28	46	2·14	69	1·78	92	1·62
24	6·92	47	2·12	70	1·77	93	1·61
25	6·53	48	2·10	71	1·76	94	1·60
26	6·08	49	2·08	72	1·75	95	1·60
27	5·61	50	2·06	73	1·74	96	1·59
28	5·12	51	2·04	74	1·73	97	1·59
29	4·63	52	2·02	75	1·72	98	1·58
30	4·15	53	2·00	76	1·71	99	1·58
31	3·70	54	1·98	77	1·70	100	1·57
32	3·32	55	1·96	78	1·69		

In the same way the mean hourly values of the dew-point temperature and degree of humidity in each month (pages (lix) and (lx)) have been calculated from the corresponding mean hourly values of air and evaporation temperatures (pages (lviii) and (lix)).

The excess of the mean temperature of the air on each day above the average of 20 years, given in the "Daily Results of the Meteorological Observations," is found by comparing the numbers contained in column 6 with a table of average daily temperatures found by smoothing the accidental irregularities of the numbers given in Table LXXVII. of the "Reduction of Greenwich Meteorological Observations, 1847–1873," which are similarly deduced from photographic records. The smoothed numbers are given in the following table.

ADOPTED VALUES of MEAN TEMPERATURE of the AIR, deduced from TWENTY-FOUR HOURLY READINGS on each Day, for every Day of the Year, as obtained from the PHOTOGRAPHIC RECORDS for the Period 1849–1868.

Day of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	°	°	°	°	°	°	°	°	°	°	°	°
1	38·1	40·5	40·3	45·3	48·7	57·5	61·6	62·6	60·1	54·7	47·0	41·5
2	37·9	40·6	40·4	45·7	48·9	57·7	61·5	62·7	60·0	54·4	46·7	41·8
3	37·8	40·7	40·5	46·1	49·1	57·9	61·4	62·7	59·8	54·0	46·4	42·1
4	37·7	40·7	40·5	46·4	49·4	58·1	61·4	62·7	59·7	53·7	46·0	42·4
5	37·6	40·6	40·5	46·6	49·7	58·2	61·5	62·7	59·5	53·4	45·6	42·6
6	37·6	40·4	40·5	46·7	50·0	58·3	61·7	62·7	59·3	53·0	45·2	42·7
7	37·6	40·2	40·6	46·8	50·3	58·4	61·9	62·7	59·0	52·7	44·7	42·8
8	37·7	39·9	40·6	46·8	50·6	58·5	62·2	62·7	58·8	52·5	44·3	42·8
9	37·7	39·6	40·7	46·9	50·8	58·5	62·5	62·7	58·5	52·3	43·8	42·8
10	37·8	39·3	40·7	46·9	51·1	58·6	62·7	62·7	58·3	52·1	43·4	42·7
11	37·9	39·1	40·8	47·0	51·4	58·7	62·9	62·7	58·1	51·9	43·0	42·5
12	38·1	38·9	40·8	47·1	51·8	58·8	63·1	62·6	58·0	51·7	42·6	42·2
13	38·2	38·8	40·9	47·2	52·1	58·9	63·3	62·5	57·8	51·6	42·3	41·8
14	38·3	38·7	41·0	47·4	52·5	59·1	63·4	62·4	57·6	51·4	42·0	41·5
15	38·4	38·7	41·1	47·5	52·9	59·3	63·4	62·3	57·4	51·3	41·8	41·1
16	38·5	38·8	41·2	47·6	53·3	59·5	63·5	62·1	57·3	51·2	41·6	40·8
17	38·6	38·9	41·3	47·8	53·7	59·7	63·5	61·9	57·1	51·1	41·5	40·5
18	38·8	39·0	41·4	47·9	54·1	59·9	63·4	61·8	56·9	51·0	41·5	40·2
19	38·9	39·2	41·4	48·0	54·4	60·2	63·3	61·6	56·8	50·8	41·4	40·0
20	39·1	39·3	41·5	48·1	54·7	60·5	63·2	61·4	56·6	50·6	41·3	39·8
21	39·3	39·5	41·6	48·2	55·0	60·8	63·0	61·3	56·4	50·4	41·2	39·6
22	39·5	39·6	41·7	48·2	55·3	61·1	62·9	61·3	56·2	50·1	41·1	39·4
23	39·6	39·7	41·8	48·3	55·5	61·4	62·8	61·2	56·1	49·7	41·0	39·3
24	39·7	39·8	42·0	48·3	55·7	61·7	62·7	61·1	55·9	49·4	41·0	39·3
25	39·8	39·9	42·3	48·4	55·9	61·9	62·7	61·0	55·8	49·1	40·9	39·2
26	39·9	40·0	42·6	48·4	56·1	62·0	62·7	60·9	55·7	48·8	40·8	39·1
27	40·0	40·1	43·0	48·4	56·3	62·0	62·6	60·8	55·5	48·5	40·8	39·0
28	40·1	40·2	43·4	48·5	56·5	61·9	62·6	60·7	55·4	48·2	40·9	38·8
29	40·2		43·8	48·5	56·8	61·8	62·6	60·6	55·2	47·9	41·0	38·7
30	40·3		44·3	48·6	57·0	61·7	62·6	60·4	54·9	47·6	41·2	38·5
31	40·4		44·8		57·3		62·6	60·3		47·3		38·3
Means	38·7	39·7	41·5	47·5	53·1	59·8	62·6	61·9	57·5	51·0	42·7	40·8

The mean of the twelve monthly values is 49°·7.

The daily register of rain contained in column 18 is that recorded by the gauge No. 6, whose receiving surface is 5 inches above the ground. This gauge is usually read at 9^h, 15^h, and 21^h Greenwich civil time. The continuous record of Osler's self-registering gauge shows whether the amounts measured at 9^h are to be placed to the same, or to the preceding civil day; and in cases in which rain fell both before and after midnight, also gives the means of ascertaining the proper proportion of the 9^h amount which should be placed to each civil day. The number of days of rain given in the foot notes, and in the abstract tables, pages (lvii) and (lxxxvi), is formed from the records of this gauge. In this numeration only those days are counted on which the fall amounted to or exceeded $0^{in}\cdot005$.

The indications of atmospheric electricity are derived from Thomson's Electrometer. Occasionally, during interruption of photographic registration, the results depend on eye-observations. The instrument was out of use from 1888 July 12 until 1889 October 16.

No particular explanation of the anemometric results seems necessary. It may be understood generally that the greatest pressures usually occur in gusts of short duration. The "Mean of 24 Hourly Measures" was in former years the mean of 24 measures of pressure taken *at* each hour, but commencing with 1887 January 1 it is the mean of measures each one of which is the average pressure during the hour of which the nominal hour is the middle point.

The mean amount of cloud given in a foot note on the right-hand page, and in the abstract table, page (lvii), is the mean found from observations made usually at 9^h, 12^h (noon), 15^h, and 21^h, of each civil day.

For understanding the divisions of time under the headings "Clouds and Weather" and "Electricity," the following remarks are necessary:—In regard to Clouds and Weather, the day is divided by columns into two parts (from midnight to noon, and from noon to midnight), and each of these parts is subdivided into two or three parts by colons (:). Thus, when there is a single colon in the first column, it denotes that the indications before it apply (roughly) to the interval from midnight to 6^h, and those following it to the interval from 6^h to noon. When there are two colons in the first column, it is to be understood that the twelve hours are divided into three nearly equal parts of four hours each. And similarly for the second column. In regard to Electricity the results are included in one column; in this case the colons divide the whole period of 24 hours (midnight to midnight).

The notation employed for Clouds and Weather is as follows, it being understood that for clouds Howard's Nomenclature is used. The figure denotes the proportion of sky covered by cloud, an overcast sky being represented by 10.

a	denotes	*aurora borealis*
ci	...	*cirrus*
ci-cu	...	*cirro-cumulus*
ci-s	...	*cirro-stratus*
cu	...	*cumulus*
cu-s	...	*cumulo-stratus*
d	...	*dew*
hy-d	...	*heavy dew*
f	...	*fog*
slt-f	...	*slight fog*
tk-f	...	*thick fog*
fr	...	*frost*
ho-fr	...	*hoar frost*
g	...	*gale*
hy-g	...	*heavy gale*
glm	...	*gloom*
gt-glm	...	*great gloom*
h	...	*haze*
slt-h	...	*slight haze*
hl	...	*hail*
l	...	*lightning*
li-cl	...	*light clouds*
lu-co	...	*lunar corona*
lu-ha	...	*lunar halo*
m	...	*mist*
slt-m	...	*slight mist*
n	...	*nimbus*
p-cl	...	*partially cloudy*
prh	...	*parhelion*
prs	...	*paraselene*
r	...	*rain*
c-r	...	*continued rain*
fr-r	...	*frozen rain*
fq-r	...	*frequent rain*
hy-r	...	*heavy rain*
c-hy-r	...	*continued heavy rain*
m-r	...	*misty rain*
fq-m-r	...	*frequent misty rain*
oc-m-r	denotes	*occasional misty rain*
oc-r	...	*occasional rain*
sh-r	...	*shower of rain*
shs-r	...	*showers of rain*
slt-r	...	*slight rain*
oc-slt-r	...	*occasional slight rain*
th-r	...	*thin rain*
fq-th-r	...	*frequent thin rain*
oc-th-r	...	*occasional thin rain*
hy-sh	...	*heavy shower*
slt-sh	...	*slight shower*
fq-shs	...	*frequent showers*
hy-shs	...	*heavy showers*
fq-hy-shs	...	*frequent heavy showers*
oc-hy-shs	...	*occasional heavy showers*
li-shs	...	*light showers*
oc-shs	...	*occasional showers*
s	...	*stratus*
sc	...	*scud*
li-sc	...	*light scud*
sl	...	*sleet*
sn	...	*snow*
oc-sn	...	*occasional snow*
slt-sn	...	*slight snow*
so-ha	...	*solar halo*
sq	...	*squall*
sqs	...	*squalls*
fq-sqs	...	*frequent squalls*
hy-sqs	...	*heavy squalls*
fq-hy-sqs	...	*frequent heavy squalls*
oc-sqs	...	*occasional squalls*
t	...	*thunder*
t-sm	...	*thunder storm*
th-cl	...	*thin clouds*
v	...	*variable*
vv	...	*very variable*
w	...	*wind*
st-w	...	*strong wind*

The following is the notation employed for Electricity :—

N	denotes	*negative*	w	denotes	*weak*
P	...	*positive*	s	...	*strong*
m	...	*moderate*	v	...	*variable*

The duplication of the letter denotes intensity of the modification described, thus, ss, is very strong; vv, very variable. 0 indicates zero potential, and a dash " — " accidental failure of the apparatus.

The remaining columns in the tables of " Daily Results " seem to require no special remark; all necessary explanation regarding the results therein contained will be found in the notes at the foot of the left-hand page, or in the descriptions of the several instruments given in § 6.

In regard to the comparisons of the extremes and means, &c. of meteorological elements with average values, contained in the foot notes, it may be mentioned that the photographic barometric results are compared with the corresponding barometric results, 1854–1873, and the photographic thermometric results and deductions therefrom with the corresponding thermometric results, 1849–1868 (see " Reduction of Greenwich Meteorological Observations 1847–1873 "). Other deductions, from eye observations, are compared with averages for the period 1841–1888.

The tables following the " Daily Results " require no lengthened explanation. They consist of tables giving the highest and lowest readings of the barometer through the year; monthly abstracts of the principal meteorological elements; hourly values in each month of barometer reading, of temperature of air, evaporation, and dew point, and of degree of humidity; sunshine results; observations of thermometers in a Stevenson screen and on the roof of the Magnet House, and of the earth thermometers; changes of direction of the wind; hourly values in each month of the horizontal movement of the air derived from Robinson's Anemometer; results derived from the Thomson Electrometer; rain results; and observations of meteors.

In the tables of mean values of meteorological elements at each hour for the different months of the year, the mean values have, in previous years, been given for the hours 0^h to 23^h only. But since 1886 the mean for the 24th hour (the following midnight) has been added, thus indicating the amount of non-periodic variation. The monthly means have also been given since 1886 for the 24 hours, 1^h to 24^h, as well as for the hours, 0^h (midnight) to 23^h, which were given in former years.

It may be pointed out that the monthly means, 0^h to 23^h, for barometer and temperature of the air and of evaporation contained in these tables, pages (lviii) and (lix), do not in some cases agree with the monthly means given in the daily results, pages (xxx) to (lii), and in the table on page (lvii), in consequence of occasional interruption of the photographic register, at which times daily values to complete the daily results could be supplied from the eye observations, as mentioned in the foot notes, but hourly values, for the diurnal inequality tables, could not be so supplied. In such cases, however, the means given with these tables are the proper means to be used in connexion with the numbers standing immediately above them, for formation of the actual diurnal inequality. In the year 1889 it happens that there are no exceptional cases of this kind.

The table "Abstract of the Changes of the Direction of the Wind" as derived from Osler's Anemometer, page (lxxv), exhibits every change of direction of the wind occurring throughout the year whenever such change amounted to two nautical points or $22\frac{1}{2}°$. It is to be understood that the change from one direction to another during the interval between the times mentioned in each line of the table was generally gradual. All complete turnings of the vane which were evidently of accidental nature, and which in the year 1881 and in previous years had been included, are here omitted. Between any time given in the second column and that next following in the first column no change of direction in general occurred varying from that given by so much as one point or $11\frac{1}{4}°$. From the numbers given in this table the monthly and yearly excess of motion, page (lxxx), is formed. By direct motion it is to be understood that the change of direction occurred in the order N, E, S, W, N, &c., and by retrograde motion that the change occurred in the order N, W, S, E, N, &c.

In regard to Electric Potential of the Atmosphere, in addition to giving the hourly values in each month, including all available days, the days in each month have been (since the year 1882) further divided into two groups, one containing all days on which the rainfall amounted to or exceeded $0^{in.}020$, the other including only days on which no rainfall was recorded, the values of daily rainfall given in column 18 of the "Daily Results of the Meteorological Observations" being adopted in selecting the days. These additional tables are given on pages (lxxxiv) and (lxxxv) respectively.

In regard to the observations of Luminous Meteors, it is simply necessary to say that in general only special meteor showers are watched for, such as those of April, August, and November. The observers of meteors in the year 1889 were Mr. Finch and Mr. Hope; their observations are distinguished by the initials F, and H, respectively.

W. H. M. CHRISTIE.

Royal Observatory, Greenwich,
1891 May 8.

EXPERIMENTS MADE BY MR. W. H. DINES WITH THE ROBINSON ANEMOMETERS BY BROWNING, AND BY NEGRETTI AND ZAMRRA, ON THE WHIRLING MACHINE, ERECTED AT HERSHAM, NEAR ESHER, IN SURREY.

In the spring of the year 1889 Mr. W. H. Dines having kindly offered to test the Robinson anemometer in ordinary use (made by Browning) on the whirling machine then temporarily erected at Hersham, in a field in the open air, the instrument was placed in his hands for this purpose from April 22 to May 8. Opportunity was taken to test also the smaller instrument by Negretti and Zambra used from 1859 until the introduction of the Browning instrument in the year 1866. A description of the whirling machine will be found in the *Quarterly Journal of the Royal Meteorological Society*, Vol. XIV., page 255. It could be driven at different velocities by means of a small steam engine. In the experiments the centre of the Browning instrument was distant 27 feet 4 inches from the axis of rotation of the whirler, and the centre of the Negretti and Zambra instrument was distant 18 feet 2 inches from the same axis. The distance between the centres of the opposite cups is, in the Browning instrument, 30·00 inches, and in the Negretti and Zambra instrument, 13·45 inches. The Browning cups are 5 inches, and the Negretti and Zambra cups $3\frac{3}{4}$ inches in diameter. Each experiment occupied 15 minutes of time. In Table I., *B* signifies the instrument by Browning, and *N* that by Negretti and Zambra. The "correction" indicates the amount by which the recorded motion in miles in 15 minutes has been increased or diminished according as the anemometer cups turned in the same or in the opposite direction to the whirler, and is equal to the number of turns of the whirler multiplied by three times the circumference of the circle described by the cups, it being understood that the motion recorded is three times the actual motion of the cups. Calling the recorded and true hourly velocities in miles v and V respectively, $\frac{v}{4}$ and $\frac{V}{4}$ indicate, in the table, the numbers given by the experiments, applying to intervals of 15 minutes.

During some of the experiments there was a little wind, but its influence on the results has not been further considered.

TABLE I.

Day, 1889.	No. of Experiment.	Number of turns of Whirler.	Whether cups of instrument turned in same or opposite direction to Whirler.	Instrument.	Miles recorded in 15 minutes.	Correction.	Corrected instrumental record. $\frac{v}{4}$	Miles travelled by instrument in 15 minutes. $\frac{V}{4}$	$\frac{V}{v}$	$\frac{3V}{v}$ = Factor.
					miles.	miles.	miles.	miles.		
April 24	1	391	same	B	16·05	+ 1·745	17·795	12·718	0·715	2·144
				N	8·79	+ 0·782	9·572	8·453	0·883	2·649
	2	345	"	B	13·95	+ 1·540	15·490	11·222	0·724	2·173
				N	7·65	+ 0·690	8·340	7·458	0·894	2·683
	3	196	"	B	6·79	+ 0·875	7·665	6·375	0·832	2·495
				N	4·04	+ 0·392	4·432	4·237	0·956	2·868
	4	91	"	B	2·68	+ 0·406	3·086	2·960	0·959	2·877
				N	1·83	+ 0·182	2·012	1·967	0·978	2·933
	5	178	"	B	5·67	+ 0·794	6·464	5·790	0·896	2·687
				N	3·57	+ 0·356	3·926	3·848	0·980	2·940
	6	142	"	B	4·41	+ 0·634	5·044	4·619	0·916	2·747
				N	2·81	+ 0·284	3·094	3·070	0·992	2·976
	7	295	"	B	11·43	+ 1·316	12·746	9·595	0·753	2·258
				N	6·21	+ 0·590	6·800	6·377	0·938	2·814
	8	256	"	B	9·75	+ 1·142	10·892	8·327	0·764	2·293
				N	5·36	+ 0·512	5·872	5·534	0·942	2·827
	9	205	opposite	B	9·63	− 0·915	8·715	6·668	0·765	2·295
				N	5·19	− 0·410	4·780	4·432	0·927	2·781
	10	298	"	B	14·54	− 1·330	13·210	9·693	0·734	2·201
				N	7·42	− 0·596	6·824	6·442	0·944	2·832
	11	336	"	B	16·59	− 1·499	15·091	10·929	0·724	2·173
				N	8·67	− 0·672	7·998	7·264	0·908	2·725
	12	388	"	B	19·20	− 1·731	17·469	12·620	0·722	2·167
				N	10·99	− 0·776	10·214	8·388	0·821	2·464
	13	111	"	B	4·56	− 0·495	4·065	3·610	0·888	2·665
				N	2·82	− 0·222	2·598	2·400	0·924	2·771
	14	83	"	B	4·01	− 0·370	3·640	2·700	0·742	2·225
				N	2·54	− 0·166	2·374	1·794	0·756	2·268
	15	156	"	B	6·99	− 0·696	6·294	5·074	0·806	2·419
				N	4·02	− 0·312	3·708	3·372	0·910	2·729

TABLE I.—*continued.*

Day, 1889.	No. of Experiment.	Number of turns of Whirler.	Whether cups of instrument turned in same or opposite direction to Whirler.	Instrument.	Miles recorded in 15 minutes.	Correction.	Corrected instrumental record. $\frac{v}{4}$	Miles travelled by instrument in 15 minutes. $\frac{V}{4}$	$\frac{V}{v}$	$\frac{3V}{v}$ = Factor.
					miles.	miles.	miles.	miles.		
April 24	16	279	opposite	B	13·53	− 1·245	12·285	9·075	0·739	2·216
				N	7·11	− 0·558	6·552	6·032	0·921	2·762
April 30	17	308	”	B	14·97	− 1·374	13·596	10·018	0·737	2·211
				N	7·81	− 0·616	7·194	6·658	0·926	2·777
	18	380	”	B	19·07	− 1·696	17·374	12·360	0·711	2·134
				N	10·71	− 0·760	9·950	8·215	0·826	2·477
	19	287	”	B	13·83	− 1·281	12·549	9·335	0·744	2·232
				N	7·04	− 0·574	6·466	6·204	0·960	2·879
	20	387	same	B	16·10	+ 1·727	17·827	12·588	0·706	2·118
				N	8·80	+ 0·774	9·574	8·366	0·874	2·622
	21	312	”	B	12·53	+ 1·392	13·922	10·148	0·729	2·187
				N	6·92	+ 0·624	7·544	6·745	0·894	2·682
	22	256	”	B	10·07	+ 1·142	11·212	8·327	0·743	2·228
				N	5·80	+ 0·512	6·312	5·534	0·877	2·630
	23	151	”	B	5·36	+ 0·674	6·034	4·912	0·814	2·442
				N	3·44	+ 0·302	3·742	3·264	0·872	2·617

Experiments Nos. 1 to 11, quite calm; Nos. 12 to 16, light breeze; Nos. 17 to 23, nearly calm.

Equations of condition were now constructed, for both instruments, of the form $a + b\,v = V$, in which v and V are respectively the recorded and true hourly velocities, and a and b constants to be determined. Considering the equations of each set to be of equal weight, and solving by the method of least squares, we have the following expressions, applying to hourly velocities in miles :—

Browning instrument ... ... $3·976 + ·6605 \times v = V$.
Negretti and Zambra instrument ... $1·472 + ·8407 \times v = V$.

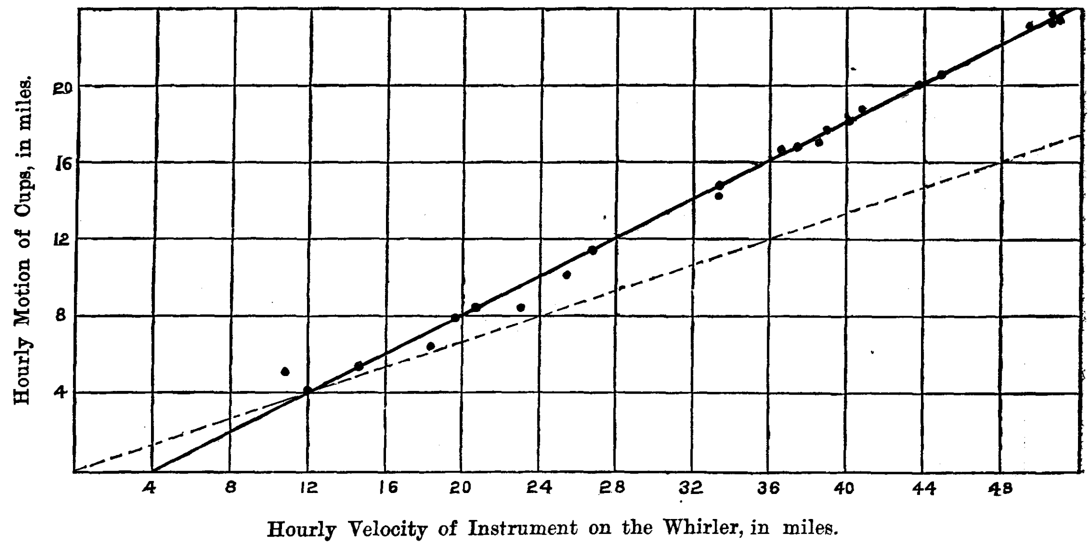
On the understanding that the velocity recorded is three times the motion of revolution of the cups (C) these expressions are equivalent to :—

Browning instrument ... ... $3·976 + 1·9815 \times C = V$.
Negretti and Zambra instrument ... $1·472 + 2·5221 \times C = V$.

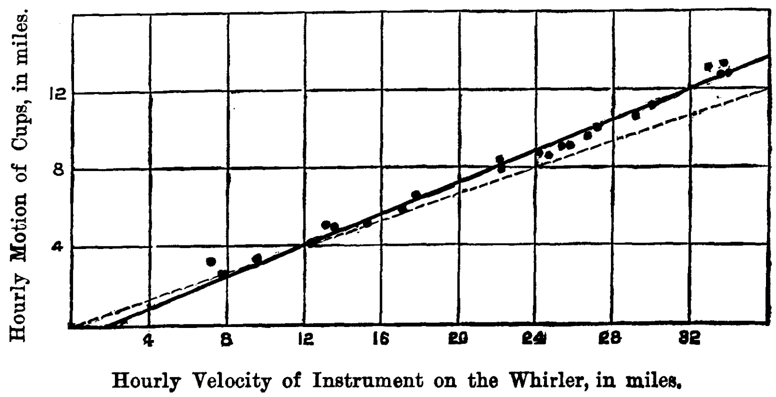
In the annexed diagrams the dots severally represent the results of the separate experiments included in the preceding table. The continuous diagonal line indicates graphically, in each case, the expressions last given, and the dotted line represents the adopted relation of motion of cups to velocity recorded, understood to have been used in the fundamental construction of the instruments, that is that the recorded velocity is three times the motion of the cups.

GRAPHICAL REPRESENTATION OF THE RESULTS OF THE WHIRLING EXPERIMENTS.

BROWNING INSTRUMENT.



NEGRETTI AND ZAMBRA INSTRUMENT.



It thus appears that in the case of the Browning instrument a velocity of 4 miles an hour is required to overcome the inertia of the anemometer, and in the case of the Negretti and Zambra instrument a velocity of 1½ miles an hour, and that when allowance is made for this, the factor is sensibly the same for low velocities as for high.

For facility of reference and comparison the values of hourly motion of cups $\left(\frac{v}{3}\right)$ and of velocity of instrument (V) used in the construction of the above diagrams, are added in Table II. The factor given by each experiment, $3\frac{V}{v}$, is also included, and the results are arranged in order of magnitude of velocity of instrument. In the experiments Nos. 1 to 8 and Nos. 20 to 23 the cups of the anemometers turned in the same direction as the whirler, and in the experiments Nos. 9 to 19 in the opposite direction to the whirler.

TABLE II.

Number of Experiment.	Browning Instrument.			Negretti and Zambra Instrument.		
	Hourly Motion of Cups.	Hourly Velocity of Instrument on Whirler.	Factor.	Hourly Motion of Cups.	Hourly Velocity of Instrument on Whirler.	Factor.
	miles.	miles.		miles.	miles.	
14	4·9	10·8	2·225	3·2	7·2	2·268
4	4·1	11·8	2·877	2·7	7·9	2·933
13	5·4	14·4	2·665	3·5	9·6	2·771
6	6·7	18·5	2·747	4·1	12·3	2·976
23	8·0	19·6	2·442	5·0	13·1	2·617
15	8·4	20·3	2·419	4·9	13·5	2·729
5	8·6	23·2	2·687	5·2	15·4	2·940
3	10·2	25·5	2·495	5·9	16·9	2·868
9	11·6	26·7	2·295	6·4	17·7	2·781
8	14·5	33·3	2·293	7·8	22·1	2·827
22	14·9	33·3	2·228	8·4	22·1	2·630
16	16·4	36·3	2·216	8·7	24·1	2·762
19	16·7	37·3	2·232	8·6	24·8	2·879
7	17·0	38·4	2·258	9·1	25·5	2·814
10	17·6	38·8	2·201	9·1	25·8	2·832
17	18·1	40·1	2·211	9·6	26·6	2·777
21	18·6	40·6	2·187	10·1	27·0	2·682
11	20·1	43·7	2·173	10·7	29·1	2·725
2	20·7	44·9	2·173	11·1	29·8	2·683
18	23·2	49·4	2·134	13·3	32·9	2·477
20	23·8	50·4	2·118	12·8	33·5	2·622
12	23·3	50·5	2·167	13·6	33·6	2·464
1	23·7	50·9	2·144	12·8	33·8	2·649

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

MAGNETICAL OBSERVATIONS

(EXCLUDING THE DAYS OF GREAT MAGNETIC DISTURBANCE).

1889.

TABLE I.—MEAN MAGNETIC DECLINATION WEST FOR EACH CIVIL DAY.

(Each result is the mean of 24 hourly ordinates from the photographic register.)

1889.

Day of Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	17°	17°	17°	17°	17°	17°	17°	17°	17°	17°	17°	17°
d	′	′	′	′	′	′	′	′	′	′	′	′
1	37·3	37·0	37·3	36·9	35·0	35·3	34·9	34·0	34·1	33·7	...	34·3
2	38·4	36·9	36·3	36·3	34·6	35·0	35·1	34·9	33·9	33·3	33·2	34·6
3	38·0	37·2	36·2	36·5	34·7	34·5	34·7	34·0	33·7	33·6	32·9	34·1
4	38·0	37·2	36·8	36·4	34·8	35·6	34·3	33·5	34·8	33·4	32·9	34·2
5	37·9	37·1	36·5	36·3	34·7	35·0	34·8	34·0	34·5	31·9	34·2	33·9
6	38·5	37·5	37·1	35·9	34·7	35·3	34·0	34·4	34·1	32·2	33·1	34·3
7	37·6	37·0	37·2	36·6	34·2	34·9	33·3	34·4	34·4	32·9	33·0	33·9
8	38·3	37·4	36·1	35·3	34·8	35·9	34·5	34·3	33·8	33·5	32·6	33·9
9	37·8	37·3	36·4	36·0	33·6	35·6	34·2	33·9	34·0	33·2	32·3	33·3
10	38·2	37·5	36·6	34·9	34·5	36·0	33·9	33·7	33·5	32·7	31·7	33·8
11	38·1	36·9	36·5	35·4	35·0	35·5	34·4	33·8	34·3	33·8	32·2	33·9
12	37·9	36·8	36·2	34·9	34·8	35·7	34·0	34·4	34·5	34·1	32·8	34·2
13	38·0	36·9	36·2	35·1	34·9	35·1	33·9	33·8	34·3	34·1	33·5	34·3
14	37·7	36·8	35·7	35·3	33·9	39·0	33·7	34·0	34·5	34·3	32·9	34·2
15	37·8	37·0	36·9	35·0	34·4	34·6	33·5	33·3	35·2	33·0	32·3	33·8
16	38·0	36·1	36·4	35·6	34·5	35·4	34·1	33·4	35·1	33·3	32·7	33·4
17	37·8	36·8	35·3	35·1	34·4	34·9	...	33·2	35·0	33·1	32·3	32·8
18	37·9	35·7	34·7	35·5	35·1	34·9	34·0	33·8	34·8	32·9	33·1	32·8
19	37·7	36·5	36·9	35·1	35·6	35·4	34·9	33·5	34·1	33·0	32·7	32·8
20	38·2	36·8	36·8	34·7	35·0	35·3	33·6	34·6	34·2	33·2	33·3	32·6
21	38·2	36·9	36·5	34·7	35·1	35·5	32·8	33·4	34·5	34·3	33·9	32·3
22	37·6	37·4	37·1	34·2	35·1	34·2	33·8	32·7	34·5	33·8	32·6	32·3
23	37·5	36·5	36·7	34·4	34·1	35·3	34·0	34·0	34·7	34·0	32·4	32·6
24	37·8	36·7	35·9	34·7	35·0	34·8	33·8	33·8	33·8	32·6	32·3	32·6
25	38·1	36·9	35·8	34·3	34·9	35·1	33·4	34·4	34·3	33·6	32·6	32·7
26	38·4	36·8	36·2	34·8	34·4	34·9	33·0	34·3	34·3	33·7	33·2	32·4
27	38·9	36·7	36·4	34·9	35·0	35·0	33·9	33·7	34·2	33·7	31·4	33·0
28	38·5	36·9	36·9	34·7	34·4	34·6	33·7	33·9	33·8	33·0	31·7	32·9
29	37·9		36·4	34·5	34·9	34·3	34·3	33·7	34·5	33·4	32·9	33·1
30	37·6		36·5	34·5	35·4	35·4	33·1	34·1	34·2	33·5	33·0	33·1
31	37·6		36·2		35·2		34·3	34·3		33·8		33·1

TABLE II.—MONTHLY MEAN DIURNAL INEQUALITY OF MAGNETIC DECLINATION WEST.

(The results in each month are diminished by the smallest hourly value).

1889.

Hour, Greenwich Civil Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	′	′	′	′	′	′	′	′	′	′	′	′
Midn.	0·5	0·3	0·0	1·8	2·6	2·7	2·1	1·9	0·6	0·7	0·0	0·4
1^h	0·9	0·6	0·5	2·2	2·6	2·4	2·0	2·1	0·6	1·3	0·7	0·8
2	1·2	0·9	0·7	2·4	2·4	2·3	2·1	2·2	0·7	1·5	1·4	1·1
3	1·3	1·0	0·6	1·8	2·2	1·8	1·9	1·9	0·7	1·8	1·9	1·4
4	1·1	1·1	0·5	1·3	1·7	1·4	1·6	1·5	0·8	1·9	2·2	1·3
5	1·2	1·3	0·8	1·2	0·8	0·2	0·8	1·1	0·6	1·8	2·3	1·3
6	1·2	1·3	0·8	0·8	0·1	0·0	0·3	0·6	0·5	1·8	2·4	1·6
7	1·1	1·3	0·8	0·4	0·0	0·1	0·0	0·0	0·1	1·3	2·5	1·5
8	1·0	1·2	0·5	0·0	0·1	0·4	0·0	0·0	0·0	0·5	2·4	1·3
9	1·3	0·9	0·4	0·6	1·1	1·3	0·7	1·0	0·8	0·5	2·1	1·6
10	1·9	1·6	1·5	2·3	3·1	3·2	2·4	3·1	2·6	2·0	2·7	2·1
11	2·3	3·0	3·6	4·7	6·1	5·6	4·7	5·6	4·8	4·4	3·8	3·0
Noon.	3·0	4·4	5·7	7·2	8·0	7·6	6·9	7·8	6·7	6·3	4·7	3·8
13^h	3·6	5·2	6·7	8·6	8·4	8·6	8·1	8·4	7·1	6·4	4·9	3·9
14	3·0	4·6	6·5	8·2	7·9	8·6	8·2	7·8	5·9	5·9	4·5	3·3
15	2·2	3·8	5·3	6·6	6·7	7·7	7·3	6·4	4·6	4·5	3·5	2·7
16	2·0	2·9	3·9	5·4	5·3	6·4	6·2	4·7	3·0	3·2	3·1	2·3
17	1·6	2·4	2·5	4·4	4·1	5·0	5·0	3·3	2·1	2·5	2·3	1·9
18	1·4	1·9	2·0	3·7	3·4	4·0	4·2	2·6	1·5	2·0	1·8	1·4
19	1·0	1·5	1·3	3·0	3·0	3·8	3·7	2·3	0·8	1·1	1·3	0·7
20	0·0	1·1	0·8	2·3	2·7	3·4	3·2	2·2	0·5	0·7	0·6	0·5
21	0·2	0·5	0·4	1·7	2·4	3·4	3·0	1·9	0·6	0·1	0·1	0·1
22	0·1	0·4	0·1	1·8	2·5	3·1	2·7	1·9	0·4	0·0	0·2	0·0
23	0·1	0·0	0·0	1·6	2·5	2·9	2·2	1·9	0·2	0·2	0·1	0·0
Means	1·38	1·80	1·91	3·08	3·32	3·58	3·30	3·01	1·93	2·18	2·15	1·58

TABLE III.—MEAN HORIZONTAL MAGNETIC FORCE (diminished by a Constant) FOR EACH CIVIL DAY.

(Each result is the mean of 24 hourly ordinates from the photographic register, expressed in terms of the whole Horizontal Force, the unit in the table being ·00001 of the whole Horizontal Force. The letters u *and* c *indicate respectively values uncorrected for, and corrected for temperature.)*

1889.

Day of Month.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	u	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*
d																								
1	169	263	266	367	53	149	265	337	248	330	478	579	602	715	619	754	545	692	494	583	...	...	510	618
2	223	307	208	295	94	159	244	324	228	317	544	655	575	679	559	714	571	703	543	623	599	659	511	598
3	269	351	199	281	86	175	286	354	293	385	541	645	554	650	550	685	591	736	541	635	613	717	563	640
4	271	339	165	245	119	199	243	325	311	417	535	634	570	676	623	743	600	735	526	618	675	771	535	643
5	245	315	193	273	125	209	242	319	433	522	539	643	615	726	613	731	623	751	500	580	644	716	573	674
6	270	309	224	306	81	170	216	317	397	520	580	684	598	706	617	723	626	742	477	564	707	801	608	707
7	295	328	221	301	105	194	269	353	442	546	631	749	551	664	570	669	566	689	476	565	748	852	598	687
8	327	378	139	235	191	263	197	301	453	533	660	766	553	642	581	682	523	610	455	542	798	899	601	702
9	367	413	120	219	155	215	213	302	494	576	663	747	581	692	588	692	411	505	465	547	781	873	660	759
10	360	406	132	204	101	207	238	310	471	551	597	679	611	727	605	699	419	547	467	561	732	814	684	807
11	343	380	192	257	133	234	253	335	475	545	559	634	625	729	613	702	449	594	470	562	739	835	667	754
12	305	353	220	280	192	291	267	349	532	597	575	669	588	706	573	655	443	613	492	588	737	814	672	749
13	314	360	211	298	183	260	268	350	474	573	612	708	589	721	587	676	431	619	513	597	686	778	677	757
14	333	384	229	340	140	224	277	354	524	587	532	612	628	746	533	620	385	540	493	587	711	812	666	750
15	305	370	195	282	131	201	244	333	467	542	511	593	574	685	602	703	416	520	498	597	739	833	685	741
16	292	348	210	287	135	222	305	375	490	570	535	629	576	675	553	681	434	535	529	642	728	817	738	815
17	244	307	247	315	173	255	324	394	482	571	528	608	...	...	571	701	422	482	559	641	707	794	661	798
18	219	301	226	306	120	190	331	413	524	611	521	610	518	605	530	646	463	516	497	589	690	784	750	851
19	225	338	221	325	207	301	277	373	516	605	547	629	502	591	545	665	442	510	600	672	701	793	713	809
20	172	271	209	279	228	310	292	376	529	611	573	665	503	597	528	648	475	531	708	807	702	779	701	785
21	153	211	164	268	208	288	287	381	555	635	611	717	503	607	535	636	474	518	718	795	712	787	652	744
22	188	230	119	227	206	286	264	356	495	599	559	658	524	613	537	629	398	473	685	774	752	829	618	724
23	187	243	132	216	226	308	260	337	525	631	517	609	529	613	580	645	297	381	705	799	729	825	631	732
24	158	250	163	245	284	368	268	338	572	685	533	629	560	649	572	642	383	470	700	799	714	794	639	740
25	200	284	182	266	252	353	289	378	559	667	542	646	543	644	601	666	404	469	692	786	661	736	612	720
26	254	314	161	250	224	323	211	283	564	660	571	670	504	605	506	595	377	461	775	857	508	597	620	709
27	244	295	140	220	259	341	206	288	553	635	585	698	482	578	496	585	407	511	753	842	451	545	619	711
28	190	274	85	196	175	267	248	325	535	629	629	737	529	613	547	641	479	563	780	864	465	557	592	660
29	197	313			230	326	221	289	534	623	548	668	539	650	514	630	513	576	756	845	490	570	615	631
30	171	289			242	331	232	326	532	616	571	689	536	661	508	633	498	578	745	849	505	606	659	633
31	234	342			253	330			488	587			557	682	533	678			739	823			689	674

At the end of the year experiments were made for determination of the angle of torsion, thus breaking the continuity of the values.

TABLE IV.—MEAN TEMPERATURE for each CIVIL DAY within the box inclosing the HORIZONTAL FORCE MAGNET.

1889.

Day of Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d 1	67°·5	67°·8	67°·6	66°·6	67°·0	67°·8	68°·3	69°·2	69°·7	67°·3	° ...	68°·1
2	67·1	67·2	66·3	66·9	67·3	68·2	67·9	70·0	69·1	66·9	66·1	67·2
3	67·0	67·0	67·3	66·4	67·4	67·9	67·6	69·2	69·6	67·5	67·9	66·8
4	66·4	66·9	66·9	67·0	68·0	67·7	68·0	68·6	69·2	67·4	67·6	68·1
5	66·5	66·9	67·1	66·8	67·3	67·9	68·2	68·5	68·9	66·9	66·6	67·8
6	65·2	67·0	67·3	67·8	68·7	67·9	68·1	68·0	68·4	67·2	67·5	67·7
7	64·9	66·9	67·3	67·1	67·9	68·5	68·3	67·7	68·7	67·3	67·9	67·3
8	65·7	67·6	66·6	67·9	66·9	68·0	67·3	67·8	67·2	67·2	67·8	67·8
9	65·5	67·7	66·1	67·3	67·0	67·1	68·2	67·9	67·5	67·0	67·4	67·7
10	65·5	66·6	68·0	66·6	66·9	67·0	68·4	67·5	68·9	67·5	67·0	68·7
11	65·1	66·3	67·8	67·0	66·5	66·7	67·9	67·3	69·6	67·4	67·6	67·2
12	65·6	66·1	67·7	67·0	66·3	67·5	68·5	67·0	70·6	67·6	66·8	66·8
13	65·5	67·2	66·8	67·0	67·7	67·6	69·1	67·3	71·3	67·1	67·4	66·9
14	65·7	68·2	67·1	66·8	66·2	66·9	68·5	67·2	70·0	67·5	67·8	67·1
15	66·3	67·2	66·5	67·3	66·7	67·0	68·2	67·8	67·9	67·7	67·5	65·9
16	65·9	66·8	67·2	66·5	66·9	67·5	67·7	68·9	67·8	68·3	67·3	66·8
17	66·2	66·4	67·0	66·5	67·3	66·9	...	69·0	66·1	67·0	67·2	69·3
18	67·0	66·9	66·5	67·0	67·2	67·3	67·2	68·4	65·8	67·4	67·5	67·8
19	68·3	67·9	67·4	67·6	67·3	67·0	67·3	68·6	66·4	66·6	67·4	67·6
20	67·7	66·5	67·0	67·1	67·0	67·4	67·5	68·6	65·9	67·7	66·8	67·1
21	66·0	67·9	66·9	67·5	66·9	68·0	67·9	67·8	65·4	66·8	66·7	67·4
22	65·3	68·1	66·9	67·4	67·9	67·7	67·3	67·4	66·7	67·3	66·8	68·0
23	65·9	67·1	67·0	66·8	68·0	67·4	67·1	66·3	67·1	67·5	67·6	67·8
24	67·4	67·0	67·1	66·5	68·3	67·6	67·3	66·5	67·2	67·7	66·9	67·8
25	67·1	67·1	67·8	67·3	68·1	67·9	67·8	66·3	66·3	67·5	66·7	68·1
26	66·1	67·3	67·7	66·6	67·6	67·7	67·8	67·3	67·1	67·0	67·3	67·3
27	65·7	66·9	67·0	67·0	67·0	68·3	67·6	67·3	67·9	67·3	67·5	67·4
28	67·1	68·2	67·4	66·8	67·5	68·1	67·1	67·5	67·1	67·1	67·4	66·4
29	68·4		67·6	66·4	67·3	68·6	68·2	68·4	66·2	67·3	66·9	64·2
30	68·5		67·3	67·5	67·1	68·5	68·8	68·8	66·9	67·9	67·8	62·3
31	68·1		66·8		67·7		68·8	69·6		67·1		62·8
Means	66°·46	67°·17	67°·13	67°·00	67°·32	67°·65	67°·93	67°·99	67°·88	67°·32	67°·27	67°·07

TABLE V.—MONTHLY MEAN DIURNAL INEQUALITY OF HORIZONTAL MAGNETIC FORCE.

(The results are expressed in terms of the whole Horizontal Force, diminished in each case by the smallest hourly value, the unit in the table being ·00001 of the whole Horizontal Force. The letters u *and* c *indicate respectively values uncorrected for, and corrected for temperature.)*

1889.

Hour, Greenwich Civil Time.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	u	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*
Midnight.	0	9	19	38	63	84	123	137	121	130	138	150	134	151	141	161	154	176	110	122	36	45	13	25
1ʰ	7	14	31	50	64	85	131	145	118	127	134	146	122	137	135	152	151	170	111	120	34	41	13	25
2	15	17	32	46	70	86	131	140	114	123	122	131	115	127	135	147	143	160	111	118	39	46	18	30
3	29	26	32	44	75	86	131	138	106	113	118	122	114	124	131	139	132	144	104	109	48	53	22	32
4	39	34	45	54	69	75	128	130	99	101	123	125	112	120	121	126	134	141	113	115	51	51	34	41
5	53	43	51	55	72	76	122	122	84	84	111	113	114	119	115	118	133	138	126	126	61	58	48	53
6	62	52	64	66	81	83	106	106	63	65	83	85	89	92	97	100	123	125	126	126	71	68	50	55
7	67	55	71	73	73	72	85	85	42	44	58	60	65	65	63	63	94	96	109	109	66	63	52	57
8	54	42	62	64	60	59	60	60	19	21	29	31	31	31	23	23	66	66	70	70	48	48	42	44
9	45	30	33	35	22	21	15	15	4	6	0	2	0	0	2	2	27	27	25	25	25	27	23	25
10	31	16	8	10	1	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	6	8	2	4
11	15	0	0	0	0	2	6	3	22	22	25	25	6	6	21	21	10	12	6	6	0	0	0	0
Noon.	21	6	19	19	20	24	36	33	50	50	56	58	39	42	55	58	53	55	40	40	7	4	16	11
13ʰ	44	29	41	41	53	57	80	77	89	89	79	81	63	68	92	97	97	102	76	76	31	31	28	23
14	44	29	49	51	74	78	119	116	124	124	122	126	104	112	113	121	118	125	106	106	26	26	34	29
15	31	21	54	56	97	103	133	133	137	137	138	142	130	138	148	156	130	140	112	114	17	17	30	28
16	30	20	47	49	96	102	147	147	146	148	149	156	140	150	152	162	118	128	111	113	15	15	31	29
17	36	26	54	56	95	101	148	148	163	165	155	164	150	162	157	169	134	144	109	111	29	26	34	29
18	32	25	54	56	110	116	155	155	177	179	182	191	163	175	157	169	152	162	125	130	38	35	38	33
19	22	17	53	55	118	122	158	158	185	187	198	210	180	195	175	190	164	176	127	129	35	35	28	23
20	21	21	59	63	93	99	151	151	175	177	190	202	175	190	173	188	164	176	130	132	33	33	36	34
21	12	14	51	58	86	95	139	141	165	167	176	188	169	184	157	174	163	177	133	135	39	39	32	32
22	10	15	29	41	71	82	132	136	154	159	159	171	157	174	156	176	161	178	123	128	27	29	24	24
23	3	12	17	33	74	90	128	137	140	149	147	161	151	168	147	167	156	175	122	131	28	35	24	29
Means corrected for Temperature.	23·9		46·4		74·9		108·9		107·0		118·3		113·8		120·0		124·7		99·6		34·7		29·8	

TABLE VI.—MONTHLY MEAN TEMPERATURE at each HOUR of the DAY within the box inclosing the HORIZONTAL FORCE MAGNET.

1889.

Hour, Greenwich Civil Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	For the Year.
Midnight.	67°·1	67°·7	67°·7	67°·5	67°·6	67°·9	68°·3	68°·4	68°·4	67°·7	67°·6	67°·5	67°·78
1ʰ	67·0	67·7	67·7	67·5	67·6	67·9	68·2	68·3	68·3	67·6	67·5	67·5	67·73
2	66·8	67·5	67·5	67·3	67·6	67·8	68·1	68·1	68·2	67·5	67·5	67·5	67·62
3	66·6	67·4	67·3	67·2	67·5	67·6	68·0	67·9	68·0	67·4	67·4	67·4	67·47
4	66·5	67·3	67·1	67·0	67·3	67·5	67·9	67·8	67·8	67·3	67·2	67·3	67·33
5	66·3	67·1	67·0	66·9	67·2	67·5	67·8	67·7	67·7	67·2	67·1	67·2	67·23
6	66·3	67·0	66·9	66·9	67·3	67·5	67·7	67·7	67·6	67·2	67·1	67·2	67·20
7	66·2	67·0	66·8	66·9	67·3	67·5	67·6	67·6	67·6	67·2	67·1	67·2	67·17
8	66·2	67·0	66·8	66·9	67·3	67·5	67·6	67·6	67·5	67·2	67·2	67·1	67·16
9	66·1	67·0	66·8	66·9	67·3	67·5	67·6	67·6	67·5	67·2	67·3	67·1	67·16
10	66·1	67·0	66·8	66·9	67·2	67·4	67·6	67·6	67·5	67·2	67·3	67·1	67·14
11	66·1	66·9	66·9	66·8	67·2	67·4	67·6	67·6	67·6	67·2	67·2	67·0	67·12
Noon.	66·1	66·9	67·0	66·8	67·2	67·5	67·7	67·7	67·6	67·2	67·1	66·8	67·13
13ʰ	66·1	66·9	67·0	66·8	67·2	67·5	67·8	67·8	67·7	67·2	67·2	66·8	67·17
14	66·1	67·0	67·0	66·8	67·2	67·6	67·9	67·9	67·8	67·2	67·2	66·8	67·21
15	66·3	67·0	67·1	66·9	67·2	67·6	67·9	67·9	67·9	67·3	67·2	66·9	67·27
16	66·3	67·0	67·1	66·9	67·3	67·7	68·0	68·0	67·9	67·3	67·2	66·9	67·30
17	66·3	67·0	67·1	66·9	67·3	67·8	68·1	68·1	67·9	67·3	67·1	66·8	67·31
18	66·4	67·0	67·1	66·9	67·3	67·8	68·1	68·1	67·9	67·4	67·1	66·8	67·33
19	66·5	67·0	67·0	66·9	67·3	67·9	68·2	68·2	68·0	67·3	67·2	66·8	67·36
20	66·7	67·1	67·1	66·9	67·3	67·9	68·2	68·2	68·0	67·3	67·2	66·9	67·40
21	66·8	67·2	67·2	67·0	67·3	67·9	68·2	68·3	68·1	67·3	67·2	67·0	67·46
22	66·9	67·4	67·3	67·1	67·4	67·9	68·3	68·4	68·2	67·4	67·3	67·0	67·55
23	67·1	67·6	67·5	67·3	67·6	68·0	68·3	68·4	68·3	67·6	67·5	67·2	67·70

TABLE VII.—MEAN VERTICAL MAGNETIC FORCE (diminished by a constant) FOR EACH CIVIL DAY.

(Each result is the mean of 24 hourly ordinates from the photographic register, expressed in terms of the whole Vertical Force, the unit in the table being ·00001 of the whole Vertical Force. The letters u *and* c *indicate respectively values uncorrected for, and corrected for temperature.)*

1889.

Day of Month.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	u	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*
d 1	905	690	868	662	804	547	735	501	733	491	822	578	841	591	812	543	753	477	562	314	...	...	450	191
2	879	671	885	683	770	538	733	491	726	480	810	547	830	590	823	549	762	488	572	328	500	273	444	191
3	878	665	861	672	760	505	724	488	728	478	817	577	822	584	822	561	756	478	570	317	529	274	407	169
4	860	654	850	661	752	504	722	478	741	488	813	567	814	566	819	569	768	499	570	315	545	282	401	144
5	856	648	833	633	748	491	721	477	741	501	820	572	821	573	815	567	770	503	573	331	518	282	409	148
6	824	648	846	606	758	493	740	483	785	514	825	577	815	567	800	556	758	489	553	309	495	242	404	145
7	805	642	847	605	756	491	738	496	788	527	835	578	809	559	785	539	748	472	578	328	507	250	396	148
8	832	652	851	603	760	510	740	483	778	540	838	594	792	560	780	534	732	482	575	331	520	255	398	141
9	829	647	840	594	732	507	758	520	764	526	834	586	787	534	782	534	710	457	569	327	517	271	391	136
10	835	659	810	572	774	521	737	497	767	527	819	571	799	551	766	528	730	459	560	301	507	265	408	137
11	820	665	782	555	773	527	736	494	768	534	813	575	812	572	777	537	757	469	559	306	520	257	392	146
12	817	652	744	533	761	496	739	493	752	523	817	560	810	555	765	527	781	475	554	304	511	275	360	131
13	812	634	762	528	755	515	738	496	775	516	814	559	831	564	738	485	798	484	543	299	500	254	362	122
14	808	623	789	534	763	517	726	488	780	553	855	617	829	583	732	488	794	506	534	284	498	237	365	127
15	820	624	783	551	745	511	725	475	764	532	826	586	809	548	752	497	736	481	537	276	500	245	335	131
16	799	617	766	545	749	509	716	480	769	531	831	591	802	549	763	489	690	435	544	275	501	246	330	115
17	799	610	762	543	740	508	705	465	786	531	824	592	...	...	792	521	650	429	547	301	512	268	424	138
18	822	614	785	556	723	489	718	478	795	553	821	575	800	562	785	524	620	405	542	287	509	259	410	149
19	855	632	834	569	752	502	744	485	790	544	826	590	782	536	776	509	605	380	544	306	502	252	405	150
20	862	647	832	582	754	516	746	504	782	540	809	571	790	544	789	526	588	377	542	292	486	248	401	155
21	831	646	850	593	753	513	742	500	791	557	821	564	785	535	766	522	571	356	531	293	474	245	388	150
22	815	630	846	591	747	509	738	485	804	554	827	581	791	549	759	521	579	350	532	282	458	226	407	144
23	818	627	826	580	736	492	734	502	827	572	826	597	770	520	716	512	580	338	536	283	480	230	418	155
24	855	630	806	553	741	499	716	480	837	587	829	589	756	512	686	465	587	347	537	282	460	239	420	163
25	860	667	797	549	756	508	732	482	848	595	834	577	767	510	685	458	575	354	529	276	455	228	408	147
26	827	664	795	538	772	526	720	488	859	613	837	593	763	513	695	447	570	330	518	276	481	237	382	142
27	820	663	784	538	740	502	726	482	844	606	833	583	767	521	687	443	592	333	514	268	470	228	358	112
28	831	640	800	535	745	501	720	480	847	594	840	592	766	526	680	432	590	354	511	261	464	226	350	135
29	871	660			752	502	733	504	833	589	825	570	776	511	693	426	571	344	514	261	445	207	289	128
30	871	660			754	512	740	483	820	576	846	589	792	523	719	450	564	324	519	262	444	191	...	...
31	867	663			748	525			810	551			809	550	739	455			520	276			...	...

At the end of the year the magnet was readjusted, thus breaking the continuity of the values.

TABLE VIII.—MEAN TEMPERATURE for each CIVIL DAY within the box inclosing the VERTICAL FORCE MAGNET.

1889.

Day of Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d 1	° 65.7	° 65.3	° 67.7	° 66.6	° 67.0	° 67.1	° 67.4	° 68.3	° 68.6	° 67.3	° ...	° 67.8
2	65.4	65.1	66.5	67.0	67.2	68.0	66.9	68.5	68.5	67.1	66.3	67.5
3	65.6	64.5	67.6	66.7	67.4	66.9	66.8	67.9	68.7	67.5	67.6	66.8
4	65.3	64.5	67.3	67.1	67.5	67.2	67.3	67.4	68.3	67.6	68.0	67.7
5	65.4	65.0	67.7	67.1	66.9	67.3	67.3	67.3	68.2	67.0	66.7	67.9
6	63.9	66.9	68.1	67.7	68.4	67.3	67.3	67.1	68.3	67.1	67.5	67.8
7	63.3	67.0	68.1	67.0	67.9	67.7	67.4	67.2	68.6	67.4	67.7	67.3
8	64.1	67.3	67.4	67.7	66.8	67.1	66.5	67.2	67.4	67.1	68.1	67.7
9	64.2	67.2	66.2	66.8	66.8	67.3	67.5	67.3	67.5	67.0	67.2	67.6
10	63.9	66.8	67.5	66.9	66.9	67.3	67.3	66.8	68.4	67.8	67.0	68.4
11	62.9	66.3	67.2	67.0	66.6	66.8	66.9	66.9	69.2	67.5	68.0	67.2
12	63.4	65.5	68.1	67.2	66.4	67.7	67.6	66.8	70.0	67.4	66.7	66.4
13	64.0	66.6	66.9	67.0	67.8	67.6	68.2	67.5	70.4	67.1	67.2	66.9
14	64.3	67.6	67.2	66.8	66.3	66.8	67.2	67.1	69.2	67.4	67.9	66.8
15	64.8	66.5	66.6	67.4	66.5	66.9	67.9	67.6	67.6	67.9	67.6	65.2
16	64.2	66.0	66.9	66.7	66.8	66.9	67.5	68.5	67.6	68.3	67.6	65.7
17	64.5	65.9	66.5	66.9	67.6	66.5	...	68.4	66.0	67.2	67.1	69.1
18	65.4	66.4	66.6	66.9	67.0	67.2	66.8	67.9	65.7	67.6	67.4	67.9
19	66.1	68.1	67.4	67.8	67.2	66.7	67.2	68.2	66.2	66.8	67.4	67.6
20	65.7	67.4	66.8	67.0	67.0	66.8	67.2	68.0	65.5	67.4	66.8	67.2
21	64.3	67.7	66.9	67.0	66.6	67.7	67.4	67.1	65.7	66.8	66.4	66.8
22	64.3	67.6	66.8	67.5	67.4	67.2	67.0	66.8	66.4	67.4	66.5	68.0
23	64.6	67.2	67.1	66.5	67.6	66.4	67.4	65.2	67.0	67.5	67.4	68.0
24	66.2	67.5	67.0	66.7	67.4	66.9	67.1	66.0	66.9	67.6	66.0	67.7
25	64.7	67.3	67.3	67.4	67.5	67.7	67.7	66.3	66.0	67.5	66.3	67.9
26	63.3	67.7	67.2	66.5	67.2	67.1	67.4	67.3	66.9	67.0	67.1	66.9
27	63.0	67.2	66.8	67.1	66.8	67.4	67.2	67.1	67.8	67.2	67.0	67.2
28	64.6	68.1	67.1	66.9	67.5	67.3	66.9	67.3	66.7	67.4	66.8	65.7
29	65.5		67.4	66.4	67.1	67.6	68.1	68.2	66.3	67.5	66.8	63.2
30	65.5		67.0	67.7	67.1	67.7	68.3	68.3	66.9	67.7	67.5	...
31	65.2		66.1		67.8		67.8	69.0		67.1		...
Means	° 64.62	° 66.65	° 67.13	° 67.03	° 67.16	° 67.20	° 67.35	° 67.44	° 67.55	° 67.36	° 67.16	° 67.17

TABLE IX.—MONTHLY MEAN DIURNAL INEQUALITY OF VERTICAL MAGNETIC FORCE.

(The results are expressed in terms of the whole Vertical Force, diminished in each case by the smallest hourly value, the unit in the table being ·00001 of the whole Vertical Force. The letters u *and* c *indicate respectively values uncorrected for, and corrected for temperature.)*

1889.

Hour, Greenwich Civil Time.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	u	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*	*u*	*c*
Midnight.	24	5	33	12	37	20	48	31	53	47	41	35	38	24	44	29	31	12	23	6	14	5	14	3
1h	20	3	30	9	37	20	45	28	51	45	38	32	35	23	41	28	28	13	21	8	11	5	12	3
2	15	2	22	5	31	18	38	26	48	42	35	31	32	22	36	27	25	12	15	4	8	2	9	0
3	12	4	21	8	26	18	34	26	46	42	34	30	29	22	34	28	24	15	14	5	4	0	10	3
4	9	1	19	10	24	20	32	28	47	45	38	36	30	25	37	35	25	18	13	7	6	4	10	6
5	7	3	17	12	22	20	32	30	49	49	39	37	32	29	39	39	25	21	14	10	6	8	6	4
6	6	2	14	12	18	18	34	32	46	44	37	35	29	28	40	40	24	24	14	12	3	5	5	5
7	6	4	14	14	20	24	36	36	45	43	36	34	29	30	38	40	25	25	19	17	2	4	3	3
8	2	0	13	13	19	23	32	32	38	36	31	29	25	26	32	36	22	24	21	19	4	4	2	4
9	0	0	12	12	15	19	23	23	24	22	19	17	17	18	21	25	12	14	18	16	6	4	0	2
10	1	4	7	7	8	12	14	14	11	11	12	12	9	10	11	13	5	7	7	5	2	2	1	3
11	5	5	2	4	1	3	5	7	0	2	0	0	0	1	1	3	0	0	0	0	0	2	2	8
Noon.	2	2	0	0	0	0	0	0	0	0	2	0	1	0	0	0	2	0	3	1	1	3	2	8
13h	7	5	5	3	8	6	10	10	15	15	12	10	5	2	13	9	13	6	13	11	11	11	8	16
14	14	10	14	12	16	14	26	26	31	31	25	21	23	18	30	24	26	19	22	20	23	21	12	18
15	14	8	23	18	32	30	37	37	44	44	36	30	33	28	47	41	34	25	32	30	30	30	12	16
16	14	8	26	21	40	36	46	44	57	57	50	44	42	35	56	47	43	34	36	34	31	31	13	17
17	16	12	23	18	44	40	51	47	65	65	60	52	51	41	63	52	44	35	34	32	28	30	12	18
18	20	14	22	17	40	36	53	49	68	68	63	55	53	43	62	51	41	32	34	28	29	31	10	16
19	23	15	24	15	35	31	52	48	65	65	60	54	52	40	55	42	40	29	35	29	27	27	12	16
20	26	13	26	15	36	30	50	46	63	63	57	51	48	36	51	38	38	27	33	24	24	24	12	14
21	24	11	25	12	38	30	51	43	59	59	52	46	45	33	49	34	37	24	30	21	22	22	10	10
22	22	7	24	7	37	27	49	39	55	53	48	42	42	28	46	29	32	17	24	13	16	14	9	9
23	24	5	29	8	38	23	50	35	56	50	44	36	40	26	42	27	30	13	23	8	15	9	8	4
Means corrected for Temperature.	6·0		11·0		21·6		30·7		41·6		32·0		24·5		30·7		18·6		15·0		12·4		8·6	

TABLE X.—MONTHLY MEAN TEMPERATURE at each HOUR of the DAY within the box inclosing the VERTICAL FORCE MAGNET.

1889.

Hour, Greenwich Civil Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	For the Year.
Midnight.	65°·2	67°·3	67°·7	67°·6	67°·4	67°·3	67°·7	67°·8	68°·1	67°·9	67°·5	67°·7	67°·43
1h	65·1	67·3	67·7	67·6	67·4	67·3	67·6	67·7	67·9	67·7	67·4	67·6	67·36
2	64·9	67·1	67·5	67·4	67·4	67·2	67·5	67·5	67·8	67·6	67·4	67·6	67·24
3	64·7	66·9	67·3	67·2	67·3	67·2	67·4	67·4	67·6	67·5	67·3	67·5	67·11
4	64·7	66·7	67·1	67·0	67·2	67·1	67·3	67·2	67·5	67·4	67·2	67·4	66·98
5	64·5	66·5	67·0	66·9	67·1	67·1	67·2	67·1	67·4	67·3	67·0	67·3	66·87
6	64·5	66·4	66·9	66·9	67·2	67·1	67·1	67·1	67·2	67·2	67·0	67·2	66·82
7	64·4	66·3	66·7	66·8	67·2	67·1	67·0	67·0	67·2	67·2	67·0	67·2	66·76
8	64·4	66·3	66·7	66·8	67·2	67·1	67·0	66·9	67·1	67·2	67·1	67·1	66·74
9	64·3	66·3	66·7	66·8	67·2	67·1	67·0	66·9	67·1	67·2	67·2	67·1	66·74
10	64·2	66·3	66·7	66·8	67·1	67·0	67·0	67·0	67·1	67·2	67·1	67·1	66·72
11	64·3	66·2	66·8	66·7	67·0	67·0	67·0	67·0	67·2	67·1	67·0	66·9	66·68
Noon.	64·3	66·3	66·9	66·8	67·1	67·1	67·1	67·1	67·3	67·2	67·0	66·9	66·76
13h	64·4	66·4	67·0	66·8	67·1	67·1	67·2	67·3	67·5	67·2	67·1	66·8	66·83
14	64·5	66·4	67·0	66·8	67·1	67·2	67·3	67·4	67·5	67·2	67·2	66·9	66·87
15	64·6	66·5	67·0	66·8	67·1	67·3	67·3	67·4	67·6	67·2	67·1	67·0	66·91
16	64·6	66·5	67·1	66·9	67·1	67·3	67·4	67·5	67·6	67·2	67·1	67·0	66·94
17	64·5	66·5	67·1	67·0	67·1	67·4	67·5	67·6	67·6	67·2	67·0	66·9	66·95
18	64·6	66·5	67·1	67·0	67·1	67·4	67·5	67·6	67·6	67·4	67·0	66·9	66·97
19	64·7	66·7	67·1	67·0	67·1	67·3	67·6	67·7	67·7	67·4	67·1	67·0	67·03
20	64·9	66·8	67·2	67·0	67·1	67·3	67·6	67·7	67·7	67·5	67·1	67·1	67·08
21	64·9	66·9	67·3	67·2	67·1	67·3	67·6	67·8	67·8	67·5	67·1	67·2	67·14
22	65·0	67·1	67·4	67·3	67·2	67·3	67·7	67·9	67·9	67·6	67·2	67·2	67·23
23	65·2	67·3	67·6	67·5	67·4	67·4	67·7	67·8	68·0	67·8	67·4	67·4	67·38

TABLE XI.—MEAN MAGNETIC DECLINATION, HORIZONTAL FORCE, and VERTICAL FORCE, in each MONTH.

(The results for Horizontal Force and Vertical Force are corrected for temperature.)

Month, 1889.	DECLINATION WEST in Arc.	HORIZONTAL FORCE in terms of the whole Horizontal Force (diminished by a Constant).	VERTICAL FORCE in terms of the whole Vertical Force (diminished by a Constant).	DECLINATION diminished by 17° and expressed as Westerly Force. (in terms of GAUSS'S METRICAL UNIT.)	HORIZONTAL FORCE (diminished by a Constant). (in terms of GAUSS'S METRICAL UNIT.)	VERTICAL FORCE (diminished by a Constant). (in terms of GAUSS'S METRICAL UNIT.)
January	17° 38'·0	318	647	2013	579	2830
February	17. 36·9	271	581	1955	493	2542
March	17. 36·4	256	509	1928	466	2227
April	17. 35·3	340	489	1870	619	2139
May	17. 34·7	564	543	1838	1027	2375
June	17. 35·3	662	580	1870	1206	2537
July	17. 34·0	662	549	1801	1206	2402
August	17. 33·9	670	507	1796	1220	2218
September	17. 34·3	572	423	1817	1042	1850
October	17. 33·4	682	295	1769	1242	1291
November	17. 32·7	758	248	1732	1380	1085
December	17. 33·4	720	144	1769	1311	630
Means	17° 34'·9	......	......	1847	......	......
Number of Column	1	2	3	4	5	6

The units in columns 2 and 3 are ·00001 of the whole Horizontal and Vertical Forces respectively; in columns 4, 5, and 6 the unit is ·00001 of the Millimètre-Milligramme-Second Unit, or ·000001 of the Centimètre-Gramme-Second (C.G.S.) Unit, in terms of which units the values of whole Horizontal Force (applicable to columns 4 and 5) are 1·8210 and 0·18210 respectively for the year, and of whole Vertical Force (applicable to column 6) are 4·3747 and 0·43747 respectively for the year.

HORIZONTAL FORCE.—At the end of the year experiments were made for determination of the angle of torsion, thus breaking the continuity of the values.

VERTICAL FORCE.—At the end of the year the magnet was readjusted, thus breaking the continuity of the values.

TABLE XII.—MEAN DIURNAL INEQUALITIES OF MAGNETIC DECLINATION, HORIZONTAL FORCE, and VERTICAL FORCE, for the Year 1889.

(Each result is the mean of the twelve monthly mean values, the annual means for each element being diminished by the smallest hourly value. The results for Horizontal Force and Vertical Force are corrected for temperature.)

Hour, Greenwich Civil Time.	Inequality of			Inequality of		
	DECLINATION WEST in Arc.	HORIZONTAL FORCE in terms of the whole Horizontal Force.	VERTICAL FORCE in terms of the whole Vertical Force.	DECLINATION expressed as WESTERLY FORCE	HORIZONTAL FORCE	VERTICAL FORCE
				in terms of GAUSS'S METRICAL UNIT.		
Midnight.	0'·51	99·0	17·9	27·0	180·3	78·3
1h	0·77	97·7	16·9	40·8	177·9	73·9
2	0·96	94·3	14·7	50·9	171·7	64·3
3	0·90	90·9	15·6	47·7	165·5	68·2
4	0·75	89·5	18·4	39·7	163·0	80·5
5	0·50	88·8	20·6	26·5	161·7	90·1
6	0·33	81·9	20·2	17·5	149·1	88·4
7	0·14	66·9	21·6	7·4	121·8	94·5
8	0·00	43·3	19·3	0·0	78·8	84·4
9	0·41	14·6	13·1	21·7	26·6	57·3
10	1·75	0·0	7·1	92·7	0·0	31·1
11	3·68	4·8	1·7	194·9	8·7	7·4
Noon.	5·39	30·0	0·0	285·5	54·6	0·0
13h	6·04	61·0	7·5	319·9	111·1	32·8
14	5·58	83·6	18·3	295·6	152·2	80·1
15	4·49	95·4	26·9	237·8	173·7	117·7
16	3·41	98·3	32·8	180·6	179·0	143·5
17	2·47	105·1	35·6	130·8	191·4	155·7
18	1·87	115·5	35·5	99·1	210·3	155·3
19	1·34	121·5	33·0	71·0	221·3	144·4
20	0·88	118·9	30·6	46·6	216·5	133·9
21	0·58	113·7	27·5	30·7	207·0	120·3
22	0·48	106·1	22·6	25·4	193·2	98·9
23	0·36	103·9	19·1	19·1	189·2	83·6
Means . . .	1'·82	80·2	19·9	96·2	146·0	86·9
Number of Column	1	2	3	4	5	6

The units in columns 2 and 3 are ·00001 of the whole Horizontal and Vertical Forces respectively; in columns 4, 5, and 6 the unit is ·00001 of the Millimètre-Milligramme-Second Unit, or ·000001 of the Centimètre-Gramme-Second (C.G.S.) Unit, in terms of which units the values of whole Horizontal Force (applicable to columns 4 and 5) are 1·8210 and 0·18210 respectively, and of whole Vertical Force (applicable to column 6) are 4·3747 and 0·43747 respectively.

TABLE XIII.—DIURNAL RANGE OF DECLINATION AND HORIZONTAL FORCE, on each CIVIL DAY, as deduced from the TWENTY-FOUR HOURLY MEASURES of ORDINATES of the PHOTOGRAPHIC REGISTER.

(The Declination is expressed in minutes of arc; the unit for Horizontal Force is ·00001 of the whole Horizontal Force. The results for Horizontal Force are corrected for temperature.)

1889.

Day of Month.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Dec.	H.F.	Dec.	H.F.	Dec.	H.F.	Dec.	H.F.	Dec.	H.F.	Dec.	H.F.	Dec.	H.F.	Dec.	H.F.	Dec.	H.F.	Dec.	H.F.	Dec.	H.F.	Dec.	H.F.
d	′		′		′		′		′		′		′		′		′		′		′		′	
1	8·0	77	3·2	95	11·4	185	11·8	194	8·8	155	8·0	319	14·2	267	10·0	317	6·9	150	7·7	255	...	...	4·8	160
2	5·9	163	2·3	76	8·5	162	8·9	252	8·9	277	10·5	262	11·8	270	9·8	200	8·7	204	7·2	237	7·8	264	5·5	152
3	1·8	98	8·2	217	4·7	122	8·6	183	7·7	250	9·8	260	9·3	240	7·9	233	9·4	212	5·9	192	5·9	302	5·5	165
4	2·6	46	3·9	70	7·5	135	8·3	167	9·6	403	8·6	205	8·9	199	7·6	165	9·1	197	6·5	170	3·7	164	5·0	85
5	2·5	106	4·1	75	4·8	137	9·7	155	11·0	197	10·0	255	7·4	169	8·4	210	9·5	192	16·0	213	7·1	261	5·3	79
6	2·1	98	5·6	122	11·1	333	8·9	180	7·3	290	8·1	247	8·2	190	5·1	119	7·1	132	12·8	220	5·3	138	9·4	220
7	6·3	158	10·2	193	8·2	240	13·0	210	7·7	211	6·2	242	9·4	217	8·3	202	8·8	125	9·3	243	5·3	148	6·6	106
8	2·9	144	7·5	180	5·5	82	11·3	294	7·5	215	6·6	275	8·4	201	8·8	232	12·2	312	10·5	233	5·5	95	6·2	102
9	3·2	97	3·2	97	4·4	126	8·8	230	6·5	212	9·1	327	7·7	200	8·2	207	15·1	532	10·7	232	5·4	159	5·9	136
10	9·7	130	5·3	135	6·6	83	12·5	272	11·2	190	8·6	177	8·2	234	11·9	220	12·6	421	7·4	165	8·0	68	3·2	87
11	6·6	212	3·0	63	7·2	173	7·2	181	9·2	208	8·0	170	7·6	179	15·9	142	9·4	244	8·0	211	6·5	72	2·8	92
12	5·4	181	4·1	95	10·9	187	7·8	205	8·2	277	8·3	170	11·2	196	9·7	332	8·1	248	8·0	172	3·4	102	3·7	87
13	6·0	139	3·7	82	8·6	198	8·4	153	11·2	186	8·0	150	10·2	280	14·4	352	9·6	192	7·1	287	2·9	136	9·5	138
14	3·4	155	12·3	169	10·3	130	11·1	245	8·2	198	16·1	409	10·9	290	10·1	260	8·8	207	6·1	113	3·0	136	3·3	219
15	4·2	97	10·3	141	9·0	199	10·1	208	9·2	329	13·5	227	10·4	203	11·3	307	5·3	214	10·5	158	7·0	120	2·9	56
16	2·2	123	6·4	132	7·5	115	10·3	229	12·4	276	11·5	276	7·3	239	7·8	265	6·9	145	6·4	141	5·8	111	8·0	119
17	1·4	99	12·5	207	23·3	442	8·9	259	10·6	224	9·5	267	...	...	7·7	212	5·4	177	6·0	149	12·7	290	7·5	124
18	3·2	90	11·8	193	18·5	307	9·9	152	8·9	202	10·2	254	5·6	279	6·8	159	10·4	181	12·5	218	5·2	207	4·6	82
19	2·7	69	8·9	138	8·1	194	12·2	166	10·4	141	9·9	218	8·0	277	5·4	212	10·1	186	8·8	475	3·2	84	5·0	108
20	15·4	327	6·8	125	8·9	163	8·8	211	7·2	213	8·0	292	7·3	290	13·6	170	6·6	187	12·4	306	3·5	50	6·5	128
21	8·3	189	5·7	128	9·1	160	8·2	155	7·5	142	10·2	160	9·8	233	10·4	235	7·2	170	8·1	172	4·3	138	8·5	158
22	5·4	143	7·9	166	8·0	122	8·3	138	9·4	245	11·3	282	6·9	187	7·5	283	15·3	240	8·3	239	4·7	111	7·8	115
23	4·8	137	10·3	129	9·2	167	7·9	170	7·3	210	8·5	276	6·7	225	9·9	147	8·5	294	7·1	200	3·6	179	4·0	150
24	3·7	102	5·9	182	7·4	187	6·7	181	10·0	197	9·3	255	10·1	192	9·5	234	10·5	317	8·8	132	7·2	147	3·9	86
25	3·5	102	6·5	130	8·9	162	12·1	166	9·3	172	8·0	232	9·7	230	11·4	329	7·4	222	6·1	190	5·1	153	2·6	65
26	5·3	57	5·7	132	7·9	237	11·6	220	12·9	208	9·9	209	10·7	183	11·9	300	5·9	184	5·5	110	13·0	400	7·5	96
27	4·4	109	7·1	165	8·7	302	10·2	257	9·7	217	9·6	226	9·9	197	10·9	406	9·0	248	6·1	123	16·7	239	6·3	252
28	3·9	101	5·9	128	15·0	283	13·2	349	10·2	213	14·0	284	7·3	275	8·2	177	8·4	264	8·5	113	14·3	321	4·7	199
29	3·8	84			11·6	228	9·4	264	10·6	171	11·5	310	13·2	230	10·7	290	9·6	317	5·6	176	9·7	262	4·9	116
30	5·8	78			9·1	244	8·2	225	13·7	284	11·9	217	11·8	262	6·1	273	7·4	213	6·1	161	8·7	258	5·6	143
31	3·4	116			9·1	197			15·5	203			10·0	304	5·8	219			6·6	189			4·1	116
Means.....	4·8	123	6·7	134	9·3	194	9·7	209	9·6	223	9·8	248	9·3	231	9·4	239	9·0	231	8·3	200	6·7	176	5·5	127

The mean of the twelve monthly values is, for Declination 8′·18, and for Horizontal Force 194·6.

TABLE XIV.—MONTHLY MEAN DIURNAL RANGE, and SUMS of HOURLY DEVIATIONS from MEAN, for DECLINATION, HORIZONTAL FORCE, and VERTICAL FORCE, as deduced from the Monthly Mean Diurnal Inequalities, Tables II., V., and IX.

(The Declination is expressed in minutes of arc: the units for Horizontal Force and Vertical Force are ·00001 of the whole Horizontal and Vertical Forces respectively. The results for Horizontal Force and Vertical Force are corrected for temperature.)

Month, 1889.	Difference between the Greatest and Least of the 24 Hourly Values.			Sums of the 24 Hourly Deviations from the Mean Value.		
	Declination.	Horizontal Force.	Vertical Force.	Declination.	Horizontal Force.	Vertical Force.
	′			′		
January	3·6	55	15	17·2	257	89
February	5·2	73	21	27·6	315	98
March	6·7	122	40	41·7	578	186
April	8·6	158	49	48·4	983	239
May	8·4	187	68	46·5	1175	344
June	8·6	210	55	50·3	1222	281
July	8·2	195	43	49·1	1212	208
August	8·4	190	52	46·0	1195	253
September	7·1	178	35	42·6	1027	192
October	6·4	135	34	36·0	757	210
November	4·9	68	31	26·9	331	234
December	3·9	57	18	20·8	227	130
Means	6′·67	135·7	38·4	37′·76	773·2	205·3

TABLE XV.—VALUES of the CO-EFFICIENTS in the PERIODICAL EXPRESSION

$$V_t = m + a_1 \cos t + b_1 \sin t + a_2 \cos 2t + b_2 \sin 2t + a_3 \cos 3t + b_3 \sin 3t + a_4 \cos 4t + b_4 \sin 4t$$

(in which t is the time from Greenwich mean midnight converted into arc at the rate of 15° to each hour, and V_t the mean value of the magnetic element at the time t for each month and for the year, as given in Tables II., V., IX., and XII., the values for Horizontal Force and Vertical Force being corrected for temperature).

The values of the co-efficients for Declination are given in minutes of arc: the units for Horizontal Force and Vertical Force are ·00001 of the whole Horizontal and Vertical Forces respectively.

Month, 1889.	m	a_1	b_1	a_2	b_2	a_3	b_3	a_4	b_4
				DECLINATION WEST.					
	′	′	′	′	′	′	′	′	′
January	1·38	− 1·07	− 0·03	+ 0·31	+ 0·59	− 0·19	+ 0·02	+ 0·15	+ 0·11
February	1·80	− 1·59	− 0·56	+ 0·34	+ 0·81	− 0·39	− 0·32	+ 0·20	+ 0·27
March	1·91	− 2·22	− 1·06	+ 0·76	+ 1·25	− 0·45	− 0·57	+ 0·22	+ 0·35
April	3·08	− 1·98	− 1·81	+ 1·20	+ 1·57	− 0·61	− 0·40	+ 0·33	+ 0·32
May	3·32	− 1·88	− 1·82	+ 1·69	+ 1·27	− 0·71	− 0·23	+ 0·22	+ 0·07
June	3·58	− 1·92	− 2·40	+ 1·51	+ 1·18	− 0·48	− 0·36	+ 0·00	+ 0·13
July	3·30	− 1·76	− 2·32	+ 1·10	+ 1·39	− 0·58	− 0·41	+ 0·05	+ 0·12
August	3·01	− 2·04	− 1·48	+ 1·63	+ 1·31	− 0·79	− 0·41	+ 0·20	+ 0·14
September	1·93	− 2·27	− 0·84	+ 1·32	+ 1·01	− 0·73	− 0·37	+ 0·32	+ 0·09
October	2·18	− 1·92	− 0·42	+ 0·80	+ 1·35	− 0·69	− 0·34	+ 0·46	+ 0·20
November	2·15	− 1·78	+ 0·20	+ 0·14	+ 0·75	− 0·35	− 0·18	+ 0·14	+ 0·12
December	1·58	− 1·35	+ 0·02	+ 0·31	+ 0·61	− 0·25	− 0·03	+ 0·17	+ 0·09
For the Year	1·82	− 1·82	− 1·04	+ 0·93	+ 1·09	− 0·52	− 0·30	+ 0·21	+ 0·17
				HORIZONTAL FORCE.					
January	23·9	− 2·3	+ 9·4	− 13·0	+ 1·9	+ 2·5	− 6·8	+ 0·2	+ 4·2
February	46·4	+ 7·3	− 1·4	− 17·1	+ 3·9	+ 4·2	− 8·3	− 1·8	+ 10·5
March	74·9	+ 25·3	− 23·4	− 21·2	+ 14·7	+ 5·9	− 7·9	+ 1·2	+ 9·4
April	108·9	+ 48·3	− 33·1	− 22·5	+ 27·5	+ 3·9	− 10·4	+ 0·1	+ 7·9
May	107·0	+ 45·3	− 61·7	− 13·7	+ 19·1	− 4·4	− 6·8	+ 0·7	+ 4·6
June	118·3	+ 54·3	− 60·2	− 18·9	+ 17·8	− 7·8	− 9·5	+ 3·3	+ 5·2
July	113·8	+ 58·4	− 54·7	− 21·0	+ 16·8	− 3·2	− 13·1	+ 1·8	+ 1·7
August	120·0	+ 55·5	− 53·9	− 13·9	+ 26·1	− 3·9	− 12·8	+ 2·8	+ 3·0
September	124·7	+ 59·9	− 33·6	− 13·5	+ 20·3	0·0	− 18·0	+ 4·1	+ 11·2
October	99·6	+ 40·2	− 18·4	− 21·3	+ 16·5	+ 3·2	− 20·6	+ 4·0	+ 9·4
November	34·7	+ 13·8	+ 12·1	− 11·5	+ 2·7	+ 1·3	− 6·4	+ 2·7	+ 7·3
December	29·8	+ 5·7	+ 6·5	− 13·0	+ 2·8	+ 2·8	− 8·6	+ 0·8	+ 4·0
For the Year	80·2	+ 34·3	− 26·0	− 16·7	+ 14·2	+ 0·4	− 10·7	+ 1·6	+ 6·5
				VERTICAL FORCE.					
January	6·0	+ 0·4	− 5·4	− 1·9	− 0·4	− 0·9	+ 0·3	+ 0·3	+ 0·5
February	11·0	+ 0·2	− 2·8	− 5·1	+ 0·6	+ 3·2	− 0·2	− 1·0	− 0·1
March	21·6	+ 5·1	− 7·3	− 9·0	− 0·2	+ 5·2	+ 0·5	− 2·5	− 1·1
April	30·7	+ 8·4	− 9·0	− 11·9	− 1·2	+ 5·2	− 1·4	− 2·0	+ 0·6
May	41·6	+ 16·8	− 11·9	− 16·0	+ 1·9	+ 4·9	− 1·7	− 0·8	+ 0·6
June	32·0	+ 12·9	− 9·5	− 14·0	− 0·1	+ 3·2	− 0·5	− 0·3	+ 0·2
July	24·5	+ 7·8	− 6·4	− 12·1	− 0·2	+ 4·3	− 0·1	− 0·8	+ 0·1
August	30·7	+ 6·4	− 5·1	− 15·4	+ 2·7	+ 6·7	− 0·9	− 1·0	− 0·1
September	18·6	+ 2·1	− 5·5	− 11·3	+ 1·1	+ 3·9	− 1·2	− 1·5	+ 0·7
October	15·0	− 2·1	− 9·4	− 8·9	+ 0·4	+ 4·3	− 1·1	− 2·5	+ 1·7
November	12·4	− 1·2	− 13·6	− 6·4	+ 1·8	+ 1·5	− 1·4	− 1·3	− 0·1
December	8·6	− 3·0	− 7·0	− 2·0	+ 1·8	− 1·0	− 1·3	+ 0·1	+ 0·4
For the Year	19·9	+ 4·5	− 7·7	− 9·5	+ 0·7	+ 3·4	− 0·7	− 1·1	+ 0·3

TABLE XVI.—VALUES of the CO-EFFICIENTS and CONSTANT ANGLES in the PERIODICAL EXPRESSIONS

$$V_t = m + c_1 \sin(t+\alpha) + c_2 \sin(2t+\beta) + c_3 \sin(3t+\gamma) + c_4 \sin(4t+\delta)$$
$$V_{t'} = m + c_1 \sin(t'+\alpha') + c_2 \sin(2t'+\beta') + c_3 \sin(3t'+\gamma') + c_4 \sin(4t'+\delta')$$

(in which t and t' are the times from Greenwich mean midnight and apparent midnight respectively converted into arc at the rate of 15° to each hour, and V_t, $V_{t'}$ the mean value of the magnetic element at the time t or t' for each month and for the year, as given in Tables II., V., IX., and XII., the values for Horizontal Force and Vertical Force being corrected for temperature). The values of the co-efficients for Declination are given in minutes of arc: the units for Horizontal Force and Vertical Force are ·00001 of the whole Horizontal and Vertical Forces respectively.

Month, 1889.	m	c_1	α	α'	c_2	β	β'	c_3	γ	γ'	c_4	δ	δ'
						DECLINATION WEST.							
	′	′	° ′	° ′	′	° ′	° ′	′	° ′	° ′	′	° ′	° ′
January	1·38	1·07	268. 16	270. 42	0·67	27. 20	32. 12	0·19	274. 58	282. 16	0·19	54. 54	64. 38
February	1·80	1·69	250. 45	254. 15	0·88	22. 45	29. 45	0·50	230. 47	241. 17	0·34	37. 26	51. 26
March	1·91	2·46	244. 26	246. 34	1·47	31. 17	35. 33	0·72	218. 12	224. 36	0·42	32. 0	40. 32
April	3·08	2·68	227. 32	227. 33	1·98	37. 14	37. 16	0·73	236. 36	236. 39	0·46	46. 24	46. 28
May	3·32	2·62	225. 56	225. 4	2·11	53. 2	51. 18	0·75	251. 54	249. 18	0·23	71. 30	68. 2
June	3·58	3·07	218. 37	218. 43	1·92	52. 0	52. 12	0·60	232. 59	233. 17	0·13	0. 0	0. 24
July	3·30	2·91	217. 13	218. 35	1·77	38. 25	41. 9	0·71	234. 47	238. 53	0·13	23. 51	29. 19
August	3·01	2·52	234. 5	235. 0	2·09	51. 13	53. 3	0·89	242. 52	245. 37	0·24	54. 56	58. 36
September	1·93	2·42	249. 40	248. 23	1·66	52. 32	49. 58	0·82	243. 23	239. 32	0·33	74. 42	69. 34
October	2·18	1·97	257. 41	254. 10	1·57	30. 34	23. 32	0·77	243. 31	232. 58	0·50	67. 8	53. 4
November	2·15	1·79	276. 23	272. 44	0·77	10. 39	3. 21	0·39	243. 10	232. 13	0·18	50. 44	36. 8
December	1·58	1·35	270. 59	270. 1	0·68	27. 8	25. 12	0·25	262. 50	259. 56	0·19	62. 32	58. 40
For the Year	1·82	2·09	240. 7	240. 7	1·43	40. 18	40. 18	0·60	239. 54	239. 54	0·26	51. 0	51. 0
						HORIZONTAL FORCE.							
			° ′	° ′		° ′	° ′		° ′	° ′		° ′	° ′
January	23·9	9·7	346. 6	348. 32	13·2	278. 4	282. 56	7·2	159. 23	166. 41	4·2	2. 17	12. 1
February	46·4	7·4	101. 15	104. 45	17·6	282. 46	289. 46	9·3	153. 11	163. 41	10·6	350. 17	4. 17
March	74·9	34·4	132. 45	134. 53	25·8	304. 52	309. 8	9·9	143. 8	149. 32	9·5	7. 5	15. 37
April	108·9	58·5	124. 24	124. 25	35·6	320. 47	320. 49	11·1	159. 25	159. 28	7·9	0. 55	0. 59
May	107·0	76·5	143. 42	142. 50	23·5	324. 13	322. 29	8·1	213. 4	210. 28	4·7	8. 13	4. 45
June	118·3	81·1	137. 56	138. 2	26·0	313. 19	313. 31	12·3	219. 20	219. 38	6·1	32. 0	32. 24
July	113·8	80·0	133. 7	134. 29	26·9	308. 33	311. 17	13·5	193. 43	197. 49	2·5	45. 16	50. 44
August	120·0	77·4	134. 11	135. 6	29·5	331. 57	333. 47	13·4	197. 8	199. 53	4·2	43. 3	46. 43
September	124·7	68·6	119. 19	118. 2	24·4	326. 19	323. 45	18·0	179. 58	176. 7	11·9	20. 15	15. 7
October	99·6	44·2	114. 39	111. 8	27·0	307. 41	300. 39	20·8	171. 8	160. 35	10·2	23. 5	9. 1
November	34·7	18·3	48. 43	45. 4	11·8	283. 22	276. 4	6·5	168. 55	157. 58	7·8	20. 23	5. 47
December	29·8	8·7	41. 2	40. 4	13·3	282. 5	280. 9	9·0	162. 10	159. 16	4·1	10. 31	6. 39
For the Year	80·2	43·0	127. 12	127. 12	21·9	310. 15	310. 15	10·8	178. 5	178. 5	6·7	14. 5	14. 5
						VERTICAL FORCE.							
			° ′	° ′		° ′	° ′		° ′	° ′		° ′	° ′
January	6·0	5·5	175. 26	177. 52	1·9	258. 24	263. 16	0·9	286. 1	293. 19	0·6	29. 51	39. 35
February	11·0	2·8	175. 21	178. 51	5·1	277. 10	284. 10	3·2	93. 59	104. 29	1·0	265. 53	279. 53
March	21·6	8·9	145. 13	147. 21	9·0	268. 56	273. 12	5·3	84. 55	91. 19	2·7	246. 13	254. 45
April	30·7	12·3	136. 53	136. 54	11·9	264. 9	264. 11	5·4	104. 45	104. 48	2·1	286. 2	286. 6
May	41·6	20·6	125. 10	124. 18	16·1	276. 39	274. 55	5·1	109. 19	106. 43	1·0	304. 36	301. 8
June	32·0	16·0	126. 25	126. 31	14·0	269. 35	269. 47	3·2	98. 32	98. 50	0·4	306. 36	307. 0
July	24·5	10·1	129. 17	130. 39	12·1	269. 13	271. 57	4·3	91. 13	95. 19	0·8	279. 39	285. 7
August	30·7	8·1	128. 36	129. 31	15·7	280. 0	281. 50	6·7	97. 29	100. 14	1·0	265. 53	269. 33
September	18·6	5·9	159. 26	158. 9	11·3	275. 26	272. 52	4·0	107. 39	103. 48	1·7	295. 48	290. 40
October	15·0	9·6	192. 26	188. 55	8·9	272. 41	265. 39	4·4	104. 1	93. 28	3·0	303. 7	289. 3
November	12·4	13·6	185. 11	181. 32	6·6	286. 8	278. 50	2·0	132. 58	122. 1	1·3	263. 32	248. 56
December	8·6	7·6	203. 9	202. 11	2·7	311. 37	309. 41	1·6	218. 0	215. 6	0·4	19. 14	15. 22
For the Year	19·9	9·0	149. 57	149. 57	9·5	274. 16	274. 16	3·4	102. 35	102. 35	1·2	284. 38	284. 38

TABLE XVII.—SEPARATE RESULTS of OBSERVATIONS of MAGNETIC DIP made in the Year 1889.

Day and Hour, (Civil Reckoning) 1889.	Needle.	Magnetic Dip.	Observer.	Day and Hour, (Civil Reckoning) 1889.	Needle.	Magnetic Dip.	Observer.	Day and Hour, (Civil Reckoning) 1889.	Needle.	Magnetic Dip.	Observer.
d h		° ′ ″		d h		° ′ ″		d h		° ′ ″	
Jan. 2. 15	C 2	67. 26. 42	N	May 4. 13	B 2	67. 24. 32	N	Sept. 4. 15	D 1	67. 25. 0	N
7. 15	C 1	67. 24. 11	N	6. 15	C 1	67. 20. 59	N	6. 13	D 2	67. 25. 36	N
15. 13	B 2	67. 23. 53	N	8. 14	B 1	67. 21. 59	N	6. 14	C 1	67. 23. 50	N
15. 14	B 1	67. 23. 23	N	8. 16	C 1	67. 23. 58	N	10. 13	C 2	67. 24. 56	N
15. 15	C 2	67. 25. 5	N	9. 14	C 2	67. 25. 32	N	12. 14	B 2	67. 22. 41	N
19. 13	D 2	67. 28. 28	N	14. 13	D 1	67. 24. 11	N	12. 16	B 1	67. 23. 25	N
23. 15	D 1	67. 26. 30	N	14. 14	D 2	67. 24. 20	N	16. 15	B 2	67. 22. 49	N
23. 15	D 2	67. 25. 54	N	17. 15	D 2	67. 24. 38	N	18. 15	B 1	67. 22. 2	N
30. 16	C 1	67. 25. 30	N	17. 16	D 1	67. 24. 29	N	19. 15	B 2	67. 22. 46	N
31. 12	B 2	67. 24. 42	N	23. 15	C 2	67. 22. 58	N	21. 13	C 2	67. 22. 59	N
31. 14	B 1	67. 24. 6	N	23. 16	B 1	67. 21. 25	N	25. 14	C 1	67. 24. 40	N
				27. 15	B 2	67. 21. 42	N	25. 15	D 2	67. 26. 0	N
				31. 14	C 1	67. 23. 16	N	27. 15	D 1	67. 27. 0	N
Feb. 2. 13	B 2	67. 23. 55	N	June 5. 15	B 2	67. 22. 58	N	Oct. 5. 13	C 2	67. 23. 24	N
7. 14	B 1	67. 25. 22	N	5. 16	B 1	67. 24. 0	N	8. 15	D 2	67. 25. 52	N
7. 16	C 1	67. 25. 28	N	7. 16	C 1	67. 23. 40	N	9. 13	D 1	67. 26. 22	N
9. 13	C 2	67. 25. 49	N	11. 15	D 2	67. 25. 21	N	10. 13	C 2	67. 25. 11	N
13. 15	D 1	67. 26. 39	N	11. 16	D 1	67. 23. 52	N	10. 14	B 1	67. 22. 31	N
13. 16	D 2	67. 26. 22	N	12. 15	C 2	67. 23. 8	N	14. 16	B 2	67. 23. 13	N
15. 14	D 2	67. 26. 29	N	18. 16	C 2	67. 23. 18	N	15. 15	B 1	67. 21. 50	N
15. 15	D 1	67. 26. 36	N	20. 15	D 1	67. 23. 30	N	16. 16	C 1	67. 23. 24	N
22. 14	C 1	67. 25. 54	N	20. 16	D 2	67. 22. 24	N	17. 15	D 1	67. 26. 7	N
22. 15	C 2	67. 25. 15	N	25. 12	C 1	67. 23. 24	N	19. 12	B 2	67. 22. 59	N
27. 14	B 2	67. 23. 17	N	25. 15	B 1	67. 22. 8	N	23. 14	B 1	67. 23. 23	N
28. 12	B 1	67. 23. 4	N	26. 13	B 2	67. 23. 11	N	23. 15	D 1	67. 25. 31	N
								26. 13	D 2	67. 26. 55	N
								30. 14	C 2	67. 24. 21	N
Mar. 1. 16	C 1	67. 24. 42	N	July 2. 16	D 2	67. 25. 21	N	Nov. 2. 13	B 2	67. 22. 25	N
5. 15	B 1	67. 22. 45	N	5. 15	D 1	67. 24. 34	N	5. 15	B 1	67. 24. 45	N
6. 15	B 2	67. 24. 26	N	8. 16	C 1	67. 25. 56	N	8. 12	C 1	67. 23. 45	N
9. 13	C 2	67. 24. 23	N	9. 12	B 1	67. 21. 1	N	8. 14	C 2	67. 23. 45	N
13. 15	D 1	67. 26. 8	N	9. 15	B 2	67. 20. 27	N	12. 14	D 1	67. 25. 46	N
13. 16	D 2	67. 26. 0	N	12. 16	C 2	67. 22. 48	N	12. 15	D 2	67. 26. 14	N
19. 12	D 2	67. 24. 55	N	17. 12	C 1	67. 24. 8	N	14. 15	B 2	67. 22. 45	N
19. 14	D 1	67. 26. 13	N	19. 13	D 1	67. 25. 15	N	16. 12	D 2	67. 25. 56	N
22. 14	C 2	67. 25. 30	N	20. 13	C 2	67. 23. 57	N	19. 14	D 1	67. 26. 21	N
25. 15	B 2	67. 23. 16	N	22. 16	B 2	67. 21. 34	N	20. 13	D 2	67. 26. 13	N
26. 15	B 1	67. 22. 34	N	23. 16	B 1	67. 21. 6	N	23. 12	C 1	67. 23. 8	N
30. 13	C 1	67. 25. 26	N	24. 14	C 1	67. 23. 21	N	25. 13	C 2	67. 22. 56	N
				24. 16	D 1	67. 25. 19	N	25. 14	B 1	67. 22. 39	N
				30. 16	D 2	67. 24. 40	N	29. 13	B 2	67. 23. 22	N
Apr. 3. 15	D 1	67. 26. 23	N	Aug. 1. 14	C 2	67. 22. 8	N	Dec. 2. 12	C 1	67. 23. 56	N
4. 16	D 2	67. 25. 36	N	1. 15	C 1	67. 20. 12	N	5. 13	D 1	67. 24. 57	N
6. 13	C 1	67. 24. 56	N	7. 13	B 1	67. 23. 54	E	6. 14	D 2	67. 26. 23	N
8. 15	B 1	67. 24. 3	N	9. 13	B 2	67. 21. 58	E	9. 14	C 2	67. 23. 7	N
11. 12	B 2	67. 23. 36	N	14. 16	C 1	67. 23. 30	N	11. 14	B 1	67. 21. 42	N
11. 15	C 2	67. 24. 40	N	15. 15	D 2	67. 25. 6	N	13. 14	B 2	67. 22. 30	N
16. 16	D 1	67. 25. 26	N	15. 16	D 1	67. 23. 42	N	18. 13	B 2	67. 22. 19	N
18. 15	C 2	67. 23. 17	N	17. 13	D 2	67. 25. 4	N	19. 13	B 1	67. 20. 30	N
20. 13	B 2	67. 23. 44	N	21. 15	D 1	67. 26. 55	N	21. 13	C 2	67. 22. 19	N
25. 14	B 1	67. 22. 58	N	22. 15	D 2	67. 24. 59	N	27. 13	D 2	67. 25. 52	N
25. 15	C 1	67. 23. 10	N	23. 13	C 2	67. 24. 20	N	27. 14	D 1	67. 26. 43	N
26. 15	D 2	67. 26. 17	N	23. 15	B 1	67. 21. 52	N	28. 13	C 1	67. 23. 46	N
29. 15	D 1	67. 24. 57	N	26. 16	B 2	67. 21. 56	N				
				28. 15	B 1	67. 23. 39	N				
				29. 14	C 2	67. 22. 56	N				
				29. 15	C 1	67. 22. 57	N				

The needles B 1 and B 2 are 9 inches in length ; C 1 and C 2, 6 inches ; and D 1 and D 2, 3 inches.
The initials E and N are those of Mr. Ellis and Mr. Nash.

TABLE XVIII.—MONTHLY and YEARLY MEANS of MAGNETIC DIP in the YEAR 1889.

Monthly Means of Magnetic Dip.

Month, 1889.	B 1, 9-inch Needle.	Number of Observations.	B 2, 9-inch Needle.	Number of Observations.	C 1, 6-inch Needle.	Number of Observations.
	° ′ ″		° ′ ″		° ′ ″	
January	67. 23. 44	2	67. 24. 18	2	67. 24. 50	2
February	67. 24. 13	2	67. 23. 36	2	67. 25. 41	2
March	67. 22. 39	2	67. 23. 51	2	67. 25. 4	2
April	67. 23. 30	2	67. 23. 40	2	67. 24. 3	2
May	67. 21. 42	2	67. 23. 7	2	67. 22. 44	3
June	67. 23. 4	2	67. 23. 4	2	67. 23. 32	2
July	67. 21. 3	2	67. 21. 1	2	67. 24. 28	3
August	67. 23. 8	3	67. 21. 57	2	67. 22. 13	3
September	67. 22. 43	2	67. 22. 45	3	67. 24. 15	2
October	67. 22. 35	3	67. 23. 6	2	67. 23. 24	1
November	67. 23. 42	2	67. 22. 51	3	67. 23. 26	2
December	67. 21. 6	2	67. 22. 24	2	67. 23. 51	2
Means	67. 22. 46	Sum 26	67. 22. 58	Sum 26	67. 23. 53	Sum 26

Month, 1889.	C 2, 6-inch Needle.	Number of Observations.	D 1, 3-inch Needle.	Number of Observations.	D 2, 3-inch Needle.	Number of Observations.
	° ′ ″		° ′ ″		° ′ ″	
January	67. 25. 54	2	67. 26. 30	1	67. 27. 11	2
February	67. 25. 32	2	67. 26. 37	2	67. 26. 25	2
March	67. 24. 57	2	67. 26. 10	2	67. 25. 28	2
April	67. 23. 59	2	67. 25. 35	3	67. 25. 57	2
May	67. 24. 15	2	67. 24. 20	2	67. 24. 29	2
June	67. 23. 13	2	67. 23. 41	2	67. 23. 53	2
July	67. 23. 22	2	67. 25. 3	3	67. 25. 0	2
August	67. 23. 8	3	67. 25. 19	2	67. 25. 3	3
September	67. 23. 58	2	67. 26. 0	2	67. 25. 48	2
October	67. 24. 19	3	67. 26. 0	3	67. 26. 23	2
November	67. 23. 21	2	67. 26. 3	2	67. 26. 8	3
December	67. 22. 43	2	67. 25. 50	2	67. 26. 8	2
Means	67. 24. 2	Sum 26	67. 25. 33	Sum 26	67. 25. 39	Sum 26

The monthly means have been formed without reference to the hour at which the observation on each day was made.
In combining the monthly results, to form annual means, weights have been given proportional to the number of observations.

COLLECTED YEARLY MEANS of MAGNETIC DIP for each of the NEEDLES, and GENERAL MEAN for the Year 1889.

Lengths of the several Sets of Needles.	Needles.	Number of Observations with each Needle.	Mean Yearly Dip from Observations with each Needle.	Mean Yearly Dip from each Set of Needles.	Mean Yearly Dip from all the Sets of Needles.
			° ′ ″	° ′ ″	° ′ ″
9-inch Needles	B 1	26	67. 22. 46	67. 22. 52	
	B 2	26	67. 22. 58		
6-inch Needles	C 1	26	67. 23. 53	67. 23. 58	67. 24. 9
	C 2	26	67. 24. 2		
3-inch Needles	D 1	26	67. 25. 33	67. 25. 36	
	D 2	26	67. 25. 39		

TABLE XIX.—DETERMINATIONS OF THE ABSOLUTE VALUE OF HORIZONTAL MAGNETIC FORCE IN THE YEAR 1889.

Abstract of the Observations of Deflexion of a Magnet for Absolute Measure of Horizontal Force.

Day and Hour, (Civil Reckoning), 1889.	Distances of Centres of Magnets.	Temperature.	Observed Deflexion.	Mean of the Times of Vibration of Deflecting Magnet.	Number of Vibrations.	Temperature.	Observer.
d h	ft.	°	° ′ ″	s		°	
January 26 13	1·0	41·8	10. 21. 20	5·701	100	41·9	N
	1·3		4. 41. 52	5·700	100	42·5	
February 18 13	1·0	43·6	10. 22. 11	5·698	100	43·6	N
	1·3		4. 42. 21	5·700	100	44·1	
March 16 13	1·0	39·8	10. 21. 41	5·705	100	39·4	N
	1·3		4. 42. 5	5·691	100	39·9	
April 13 13	1·0	47·3	10. 19. 57	5·700	100	47·4	N
	1·3		4. 41. 16	5·698	100	47·9	
May 16 14	1·0	59·0	10. 18. 30	5·706	100	59·1	N
	1·3		4. 40. 29	5·704	100	60·4	
June 18 14	1·0	62·8	10. 18. 19	5·707	100	62·4	N
	1·3		4. 40. 28	5·709	100	64·0	
July 18 15	1·0	62·8	10. 17. 29	5·710	100	61·9	N
	1·3		4. 40. 2	5·705	100	63·5	
August 16 15	1·0	65·2	10. 17. 24	5·712	100	65·9	N
	1·3		4. 40. 17	5·708	100	66·8	
September 14 13	1·0	66·8	10. 17. 26	5·708	100	66·4	N
	1·3		4. 40. 13	5·710	100	66·4	
October 16 14	1·0	53·4	10. 18. 20	5·715	100	53·3	N
	1·3		4. 40. 36	5·707	100	54·1	
November 15 14	1·0	48·5	10. 18. 10	5·702	100	48·5	N
	1·3		4. 40. 32	5·702	100	49·0	
December 12 14	1·0	38·1	10. 18. 22	5·703	100	38·1	N
	1·3		4. 40. 44	5·700	100	39·2	

The deflecting magnet is placed on the east side of the suspended magnet, with its marked pole alternately east and west, and on the west side with its marked pole also alternately east and west: the deflexion given in the table above is the mean of the four deflexions observed in these positions of the magnets.

The initial N is that of Mr. Nash.

In the subsequent calculations every observation is reduced to the temperature 35° Fahrenheit.

Computation of the Values of Horizontal Force in Absolute Measure.

Day and Hour, (Civil Reckoning), 1889.	In English Measure.									In Metric Measure.
	Apparent Value of A_1.	Apparent Value of A_2.	Apparent Value of P.	Mean Value of P.	Log $\frac{m}{X}$.	Adopted Time of Vibration of Deflecting Magnet.	Log m X.	Value of m.	Value of X.	Value of X.
d h						s				
January 26 13	0·08997	0·09005	−0·00220	−0·00266	8·95520	5·7005	0·14757	0·3559	3·9462	1·8195
February 18 13	0·09012	0·09023	−0·00316		8·95599	5·6990	0·14790	0·3564	3·9442	1·8186
March 16 13	0·08999	0·09009	−0·00271		8·95536	5·6980	0·14783	0·3561	3·9467	1·8197
April 13 13	0·08985	0·08994	−0·00243		8·95466	5·6990	0·14817	0·3560	3·9515	1·8220
May 16 14	0·08982	0·08987	−0·00130		8·95442	5·7050	0·14809	0·3558	3·9521	1·8223
June 18 14	0·08986	0·08993	−0·00186		8·95464	5·7080	0·14754	0·3557	3·9487	1·8207
July 18 15	0·08974	0·08979	−0·00135		8·95401	5·7075	0·14757	0·3555	3·9517	1·8220
August 16 15	0·08976	0·08990	−0·00384		8·95435	5·7100	0·14742	0·3555	3·9495	1·8210
September 14 13	0·08979	0·08991	−0·00316		8·95443	5·7090	0·14759	0·3556	3·9498	1·8212
October 16 14	0·08971	0·08982	−0·00293		8·95403	5·7110	0·14647	0·3550	3·9466	1·8197
November 15 14	0·08961	0·08972	−0·00299		8·95356	5·7020	0·14748	0·3552	3·9533	1·8228
December 12 14	0·08949	0·08964	−0·00400		8·95304	5·7015	0·14688	0·3548	3·9529	1·8226
Means	...	...	...	...	...	...	...	...	3·9494	1·8210

The value of X in English Measure is referred to the Foot-Grain-Second Unit, and in Metric Measure to the Millimètre-Milligramme-Second Unit. To obtain X in the Centimètre-Gramme-Second (C.G.S.) Unit, the values in the last column of the table must be divided by 10.

MONTHLY MEAN DIURNAL INEQUALITIES OF MAGNETIC ELEMENTS FROM HOURLY ORDINATES, ON FIVE SELECTED DAYS, IN EACH MONTH.

Each result is the mean of the corresponding hourly ordinates from the photographic register, on five quiet days in each month, selected for comparison with results at other British Observatories. The days included are January 3, 6, 15, 24, 27, February 4, 10, 13, 22, 25, March 3, 10, 19, 21, 24, April 5, 11, 16, 17, 19, May 3, 9, 16, 21, 25, June 5, 8, 12, 24, 27, July 4, 9, 15, 22, 25, August 3, 5, 14, 24, 30, September 4, 7, 15, 20, 29, October 4, 11, 16, 23, 27, November 5, 13, 15, 19, 21, December 4, 10, 18, 19, 25.

The results for Declination are given in minutes of arc : those for Horizontal Force and Vertical Force are given both in terms of the whole Horizontal or Vertical Force and in terms of the Millimètre-Milligramme-Second (Metric) Unit. The letter *f* indicates values in terms of the whole Horizontal or Vertical Force, and the letter *m* values in terms of the Metric Unit, the unit for the former values being ·00001 of the whole Horizontal or Vertical Force, and for the latter ·00001 of the Metric Unit, or ·000001 of the Centimètre-Gramme-Second (C.G.S.) Unit. The values of the whole Horizontal and Vertical Forces expressed in terms of the Metric Unit are 1·8210 and 4·3747 respectively for the year.

TABLE XX.—MONTHLY MEAN DIURNAL INEQUALITY OF MAGNETIC DECLINATION WEST.

(The results are in each case diminished by the smallest hourly value.)

Hour Greenwich Civil Time.	1889. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	For the year.
Midnight	0′·0	0′·5	0′·9	3′·3	3′·5	3′·5	2′·5	1′·4	1′·4	0′·6	0′·5	0′·1	1′·26
1h	0·2	0·8	1·2	3·4	3·6	3·4	2·4	2·2	1·5	1·3	0·6	0·6	1·51
2	0·6	0·6	0·9	3·2	3·4	3·6	1·8	2·0	1·7	1·5	1·3	0·8	1·52
3	0·6	0·9	0·9	2·9	3·1	3·0	1·6	2·1	1·3	1·7	1·7	1·3	1·50
4	0·4	1·0	0·4	2·9	2·6	2·1	1·1	1·3	1·3	1·6	1·9	1·0	1·21
5	0·5	1·1	0·9	2·1	1·2	0·8	0·5	1·3	1·1	1·2	1·4	1·1	0·84
6	0·4	1·1	0·8	1·6	0·6	0·0	0·0	0·3	0·8	1·4	1·5	1·0	0·53
7	0·3	0·8	0·7	0·8	0·0	0·0	0·1	0·0	0·3	1·3	1·4	0·8	0·28
8	0·2	0·3	0·1	0·0	0·3	0·2	0·1	0·1	0·0	0·1	1·2	0·5	0·00
9	0·5	0·0	0·0	0·9	1·5	1·1	0·5	0·8	0·7	0·0	1·1	1·0	0·42
10	0·8	0·8	1·2	3·0	3·5	3·2	2·0	2·7	2·3	1·5	1·9	1·4	1·76
11	1·5	2·6	3·4	5·7	6·1	5·9	4·2	5·1	4·6	4·0	3·0	2·3	3·77
Noon	2·2	3·8	5·8	8·4	7·7	7·8	6·4	6·7	6·6	5·9	3·8	2·9	5·41
13h	2·9	4·7	6·4	9·6	8·3	8·4	7·2	8·0	7·5	6·1	4·3	3·2	6·12
14	2·5	4·4	6·1	9·1	7·3	7·9	8·0	7·5	6·7	5·5	3·7	2·2	5·65
15	1·5	3·4	5·2	7·2	6·1	6·8	7·1	5·9	5·4	4·1	2·8	1·9	4·52
16	1·3	2·4	3·6	6·0	5·0	5·4	6·1	3·8	4·2	3·1	2·2	1·7	3·47
17	0·8	2·0	2·4	5·2	4·1	4·3	4·6	2·9	3·4	2·7	1·5	1·5	2·69
18	0·6	1·4	1·9	4·6	3·4	3·8	3·9	2·6	2·8	2·5	1·2	1·1	2·22
19	0·5	1·3	1·8	3·9	3·7	3·8	3·4	2·5	2·7	2·1	0·9	0·6	2·01
20	0·2	0·8	1·5	3·3	3·8	3·8	3·2	2·7	1·8	1·7	0·4	0·5	1·71
21	0·1	0·6	1·2	3·1	3·9	4·1	3·1	2·4	1·8	1·3	0·5	0·0	1·58
22	0·0	0·5	1·0	3·1	3·9	4·0	3·1	2·2	2·0	1·4	0·0	0·2	1·52
23	0·2	0·1	0·6	3·0	3·7	3·8	2·6	2·2	0·9	0·5	0·1	0·1	1·22
Means ...	0′·78	1′·50	2′·04	4′·01	3′·76	3′·78	3′·15	2′·86	2′·62	2′·21	1′·62	1′·16	2′·20

TABLE XXI.—MONTHLY MEAN DIURNAL INEQUALITY OF HORIZONTAL MAGNETIC FORCE

(The results are corrected for temperature and in each case diminished by the smallest hourly value.)

1889.

Hour Greenwich Civil Time.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		For the Year.	
	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m
Midn.	2	4	47	86	63	115	143	260	130	237	146	266	133	242	188	342	166	302	106	193	97	177	8	15	96·6	175·9
1h	0	0	55	100	66	120	155	282	126	229	134	244	121	220	173	315	162	295	111	202	75	137	18	33	93·9	170·7
2	8	15	44	80	56	102	137	249	115	209	138	251	111	202	171	311	159	290	111	202	73	133	14	25	89·0	161·7
3	15	27	39	71	60	109	123	224	103	188	138	251	93	169	160	291	148	270	109	198	85	155	24	44	85·6	155·7
4	24	44	44	80	53	97	127	231	108	197	131	239	98	178	154	280	139	253	112	204	101	184	30	55	87·6	159·5
5	27	49	48	87	51	93	116	211	94	171	123	224	88	160	132	240	137	249	122	222	82	149	36	66	82·2	149·4
6	33	60	59	107	54	98	106	193	72	131	92	168	64	117	119	217	137	249	116	211	92	168	43	78	76·4	139·0
7	42	76	67	122	64	117	82	149	50	91	66	120	46	84	77	140	125	228	98	178	90	164	59	107	66·4	120·6
8	26	47	57	104	54	98	54	98	16	29	28	51	26	47	41	75	89	162	74	135	69	126	45	82	42·5	77·1
9	22	40	27	49	20	36	12	22	0	0	0	0	10	18	21	38	54	98	28	51	43	78	23	42	15·9	28·6
10	2	4	8	15	10	18	0	0	16	29	6	11	0	0	0	0	10	18	0	0	16	29	2	4	0·0	0·0
11	2	4	0	0	0	0	14	25	40	73	32	58	6	11	24	44	0	0	8	15	0	0	16	29	6·0	10·9
Noon	16	29	6	11	18	33	51	93	64	117	81	148	38	69	69	126	30	55	48	87	25	46	21	38	33·1	60·3
13h	40	73	32	58	62	113	99	180	105	191	101	184	60	109	128	233	78	142	70	127	59	107	38	69	66·9	121·5
14	40	73	47	86	83	151	138	251	129	235	139	253	94	171	162	295	113	206	92	168	55	100	41	75	88·6	161·3
15	22	40	53	97	99	180	148	270	135	246	165	300	119	217	190	346	131	239	106	193	55	100	35	64	99·0	180·3
16	26	47	56	102	101	184	164	299	150	273	164	299	131	239	206	375	125	228	112	204	61	111	27	49	104·4	190·1
17	26	47	72	131	91	166	176	320	166	302	170	310	129	235	204	371	141	257	120	219	86	157	36	66	112·3	204·4
18	32	58	74	135	91	166	173	315	180	328	186	339	163	297	213	388	165	300	140	255	95	173	30	55	122·7	223·4
19	31	56	79	144	103	188	177	322	192	350	202	368	179	326	229	417	183	333	155	282	99	180	21	38	131·7	239·6
20	23	42	67	122	78	142	171	311	190	346	198	361	185	337	235	428	177	322	146	266	94	171	28	51	126·9	230·9
21	14	25	69	126	80	146	159	290	180	328	202	368	175	319	222	404	157	286	152	277	92	168	20	36	121·0	220·4
22	14	25	74	135	77	140	152	277	183	333	186	339	155	282	228	415	156	284	134	244	68	124	0	0	113·1	205·8
23	5	9	67	122	74	135	143	260	172	313	188	342	148	270	218	397	156	284	149	271	81	148	8	15	111·6	203·1
Means	20·5	37·2	49·6	90·4	62·8	114·5	117·5	213·8	113·2	206·1	125·7	228·9	98·8	180·0	148·5	270·3	122·4	222·9	100·8	183·5	70·5	128·5	26·0	47·3	82·2	149·6

TABLE XXII.—MONTHLY MEAN DIURNAL INEQUALITY OF VERTICAL MAGNETIC FORCE.

(The results are corrected for temperature and in each case diminished by the smallest hourly value.)

1889.

Hour Greenwich Civil Time.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		For the Year.	
	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m
Midn.	5	22	14	61	21	92	33	144	48	210	31	136	37	162	29	127	29	127	13	57	16	70	6	26	21·9	95·9
1h	4	17	14	61	23	101	31	136	50	219	29	127	35	153	31	136	31	136	15	66	16	70	2	9	21·8	95·7
2	2	9	8	35	15	66	31	136	48	210	28	122	33	144	33	144	33	144	15	66	12	52	0	0	19·9	87·1
3	2	9	12	52	18	79	36	157	52	227	30	131	31	136	34	149	35	153	13	57	12	52	6	26	21·8	95·4
4	6	26	12	52	20	87	38	166	58	254	36	157	38	166	42	184	36	157	15	66	8	35	4	17	24·5	107·0
5	9	39	17	74	22	96	42	184	66	289	36	157	40	175	48	210	38	166	13	57	8	35	4	17	27·0	118·0
6	9	39	17	74	22	96	44	192	60	262	34	149	36	157	56	245	38	166	18	79	4	17	4	17	26·9	117·5
7	11	48	19	83	24	105	44	192	60	262	40	175	40	175	56	245	42	184	17	74	4	17	4	17	28·5	124·5
8	9	39	21	92	20	87	38	166	54	236	34	149	36	157	48	210	38	166	17	74	4	17	4	17	25·3	110·6
9	5	22	17	74	14	61	26	114	36	157	22	96	30	131	32	140	28	122	13	57	2	9	6	26	17·6	77·2
10	7	31	9	39	8	35	20	87	18	79	14	61	18	79	18	79	20	87	3	13	2	9	8	35	10·5	45·9
11	11	48	3	13	4	17	8	35	2	9	2	9	6	26	4	17	6	26	0	0	2	9	12	52	3·4	14·8
Noon	1	4	3	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	9	0	0	13	57	0·0	0·0
13h	11	48	0	0	0	0	8	35	14	61	4	17	4	17	6	26	2	9	3	13	6	26	19	83	4·8	21·0
14	15	66	8	35	10	44	22	96	34	149	12	52	23	101	20	87	18	79	13	57	18	79	18	79	16·0	70·1
15	13	57	14	61	22	96	40	175	50	219	22	96	31	136	34	149	30	131	23	101	22	96	14	61	24·7	107·9
16	13	57	19	83	36	157	42	184	60	262	34	149	41	179	37	162	38	166	27	118	16	70	14	61	29·8	130·4
17	9	39	17	74	38	166	44	192	68	297	44	192	43	188	47	206	34	149	21	92	14	61	16	70	31·3	136·9
18	9	39	13	57	34	149	46	201	66	289	44	192	49	214	47	206	36	157	19	83	16	70	12	52	31·0	135·5
19	11	48	8	35	32	140	46	201	62	271	42	184	45	197	39	171	32	140	19	83	12	52	14	61	28·6	125·0
20	11	48	10	44	30	131	44	192	54	236	42	184	37	162	37	162	30	131	21	92	12	52	12	52	26·7	116·9
21	6	26	10	44	25	109	44	192	51	223	34	149	35	153	35	153	27	118	23	101	16	70	12	52	24·9	108·9
22	4	17	6	26	27	118	39	171	47	206	34	149	33	144	35	153	27	118	21	92	8	35	14	61	23·0	100·6
23	0	0	4	17	25	109	39	171	47	206	32	140	33	144	35	153	27	118	15	66	6	26	14	61	21·5	94·0
Means	7·6	33·2	11·5	50·0	20·4	89·2	33·5	146·6	46·0	201·4	28·3	123·9	31·4	137·3	33·5	146·4	28·1	122·9	15·0	65·5	9·8	42·9	9·7	42·0	21·3	93·2

ROYAL OBSERVATORY, GREENWICH.

MAGNETIC DISTURBANCES

AND

EARTH CURRENTS.

1889.

MAGNETIC DISTURBANCES in DECLINATION, HORIZONTAL FORCE, and VERTICAL FORCE, and EARTH CURRENTS, recorded at the ROYAL OBSERVATORY, GREENWICH, in the Year 1889.

The following notes give a brief description of all magnetic movements (superposed on the ordinary diurnal movement) exceeding 3′ in Declination, 0·001 in Horizontal Force, or 0·0003 in Vertical Force, as taken from the photographic records of the respective Magnetometers. The movements in Horizontal and Vertical Force are expressed in parts of the whole Horizontal and Vertical Forces respectively. When any one of the three elements is not specifically mentioned it is to be understood that the movement, if any, was insignificant. Any failure or want of register is specially indicated.

The term "wave" is used to indicate a movement in one direction and return; "double wave" a movement in one direction and return with continuation in the opposite direction and return; "two successive waves" consecutive wave movements in the same direction; "fluctuations" a number of movements in both directions. The extent and direction of the movement are indicated in brackets, + denoting an increase, and − a decrease of the magnetic element. In the case of fluctuations the sign ± denotes positive and negative movements of generally equal extent.

In all cases of marked magnetic movement the earth-current photographs show corresponding earth currents, but it has not been thought necessary to refer to these in detail.

Magnetic movements which do not admit of brief description in this way are exhibited with their corresponding earth currents on accompanying plates.

The time is Greenwich Civil Time (commencing at midnight, and counting the hours from 0 to 24).

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January 1. 19^h to 2. 9^h Fluctuations in Dec. (± 3′): in H.F. (± ·001): in V.F. (± ·0001).

2. 17^h to 21^h Fluctuations in Dec. (± 2′).

7. $19\frac{1}{2}^h$ to $20\frac{1}{2}^h$ Double crested wave in Dec. (− 10′ and − 5′). $19\frac{1}{2}^h$ to 23^h Fluctuations in H.F. (± ·001): in V.F. (± ·0002).

10. 19^h to $20\frac{1}{2}^h$ Wave in Dec. (− 10′), followed till 11. 2^h by small fluctuations: fluctuations in H.F. (± ·0008): in V.F. (± ·0001).

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January 11. $21\frac{1}{3}^h$ to $21\frac{2}{3}^h$ Wave in Dec. (− 5′), followed till 12. 4^h by small fluctuations. 11. $21\frac{1}{3}^h$ to $22\frac{1}{2}^h$ Wave in H.F. (+ ·0015), followed till 12. 4^h by small fluctuations.

12. 20^h to 13. 3^h. Fluctuations in Dec. (± 2′). 12. 20^h to 13. 0^h Fluctuations in H.F. (± ·0015): in V.F. (± ·0002).

13. 14^h to 14. 0^h Fluctuations in Dec. (± 2′): in H.F. and V.F. small.

20. 2^h to 8^h Fluctuations in Dec. (± 3′): in H.F. (± ·0008).

20. 12^h to 21. 12^h. See Plate I.

21. 14^h to 22. 6^h Fluctuations in Dec. (± 4′): in H.F. (± ·0015): in V.F. (± ·0001).

23. 19^h to $20\frac{1}{2}^h$ Wave in Dec. (− 7′): in H.F. (− ·001): increase of V.F. (+ ·0003).

30. 19^h to 31. 1^h Fluctuations in Dec. (± 4′): in H.F. (± ·0008): in V.F. small.

February 3. 12^h to 22^h Fluctuations in Dec. (± 3′): in H.F. (± ·0013). in V.F. (± ·0001).

6. $23\frac{1}{2}^h$ to 7. $0\frac{1}{2}^h$ Wave in Dec. (− 7′), followed till 7. 3^h by small fluctuations: 6. 22^h to 7. 2^h Fluctuations in H.F. (± ·001): in V.F. (± ·0001).

7. 14^h to 8. 3^h Fluctuations in Dec. (± 2′): in H.F. (± ·0008): in V.F. small.

8. 13^h to 23^h Fluctuations in Dec. (± 2′): in H.F. (± ·0007).

14. $21\frac{1}{2}^h$ to 15. 1^h Double crested wave in Dec. (− 8′): small fluctuations in H.F. and V.F.

15. 12^h to 16. 5^h Fluctuations in Dec. (± 3′): in H.F. (± ·0008): in V.F. (± ·0002).

16. 19^h to 17. 0^h Fluctuations in Dec. (± 2′)

17. 11^h to 19. 2^h Fluctuations in Dec. (± 5′): in H.F. (± ·0015): in V.F. (± ·0002).

19. 20^h to 20. 8^h Fluctuations in Dec. (± 3′): in H.F. (± ·0008): in V.F. small.

21. 22^h to 22. 2^h Fluctuations in H.F. (± ·0007).

22. 22^h to 23. 6^h Fluctuations in Dec. (± 5′): in H.F. (± ·001). 23. 1^h to $2\frac{1}{2}^h$ Decrease of V.F. (− ·0003).

24. $21\frac{1}{2}^h$ to $22\frac{1}{2}^h$ Wave in Dec. (− 2′): in H.F. (+ ·0016): in V.F. (− ·0001).

26. 20^h to 27. 6^h Fluctuations in Dec. (± 3′): in H.F. and V.F. small.

27. 17^h to $18\frac{1}{2}^h$ Wave in Dec. (− 8′), followed till 28. 2^h by fluctuations (± 2′): fluctuations in H.F. (± ·0012): in V.F. (± ·0001).

28. 23^h to March 1. 7^h Fluctuations in Dec. (± 7′): in H.F. (± ·001): in V.F. (± ·0002).

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March 1. 12^h to 21^h Fluctuations in Dec. (± 3′) : in H.F. (± ·001) : in V.F. small.

2. $18\frac{1}{2}^h$ to 21^h Wave in Dec. (– 4′).

5. 20^h to 6. 10^h Fluctuations in Dec. (± 4′) : in H.F. (± ·0012) : in V.F. small.

6. 10^h to 22^h. See Plate I.

6. 22^h to 7. 9^h Fluctuations in Dec. (± 5′) : in H.F. (± ·001) : in V.F. (± ·0001).

7. 19^h to 23^h Fluctuations in Dec. (± 4′) : in H.F. (± ·0008) : in V.F. (± ·0001).

8. 16^h to 20^h Fluctuations in Dec. (± 3′).

12. 21^h to 13. 1^h Fluctuations in Dec. (± 5′) : in H.F. (± ·0008) : in V.F. (± ·0001).

13. 19^h to 14. 7^h Fluctuations in Dec. (± 4′), with wave 14. $1\frac{3}{4}^h$ to $3\frac{1}{2}^h$ (+ 13′) : fluctuations in H.F. (± ·0015) : in V.F. (± ·0003).

14. 18^h to 15. 4^h Fluctuations in Dec. (± 3′) : in H.F. and V.F. small.

17. 18^h to 18. 3^h. See Plate I.

20. 19^h to 21. 0^h Fluctuations in Dec. (± 3′) : in H.F. small.

22. 6^h to 15^h Small rapid fluctuations in Dec., H.F. and V.F. 22. 20^h to 23. 2^h Fluctuations in Dec. (± 3′) : in H.F. (± ·0006) : in V.F. small.

26. 14^h to 27. 5^h Fluctuations in Dec. (± 4′) : in H.F. (± ·001) : in V.F. (± ·0001).

28. 3^h to 29. 3^h. See Plate I.

29. $16\frac{1}{2}^h$ to $17\frac{1}{2}^h$ Wave in Dec. (– 4′). 29. 16^h to 30. 0^h Fluctuations in H.F. (± ·001) : in V.F. small.

30. 19^h to 23^h Fluctuations in Dec. (± 2′). 30. $20\frac{3}{4}^h$ to 22^h Wave in H.F. (+ ·002) : in V.F. (– ·0001).

31. $20\frac{3}{4}^h$ to 22^h Wave in Dec. (– 5′).

April 1. 19^h to 22^h Fluctuations in Dec. (± 2′) : in H.F. (± ·001) : in V.F. small.

2. 3^h to 6^h Fluctuations in Dec. (± 3′). 5^h to 7^h Wave in H.F. (+ ·0015). $11\frac{1}{2}^h$ to 12^h Wave in Dec. (+ 4′) : in H.F. (+ ·0017) : in V.F. (+ ·0002). 2. 19^h to 4. 0^h Fluctuations in Dec. (± 3′) : in H.F. (± ·001) : in V.F. small.

7. 16^h to $16\frac{3}{4}^h$ Wave in H.F. (+ ·0017).

7. 19^h to 8. 7^h. See Plate II.

8. 7^h to 9^h Fluctuations in Dec. (± 3′) : in H.F. (± ·0008). 8. $19\frac{3}{4}^h$ to 22^h Wave in Dec., steep at commencement (– 10′), followed till 9. 3^h by fluctuations (± 3′) : fluctuations in H.F. (± ·0012). 8. $19\frac{3}{4}^h$ to 20^h Wave in V.F. (– ·0001). 9. 0^h to 3^h Wave in V.F. (– ·0003).

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April 9. 13^h to 10. 5^h Fluctuations in Dec. (± 2′) : in H.F. (± ·001) : in V.F. small.

12. $22\frac{1}{2}^h$ to $23\frac{1}{4}^h$ Wave in Dec. (− 4′).

21. 13^h to 22. 4^h Fluctuations in Dec. (± 2′) : in H.F. (± ·0007) : in V.F. small.

23. 14^h to 24. 5^h Fluctuations in Dec. (± 4′) : in H.F. (± ·0012) : in V.F. (± ·0001).

25. $12\frac{1}{2}^h$ to $13\frac{1}{2}^h$ Wave in H.F. (− ·002). 25. 19^h to 26. 7^h Fluctuations in Dec. (± 4′) : in H.F. (± ·0012) : in V.F. (± ·0002).

27. 21^h to 28. 9^h Fluctuations in Dec. (± 4′). 27. 21^h to 28. 19^h Fluctuations in H.F. (± ·0012). 28. $2\frac{3}{4}^h$ to 7^h Long. wave in V.F. (− ·0005).

May 5. 18^h to 23^h Fluctuations in Dec. (± 3′). 14^h to 23^h Fluctuations in H.F. (± ·0008) : in V.F. (± ·0001).

7. $3\frac{1}{2}^h$ to 6^h Wave in Dec. (+ 6′). $20\frac{3}{4}^h$ to 22^h Wave in Dec. (− 4′).

10. $13\frac{1}{2}^h$ to 15^h Wave in H.F. (+ ·0015).

22. 2^h to 10^h Fluctuations in Dec. (± 5′) : in H.F. (± ·0015). 5^h to 6^h Decrease of V.F. (− ·0004).

26. 5^h to 27. 7^h Occasional small rapid fluctuations in Dec., with wave 26. $20\frac{1}{4}^h$ to 23^h (− 12′) : occasional small rapid fluctuations in H.F., with larger fluctuations 26. 16^h to 23^h (± ·001) : occasional small rapid fluctuations in V.F.

30. 17^h to 19^h Fluctuations in H.F. (± ·001) : in Dec. and V.F. small. 30. 21^h to 31. 5^h Fluctuations in Dec. (± 3′) : in H.F. (± ·0006).

31. 12^h to 20^h Fluctuations in H.F. (± ·001).

June 9. 4^h to 14^h Fluctuations in Dec. (± 3′). 4^h to 20^h Fluctuations in H.F. (± ·0008) : in V.F. small.

10. $19\frac{1}{2}^h$ to 21^h Wave in Dec. (− 5′). 12^h to 22^h Fluctuations in H.F. (± ·0007).

14. 3^h to 8^h Fluctuations in Dec. (± 4′) : in H.F. small.

14. 10^h to 19^h. See Plate II.

14. 20^h to 15. 6^h Fluctuations in Dec. (± 3′) : in H.F. (± ·0007) : in V.F. small.

15. $23\frac{3}{4}^h$ to 16. 2^h Wave in Dec. (+ 5′) : in H.F. (+ ·002). 16. 0^h to 1^h Decrease of V.F. (− ·0004).

20. 19^h to 21. 19^h Fluctuations in Dec. (± 3′) : in H.F. (± ·0012) : in V.F. small.

22. 0^h to 4^h Fluctuations in Dec. (± 6′). 22. 14^h to 18^h Fluctuations in H.F. (± ·0012).

28. 20^h to 29. 4^h Fluctuations in Dec. (± 4′). 28. 14^h to 29. 4^h Fluctuations in H.F. (± ·0015) : in V.F. small.

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July 1. 2^h to 11^h Fluctuations in Dec. (± 3′) : in H.F. (± ·001) : in V.F. (± ·0001). 1. 18^h to 2. 8^h Fluctuations in Dec. (± 4′) : in H.F. (± ·0008).

5. 20^h to 6. 5^h Fluctuations in Dec. (± 3′). 5. 16^h to 6. 5^h. Fluctuations in H.F. (± ·001) : in V.F. small.

6. 14^h to 7. 4^h Fluctuations in H.F. (± ·0015) : in V.F. (± ·0001). 7. 1^h to $2\frac{1}{2}^h$ Wave in Dec. (+ 9′).

11. 14^h to 21^h Fluctuations in Dec. (± 2′) : in H.F. (± ·0015) : in V.F. (± ·0002).

14. 18^h to 21^h Fluctuations in H.F. (± ·001).

17. 0^h to 18. 0^h. See Plate II.

18. 12^h to 16^h Fluctuations in H.F. (± ·001). 18. 21^h to 19. 5^h Fluctuations in Dec. (± 2′) : in H.F. (± ·0006) : in V.F. small.

20. 23^h to 21. 5^h Fluctuations in Dec. (± 6′) : in H.F. (± ·0012) : in V.F. (± ·0002).

25. 23^h to 26. 2^h Fluctuations in Dec. (± 3′). 25. 15^h to 26. 2^h Fluctuations in H.F. (± ·0006).

28. 17^h to 29. 8^h Fluctuations in Dec. (± 3′) : in H.F. (± ·0006).

29. 14^h to 18^h Fluctuations in H.F. (± ·0006). 29. $22\frac{1}{2}^h$ to 30. 0^h Wave in H.F. (+ ·0015).

30. 20^h to 31. 8^h Fluctuations in Dec. (± 5′) : in H.F. (± ·0007) : in V.F. small.

31. 19^h to August 1. 2^h Fluctuations in Dec. (± 2′), with wave, August 1. $0\frac{1}{4}^h$ to 2^h (+ 8′) : fluctuations in H.F. (± ·001). August 1. $0\frac{3}{4}^h$ to $1\frac{1}{4}^h$ Decrease of V.F. (— ·0006).

August 1. 18^h to 2. 3^h Fluctuations in Dec. (± 3′). 1. 14^h to 2. 0^h Fluctuations in H.F. (± ·0012). 1. 16^h to 20^h Fluctuations in V.F. (± ·0002). 1. 22^h to 23^h Decrease of V.F. (— ·0005).

2. 12^h to 23^h Fluctuations in H.F. (± ·0008).

8. 15^h to 19^h Fluctuations in H.F. (± ·001) : in Dec. and V.F. small.

13. 0^h to 14. 0^h. See Plate II.

15. 18^h to 16. 5^h Fluctuations in Dec. (± 3′). 15. 16^h to 16. 5^h Fluctuations in H.F. (± ·0008) : in V.F. small.

20. 13^h to 23^h Fluctuations in Dec. (± 3′) : in H.F. (± ·001). 14^h to 19^h Long wave in V.F. (+ ·0007).

21. $18\frac{2}{3}^h$ to $19\frac{3}{4}^h$ Wave in Dec. (— 5′).

22. $18\frac{3}{4}^h$ to $20\frac{1}{4}^h$ Wave in Dec. (— 5′).

25. 15^h to 20^h Fluctuations in H.F. (± ·001).

26. 10^h to 22^h Fluctuations in H.F. (± ·0015) : in Dec. and V.F. small.

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August 27. 17^h to 23^h Fluctuations in Dec. (± 4′). 27. 13^h to 23^h Fluctuations in H.F. (± ·0012): in V.F. (± ·0001).

28. 22^h to 29. 4^h Fluctuations in Dec. (± 3′): in H.F. (± ·0012): in V.F. small.

29. $15\frac{1}{2}^h$ to 17^h Wave in H.F. (— ·0017).

September 8. 12^h to 11. 12^h. See Plate III.

11. 19^h to 12. 5^h Fluctuations in Dec. (± 3′). 11. 22^h to 12. 5^h Fluctuations in H.F. (± ·0008): in V.F. small.

13. 19^h to 20^h Wave in Dec. (— 5′): small fluctuations in H.F.

18. 21^h to 19. 1^h Fluctuations in Dec. (± 3′). 18. 17^h to 19. 1^h Fluctuations in H.F. (± ·0006): in V.F. (± ·0001).

22. $0\frac{1}{3}^h$ to 2^h Wave in Dec. (+ 5′): in H.F. (+ ·0008). $0\frac{3}{4}^h$ to $1\frac{1}{4}^h$ Decrease of V.F. (— ·0003).

22. 12^h to 23. 12^h. See Plate IV.

23. 15^h to 24. 0^h Fluctuations in Dec. (± 6′): in H.F. (± ·0012): in V.F. (± ·0002).

24. 18^h to 25. 3^h Fluctuations in Dec. (± 3′): in H.F. small, with wave 24. $20\frac{1}{2}^h$ to $22\frac{1}{4}^h$ (+ ·003): small fluctuations in V.F.

25. 13^h to 14^h Wave in Dec. (— 3′): in H.F. (— ·0012). 20^h to 23^h Fluctuations in Dec. (± 2′)

October 5. 16^h to 6. 16^h. See Plate IV.

6. 16^h to 7. 4^h Fluctuations in Dec. (± 5′): in H.F. (± ·002): in V.F. (± ·0003).

7. 13^h to 8. 0^h Fluctuations in Dec. (± 4′): in H.F. (± ·0012): in V.F. (± ·0001).

8. 19^h to $20\frac{3}{4}^h$ Wave in Dec. (— 6′). 9. 1^h to 4^h Fluctuations in Dec. (± 3′). 8. 16^h to 9. 4^h Fluctuations in H.F. (± ·0006): in V.F. small.

9. 17^h to 10. 0^h Fluctuations in Dec. (± 3′): in H.F. (± ·0006).

13. 14^h to 14. 3^h Fluctuations in Dec. (± 3′): in H.F. (± ·0008): in V.F. (± ·0001).

15. 17^h to 16. 2^h Fluctuations in Dec. (± 6′): in H.F. (± ·001): in V.F. (± ·0001).

18. 15^h to 19. 0^h. See Plate IV.

19. 20^h to 20. 5^h Fluctuations in Dec. (± 6′): in H.F. (± ·0012): in V.F. (± ·0002).

20. 15^h to 21. 3^h. See Plate IV.

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October 21. 17^h to 22. 4^h Fluctuations in Dec. (± 4′) : in H.F. (± ·001) : in V.F. (± ·0001).

26. $18\frac{1}{2}^h$ to $19\frac{1}{4}^h$ Wave in Dec. (− 4′).

28. 16^h to 29. 0^h Fluctuations in Dec. (± 3′) : in H.F. and V.F. small.

November 1. 0^h to 3. 0^h. See Plate V.

3. 0^h to 5^h Fluctuations in Dec. (± 2′) : in H.F. (± ·0007). 3. 12^h to 4. 4^h Fluctuations in Dec. (± 5′): in H.F. (± ·0012) : in V.F. (± ·0002).

6. $0\frac{1}{2}^h$ to 2^h Wave in Dec. (+ 9′) : in H.F. (+ ·0012). 6. $0\frac{1}{2}^h$ to $1\frac{1}{2}^h$ Decrease of V.F. (− ·0005).

9. 18^h to 10. 4^h Fluctuations in Dec. (± 4′) : in H.F. (± ·0013) : in V.F. (± ·0002).

10. 20^h to 11. 1^h Fluctuations in Dec. (± 3′) : in H.F. and V.F. small.

15. 20^h to 16. 2^h Fluctuations in Dec. (± 3′) : in H.F. and V.F. small.

17. 7^h to 18. 3^h Fluctuations in Dec. (± 4′) : in H.F. (± ·0015) : in V.F. (± ·0001).

18. 15^h to 20^h Fluctuations in Dec. (± 4′) : in H.F. (± ·0012) : in V.F. small.

21. 22^h to 22. 4^h Fluctuations in Dec. (± 2′) : in H.F. (± ·0006).

24. 20^h to 22^h Wave in Dec. (− 13′). 19^h to 22^h Fluctuations in H.F. (± ·0012) : in V.F. (± ·0001).

25. 14^h to 26. 2^h Fluctuations in Dec. (± 3′) : in H.F. (± ·0007) : in V.F. (± ·0001).

26. 12^h to 29. 12^h. See Plate VI.

29. 13^h to 30. 0^h Fluctuations in Dec. (± 5′) : in H.F. (± ·0015) : in V.F. small.

30. $19\frac{3}{4}^h$ to $20\frac{1}{2}^h$ Wave in Dec. (− 8′). 20^h to 21^h Wave in H.F. (+ ·002).

December 2. 15^h to 18^h Fluctuations in Dec. (± 3′) : in H.F. (± ·001).

3. $16\frac{1}{4}^h$ to $18\frac{1}{4}^h$ Wave in Dec. (− 11′).

5. $20\frac{1}{2}^h$ to 22^h Wave in H.F. (+ ·001)

6. 13^h to 7. 2^h Fluctuations in Dec. (± 6′) : in H.F. (± ·0012) : in V.F. (± ·0001).

7. 18^h to 19^h Wave in Dec. (− 9′), followed till 8. 7^h by fluctuations (± 3′) : fluctuations in H.F. (± ·0012) : in V.F. (± ·0001).

9. 18^h to 10. 0^h Fluctuations in Dec. (± 3′) : in H.F. (± ·0007) : in V.F. (± ·0001).

13. $20\frac{1}{2}^h$ to 22^h Wave in Dec. (− 5′).

14. 3^h to 8^h Fluctuations in Dec. (± 3′) : in H.F. (± ·001).

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December 16. 22^h to 17. 4^h Fluctuations in Dec. (± 4′) : in H.F. (± ·0007) : in V.F. (± ·0001).

19. 21^h to 20. 3^h Fluctuations in Dec. (± 3′) : in H.F. (± ·0008) : in V.F. small.

20. 19^h to 21. 3^h Fluctuations in Dec. (± 3′). 20. 14^h to 21. 3^h Fluctuations in H.F. (± ·0008) : in V.F. (± ·0001).

21. 18^h to 23^h Fluctuations in Dec. (± 3′) : in H.F. and V.F. small.

22. 2^h to 6^h Fluctuations in Dec. (± 3′). 22. 19^h to 23. 6^h Fluctuations in Dec. (± 3′) : in H.F. (± ·0008) : in V.F. small.

23. 19^h to 22^h Fluctuations in Dec. (± 3′) : in H.F. small.

24. 18^h to 19^h Wave in Dec. (— 4′).

26. $20\frac{1}{2}^h$ to $22\frac{1}{2}^h$ Wave in Dec. (— 8′), followed till 27. 9^h by fluctuations (± 4′) : fluctuations in H.F. (± ·001) : in V.F. small.

27. 16^h to 22^h Rapid fluctuations in H.F. (± ·0008) : small rapid fluctuations in Dec. and V.F.

28. 15^h to 17^h Wave in Dec. (— 3′) : in H.F. (— ·002). 28. $19\frac{1}{2}^h$ to 21^h Wave in Dec. (— 6′). 28. 19^h to 29. 1^h Fluctuations in H.F. (± ·0008).

29. 17^h to 30. 4^h Fluctuations in Dec. (± 2′) : in H.F. (± ·0006).

EXPLANATION OF THE PLATES.

The magnetic motions figured on the Plates are—

(1.) Those for days of great disturbance—July 17, November 1.

(2.) Those for days of lesser disturbance—January 20–21, March 6, 17–18, 28–29, April 7–8, June 14, August 13, September 8–9, 9–10, 10–11, 22–23, October 5–6, 18, 20–21, November 2, 26–27, 27–28, 28–29.

(3.) Those for four quiet days, January 27, April 5, August 7, November 7, which are given as types of the ordinary diurnal movement at four seasons of the year. The earth currents on these days are very small.

The time is Greenwich Civil Time (commencing at midnight, and counting the hours from 0 to 24).

The magnetic declination, horizontal force, and vertical force, are indicated by the letters D., H., and V. respectively; the declination (west) is expressed in minutes of arc, the units for horizontal and vertical force are ·00001 of the whole horizontal and vertical forces respectively, the corresponding scales being given on the sides of each diagram. Equal changes of amplitude in the several registers correspond nearly to equal changes of absolute magnetic force, 0·001 of a C. G. S. unit being represented by $0^{in}\cdot81 = \overset{mm.}{20\cdot6}$ in the declination curve, by $0^{in}\cdot75 = \overset{mm.}{19\cdot0}$ in the horizontal force curve, and by $0^{in}\cdot86 = \overset{mm.}{21\cdot9}$ in the vertical force curve.

Downward motion indicates increase of declination and of horizontal and vertical force.

The earth current register E_1 is that of the line Angerstein Wharf—Lady Well, making an angle of 50° with the magnetic meridian, reckoning from north to east. The E_2 register is that of the line Blackheath—North Kent East Junction, making an angle of 46° with the magnetic meridian, reckoning from north to west. Zero E_1 and Zero E_2 indicate the respective instrumental zeros. On January 20–21, March 17–18, June 14, July 17 after $10\frac{1}{2}^h$, August 13, September 22–23, October 18, 20–21, the earth current motions are not given, as the apparatus was arranged on those days to record on a much larger scale for determination of the diurnal inequality.

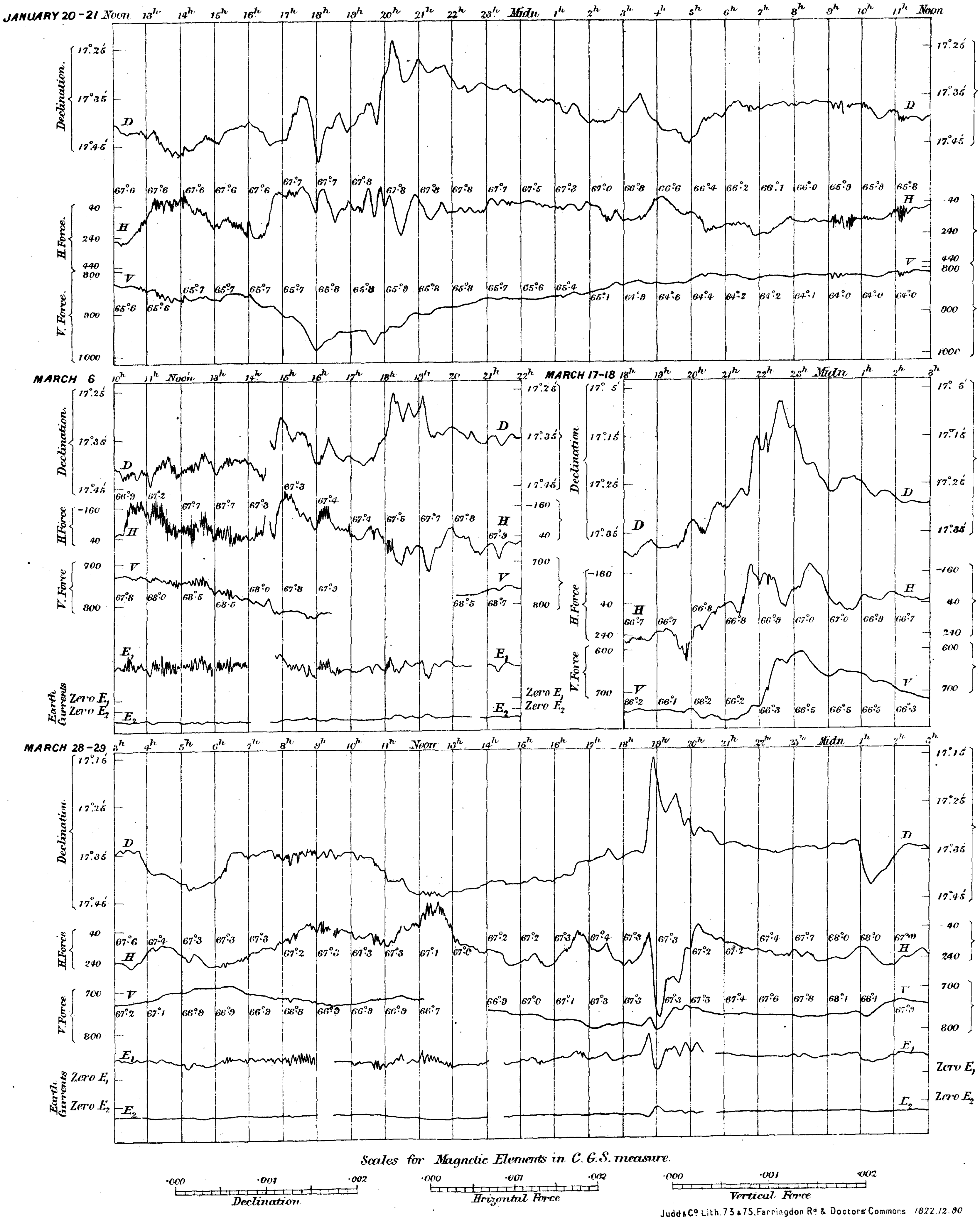
Downward motion of earth current register indicates in the E_1 circuit the passage of a current, corresponding to that from the copper pole of a battery, in the direction Angerstein Wharf to Lady Well (N.E. to S.W. magnetic), and in the E_2 circuit to the passage of a similar current in the direction Blackheath to North Kent East Junction (S.E. to N.W. magnetic).

An arrow (↑) indicates that the register was out of range of registration in the direction of the arrow head.

The temperatures (Fahrenheit) of the horizontal and vertical force magnets at each hour are given in small figures on the Diagrams.

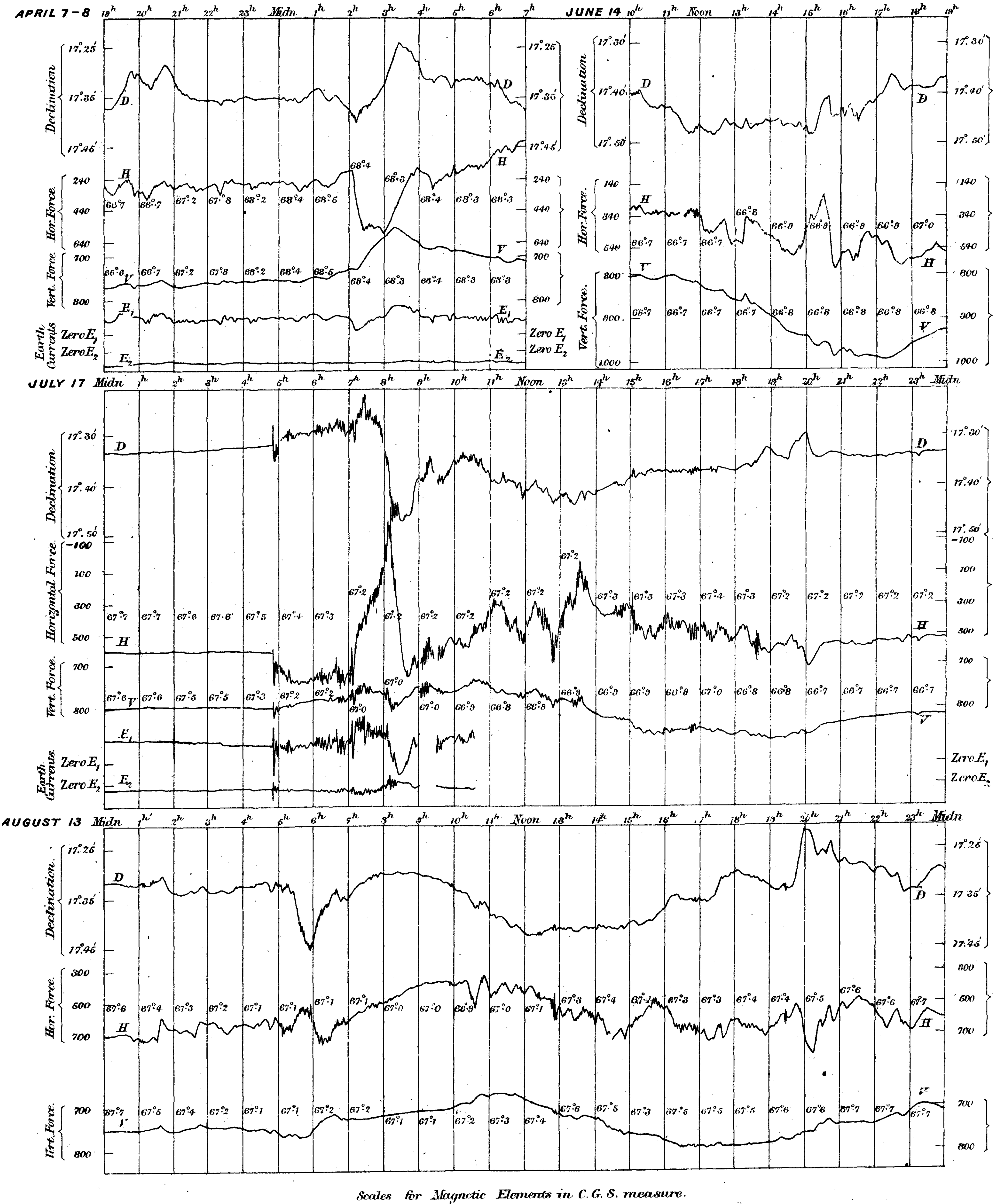
From March 6. $16\frac{1}{2}^h$ to 20^h and from March 28. 12^h to 14^h the vertical force register was lost through accidental causes: and, on account of derangement of the earth current wires, the E_2 register is wanting on September 8–9, 9–10, 10–11, and the E_1 register on November 26–27.

Magnetic Disturbances and Earth Currents recorded at the Royal Observatory, Greenwich, 1889.

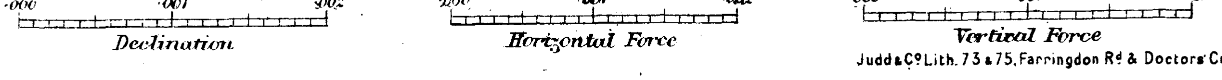


Judd & Co Lith. 73 & 75. Farringdon Rd & Doctors Commons 1822.12.90

Magnetic Disturbances and Earth Currents recorded at the Royal Observatory, Greenwich, 1889.



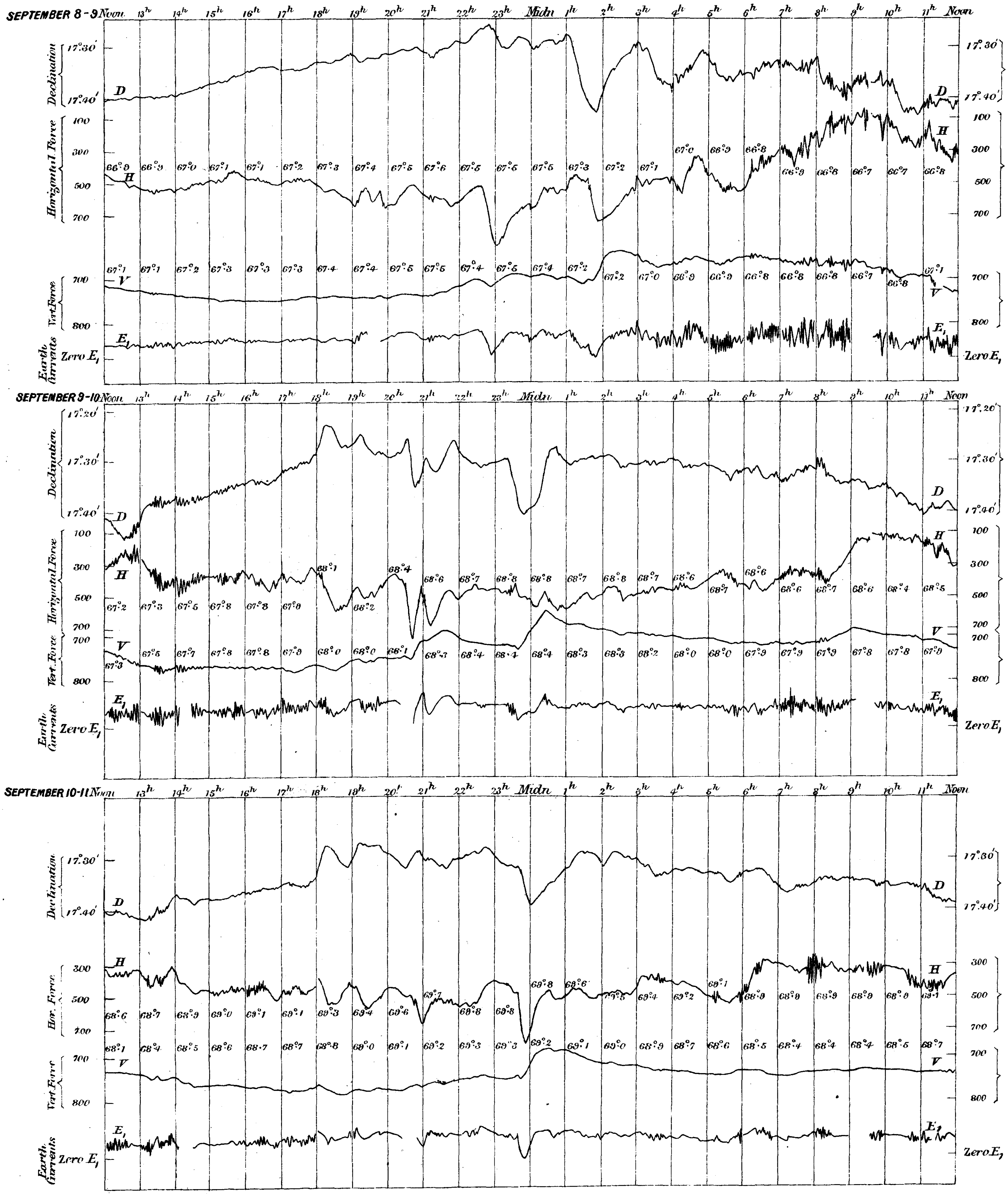
Scales for Magnetic Elements in C. G. S. measure.



Judd & Co. Lith. 73 & 75, Farringdon Rd. & Doctors' Commons 1822.12.90

Plate III

Magnetic Disturbances and Earth Currents recorded at the Royal Observatory, Greenwich, 1889.

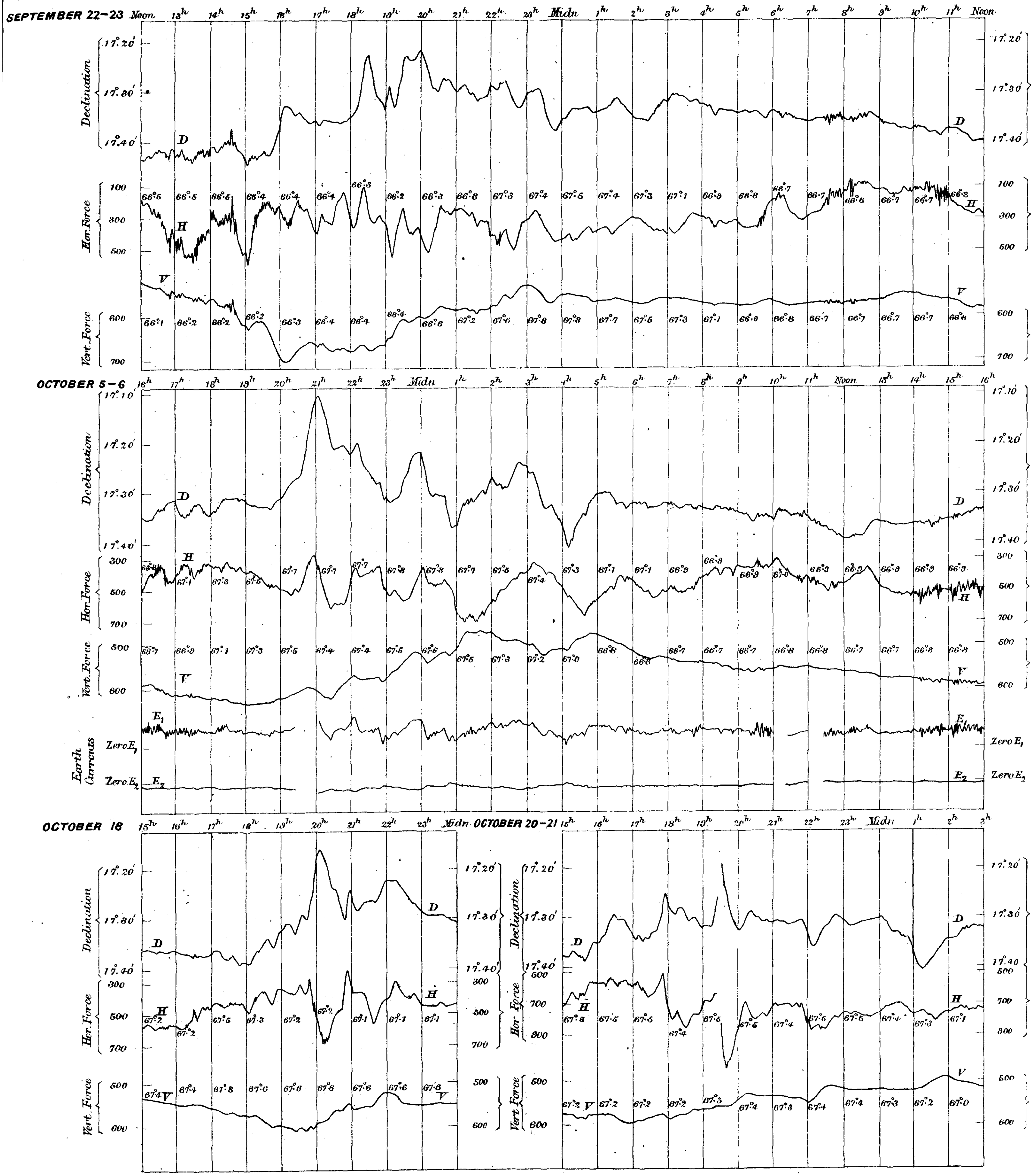


Scales for Magnetic Elements in C.G.S. measure.

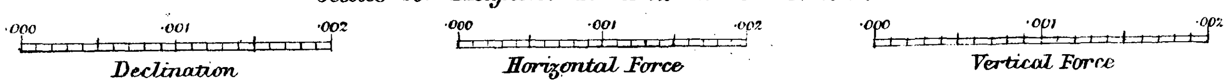
·000 ·001 ·002	·000 ·001 ·002	·000 ·001 ·002
Declination.	*Horizontal Force.*	*Vertical Force.*

Judd & Co. Lith. 73 & 75. Farringdon Rd & Doctors' Commons. 1822. 12. 90

Magnetic Disturbances and Earth Currents recorded at the Royal Observatory Greenwich, 1889.

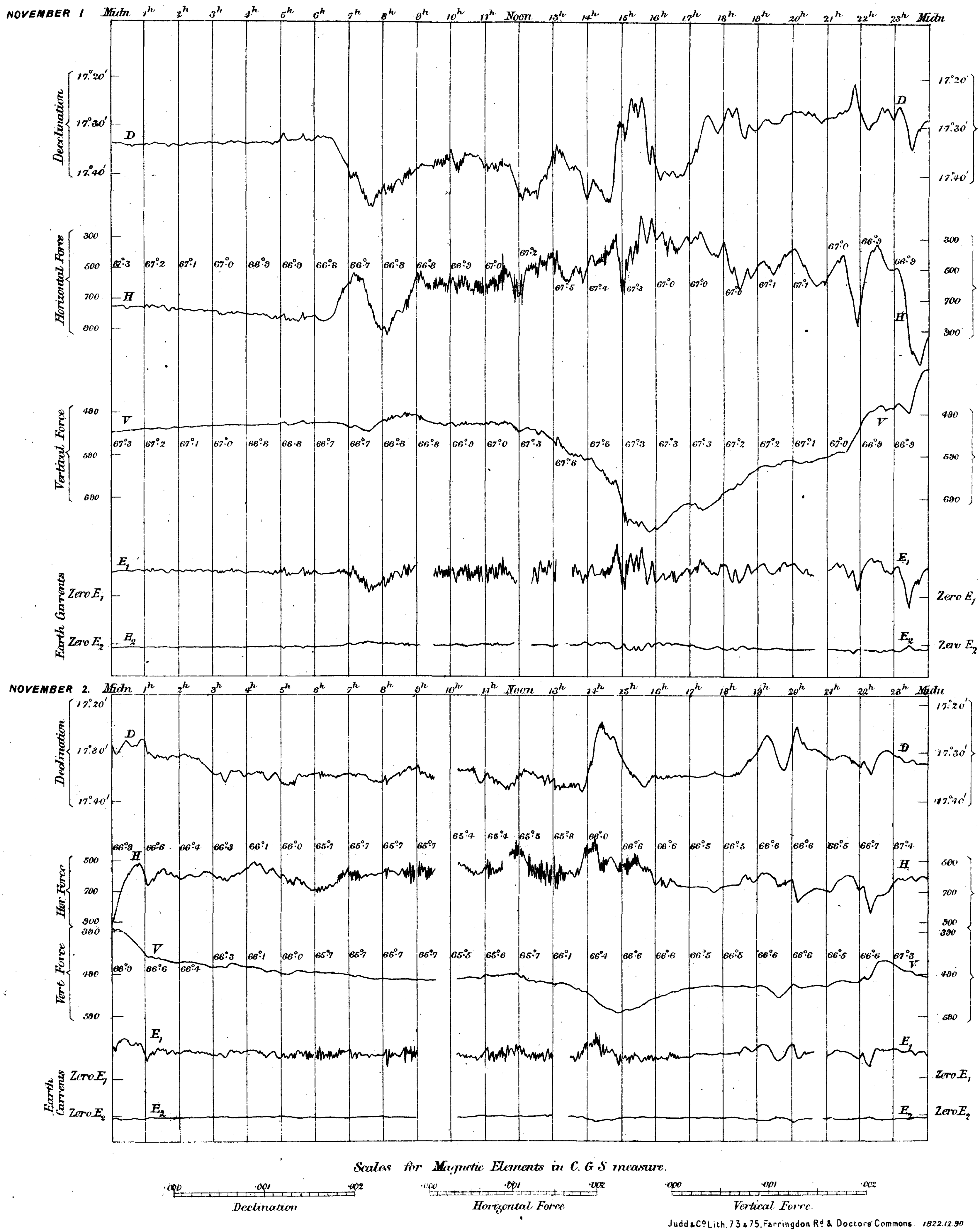


Scales for Magnetic Elements in C.G.S. measure.



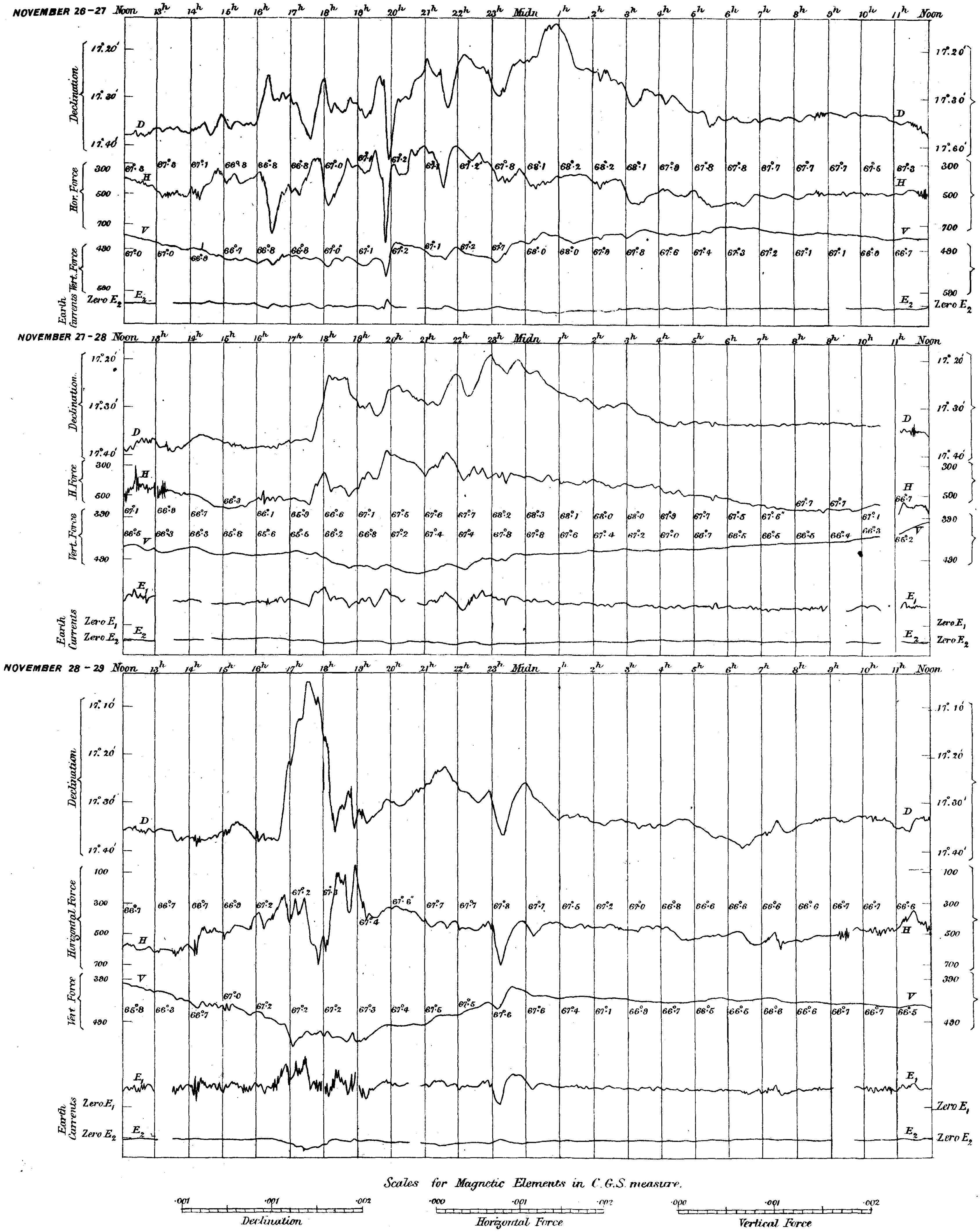
1822 12.90.

Magnetic Disturbances and Earth Currents recorded at the Royal Observatory, Greenwich, 1889.



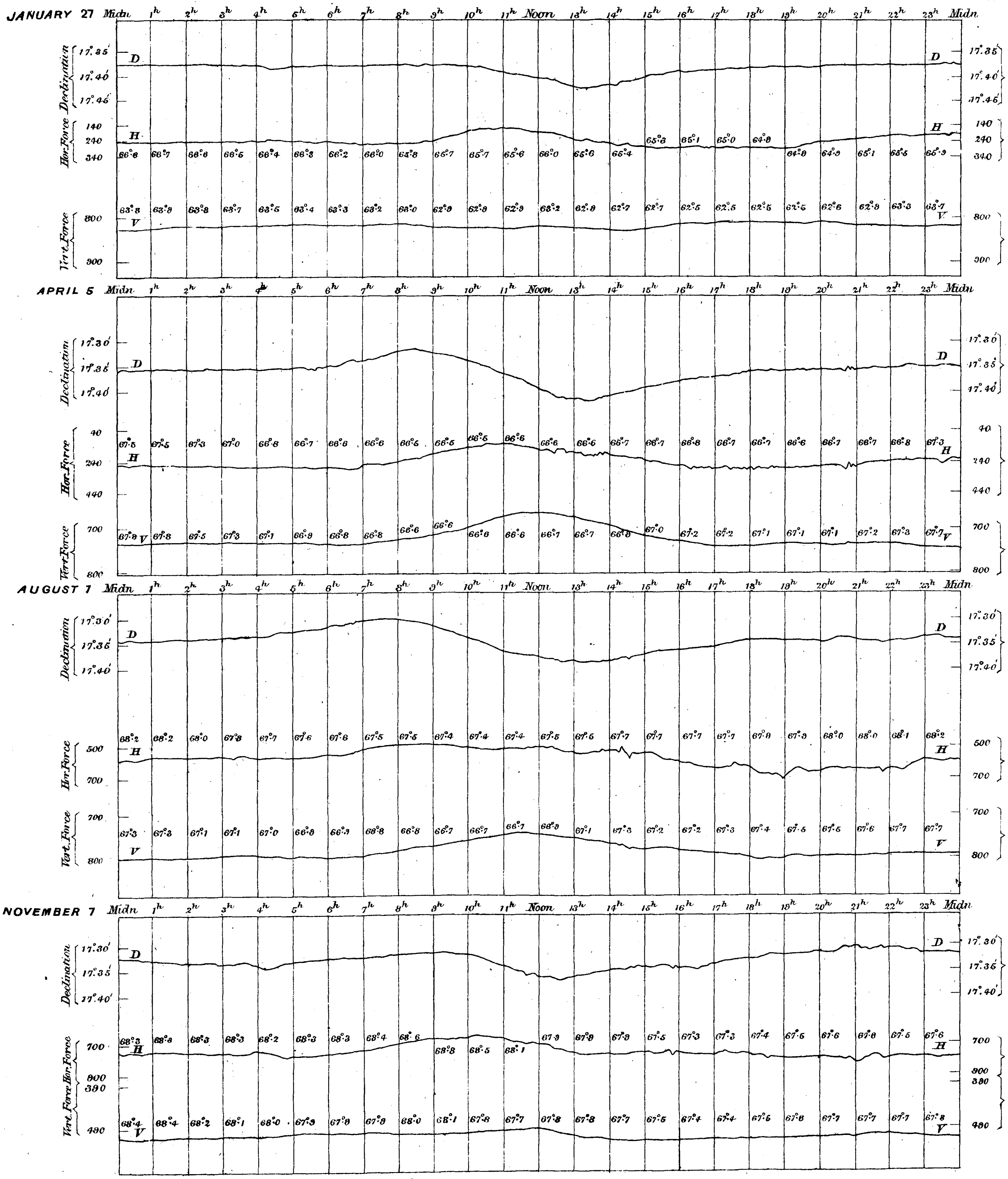
Judd & Co Lith. 73 & 75, Farringdon Rd & Doctors' Commons. 1822.12.90

Magnetic Disturbances and Earth Currents recorded at the Royal Observatory Greenwich. 1889.

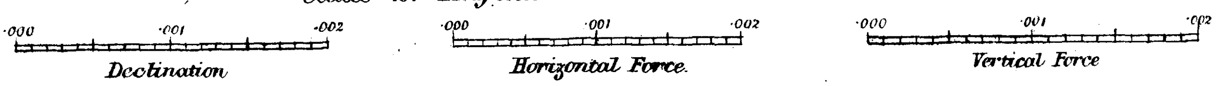


Judd & Co Lith. 73 & 75. Farringdon Rd & Doctors' Commons 1822.12.90

Types of Magnetic Diurnal Variations at four seasons of the year, recorded at the Royal Observatory Greenwich, 1889.



Scales for Magnetic Elements in C.G.S measure.



1822.12.90

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

METEOROLOGICAL OBSERVATIONS.

1889.

MONTH and DAY, 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Lowest.	Daily Range.	Mean of 24 Hourly Values.	Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
Jan. 1	New: Greatest Dec. S	30.017	35.2	26.8	8.4	30.4	− 7.7	30.3	30.2	0.2	3.1	0.0	99	35.8	24.0	41.4	38.7	0.000	0.0	...
2	...	30.293	37.5	25.5	12.0	32.4	− 5.5	31.8	30.5	1.9	4.3	0.0	93	42.0	18.0	41.7	37.3	0.000	0.0	...
3	...	30.517	37.1	29.7	7.4	35.2	− 2.6	33.9	31.9	3.3	4.5	1.7	87	40.4	26.5	40.0	35.3	0.000	0.0	...
4	...	30.466	35.1	26.2	8.9	31.2	− 6.5	30.8	29.9	1.3	3.6	0.0	94	41.0	22.8	38.0	34.3	0.000	0.0	...
5	...	30.216	30.5	24.2	6.3	27.6	−10.0	27.6	27.6	0.0	1.7	0.0	100	34.0	24.2	39.2	34.2	0.000	3.0	...
6	...	29.925	29.5	19.8	9.7	23.9	−13.7	23.9	23.9	0.0	0.0	0.0	100	30.7	19.8	38.6	34.6	0.000	0.0	...
7	...	29.850	36.1	22.5	13.6	29.8	− 7.8	29.7	29.3	0.5	3.0	0.0	97	37.0	18.0	38.4	34.9	0.006	0.0	...
8	In Equator	29.694	44.7	32.8	11.9	38.6	+ 0.9	37.8	36.7	1.9	3.7	0.3	94	47.8	25.3	38.0	35.5	0.000	3.0	...
9	First Qr.	29.324	49.0	41.3	7.7	44.9	+ 7.2	42.9	40.6	4.3	8.8	1.8	86	67.4	34.8	37.7	34.9	0.216	3.0	...
10	...	29.231	41.3	35.5	5.8	37.9	+ 0.1	37.3	36.5	1.4	2.4	0.0	95	45.0	35.5	38.2	35.9	0.132	0.0	...
11	...	29.435	42.5	34.3	8.2	37.3	− 0.6	35.8	33.7	3.6	5.7	1.0	87	69.7	30.6	39.0	36.0	0.000	0.0	...
12	Apogee	29.317	35.1	30.4	4.7	33.8	− 4.3	33.1	31.8	2.0	4.4	0.5	92	37.4	23.6	39.9	36.3	0.128	0.0	...
13	...	29.775	38.4	33.3	5.1	36.2	− 2.0	35.6	34.7	1.5	3.6	0.3	95	38.7	31.4	39.9	36.9	0.000	0.0	...
14	...	30.016	38.9	36.3	2.6	37.5	− 0.8	36.4	34.9	2.6	4.6	0.7	91	43.2	34.4	40.0	37.7	0.000	0.0	...
15	Greatest Declination N.	29.969	36.6	32.7	3.9	35.5	− 2.9	34.3	32.4	3.1	4.5	1.7	89	39.5	32.4	40.2	38.2	0.000	0.5	...
16	...	29.816	34.0	32.1	1.9	33.1	− 5.4	31.9	29.5	3.6	4.5	2.6	87	36.3	31.9	40.0	37.8	0.000	1.5	...
17	Full	30.120	41.0	33.8	7.2	36.4	− 2.2	35.7	34.7	1.7	3.9	0.0	94	50.2	30.5	40.0	37.7	0.006	0.0	...
18	...	30.221	51.3	32.4	18.9	43.1	+ 4.3	41.3	39.2	3.9	8.0	0.0	86	68.4	29.1	40.4	36.7	0.000	0.0	...
19	...	30.155	46.5	37.0	9.5	43.3	+ 4.4	40.6	37.4	5.9	11.3	1.9	80	61.9	27.5	41.4	38.2	0.010	0.0	...
20	...	30.077	42.9	29.0	13.9	38.6	− 0.5	38.1	37.5	1.1	3.9	0.3	96	46.2	21.2	41.0	38.6	0.138	0.0	...
21	...	30.124	41.0	29.1	11.9	35.0	− 4.3	34.5	33.7	1.3	3.1	0.0	95	42.3	21.2	41.0	36.9	0.015	0.0	...
22	...	30.230	41.5	35.2	6.3	37.6	− 1.9	36.0	33.8	3.8	7.1	2.0	86	54.2	29.8	41.2	37.9	0.004	0.0	...
23	In Equator	30.300	41.1	29.9	11.2	34.3	− 5.3	33.9	33.3	1.0	3.8	0.0	96	74.6	21.2	41.6	38.3	0.000	0.0	...
24	Last Qr.	30.304	43.0	32.4	10.6	38.0	− 1.7	37.5	36.8	1.2	2.4	0.0	95	43.0	30.2	40.0	38.7	0.000	0.0	...
25	...	30.264	43.1	39.7	3.4	41.5	+ 1.7	40.1	38.3	3.2	5.7	1.8	89	43.2	39.1	41.0	39.1	0.000	0.0	...
26	...	30.201	50.8	40.1	10.7	44.9	+ 5.0	42.2	39.0	5.9	10.1	3.7	80	73.9	31.1	40.9	39.3	0.000	1.0	...
27	...	30.396	44.7	30.9	13.8	37.4	− 2.6	35.6	33.1	4.3	11.2	1.3	85	73.2	21.8	41.0	39.3	0.000	0.0	...
28	Perigee	30.266	49.1	33.5	15.6	42.8	+ 2.7	41.1	39.1	3.7	6.1	1.3	86	80.0	22.5	41.6	39.5	0.011	0.2	...
29	Greatest Declination S.	29.820	48.0	37.4	10.6	44.5	+ 4.3	42.3	39.7	4.8	9.9	1.0	83	50.9	29.0	42.4	40.2	0.069	0.8	...
30	...	29.762	46.7	32.3	14.4	41.7	+ 1.4	39.9	37.6	4.1	7.0	1.5	87	56.4	23.3	42.0	40.4	0.041	0.0	...
31	... New	29.715	53.6	40.7	12.9	47.9	+ 7.5	46.3	44.5	3.4	7.0	1.8	89	75.3	33.4	42.8	41.1	0.063	0.0	...
Means	...	29.994	41.5	32.2	9.3	37.2	− 1.6	36.1	34.6	2.6	5.3	0.9	90.7	51.0	27.2	40.3	37.4	Sum 0.839	0.4	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, 15, 16, and 17 are derived from eye-readings of self-registering thermometers.

The electrometer was not in action throughout the month.

The mean reading of the *Barometer* for the month was 29in·994, being 0in·265 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 53°·6 on January 31; the lowest in the month was 19°·8 on January 6; and the range was 33°·8.
The mean of all the highest daily readings in the month was 41°·5, being 1°·5 *lower* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was 32°·2, being 1°·3 *lower* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was 9°·3, being 0°·2 *less* than the average for the 48 years, 1841–1888.
The mean for the month was 37°·2, being 1°·6 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
	hours.	hours.			lbs.	lbs.	lbs.	miles.		
Jan. 1	0·0	7·9	Calm	NE	0·0	0·0	0·00	111	tk.-f : tk.-f, ho.-fr	v,tk.-f,li.-cl : 0 : 1, th.-cl,ho.-fr
2	0·1	7·9	NE : NNE	NNE	0·4	0·0	0·01	191	2, th.-cl, ho.-fr : 5, th.-cl, slt.-f	9,ci.-cu, cu.-s : p.-cl : v
3	0·0	7·9	NNE : NE	NE	0·3	0·0	0·00	142	p.-cl : 10	10 : 10 : v, tk.-f
4	0·0	7·9	Calm : S	SW	0·0	0·0	0·00	47	p.-cl, tk.-f : 10, f	10 : 10
5	0·0	7·9	SW	Calm	0·0	0·0	0·00	67	10 : 10 : 10, f	10, f : 10, tk.-f, ho.-fr
6	0·0	8·0	Calm	SW : WSW	0·5	0·0	0·00	46	10, fr, f : 10, ho.-fr, glm, f	10, f : 10, slt.-f, slt.-sn
7	0·0	8·0	W : Calm	Calm : SSE	0·2	0·0	0·00	85	10, slt.-sn : 10, f	8, ci.-cu, slt.-f : 1, li.-cl
8	0·0	8·0	SSE : SE	S : SSE	2·0	0·0	0·28	239	0 : p.-cl,li.-cl,cu.-s	10 : 2, li.-sc : v,li.-cl,cu.-s,lu.-ha, lu.-co
9	1·2	8·1	SSE : SSW	SSW : S	5·4	0·0	1·10	397	10, li.-shs : 6,li.-cl, slt.-r,w	6,ci.-cu,cu.-s,li.-cl : v, hy.-sh : 10, fq.-r
10	0·0	8·1	SW : NNW	NNW : ENE	5·5	0·0	0·77	297	10, fq.-r : 10, glm, fq.-shs	10, oc.-slt.-r, w : 10, oc.-th.-r
11	1·5	8·1	E : NE	E : ESE	0·2	0·0	0·00	169	p.-cl, li.-shs : p.-cl, ci.-cu, cu.-s	6,ci.-cu,cu.-s : 10 : 10
12	0·0	8·2	E : NNE	NNE	1·2	0·0	0·04	236	10 : 10,glm,fq.-slt.-r,slt.-sn	10, fq.-slt.-r, slt.-sn : 10, oc.-slt.-r, slt.-sn
13	0·0	8·2	NNE	N	0·6	0·0	0·01	215	10, shs.-r : 10, glm	10, slt.-r : 10 : 10
14	0·0	8·2	N : NNE	NNE : NE	0·1	0·0	0·00	162	10 : 10	10 : 10, oc.-th.-r
15	0·0	8·3	NNE : Calm	SE	0·0	0·0	0·00	77	10 : 10	10 : 10
16	0·0	8·3	SSE	SE : S	0·2	0·0	0·00	95	10 : 10 : 10, slt.-r	10 : 10
17	0·0	8·3	SSW : SW	WSW : SW	0·0	0·0	0·00	119	10 : 10 : 10, slt.-r	10 : 10 : th.-cl, slt.-f
18	0·4	8·4	SW : SSW	SW	2·7	0·0	0·35	336	p.-cl, lu.-ha : p.-cl, prh	9,cu.-s, li.-cl : p.-cl, lu.-ha : 10, sc
19	1·1	8·4	WSW : NW	WNW : WSW	1·0	0·0	0·05	240	10, slt.-r : v,slt.-f,ho.-fr : 1, th.-cl, slt.-f	2,li.-cl, slt.-h : v, li.-cl, h
20	0·0	8·5	SW	NNE : N	0·5	0·0	0·02	149	v : th.-cl,slt.-f,ho.-fr : 10, r	10, glm, f : v : 0,tk.-f,ho.-fr
21	0·0	8·5	SW : WSW	WNW : N : NNE	3·2	0·0	0·19	196	tk.-f : 10, f, glm	10, oc.-slt.-r : v
22	1·1	8·6	NNE	NNE : N	1·7	0·0	0·25	317	10, li.-shs : 6, th.-cl	10, cu.-s : 10
23	0·5	8·6	NNE : N	N : WSW	0·0	0·0	0·00	102	p.-cl, li.-cl : p.-cl, f	tk.-f : 10, slt.-f
24	0·0	8·7	SW : NW	NNW : SW	0·1	0·0	0·00	93	10, tk.-f : 10, tk.-f	10, slt.-f : 10, slt.-f
25	0·0	8·7	SSW : W : WNW	WSW : WNW	0·5	0·0	0·06	257	10, f : 10, glm	10, glm : 10 : 10
26	3·7	8·8	WSW	WSW	1·2	0·0	0·12	317	10 : p.-cl : 4, li.-cl	v, cu.-s : v, h
27	4·8	8·8	N: NNE	SSE : S	0·9	0·0	0·03	164	0 : 0, ho.-fr	0 : 1, li.-cl : v, th.-cl
28	1·8	8·9	SSW : WSW	SW : SSW	1·3	0·0	0·09	292	v : v, li.-cl, shs.-r	9, ci.-cu, slt.-r : 10
29	0·0	8·9	SSW	SW : NNW	7·5	0·0	1·33	501	10 : 10, sc, slt.-r, w	10, w, r, gt.-glm : v
30	0·0	9·0	SW	SW : W	5·0	0·0	0·51	391	0 : 10, slt.-r	10, fq.-th.-r : 10, slt.-r : v, m
31	1·0	9·0	WSW : SW	WSW : W	5·5	0·0	1·19	521	v : 10	10, shs.-r, w : 10, slt.-r, w
Means	0·6	8·4	...	...	...	...	0·21	212		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 36°·1, being 1°·3 *lower* than
The mean *Temperature of the Dew Point* for the month was 34°·6, being 0°·8 *lower* than
The mean *Degree of Humidity* for the month was 90·7, being 3·4 *greater* than
The mean *Elastic Force of Vapour* for the month was $0^{in}\cdot200$, being $0^{in}\cdot007$ *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was $2^{grs}\cdot3$, being $0^{grs}\cdot1$ *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 559 grains, being 7 grains *greater* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 8·2.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·066. The maximum daily amount of *Sunshine* was 4·8 hours on January 27.

The highest reading of the *Solar Radiation Thermometer* was 80°·0 on January 28; and the lowest reading of the *Terrestrial Radiation Thermometer* was 18°·0 on January 2 and 7.

The mean daily distribution of *Ozone* for the 12 hours ending 9^{h} was 0·2; for the 6 hours ending 15^{h} was 0·2; and for the 6 hours ending 21^{h} was 0·0.

The *Proportions of Wind* referred to the cardinal points were N. 8, E. 4, S. 8, and W. 8. Three days were calm.

The *Greatest Pressure of the Wind* in the month was 7·5 lbs. on the square foot on January 29. The mean daily *Horizontal Movement of the Air* for the month was 212 miles; the greatest daily value was 521 miles on January 31; and the least daily value was 46 miles on January 6.

Rain fell on 12 days in the month, amounting to $0^{in}\cdot839$, as measured by gauge No. 6 partly sunk below the ground; being $1^{in}\cdot172$ *less* than the average fall for the 48 years, 1841–1888.

MONTH and DAY, 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Of Radiation. Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Of the Water of the Thames at Deptford. Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
Feb. 1	...	29·553	56·0	47·8	8·2	52·4	+11·9	50·8	49·2	3·2	6·3	1·8	89	67·3	42·0	43·7	41·5	0·000	0·2	...
2	...	29·473	47·8	33·0	14·8	39·8	− 0·8	35·9	30·8	9·0	14·0	1·3	71	82·5	29·4	44·5	42·7	0·044	0·8	...
3	...	29·067	42·6	30·7	11·9	36·1	− 4·6	34·5	32·1	4·0	8·1	0·0	86	57·2	25·0	44·5	41·5	0·253	0·0	...
4	In Equator	29·745	38·8	29·5	9·3	34·1	− 6·6	32·4	29·5	4·6	12·3	1·7	82	63·8	23·0	43·2	41·7	0·059	0·0	...
5	...	30·037	38·2	27·2	11·0	33·5	− 7·1	31·9	29·0	4·5	7·9	0·5	83	54·3	19·7	42·3	37·9	0·013	0·0	...
6	...	29·787	44·1	36·4	7·7	41·3	+ 0·9	39·3	36·8	4·5	6·8	1·1	85	54·0	31·0	41·7	39·7	0·016	0·0	...
7	First Qr.	29·561	44·7	30·3	14·4	38·6	− 1·6	36·3	34·4	4·2	9·9	0·0	86	66·0	24·5	41·8	39·9	0·344	0·2	...
8	...	29·386	48·6	29·1	19·5	37·7	− 2·2	35·0	31·3	6·4	11·8	4·8	78	60·8	23·0	40·8	38·9	0·120	0·8	...
9	Apogee	29·397	36·0	28·3	7·7	33·1	− 6·5	28·9	20·6	12·5	17·2	8·1	59	69·8	22·7	40·1	38·3	0·000	0·0	...
10	...	29·415	33·2	22·5	10·7	28·7	−10·6	27·8	24·5	4·2	10·2	0·0	84	43·0	16·2	38·7	37·1	0·277	0·0	...
11	...	29·319	34·6	27·8	6·8	31·0	− 8·1	30·2	28·0	3·0	8·8	0·0	87	53·5	22·8	37·7	36·2	0·238	0·0	...
12	Greatest Declination N.	29·961	37·1	19·9	17·2	28·7	−10·2	27·5	23·0	5·7	8·6	0·0	79	67·3	15·6	37·8	34·7	0·005	0·0	...
13	...	29·927	42·2	18·9	23·3	31·2	− 7·6	30·6	29·1	2·1	7·5	0·0	91	44·0	18·4	36·0	34·1	0·170	1·0	...
14	...	29·319	49·2	39·0	10·2	45·2	+ 6·5	44·3	43·2	2·0	4·1	0·2	93	50·6	33·8	36·5	34·7	0·375	0·0	...
15	Full	29·564	45·2	33·3	11·9	39·8	+ 1·1	36·1	31·3	8·5	13·0	3·9	72	76·0	27·0	37·0	34·9	0·000	0·0	...
16	...	29·944	45·1	28·3	16·8	37·0	− 1·8	36·0	34·6	2·4	6·0	0·4	91	48·3	22·0	37·5	35·9	0·108	0·0	...
17	...	30·031	57·3	38·9	18·4	47·0	+ 8·1	44·9	42·6	4·4	9·8	1·5	85	85·4	30·8	38·4	35·6	0·002	0·0	...
18	...	30·250	53·2	39·9	13·3	47·1	+ 8·1	44·9	42·5	4·6	8·4	1·3	85	91·9	34·8	39·8	37·5	0·000	3·0	...
19	In Equator	30·210	50·1	41·7	8·4	46·6	+ 7·4	44·2	41·5	5·1	9·9	2·9	83	55·3	34·0	41·2	38·3	0·000	0·0	...
20	...	29·883	48·3	38·2	10·1	43·1	+ 3·8	40·7	37·8	5·3	8·4	2·4	81	64·5	30·0	42·2	40·2	0·042	0·0	...
21	...	29·946	41·7	34·0	7·7	38·7	− 0·8	36·3	33·1	5·6	8·3	3·0	81	69·0	28·0	42·7	41·7	0·010	0·0	...
22	Last Qr.	29·969	42·4	31·7	10·7	36·3	− 3·3	34·1	30·9	5·4	8·5	1·8	81	77·3	25·7	43·6	42·1	0·000	0·0	...
23	...	29·991	38·0	29·1	8·9	33·3	− 6·4	31·6	28·4	4·9	8·7	0·5	82	86·2	24·3	42·8	41·4	0·000	0·5	...
24	Perigee	30·015	39·2	31·1	8·1	33·9	− 5·9	31·9	28·4	5·5	8·9	1·7	79	70·5	27·0	43·2	40·7	0·005	1·5	...
25	Greatest Declination S.	29·796	39·6	31·7	7·9	34·0	− 5·9	32·6	30·1	3·9	7·0	0·0	85	59·2	28·0	42·9	40·3	0·020	0·0	...
26	...	29·616	37·9	27·6	10·3	32·4	− 7·6	31·3	28·9	3·5	9·5	0·0	87	76·6	23·6	42·0	39·7	0·003	0·0	...
27	...	29·437	37·7	31·1	6·6	33·0	− 7·1	31·6	28·8	4·2	8·2	1·4	84	59·0	29·5	40·8	39·3	0·034	0·0	...
28	...	29·530	35·2	29·6	5·6	31·3	− 8·9	30·2	27·4	3·9	7·3	0·4	84	68·0	29·6	39·5	38·7	0·057	0·0	...
Means	...	29·719	43·0	31·7	11·3	37·3	− 2·3	35·4	32·4	4·9	9·1	1·5	82·6	65·0	26·5	40·8	38·8	Sum 2·195	0·3	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, 15, 16, and 17 are derived from eye-readings of self-registering thermometers.

The electrometer was not in action throughout the month.

The mean reading of the *Barometer* for the month was $29^{in}·719$, being $0^{in}·113$ *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was $57^{\circ}·3$ on February 17; the lowest in the month was $18^{\circ}·9$ on February 13; and the range was $38^{\circ}·4$.
The mean of all the highest daily readings in the month was $43^{\circ}·0$, being $2^{\circ}·4$ *lower* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was $31^{\circ}·7$, being $2^{\circ}·7$ *lower* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was $11^{\circ}·3$, being $0^{\circ}·3$ *greater* than the average for the 48 years, 1841–1888.
The mean for the month was $37^{\circ}·3$, being $2^{\circ}·3$ *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
	hours.	hours.			lbs.	lbs.	lbs.	miles.		
Feb. 1	0·0	9·1	WSW	WSW	5·8	0·0	0·86	510	10 : 10	10 : v, r, w
2	5·4	9·2	W	W : WSW	10·2	0·0	2·65	713	v, w : 2, st.-w	5,ci.-cu,cu.-s,w,slt.-sn : v,oc.-sn,w : v,r,sn,w
3	0·6	9·2	WSW	W : NNE	5·7	0·0	0·78	449	1 : p.-cl, slt.-sn	10, r, w : 10, r, sn, w
4	2·2	9·3	NNE : N	NNE : N	11·0	0·0	1·65	556	10, r, sn, hy.-sqs : 10, sn, w	v, ci.-cu, cu.-s, slt.-sn, w : 1, li.-cl, ho.-fr
5	0·2	9·3	N : WSW	WSW : SW	2·0	0·0	0·16	319	v : p.-cl, f	9, th.-cl : 10, fq.-r
6	0·0	9·4	W	WNW : SW	2·3	0·0	0·19	359	10, shs.-r : 10, slt.-r	10 : 10 : 10, r
7	0·6	9·4	SSW : WSW : NNE	N : NNW	6·0	0·0	0·57	378	10, c.-r : 10, c.-r : 10, r	9, cu.-s, th.-cl : 0, h, ho.-fr
8	0·2	9·5	SW	SW : W : NW	14·0	0·0	2·48	664	p.-cl : 10 : 10, w	10, hy.-sqs, r, hl : v,slt.-sn,st.-w : 0, g
9	3·6	9·6	NW	NNW	11·8	0·1	3·05	669	0, st.-w : ho.-fr : v, li.-cl, w	6, cu,cu.-s,slt.-sn,w : 0, fr
10	0·0	9·6	NW : WSW	SW : ESE	1·4	0·0	0·06	249	0 : th.-cl, so.-ha	10, sn : 10, sn
11	0·0	9·7	ESE : NE : N	N	1·9	0·0	0·08	243	10, sn : 9, sn, so.-ha	10, slt.-sn : 2 : p.-cl
12	3·3	9·8	N : WNW	N	2·6	0·0	0·18	193	v : p.-cl, cu.-s, th.-cl, slt.-sn	6,ci.-cu,cu,cu.-s : 2 : v,f,ho.-fr
13	0·0	9·8	SSW : SW	SSW	4·7	0·0	0·72	403	v : 10, slt.-sn	10, sn, r : 10, c.-r : 10, r
14	0·0	9·9	SW	NW : WNW	3·7	0·0	0·62	384	10, shs.-r : 10, glm, r	10, glm, r : p.-cl
15	5·4	9·9	WSW : WNW	NNW	6·7	0·0	0·93	453	v : 4, li.-cl	5, cu, cu.-s : 0 : 0
16	0·0	10·0	SW : SSW	SSW : WSW	4·1	0·0	0·36	356	0 : p.-cl : 10, so.-ha	10, fq.-th.-r, slt.-sn : v, li.-cl
17	3·9	10·1	WSW : W	WSW	2·7	0·0	0·14	354	0 : 6, li.-cl	p.-cl, li.-cl : v, th.-cl
18	3·4	10·1	WSW	WSW	2·7	0·0	0·18	381	p.-cl, d : 0, d : 2, li.-cl	10, ci.-cu : p.-cl : 10
19	0·0	10·2	WSW : W	W : NNW	4·5	0·0	0·28	372	10, w : 10	10 : 10 : p.-cl
20	0·4	10·3	WSW : NW	NW : N	3·6	0·0	0·16	309	10 : 10 : p.-cl, slt.-r	p.-cl, cu.-s, ci.-cu, r : v, r : 10
21	1·2	10·3	N	N	3·2	0·0	0·54	376	p.-cl, slt.-r : v, li.-cl	10,sc,slt.-r,slt.-sn : 2, ho.-fr : 2,th.-cl,ho.-fr
22	1·7	10·4	N	N	2·7	0·0	0·26	341	v, li.-cl, ho.-fr : p.-cl, ci.-cu	10, oc.-slt.-r : 10, slt.-r : v, sl
23	4·3	10·5	NNE	NNE	3·0	0·0	0·49	423	p.-cl : v, ho.-fr	9, slt.-sn : 10, slt.-sn : p.-cl
24	1·1	10·5	NNE : N	N	2·3	0·0	0·23	319	p.-cl : 7, ci.-cu	10, slt.-sn : 10, slt.-sn
25	0·0	10·6	N	N : NNE	1·1	0·0	0·05	260	10, oc.-sn : 10, oc.-sn	10, cu.-s, slt.-sn : 10, oc.-sn
26	2·4	10·7	NE : NNE	NE : NNE	0·6	0·0	0·00	181	10, oc.-sn : v, th.-cl, slt.-sn	10, sn : 10, oc.-sn
27	0·0	10·7	N : NNE	ENE	0·9	0·0	0·03	267	10, slt.-sn : 10	10, oc.-sn : 10, slt.-sn
28	0·5	10·8	NNE	NE : NNE	0·6	0·0	0·03	332	10, oc.-sn : 10, sn	9, cu, cu.-s, slt.-sn : 10, sn : 10, sn
Means	1·4	9·9	...	...	...	...	0·63	386		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 35°·4, being 2°·5 *lower* than
The mean *Temperature of the Dew Point* for the month was 32°·4, being 3°·0 *lower* than
The mean *Degree of Humidity* for the month was 82·6, being 2·2 *less* than
The mean *Elastic Force of Vapour* for the month was 0in·184, being 0in·023 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 2grs·1, being 0gr·3 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 554 grains, being *the same as*
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 8·0.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·145. The maximum daily amount of *Sunshine* was 5·4 hours on February 2 and 15.

The highest reading of the *Solar Radiation Thermometer* was 91°·9 on February 18; and the lowest reading of the *Terrestrial Radiation Thermometer* was 15°·6 on February 12.

The mean daily distribution of *Ozone* for the 12 hours ending 9h. was 0·1; for the 6 hours ending 15h. was 0·2; and for the 6 hours ending 21h. was 0·0.

The *Proportions of Wind* referred to the cardinal points were N. 12, E. 2, S. 3, and W. 11.

The *Greatest Pressure of the Wind* in the month was 14·0 lbs. on the square foot on February 8. The mean daily *Horizontal Movement of the Air* for the month was 386 miles; the greatest daily value was 713 miles on February 2; and the least daily value was 181 miles on February 26.

Rain fell on 19 days in the month amounting to 2in·195, as measured by gauge No. 6 partly sunk below the ground; being 0in·716 *greater* than the average fall for the 48 years, 1841–1888.

MONTH and DAY, 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Lowest.	Daily Range.	Mean of 24 Hourly Values.	Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
Mar. 1	New	29·688	38·2	29·3	8·9	32·3	− 8·0	31·0	28·2	4·1	10·0	0·0	85	88·7	28·8	38·8	37·3	0·010	3·0	...
2	...	29·768	36·1	28·3	7·8	31·3	− 9·1	30·1	27·1	4·2	7·8	1·7	83	67·9	26·8	40·2	38·5	0·000	0·0	...
3	...	29·827	38·1	22·5	15·6	29·3	−11·2	27·9	23·1	6·2	10·7	0·0	77	106·8	16·5	41·0	37·0	0·000	0·0	...
4	In Equator	29·875	39·5	18·7	20·8	28·8	−11·7	27·1	20·8	8·0	13·0	0·0	72	97·3	12·3	40·8	36·3	0·000	1·0	...
5	...	29·967	40·4	25·5	14·9	31·4	− 9·1	29·5	24·7	6·7	12·7	0·6	75	91·6	17·0	38·8	35·9	0·000	3·0	...
6	...	29·914	48·0	25·1	22·9	35·6	− 4·9	32·8	28·5	7·1	13·0	2·4	75	85·7	15·6	38·2	35·9	0·000	1·8	...
7	...	29·321	49·4	34·7	14·7	43·1	+ 2·5	42·1	40·9	2·2	7·0	0·6	92	62·3	28·0	38·4	36·1	0·305	10·5	...
8	...	29·064	55·4	41·4	14·0	49·0	+ 8·4	47·8	46·5	2·5	6·8	0·6	92	83·2	37·0	39·0	37·3	0·184	17·5	...
9	Apogee: First Quarter.	29·321	53·1	34·1	19·0	41·7	+ 1·0	38·7	35·0	6·7	17·4	0·0	78	111·0	28·8	40·8	39·0	0·050	7·2	...
10	...	29·574	44·1	31·3	12·8	37·5	− 3·2	36·5	35·1	2·4	7·9	0·0	91	58·5	26·5	42·0	39·9	0·000	0·0	...
11	Greatest Declination N.	29·807	45·6	33·0	12·6	38·6	− 2·2	35·6	31·6	7·0	14·5	1·3	76	102·2	24·0	43·2	41·7	0·000	0·0	...
12	...	30·091	46·1	28·4	17·7	38·3	− 2·5	37·0	35·2	3·1	7·2	1·2	89	68·2	19·5	43·8	40·2	0·043	3·0	...
13	...	30·033	52·4	37·9	14·5	45·2	+ 4·3	42·7	39·8	5·4	10·6	0·9	82	76·4	29·4	42·2	39·4	0·003	0·0	...
14	...	30·162	48·3	36·6	11·7	41·7	+ 0·7	38·4	34·3	7·4	13·2	3·4	76	100·0	29·7	42·0	40·7	0·000	3·0	...
15	...	30·362	40·8	26·0	14·8	34·3	− 6·8	32·0	28·1	6·2	10·8	2·0	77	92·4	17·0	42·2	41·2	0·000	0·0	...
16	...	30·250	50·0	25·1	24·9	38·9	− 2·3	36·3	32·8	6·1	10·3	0·6	80	88·0	16·1	43·1	41·7	0·000	0·0	...
17	Full	30·029	53·3	38·1	15·2	45·7	+ 4·4	43·2	40·3	5·4	9·2	1·8	82	74·5	30·7	43·8	42·5	0·004	0·0	...
18	In Equator	29·698	49·2	40·0	9·2	43·9	+ 2·5	40·5	36·5	7·4	11·8	3·3	75	72·5	31·8	44·2	43·1	0·000	4·0	...
19	...	29·137	56·0	36·4	19·6	44·7	+ 3·3	42·8	40·6	4·1	11·0	0·0	86	83·0	29·3	45·0	42·8	0·145	5·8	...
20	...	28·830	52·5	38·9	13·6	44·0	+ 2·5	42·6	40·9	3·1	9·0	0·0	89	110·3	34·0	45·6	44·1	0·041	8·2	...
21	Perigee	29·244	41·3	33·0	8·3	37·9	− 3·7	36·1	33·7	4·2	10·1	0·7	85	50·0	27·5	45·8	44·1	0·337	0·0	...
22	...	29·929	46·5	31·5	15·0	37·9	− 3·8	34·8	30·6	7·3	15·6	0·0	76	94·3	25·6	45·2	44·7	0·000	0·0	...
23	...	30·099	53·2	32·1	21·1	42·5	+ 0·7	38·9	34·5	8·0	16·0	2·8	74	110·6	25·3	44·8	43·3	0·000	4·0	...
24	Last Quarter: Greatest Dec S.	30·044	60·0	43·0	17·0	49·6	+ 7·6	47·2	44·6	5·0	10·6	1·7	84	95·1	41·1	45·0	43·6	0·016	4·0	...
25	...	29·839	59·0	43·0	16·0	49·1	+ 6·8	46·2	43·1	6·0	15·0	1·9	80	93·2	36·0	44·9	43·7	0·046	3·0	...
26	...	29·803	47·6	38·7	8·9	42·7	+ 0·1	38·8	34·1	8·6	12·2	5·3	72	85·2	31·5	46·2	44·9	0·003	0·2	...
27	...	30·118	49·0	33·4	15·6	39·7	− 3·3	35·3	29·5	10·2	16·0	5·4	67	96·1	25·9	45·8	43·1	0·000	0·8	...
28	...	30·277	54·3	26·6	27·7	40·9	− 2·5	37·5	33·3	7·6	18·4	1·0	74	101·3	19·9	46·0	45·2	0·012	0·0	...
29	...	30·152	58·1	42·6	15·5	50·4	+ 6·6	48·2	45·9	4·5	9·9	0·0	85	69·1	42·3	45·8	44·2	0·010	0·0	...
30	...	29·945	54·1	42·6	11·5	49·1	+ 4·8	46·1	42·9	6·2	9·8	0·4	79	74·0	39·8	46·8	44·8	0·015	0·0	...
31	New: In Equator	29·720	49·6	38·9	10·7	44·7	− 0·1	42·3	39·5	5·2	10·3	1·8	82	76·3	31·0	47·0	45·3	0·093	0·0	...
Means	...	29·803	48·7	33·4	15·2	40·6	− 0·9	38·3	34·9	5·7	11·5	1·3	80·3	86·0	27·2	43·1	41·2	Sum 1·317	2·6	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, 15, 16, and 17 are derived from eye-readings of self-registering thermometers.

The electrometer was not in action throughout the month.

The mean reading of the *Barometer* for the month was 29in·803, being 0in·081 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 60°·0 on March 24; the lowest in the month was 18°·7 on March 4; and the range was 41°·3.
The mean of all the highest daily readings in the month was 48°·7, being 1°·0 *lower* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was 33°·4, being 1°·6 *lower* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was 15°·2, being 0°·5 *greater* than the average for the 48 years, 1841–1888.
The mean for the month was 40°·6, being 0°·9 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	WIND AS DEDUCED FROM SELF-REGISTERING ANEMOMETERS. OSLER'S. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	ROBINSON'S. Horizontal Movement of the Air.	CLOUDS AND WEATHER. A.M.	P.M.
	hours.	hours.			lbs.	lbs.	lbs.	miles.		
Mar. 1	3·6	10·8	NNE : ENE	ENE	0·6	0·0	0·01	238	10, sn : 10, sn : p.-cl,cu.-s	7, ci.-cu, cu, cu.-s, slt.-sn : 10, slt.-sn
2	0·0	10·9	NE : NNE	ENE : ESE	0·0	0·0	0·00	109	10 : 10	10,cu, cu.-s, oc.-sn : 10, slt.-sn
3	2·6	11·0	ESE : E	NE : ESE	0·0	0·0	0·00	106	v, slt.-sn : 8, cu.-s	6, cu.-s, ci.-cu, slt.-sn : 0, ho.-fr
4	3·3	11·1	Calm : ESE	ESE	0·0	0·0	0·00	137	0, ho.-fr : 3, li.-cl	6, ci.-cu, cu.-s : 10 : 10
5	5·6	11·1	ESE : SE	SE : S	0·0	0·0	0·00	139	10, slt.-sn : p.-cl : 3, li.-cl	2, cu : 0, ho.-fr
6	5·9	11·2	S : SSW	SSW : S	1·0	0·0	0·02	259	0 : p.-cl, ci.-cu	v,li.-cl,slt.-h,so.-ha: v, th.-cl
7	0·0	11·2	SE : SSE	SSW	5·5	0·0	0·88	484	v : 10, fq.-r : 10, fq.-r	10, sc, fq.-th.-r : 10, fq.-th.-r
8	0·3	11·3	SSW	SSW : SSE	5·1	0·0	0·45	456	10, fq.-r : 10, sc, slt.-r	10, fq.-th.-r : 10, fq.-r : 10
9	8·3	11·4	WSW	WSW : SSW	10·3	0·0	1·10	492	10, w : p.-cl : 3, li.-cl	6, cu, cu.-s, ci.-cu : 0, h
10	0·0	11·4	NE : Calm	NNE : E	0·0	0·0	0·00	140	v, f : 10, slt.-f	10, oc.-slt.-r : 10
11	5·4	11·5	N : NNE	NNE	4·4	0·0	0·40	391	10 : p.-cl : v, li.-cl	8, cu, cu.-s : p.-cl : 0, ho.-fr
12	0·0	11·6	N : WSW	WSW : W	0·0	0·0	0·00	192	v : 10 : 10, fq.-r	10, oc.-slt.-r : 10, slt.-f : v, h, slt.-f
13	0·4	11·6	WSW : NW	NNW : NNE	2·7	0·0	0·07	315	v : 10 : p.-cl	10 : p.-cl : 10, th.-cl
14	3·4	11·7	NNE : N	N : NNE	2·1	0·0	0·07	311	10 : 10 : p.-cl	6, ci.-cu, cu, cu.-s : 10, th.-r : 10, slt.-r
15	4·4	11·8	NNE : ENE	ENE : SE	1·4	0·0	0·01	207	v : 9, ci.-cu	7, ci.-cu, cu.-s : 0, slt.-m, ho.-fr
16	1·2	11·8	SW : WSW	SW : WNW	1·4	0·0	0·02	260	v, ci.-cu : 10 : 10	v, li.-cl : 10
17	0·2	11·9	WSW : W	WSW	0·3	0·0	0·00	254	10 : 10, slt.-r	10 : 10
18	0·0	12·0	SW	SSW : SE	0·0	0·0	0·00	172	10 : 10	9, so.-ha : 10
19	0·8	12·0	ESE : SSW	SSW : S	9·0	0·0	0·59	331	th.-cl,lu.-ha: 10 : 10, th.-r	9, cu, cu.-s, slt.-r : 10,fq.-r : 10, fq.-r, w
20	5·1	12·1	SSW : SW	SSW	6·6	0·0	0·90	405	v, w : cu.-s,li.-cl,li.-shs	v, cu, cu.-s : v, sh.-r : 10
21	0·0	12·2	N	NNE	8·4	0·0	1·77	463	10 : 10, fq.-r : 10,fq.-r,sn,w	10, fq.-r, sn : 10, fq.-r, sl : v
22	3·4	12·2	N	N : WSW	1·5	0·0	0·16	244	v : p.-cl	6, ci, cu.-s, li.-cl : p.-cl, slt.-f: 0
23	8·9	12·3	SW : WSW	WSW : SW	3·5	0·0	0·51	376	0 : 0 : 2, li.-cl	5, cu, th.-cl : 10 : 10
24	1·0	12·4	SW : WSW	WSW	3·6	0·0	1·06	491	10, li.-shs : 10, shs.-r	p.-cl, slt.-r : v, li.-cl
25	1·2	12·4	WSW : SW	WSW : WNW : NNW	4·0	0·0	0·63	442	v : 10, fq.-r	v, cu,li.-cl : v, li.-ci
26	1·8	12·5	W : NNW	N	6·3	0·0	0·70	401	0 : 9,ci.-cu,cu.-s, slt.-r	10 : 10
27	3·7	12·6	N	NNE	6·1	0·0	1·05	394	10 : 10	7, ci.-cu, cu.-s : 0
28	6·5	12·6	N : SW	W : WSW	1·3	0·0	0·04	238	0, ho.-fr : 0, h	v, ci.-cu, th.-cl, h : 10, slt.-r : 10,fq.-th.-r
29	0·0	12·7	WSW : NNW	N : NNW	0·0	0·0	0·00	170	10, slt.-r : 10	10, glm, slt.-r : 10, slt.-f
30	0·1	12·8	WSW : W	W : WSW	1·2	0·0	0·02	263	v : 10	10, slt.-r : 10, r
31	1·7	12·8	NW : WNW	Variable	0·5	0·0	0·01	177	10, shs.-r : p.-cl, slt.-r	10, slt.-r : 10,slt.-r, hl : v
Means	2·5	11·8	...	...	...	...	0·34	292		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 38°·3, being 0°·7 *lower* than
The mean *Temperature of the Dew Point* for the month was 34°·9, being 1°·1 *lower* than
The mean *Degree of Humidity* for the month was 80·3, being 0·6 *less* than
The mean *Elastic Force of Vapour* for the month was 0in·203, being 0in·009 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 2grs·4, being 0gr·1 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 552 grains, being 2 grains *greater* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 7·8.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·215. The maximum daily amount of *Sunshine* was 8·9 hours on March 23.

The highest reading of the *Solar Radiation Thermometer* was 111°·0 on March 9; and the lowest reading of the *Terrestrial Radiation Thermometer* was 12°·3 on March 4.

The mean daily distribution of *Ozone* for the 12 hours ending 9h. was 1·1; for the 6 hours ending 15h. was 0·9; and for the 6 hours ending 21h. was 0·6.

The *Proportions of Wind* referred to the cardinal points were N. 8, E. 4, S. 8, and W. 10. One day was calm.

The *Greatest Pressure of the Wind* in the month was 10·3 lbs. on the square foot on March 9. The mean daily *Horizontal Movement of the Air* for the month was 292 miles; the greatest daily value was 492 miles on March 9; and the least daily value was 106 miles on March 3.

Rain fell on 14 days in the month, amounting to 1in·317, as measured by gauge No. 6 partly sunk below the ground; being 0in·136 *less* than the average fall for the 48 years, 1841–1888.

MONTH and DAY, 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Of Radiation. Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Of the Water of the Thames at Deptford. Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
April 1	...	29·759	52·2	33·3	18·9	43·2	− 2·1	40·4	37·1	6·1	14·0	0·0	79	73·4	25·4	47·7	46·0	0·008	0·8	...
2	...	29·715	50·6	39·4	11·2	43·4	− 2·3	38·4	32·4	11·0	17·6	5·5	65	100·6	32·4	47·9	44·9	0·000	2·2	...
3	...	29·600	45·0	36·0	9·0	39·5	− 6·6	37·1	34·0	5·5	10·1	0·0	81	67·0	33·7	47·6	45·4	0·150	1·8	...
4	...	29·105	54·1	38·3	15·8	45·4	− 1·0	43·1	40·5	4·9	14·4	0·0	83	118·8	37·2	47·1	43·7	0·022	11·2	...
5	...	29·241	56·1	37·8	18·3	44·4	− 2·2	41·8	38·7	5·7	13·0	0·5	80	125·1	34·6	47·8	45·7	0·000	7·2	...
6	Apogee	29·322	55·0	37·9	17·1	44·4	− 2·3	42·6	40·5	3·9	13·2	0·0	86	108·8	32·6	47·9	45·9	0·002	1·8	...
7	Greatest Declination N.	29·225	53·5	37·5	16·0	43·9	− 2·9	41·8	39·3	4·6	10·8	0·2	83	112·0	37·0	48·4	45·9	0·000	6·0	...
8	First Qr.	29·168	55·1	40·2	14·9	46·5	− 0·3	44·7	42·7	3·8	10·8	0·0	87	90·2	37·0	48·8	46·7	0·052	0·0	...
9	...	29·186	48·7	41·3	7·4	44·3	− 2·6	43·7	43·0	1·3	2·5	0·0	95	68·7	41·3	49·1	47·7	0·187	0·0	...
10	...	29·318	44·7	39·6	5·1	42·4	− 4·5	42·1	41·7	0·7	2·0	0·0	98	53·7	36·0	48·1	47·7	0·190	0·0	...
11	...	29·337	50·5	35·5	15·0	42·1	− 4·9	41·0	39·7	2·4	7·8	0·0	91	90·5	28·9	48·7	47·3	0·000	0·0	...
12	...	29·435	52·4	37·0	15·4	44·6	− 2·5	43·1	41·4	3·2	10·2	0·0	89	102·6	28·3	47·9	46·9	0·032	1·0	...
13	...	29·522	48·2	38·8	9·4	41·5	− 5·7	39·7	37·4	4·1	9·4	0·5	87	79·0	38·5	47·9	46·8	0·100	0·0	...
14	In Equator	29·580	44·5	36·6	7·9	39·9	− 7·5	38·9	37·6	2·3	4·4	0·2	92	58·0	35·9	47·7	44·9	0·102	0·0	...
15	Full	29·759	48·3	35·2	13·1	41·5	− 6·0	39·0	35·9	5·6	9·4	1·6	81	104·2	27·5	47·4	45·2	0·000	0·0	...
16	...	29·792	50·5	32·6	17·9	41·9	− 5·7	39·1	35·6	6·3	11·8	1·8	79	92·6	24·7	47·2	45·7	0·000	0·0	...
17	...	29·791	55·6	39·1	16·5	46·9	− 0·9	44·5	41·8	5·1	10·2	1·3	83	88·8	35·7	46·8	45·6	0·000	0·0	...
18	Perigee	29·938	61·1	47·3	13·8	52·2	+ 4·3	50·3	48·4	3·8	8·9	0·8	87	117·0	41·5	47·3	46·1	0·000	1·0	...
19	...	30·035	66·1	43·6	22·5	53·1	+ 5·1	49·2	45·3	7·8	16·2	1·3	75	118·6	37·6	47·7	46·9	0·000	1·0	...
20	...	29·889	61·3	44·5	16·8	51·3	+ 3·2	47·7	44·0	7·3	15·8	2·3	77	115·0	39·0	48·9	47·1	0·000	10·5	...
21	Greatest Declination S.	29·645	56·7	41·4	15·3	48·5	+ 0·3	45·4	42·0	6·5	11·4	2·4	79	100·0	33·5	49·1	47·1	0·026	9·5	...
22	Last Qr.	29·644	60·8	38·3	22·5	47·5	− 0·7	43·8	39·7	7·8	16·5	1·4	75	135·1	30·1	49·4	47·9	0·053	10·5	...
23	...	29·550	55·3	37·0	18·3	44·9	− 3·4	42·5	39·7	5·2	13·6	1·0	83	114·2	28·5	50·3	48·4	0·193	9·0	...
24	...	29·323	53·7	40·4	13·3	44·8	− 3·5	42·8	40·5	4·3	9·0	1·1	85	116·6	33·0	50·7	48·0	0·271	4·5	...
25	...	29·607	52·1	37·0	15·1	44·8	− 3·6	43·0	40·9	3·9	8·2	0·7	86	93·3	29·0	50·9	49·1	0·083	0·0	...
26	...	29·831	61·4	35·1	26·3	47·4	− 1·0	44·0	40·2	7·2	17·9	0·0	77	123·9	28·6	50·5	49·7	0·000	2·8	...
27	In Equator	29·798	64·5	44·2	20·3	51·6	+ 3·2	48·0	44·4	7·2	16·5	0·8	76	116·0	36·5	50·9	50·3	0·130	6·0	...
28	...	29·615	59·6	41·8	17·8	49·7	+ 1·2	47·6	45·4	4·3	14·2	0·2	86	116·0	35·5	51·3	50·5	0·158	5·5	...
29	...	29·678	60·7	38·1	22·6	48·4	− 0·1	44·0	39·2	9·2	18·4	0·9	71	126·3	31·6	52·7	51·5	0·000	9·8	...
30	New	29·428	62·7	41·9	20·8	50·3	+ 1·7	48·5	46·6	3·7	11·8	1·5	88	105·2	33·5	53·1	52·0	0·093	6·8	...
Means	...	29·561	54·7	38·9	15·8	45·7	− 1·8	43·3	40·5	5·2	11·7	0·9	82·8	101·0	33·5	48·9	47·2	Sum 1·852	3·6	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, 15, 16, and 17 are derived from eye readings of self-registering thermometers.

The electrometer was not in action throughout the month.

The mean reading of the *Barometer* for the month was 29in·561, being 0in·242 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 66°·1 on April 19; the lowest in the month was 32°·6 on April 16; and the range was 33°·5.
The mean of all the highest daily readings in the month was 54°·7, being 2°·6 *lower* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was 38°·9, being 0°·1 *lower* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was 15°·8, being 2°·6 *less* than the average for the 48 years, 1841–1888.
The mean for the month was 45°·7, being 1°·8 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	WIND AS DEDUCED FROM SELF-REGISTERING ANEMOMETERS. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	CLOUDS AND WEATHER. A.M.	P.M.
	hours.	hours.			lbs.	lbs.	lbs.	miles.		
April 1	0·8	12·9	N : SW : WNW	NW : WNW	4·4	0·0	0·61	340	0 : p.-cl, f : 10, glm, f	10 : v, r, w
2	4·6	13·0	NW : NNW	NNW	4·6	0·0	1·41	492	v, w : p.-cl, cu.-s, w	6,cu,ci.-cu,cu.-s,li.-cl,w : 10, w : 10, w
3	0·0	13·0	NNW : SW	WSW : S	1·9	0·0	0·08	236	10 : 10	10, fq.-r : 10, fq.-r
4	6·2	13·1	SSW	SSW	3·5	0·0	0·35	300	10, oc.-slt.-r : v, ci.-cu, cu, r, hl	v, cu, cu.-s, shs.-r : 9, shs.-r
5	4·0	13·2	SSE	SSE : ESE	0·4	0·0	0·00	153	v : 8	8,cu,cu.-s,fr.-r : 1, li.-cl : v, li.-cl, cu.-s
6	4·0	13·2	E : ENE	ENE : ESE	0·0	0·0	0·00	171	10 : v, li.-shs : p.-cl	5, cu, cu.-s, li.-cl : 10
7	6·4	13·3	NE : E	E : ESE	0·5	0·0	0·00	193	10 : p.-cl, cu	v, cu : v, th.-cl
8	0·4	13·4	ENE : E	E	2·9	0·0	0·23	270	10, sh.-r : 10 : 9, ci.-cu	9,ci.-cu,cu.-s : 10 : p.-cl, r
9	0·0	13·4	E : ENE	E : ESE	0·6	0·0	0·00	230	10, li.-shs : 10, fq.-r	10 : 10, fq.-r : 10
10	0·0	13·5	E : NE	Variable	0·0	0·0	0·00	87	10, li.-shs : 10, fq.-th.-r	10, fq.-th.-r, glm : 10, fq.-th.-r, slt.-f
11	0·3	13·6	S : NE	SSW : SSE : SE	1·3	0·0	0·00	122	10, f : 10, f : p.-cl, slt.-f	p.-cl,cu,cu.-s,ci.-cu,sh.-r : v, li.-cl
12	1·3	13·6	E : ENE	NE : NNE	1·5	0·0	0·03	224	10 : 10 : p.-cl	10 : 10, oc.-r
13	0·2	13·7	NNE	N : NNW	2·9	0·0	0·39	369	10, shs.-r : 10, sc, slt.-r	10 : 10, fq.-th.-r
14	0·0	13·7	NNW : N	NNE	1·8	0·0	0·14	318	10, fq.-r : 10, fq.-r	10, fq.-th.-r : 10, fq.-th.-r
15	1·0	13·8	NNE	NNE	1·6	0·0	0·03	273	10, shs.-r : 10 : p.-cl	10, slt.-r : p.-cl : v
16	0·8	13·9	N	N : NNE	1·8	0·0	0·06	258	0, ho.-fr : p.-cl	10 : 10
17	0·0	13·9	N : NW	N : NNE	1·4	0·0	0·01	179	10 : 10, glm : 10, m	9 : 10
18	1·3	14·0	NNE : N	NE : SSE : SSW	0·1	0·0	0·00	145	10 : 10, glm	p.-cl, cu : v, h : 0
19	7·0	14·1	SW : WSW	WSW : SW	2·3	0·0	0·17	317	0 : 0, slt.-h	v, li.-cl : v, li.-cl
20	2·4	14·1	SSW : SW	WSW : SW	4·3	0·0	0·57	404	10 : 10	p.-cl : 0, d
21	2·3	14·2	SW : SSW	SW	8·2	0·0	1·42	524	v : v, slt.-r, w	9, w : p.-cl, sh.-r : 0
22	7·7	14·2	SSW : WSW	WSW : SW	2·7	0·0	0·17	...	v : p.-cl : p.-cl,cu,cu.-s,slt.-r	v,cu,cu.-s,shs.-r,t,hl : v : 0, d
23	4·7	14·3	SW	SSW : SW	8·5	0·0	1·05	...	0 : p.-cl, cu, slt.-r	10, cu, cu.-s, fq.-r, w : v, fq.-r, l, t
24	1·3	14·4	SSW : WSW	SW : N	1·7	0·0	0·04	...	v, shs.-r : 10, hy.-sh : 10	10, hy.-r, hl, glm : 10 : v
25	1·3	14·4	N	N : SW	7·4	0·0	0·62	...	p.-cl, shs.-r : 10, shs.-r	9, cu, cu.-s, r : v : 0, d, slt.-f
26	10·2	14·5	SW : SSW	SSW	1·9	0·0	0·10	...	0, d : 0 : v, h	p.-cl,cu.-s,ci.-cu,li.-cl : p.-cl, slt.-r : 10, r
27	3·8	14·5	SSW : SW	SW : SSW	1·2	0·0	0·02	...	10 : 10, r : p.-cl	8,ci.-cu,cu.-s : p.-cl : v, th.-cl
28	2·5	14·6	SSE : ENE	SSW	2·5	0·0	0·16	...	10, r : 10, li.-shs	p.-cl, oc.-slt.-r : v, li.-cl
29	12·9	14·7	SSW	SSW : SSE : E	2·3	0·0	0·10	...	0 : v, cu, so.-ha	4, ci.-cu, cu : 3 : v
30	0·3	14·7	E	SE : S : SSW	6·0	0·0	0·20	...	10, shs.-r : 10, slt.-r	10, sq, sh.-r : 10, oc.-r, t : 1
Means	2·9	13·8	...	...	...	...	0·26	(21 days) 267		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 43°·3, being 0°·6 *lower* than
The mean *Temperature of the Dew Point* for the month was 40°·5, being 0°·2 *higher* than
The mean *Degree of Humidity* for the month was 82·8, being 5·9 *greater* than
The mean *Elastic Force of Vapour* for the month was 0in·252, being 0·002 *greater* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 2grs·9, being *the same as*
The mean *Weight of a Cubic Foot of Air* for the month was 542 grains, being 2 grains *less* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 7·7.
The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·211. The maximum daily amount of *Sunshine* was 12·9 hours on April 29.
The highest reading of the *Solar Radiation Thermometer* was 135°·1 on April 22; and the lowest reading of the *Terrestrial Radiation Thermometer* was 24°·7 on April 16.
The mean daily distribution of *Ozone* for the 12 hours ending 9h. was 2·0; for the 6 hours ending 15h. was 1·1; and for the 6 hours ending 21h. was 0·5.
The *Proportions of Wind* referred to the cardinal points were N. 9, E. 7, S. 9, and W. 5.
The *Greatest Pressure of the Wind* in the month was 8·5 lbs. on the square foot on April 23. The mean daily *Horizontal Movement of the Air* for the month (21 days) was 267 miles; the greatest daily value was 524 miles on April 21; and the least daily value was 87 miles on April 10.
Rain fell on 17 days in the month, amounting to 1in·352, as measured by gauge No. 6 partly sunk below the ground; being 0in·198 *greater* than the average fall for the 48 years, 1841–1888.
On April 22, Robinson's Anemometer was placed in the hands of Mr. Dines in order to be tested on his whirling machine. It was returned on May 8.

MONTH and DAY, 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Lowest.	Daily Range.	Mean of 24 Hourly Values.	Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
May 1	...	29·530	54·5	41·0	13·5	47·6	− 1·1	44·8	41·8	5·8	12·0	0·0	81	99·1	33·1	52·7	51·3	0·002	8·2	...
2	...	29·610	59·0	41·0	18·0	48·5	− 0·4	47·0	45·3	3·2	9·9	0·0	89	113·2	34·4	53·3	51·7	0·544	4·2	...
3	Apogee	29·806	63·5	41·2	22·3	52·4	+ 3·3	48·5	44·5	7·9	16·1	0·2	75	119·2	37·3	53·9	52·2	0·000	6·8	...
4	...	29·768	73·4	45·8	27·6	58·5	+ 9·1	53·0	48·1	10·4	24·1	1·3	68	130·5	40·8	54·3	53·1	0·000	0·2	...
5	Greatest Declination N.	29·672	73·3	49·8	23·5	60·0	+10·3	55·7	51·9	8·1	20·0	1·2	75	129·1	44·2	55·7	54·1	0·121	0·8	...
6	...	29·627	74·2	48·8	25·4	60·7	+10·7	56·6	53·1	7·6	17·7	0·6	76	129·0	41·3	57·0	55·3	0·000	5·0	...
7	...	29·642	67·1	49·8	17·3	56·2	+ 5·9	54·0	51·9	4·3	12·2	0·8	86	126·6	44·8	58·0	56·1	0·000	9·5	...
8	First Qr.	29·675	67·8	49·1	18·7	55·3	+ 4·7	51·1	47·1	8·2	15·8	0·8	74	134·5	40·7	58·4	57·2	0·000	6·5	...
9	...	29·546	73·1	49·5	23·6	60·1	+ 9·3	56·4	53·2	6·9	16·6	1·5	78	141·8	41·0	59·0	58·0	0·098	3·5	...
10	...	29·587	65·8	49·3	16·5	54·8	+ 3·7	51·4	48·1	6·7	12·2	1·4	78	129·5	49·3	60·4	59·0	0·269	3·5	...
11	...	29·610	54·2	47·7	6·5	51·3	− 0·1	49·0	46·6	4·7	9·4	0·8	84	68·6	47·1	59·8	58·6	0·224	1·0	...
12	In Equator	29·624	52·0	46·4	5·6	49·5	− 2·3	49·0	48·4	1·1	2·6	0·0	96	61·7	46·4	59·3	58·2	0·128	3·0	...
13	...	29·702	59·1	49·3	9·8	52·5	+ 0·4	51·4	50·3	2·2	6·3	0·0	93	79·0	46·0	58·2	57·1	0·059	4·0	...
14	...	29·667	65·3	47·2	18·1	54·3	+ 1·8	52·2	50·1	4·2	12·2	0·0	86	123·0	43·5	58·1	56·2	0·000	0·0	...
15	Full	29·667	66·1	45·7	20·4	53·8	+ 0·9	51·6	49·4	4·4	11·2	0·0	85	123·5	44·0	57·0	56·0	0·000	1·0	...
16	Perigee	29·793	71·1	45·7	25·4	57·8	+ 4·5	52·5	47·7	10·1	23·9	0·0	69	132·9	42·5	57·8	56·7	0·000	0·0	...
17	...	29·761	70·2	47·1	23·1	56·2	+ 2·5	53·6	51·2	5·0	14·6	0·0	83	124·8	37·0	57·4	56·4	0·000	1·0	...
18	Greatest Declination S	29·764	68·0	45·6	22·4	55·0	+ 0·9	51·1	47·4	7·6	16·3	1·6	76	134·8	38·6	58·0	57·2	0·000	5·0	...
19	...	29·755	61·6	45·3	16·3	53·5	− 0·9	52·1	50·7	2·8	8·4	0·0	90	110·0	38·0	58·9	57·8	0·251	0·0	...
20	...	29·875	67·7	51·1	16·6	57·2	+ 2·5	55·0	53·0	4·2	11·5	0·0	86	127·5	43·3	58·8	58·0	0·004	0·0	...
21	Last Qr.	29·916	71·2	51·3	19·9	60·0	+ 5·0	56·3	53·1	6·9	15·3	1·2	78	140·1	43·5	58·9	57·9	0·000	3·0	...
22	...	29·813	80·5	48·3	32·2	64·1	+ 8·8	59·0	54·7	9·4	21·4	0·0	72	135·9	42·0	60·0	59·6	0·000	0·0	...
23	...	29·648	85·2	52·5	32·7	65·7	+10·2	61·6	58·2	7·5	20·9	0·6	77	138·6	45·6	61·0	60·1	0·189	0·0	...
24	...	29·441	82·5	53·1	29·4	66·7	+11·0	60·6	55·7	11·0	23·5	0·6	68	145·2	45·6	62·1	60·3	0·000	3·0	...
25	In Equator	29·377	76·7	54·0	22·7	63·1	+ 7·2	59·3	56·1	7·0	13·3	2·7	78	129·0	50·6	63·0	62·9	0·069	3·0	...
26	...	29·483	60·5	53·0	7·5	56·0	− 0·1	55·5	55·0	1·0	3·0	0·0	96	77·5	53·0	64·2	63·1	0·404	0·0	...
27	...	29·528	58·2	51·2	7·0	54·3	− 2·0	53·9	53·5	0·8	1·7	0·0	97	77·2	46·5	64·4	62·3	0·745	1·0	...
28	...	29·512	65·0	48·8	16·2	55·3	− 1·2	52·5	49·8	5·5	12·5	0·2	83	131·7	43·8	63·6	62·9	0·041	4·5	...
29	New	29·542	65·0	45·5	19·5	54·2	− 2·6	50·6	47·1	7·1	16·0	1·5	77	127·2	42·0	63·8	63·5	0·110	9·0	...
30	...	29·676	64·6	45·2	19·4	54·2	− 2·8	49·8	45·5	8·7	17·1	2·1	72	127·5	41·7	62·4	61·5	0·039	12·0	...
31	Apogee	29·704	67·1	46·1	21·0	54·8	− 2·5	50·8	47·0	7·8	17·5	0·0	75	133·2	41·8	63·8	62·5	0·002	12·8	...
Means	...	29·656	67·2	47·9	19·3	56·2	+ 3·1	53·1	50·2	6·1	14·0	0·6	80·7	119·4	42·9	59·1	58·0	Sum 3·299	3·6	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, 15, 16, and 17 are derived from eye-readings of self-registering thermometers.

The electrometer was not in action throughout the month.

The mean reading of the *Barometer* for the month was 29in·656, being 0in·121 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 85°·2 on May 23; the lowest in the month was 41°·0 on May 1 and 2; and the range was 44°·2.
The mean of all the highest daily readings in the month was 67°·2, being 3°·1 *higher* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was 47°·9, being 4°·3 *higher* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was 19°·3, being 1°·2 *less* than the average for the 48 years, 1841–1888.
The mean for the month was 56°·2, being 3°·1 *higher* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
	hours.	hours.			lbs.	lbs.	lbs.	miles.		
May 1	2·5	14·8	SSE : S	SE : ESE	1·6	0·0	0·12	...	v : 10 : 9, so.-ha	10 : 10,oc.-slt.-r : 1,li.-cl,h,m
2	4·0	14·8	ESE : SE	SW : SSW	0·7	0·0	0·00	...	shs.-r : 10,shs.-r : v, shs.-r	v, hy.-r, hl : v, shs.-r : 0, d
3	8·8	14·9	SSW : S	SSW : SE	1·6	0·0	0·07	...	0 : p.-cl,ci.-cu,cu.-s,so.-ha	p.-cl,cu, cu.-s, li.-cl, so.-ha : 2, th.-cl
4	8·8	14·9	Calm : SE	SSE : ESE	1·4	0·0	0·01	...	10 : 3, ci.-s, s, so.-ha	5,cu,ci.-cu,ci.-s,s : 2, li.-cl : v
5	9·0	15·0	ENE : E	ESE	1·6	0·0	0·08	...	v : 2, th.-cl	v,cu, li.-cl, shs.-r, hl, t : p.-cl,ci.-cu,li.-cl
6	10·3	15·1	NE : ENE	ENE : E : ESE	1·4	0·0	0·03	...	v : v	1, li.-cl : 1, li.-cl : v, th.-cl
7	6·5	15·1	E : S	S : SSW	1·2	0·0	0·02	...	v,th.-cl : p.-cl, cu	8, ci.-cu, cu.-s : 10 : 10
8	7·2	15·2	SSW : SW	SSW : ESE	1·2	0·0	0·03	...	10, oc.-slt.-r : 10 : p.-cl	5,cu, cu.-s, li.-cl,ci.-cu : p.-cl, so.-ha, prh : 2, li.-cl,lu.-ha
9	3·5	15·2	E	E : ESE : SW	3·4	0·0	0·40	265	10, shs.-r : p.-cl : p.-cl, so.-ha	8,cu,cu.-s,so.-ha : 10,l,t,hy.-sh : v,th.-cl,lu.-ha
10	1·0	15·3	SW : WSW	WSW	0·4	0·0	0·01	202	10, r : 10, r : p.-cl, slt.-r	9, cu, cu.-s : 10 : 10
11	0·0	15·3	NW : NNW	NW : WNW : WSW	2·3	0·0	0·37	322	10 : 10	10, oc.-r : 10, fq.-r
12	0·0	15·4	WSW	WSW	2·0	0·0	0·61	370	10, fq.-r : 10, oc.-r	10, fq.-th.-r : 10, slt.-r
13	0·0	15·4	WSW	WSW : NNE	0·0	0·0	0·00	142	10, r : 10, glm, f	10 : 10, gt.-glm : 10, slt.-r
14	2·2	15·5	NE : SE	SE : E	0·6	0·0	0·03	132	10 : 10, m	7,cu,cu.-s,ci.-cu,m : p.-cl : 10, slt.-f
15	6·5	15·5	E : NE	NE : NNE	0·3	0·0	0·03	202	10, f : 10 : 9	7,ci.-cu,cu.-s,th.-cl : 0 : v
16	10·4	15·6	N : NE	N : NE	0·1	0·0	0·00	100	10, f : v, m	0, h : 0, d
17	2·5	15·6	NE : NNE	SE : SSW	0·4	0·0	0·01	123	v, tk.-f : 10, m	8, ci.-cu, th.-cl, so.-ha : 7, cu.-s, li.-cl
18	6·1	15·7	SW : WSW	SW : SSW	0·4	0·0	0·04	190	10 : v : 10	8, cu, cu.-s : 2, li.-cl, d
19	0·7	15·7	WSW	W : NNE	0·4	0·0	0·01	123	v : p.-cl, r : 10, glm, f	10, fq.-r, f, glm : 10, oc.-r
20	2·7	15·8	NNE : N	N : NNE	0·2	0·0	0·00	148	10, shs.-r : 10	6,ci.-cu,ci.-s,th.-cl : v, li.-cl
21	8·7	15·8	NNE : NE	ESE	0·2	0·0	0·00	137	10 : 6, ci.-cu, li.-cl	v, cu, ci.-cu : 0, slt.-f
22	10·3	15·9	Calm : NNE	NE : ESE	0·5	0·0	0·01	88	v : 10, f : 1, li.-cl, h	1,cu, ci.-cu, li.-cl : 1, li.-cl : 0
23	8·8	15·9	Calm : SE	Variable	0·7	0·0	0·00	87	0 : 0, m, h : v, h	v, t.-sm, hy.-r, hl : v, li.-cl,slt.-m,l
24	13·2	16·0	Calm : S	S : SSE	1·4	0·0	0·07	170	0 : 2, li.-cl	3, cu : 3 : v, l, t
25	4·7	16·0	SSE : SSW	WSW : N : NNE	0·5	0·0	0·02	214	10, sh.-r : 10 : p.-cl, ci.-cu	8, cu, cu.-s : 10, l, t, hy.-r
26	0·0	16·0	NE : NNE	NE : NNE	0·1	0·0	0·00	171	10, hy.-r : 10, slt.-r, slt.-f	10, fq.-r : 10, fq.-r
27	0·0	16·1	NE : N	NE : Calm : S	0·1	0·0	0·00	149	10, slt.-r : 10, hy.-r : 10, hy.-r	10, slt.-r : 10 : p.-cl
28	2·1	16·1	SSW : SW	SSW	1·7	0·0	0·22	296	v : p.-cl	9, cu, cu.-s, ci.-cu, slt.-r : 10, r : v,cu.-s,li.-cl,slt.-r
29	9·9	16·1	SSW	SW : SSW	4·8	0·0	0·77	378	v : p.-cl, cu.-s, sh.-r	6, cu, cu.-s, ci.-cu : 2, li.-cl
30	12·2	16·2	SSW	SSW : S	2·7	0·0	0·62	361	0 : p.-cl, li.-cl : v, shs.-r	v, cu, ci.-cu, cu.-s : v, li.-cl
31	10·2	16·2	S : SSW	SSW : S	2·5	0·0	0·45	320	0 : v, li.-cl : v, so.-ha	4, cu, cu.-s, ci : 2 : 0
Means	5·6	15·6	...	...	...	...	0·13	(23 days) 204		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 53°·1, being 4°·2 *higher* than the average for the 20 years, 1849-1868.
The mean *Temperature of the Dew Point* for the month was 50°·2, being 5°·1 *higher* than the average for the 20 years, 1849-1868.
The mean *Degree of Humidity* for the month was 80·7, being 5·3 *greater* than the average for the 20 years, 1849-1868.
The mean *Elastic Force of Vapour* for the month was 0in·364, being 0in·063 *greater* than the average for the 20 years, 1849-1868.
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 4grs·1, being 0gr·7 *greater* than the average for the 20 years, 1849-1868.
The mean *Weight of a Cubic Foot of Air* for the month was 532 grains, being 6 grains *less* than the average for the 20 years, 1849-1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 6·6.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·358. The maximum daily amount of *Sunshine* was 13·2 hours on May 24.

The highest reading of the *Solar Radiation Thermometer* was 145°·2 on May 24; and the lowest reading of the *Terrestrial Radiation Thermometer* was 33°·1 on May 1.

The mean daily distribution of *Ozone* for the 12 hours ending 9h. was 1·9; for the 6 hours ending 15h. was 1·0; and for the 6 hours ending 21h. was 0·7.

The *Proportions of Wind* referred to the cardinal points were N. 6, E. 8, S. 10, and W. 6. One day was calm.

The *Greatest Pressure of the Wind* in the month was 4·8 lbs. on the square foot on May 29. The mean daily *Horizontal Movement of the Air* for the month (23 days) was 204 miles; the greatest daily value was 378 miles on May 29; and the least daily value was 87 miles on May 23.

Rain fell on 15 days in the month, amounting to 3in·299, as measured by gauge No. 6 partly sunk below the ground; being 1in·309 *greater* than the average fall for the 48 years, 1841–1888.

MONTH and DAY, 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Of Radiation. Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Of the Water of the Thames at Deptford. Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
June 1	Greatest Declination N.	29·772	73·8	46·4	27·4	60·0	+ 2·5	54·8	50·2	9·8	21·8	1·7	70	133·4	43·7	64·2	63·1	0·000	6·5	...
2	...	29·570	82·7	54·4	28·3	67·8	+10·1	61·8	57·1	10·7	26·3	0·6	68	137·0	51·7	63·8	62·7	0·000	5·2	...
3	...	29·716	76·9	52·0	24·9	63·3	+ 5·4	57·2	52·1	11·2	21·4	1·7	67	143·9	47·2	64·3	63·2	0·000	3·5	...
4	...	30·090	78·9	49·8	29·1	62·5	+ 4·4	57·3	52·9	9·6	19·2	1·9	71	140·5	45·0	64·4	63·6	0·000	1·5	...
5	...	30·176	75·4	52·7	22·7	63·2	+ 5·0	56·7	51·2	12·0	23·8	0·8	65	135·5	46·0	...	...	0·000	0·0	...
6	First Qr.	29·935	83·9	54·4	29·5	66·0	+ 7·7	61·5	57·9	8·1	22·8	1·5	75	133·2	54·3	...	...	0·226	0·0	...
7	...	29·809	81·6	56·4	25·2	67·3	+ 8·9	64·3	61·9	5·4	12·7	1·3	83	143·5	56·4	...	...	0·080	0·0	...
8	In Equator	29·736	60·7	53·9	6·8	57·2	− 1·3	55·7	54·4	2·8	5·3	1·2	90	81·6	53·2	...	...	0·000	0·0	...
9	...	29·510	59·0	53·0	6·0	55·5	− 3·0	53·7	52·0	3·5	5·5	1·5	88	83·9	50·7	...	...	0·000	0·0	...
10	...	29·523	53·0	48·8	4·2	50·6	− 8·0	49·8	49·0	1·6	3·8	0·0	94	72·8	47·7	...	...	1·374	0·0	...
11	...	29·677	63·6	49·0	14·6	55·3	− 3·4	53·9	52·5	2·8	8·4	0·0	91	117·4	49·0	...	...	0·031	2·0	...
12	...	29·762	66·3	54·0	12·3	58·9	+ 0·1	56·1	53·6	5·3	12·4	1·3	82	93·0	51·5	...	...	0·000	0·0	...
13	Full: Perigee	29·759	73·1	53·5	19·6	62·0	+ 3·1	58·0	54·6	7·4	15·3	0·8	77	117·2	49·0	...	...	0·000	2·0	...
14	Greatest Declination S.	29·795	66·6	50·5	16·1	58·3	− 0·8	55·4	52·8	5·5	10·6	0·8	82	111·0	45·6	...	...	0·000	0·0	...
15	...	29·797	66·3	53·3	13·0	59·4	+ 0·1	57·1	55·1	4·3	9·5	0·6	86	101·0	49·0	...	...	0·332	0·0	...
16	...	29·904	73·1	50·3	22·8	60·9	+ 1·4	56·6	52·9	8·0	18·4	0·4	75	134·4	46·0	...	...	0·002	0·0	...
17	...	30·018	69·1	48·1	21·0	58·2	− 1·5	54·7	51·6	6·6	12·1	1·0	78	124·3	43·8	...	...	0·000	0·0	...
18	...	30·027	65·4	48·1	17·3	56·1	− 3·8	52·3	48·7	7·4	15·4	0·4	76	128·0	43·3	...	...	0·000	0·0	...
19	...	29·930	70·0	45·7	24·3	56·7	− 3·5	52·9	49·4	7·3	15·7	1·5	76	142·0	41·1	...	...	0·000	0·0	...
20	Last Qr.	29·886	75·8	50·7	25·1	61·5	+ 1·0	56·9	52·9	8·6	17·5	2·8	74	139·0	45·8	62·8	62·1	0·000	0·0	...
21	In Equator	29·880	74·1	53·8	20·3	62·5	+ 1·7	58·8	55·6	6·9	14·4	0·9	79	135·6	48·8	63·2	63·1	0·000	0·0	...
22	...	29·897	79·0	51·1	27·9	62·5	+ 1·4	57·8	53·8	8·7	20·9	2·1	73	138·8	46·6	64·3	62·5	0·000	0·0	...
23	...	29·868	71·3	49·5	21·8	60·1	− 1·3	55·5	51·5	8·6	16·6	2·4	73	137·0	45·0	64·1	63·9	0·000	0·0	...
24	...	29·846	70·1	51·8	18·3	60·3	− 1·4	56·7	53·6	6·7	16·9	1·1	79	124·3	45·2	64·8	64·1	0·022	0·0	...
25	...	29·898	78·9	53·1	25·8	63·2	+ 1·3	57·7	53·1	10·1	21·9	0·8	70	143·3	49·0	64·8	64·2	0·000	0·0	...
26	...	29·912	81·0	50·3	30·7	65·7	+ 3·7	59·9	55·2	10·5	20·6	2·2	69	144·0	44·0	64·5	62·2	0·000	0·0	...
27	Apogee	29·856	81·8	52·4	29·4	66·5	+ 4·5	60·0	54·7	11·8	22·9	3·0	66	144·0	43·9	63·0	61·5	0·000	0·0	...
28	New: Greatest Dec. N	29·891	80·0	52·0	28·0	65·3	+ 3·4	59·3	54·4	10·9	22·9	1·0	68	134·0	43·4	64·0	61·5	0·000	0·0	...
29	...	30·011	76·7	55·3	21·4	66·1	+ 4·3	61·9	58·5	7·6	14·8	1·9	77	111·5	49·0	68·0	62·3	0·000	0·0	...
30	...	30·114	79·4	55·7	23·7	67·1	+ 5·4	60·8	55·8	11·3	20·6	2·7	67	137·0	47·1	65·0	62·1	0·000	2·0	...
Means	...	29·852	72·9	51·7	21·2	61·3	+ 1·6	57·2	53·6	7·7	16·3	1·3	76·3	125·4	47·4	...	...	Sum 2·067	0·8	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, 15, 16, and 17 are derived from eye-readings of self-registering thermometers. The Thames thermometers were out of order from June 5 to 19.

The electrometer was not in action throughout the month.

The mean reading of the *Barometer* for the month was 29in·852, being 0in·024 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 83°·9 on June 6; the lowest in the month was 45°·7 on June 19; and the range was 38°·2.
The mean of all the highest daily readings in the month was 72°·9, being 2°·1 *higher* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was 51°·7, being 1°·9 *higher* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was 21°·2, being 0°·2 *greater* than the average for the 48 years, 1841–1888.
The mean for the month was 61°·3, being 1°·6 *higher* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	General Direction. P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	Clouds and Weather. P.M.
	hours.	hours.			lbs.	lbs.	lbs.	miles.		
June 1	12·8	16·2	S : SSE : SE	SSE : SE : E	1·3	0·0	0·05	185	0 : 1, li.-cl	3,cu,cu.-s,ci.-cu : 3, m : 10, th.-cl
2	10·1	16·3	ENE : E : S	S : WSW	1·9	0·0	0·14	228	10, f : v, li.-cl	1, li.-cl : v, li.-cl, s, l
3	11·9	16·3	WSW	WSW : SW	2·0	0·0	0·25	306	p.-cl : v, li.-cl, cu	5, cu, ci.-cu, li.-cl : 0
4	6·6	16·3	SW : WSW	SW : E	0·4	0·0	0·00	141	v : 10 : p.-cl	5,cu,ci.-cu,cu.-s : p.-cl : 0
5	10·6	16·4	E : NE	NNE	2·5	0·0	0·37	245	0 : 0	v, cu : 10 : 10
6	6·5	16·4	NNE : N	ENE : NE	2·5	0·0	0·02	198	10 : 10 : v, th.-cl	2, ci : 2 : 10, t.-sm, hy.-r
7	4·4	16·4	NE : E	NNE : NE	0·7	0·0	0·01	202	v, l : p.-cl	p.-cl, cu, ci.-cu, li.-cl : 10, t.-sm, hy.-r : 10
8	0·0	16·4	NNE : N	N : NNE	0·5	0·0	0·00	191	10 : 10	10 : 10
9	0·0	16·4	N : NNE	NNE	1·4	0·0	0·05	204	10 : 10	10 : 10, slt.-r : 10
10	0·0	16·5	NNE	NNE	8·6	0·0	1·42	517	10, c.-hy.-r, w : 10, hy.-r, w, sc	10, sc, th.-r, w : 10, c.-r
11	0·2	16·5	NNE : NE : SE	SSE : SW : N	1·4	0·0	0·02	174	10, slt.-r : 10, slt.-r	10, slt.-r : 10, slt.-r
12	0·4	16·5	N : Calm	WNW : Calm	0·0	0·0	0·00	71	10 : 10, glm, f	10 : 10, m
13	2·1	16·5	Calm : SE	Calm : W : WSW	0·0	0·0	0·00	81	10 : p.-cl, gt.-glm	9, cu.-s,ci.-cu,th.-cl : 4
14	0·6	16·5	WSW	SW : SSW	0·2	0·0	0·00	193	10 : p.-cl, cu, t	10 : 10 : v, s
15	0·0	16·5	SSW : WSW	SW : ENE	0·5	0·0	0·00	84	v : 10 : 10	10, glm : 10, hy.-r
16	12·6	16·5	NE : ENE	ENE : ESE	0·5	0·0	0·01	164	p.-cl : 4, li.-cl	2, li.-cl, ci.-cu : 0
17	8·6	16·6	Calm : NE	ENE : E	1·4	0·0	0·03	148	0 : 0 : v	9, cu, cu.-s : v : 0
18	7·5	16·6	ENE : NE	ENE : E	2·0	0·0	0·21	240	v, slt.-f : 10 : p.-cl	7,cu.-s,ci.-cu,cu : 1 : 1
19	8·9	16·6	NNE : NE	NE : E	1·3	0·0	0·10	239	p.-cl : 9	7,ci.-cu,cu.-s : 5 : v, li.-cl
20	10·1	16·6	NE	ENE : NE	1·7	0·0	0·08	249	10 : 10 : v, cu.-s	4, cu, ci.-cu : 1, li.-cl : 0
21	8·1	16·6	NNE : NE	ENE : E : ESE	1·8	0·0	0·01	236	10 : 10 : p.-cl	5, cu, cu.-s : p.-cl : 10
22	9·5	16·6	ENE : NNE	N : NNE	0·5	0·0	0·00	156	10 : 10 : v	2,li.-cl,slt.-h : 1 : 0
23	4·8	16·6	NNE : N	NNE	1·0	0·0	0·02	228	10 : 10	v, cu, th.-cl : v : 0
24	4·5	16·6	N : NNE	E : ESE	0·0	0·0	0·00	115	10 : 10 : 10, r	8,cu,cu.-s,ci.-cu : p.-cl : v
25	9·0	16·6	NE	E : ESE	0·0	0·0	0·00	104	10 : 10, m : v, m	2, ci.-cu, cu, slt.-h : 0
26	13·1	16·5	Calm : NE	ENE : E	0·6	0·0	0·00	155	0 : 0, m : 1, slt.-h	1, cu : 0 : 0
27	11·0	16·5	NE : NNE	NE : ESE	0·0	0·0	0·00	117	0 : 1, li.-cl, slt.-h	v, cu, ci.-cu, cu.-s : 0
28	11·1	16·5	Calm : ESE	ESE : Calm	0·0	0·0	0·00	58	0 : 0, slt.-h, m	0 : v, li.-cl : v, li.-cl
29	0·6	16·5	Calm : WSW	N : NNW	1·0	0·0	0·01	95	v : 0, h, m : v,h,m,glm	p.-cl, h : 10, slt.-r, t : v
30	9·8	16·5	NNW : SW	W : NNW	1·2	0·0	0·05	174	10 : p.-cl, ci, ci.-cu	v, m : v
Means	6·5	16·5	...	...	...	...	0·10	183		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 57°·2, being 2°·0 *higher* than
The mean *Temperature of the Dew Point* for the month was 53°·6, being 2°·4 *higher* than
The mean *Degree of Humidity* for the month was 76·3, being 3·0 *greater* than
The mean *Elastic Force of Vapour* for the month was $0^{in}\cdot412$, being $0^{in}\cdot035$ *greater* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was $4^{grs}\cdot6$, being $0^{gr}\cdot4$ *greater* than
The mean *Weight of a Cubic Foot of Air* for the month was 530 grains, being 1 grain *less* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 6·0.
The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·395. The maximum daily amount of *Sunshine* was 13·1 hours on June 26.
The highest reading of the *Solar Radiation Thermometer* was 144°·0 on June 26 and 27; and the lowest reading of the *Terrestrial Radiation Thermometer* was 41°·1 on June 19.
The mean daily distribution of *Ozone* for the 12 hours ending 9^h was 0·3; for the 6 hours ending 15^h was 0·2; and for the 6 hours ending 21^h was 0·3.
The *Proportions of Wind* referred to the cardinal points were N. 11, E. 9, S. 3, and W. 4. Three days were calm.
The *Greatest Pressure of the Wind* in the month was 8·6 lbs. on the square foot on June 10. The mean daily *Horizontal Movement of the Air* for the month was 183 miles; the greatest daily value was 517 miles on June 10; and the least daily value was 58 miles on June 28.
Rain fell on 6 days in the month, amounting to $2^{in}\cdot067$ as measured by gauge No. 6 partly sunk below the ground; being $0^{in}\cdot056$ *greater* than the average fall for the 48 years, 1841–1888.

MONTH and DAY. 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Of Radiation. Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Of the Water of the Thames at Deptford. Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
July 1	...	30·200	74·0	54·1	19·9	63·4	+ 1·8	57·6	52·7	10·7	18·0	4·9	68	140·0	47·5	63·2	63·1	0·000	0·2	...
2	...	30·185	69·1	51·9	17·2	60·2	− 1·3	54·8	50·1	10·1	16·7	3·6	69	119·4	43·8	65·0	64·3	0·000	0·8	...
3	...	30·076	65·0	54·0	11·0	58·7	− 2·7	54·8	51·3	7·4	10·1	3·6	76	89·2	50·0	65·4	65·1	0·000	0·0	...
4	...	29·991	73·2	55·5	17·7	61·9	+ 0·5	58·4	55·4	6·5	15·1	1·3	80	134·0	53·0	65·4	65·1	0·000	0·0	...
5	...	29·992	80·5	54·6	25·9	64·8	+ 3·3	59·0	54·2	10·6	23·6	0·9	69	145·8	46·5	66·2	65·1	0·000	0·0	...
6	In Equator: First Quarter.	29·867	81·2	50·3	30·9	65·9	+ 4·2	59·0	53·4	12·5	23·6	0·2	64	128·5	41·7	66·8	66·1	0·000	2·8	...
7	...	29·583	73·5	56·9	16·6	63·3	+ 1·4	58·4	54·3	9·0	16·0	3·0	73	127·3	48·8	...	...	0·000	2·2	...
8	...	29·614	65·1	54·3	10·8	58·3	− 3·9	55·2	52·4	5·9	9·0	0·0	81	104·0	50·6	...	...	0·148	0·2	...
9	...	29·648	75·1	57·9	17·2	64·1	+ 1·6	60·6	57·7	6·4	17·1	0·0	80	148·0	57·9	...	...	0·212	4·2	...
10	...	29·517	72·0	57·0	15·0	62·6	− 0·1	60·4	58·5	4·1	10·3	0·0	87	116·0	50·0	...	...	0·114	15·8	...
11	...	29·779	74·8	52·1	22·7	62·9	0·0	58·4	54·6	8·3	16·4	3·0	74	144·7	44·8	...	...	0·000	5·8	...
12	Perigee: Greatest Dec. S.: Full.	29·806	76·1	58·1	18·0	64·7	+ 1·6	62·1	59·9	4·8	13·0	0·2	85	141·3	53·5	...	...	0·154	5·5	...
13	...	29·725	74·0	57·4	16·6	63·9	+ 0·6	60·8	58·2	5·7	11·7	0·4	82	144·3	53·0	...	...	0·099	2·5	...
14	...	29·674	71·0	56·5	14·5	61·0	− 2·4	58·6	56·5	4·5	11·0	1·5	86	135·4	52·1	...	...	0·191	0·0	...
15	...	29·718	69·5	52·0	17·5	59·1	− 4·3	55·6	52·5	6·6	14·6	1·3	79	133·5	44·5	...	...	0·018	5·8	...
16	...	29·675	69·9	49·0	20·9	57·7	− 5·8	53·8	50·3	7·4	16·9	2·4	76	134·0	42·2	...	...	0·003	2·5	...
17	...	29·627	67·0	51·6	15·4	56·8	− 6·7	53·1	49·7	7·1	18·2	0·4	77	126·2	50·1	...	...	0·186	0·8	...
18	In Equator	29·756	69·5	51·5	18·0	59·8	− 3·6	55·1	50·9	8·9	16·2	2·0	73	111·0	43·0	...	...	0·000	0·0	...
19	Last Qr.	29·735	74·2	47·5	26·7	59·2	− 4·1	55·0	51·2	8·0	16·9	0·0	75	137·5	38·6	...	...	0·000	0·7	...
20	...	29·617	68·2	50·7	17·5	59·1	− 4·1	56·4	54·0	5·1	13·0	0·2	84	128·4	44·6	...	...	0·029	9·0	...
21	...	29·486	71·1	55·0	16·1	60·0	− 3·0	57·6	55·5	4·5	11·7	0·9	86	133·9	49·0	...	...	0·513	5·7	...
22	...	29·677	68·6	49·7	18·9	57·6	− 5·3	51·9	46·7	10·9	17·8	4·4	67	125·5	43·4	...	...	0·000	1·5	...
23	...	29·621	67·0	49·5	17·5	56·4	− 6·4	52·9	49·6	6·8	15·0	0·0	78	134·4	42·7	...	...	0·105	0·0	...
24	Apogee	29·627	67·2	47·5	19·7	56·7	− 6·0	54·1	51·7	5·0	13·0	0·0	83	124·9	41·0	...	...	0·008	1·5	...
25	...	29·413	67·0	55·0	12·0	59·2	− 3·5	55·8	52·8	6·4	13·7	1·1	80	121·3	52·0	...	...	0·098	10·5	...
26	Greatest Declination N.	29·495	68·9	53·6	15·3	59·0	− 3·7	55·5	52·4	6·6	17·3	0·2	79	125·0	50·1	...	...	0·082	0·0	...
27	...	29·724	64·1	53·0	11·1	57·8	− 4·8	55·3	53·1	4·7	9·1	0·0	84	107·0	52·5	...	...	0·085	0·0	...
28	New	29·877	71·9	50·4	21·5	61·2	− 1·4	56·2	51·9	9·3	16·4	0·2	72	112·2	46·2	...	...	0·000	0·0	...
29	...	29·931	70·5	56·1	14·4	62·1	− 0·5	59·4	57·1	5·0	11·2	0·8	84	105·1	53·8	...	...	0·020	0·0	...
30	...	29·960	78·8	57·0	21·8	66·7	+ 4·1	61·7	57·7	9·0	19·0	0·8	73	119·7	51·3	...	...	0·000	1·0	...
31	...	29·938	78·7	52·5	26·2	65·5	+ 2·9	60·9	57·1	8·4	20·1	0·6	75	134·2	47·5	...	...	0·000	2·0	...
Means	...	29·759	71·5	53·3	18·2	61·0	− 1·7	57·0	53·7	7·3	15·2	1·2	77·4	126·8	47·9	...	...	Sum 2·065	2·6	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, 15, 16, and 17 are derived from eye-readings of self-registering thermometers.

The observations of the temperature of the water of the Thames were suspended from July 7 till September 10.

The electrometer was not in action throughout the month.

The mean reading of the *Barometer* for the month was 29in·759, being 0in·050 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 81°·2 on July 6; the lowest in the month was 47°·5 on July 19 and 24; and the range was 33°·7.
The mean of all the highest daily readings in the month was 71°·5, being 2°·7 *lower* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was 53°·3, being 0°·2 *higher* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was 18°·2, being 2°·9 *less* than the average for the 48 years, 1841–1888.
The mean for the month was 61°·0, being 1°·7 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	WIND AS DEDUCED FROM SELF-REGISTERING ANEMOMETERS. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	CLOUDS AND WEATHER. A.M.	P.M.
	hours.	hours.			lbs.	lbs.	lbs.	miles.		
July 1	9·5	16·5	NNW : N	N : ESE	1·4	0·0	0·22	238	v : v, cu, ci.-cu	9, cu, cu.-s: v : 9,cu.-s,li.-cl
2	3·0	16·5	NNE	NNE	2·6	0·0	0·06	270	10 : p.-cl	9, cu, cu.-s : v
3	0·0	16·4	NNE	NE	1·2	0·0	0·00	218	10 : 10	10 : 10
4	4·9	16·4	NNE : ENE	ENE : E	0·0	0·0	0·00	187	10 : 10	v : 3 : 10
5	11·6	16·4	E : ENE : NE	ENE : Calm	0·5	0·0	0·00	151	10 : 2 : 2, cu	v, cu : 0
6	12·5	16·4	Calm : NNW	WSW : SW	0·7	0·0	0·02	150	0 : 0, h, m	2, ci.-cu, cu, h : v, th.-cl
7	2·5	16·3	WSW : W	W : WNW	3·5	0·0	0·53	370	v : 10 : p.-cl	v, li.-cl : v, li.-cl
8	0·2	16·3	W : ENE : SE	NE : SE	0·1	0·0	0·00	72	10 : 10, fq.-r	10, r : p.-cl, slt.-r : 10, shs.-r
9	3·1	16·3	SSW	S : SSE	0·9	0·0	0·01	139	10, shs.-r : 10 : p.-cl	7, cu, ci.-cu, cu.-s, li.-cl : 10, fq.-r
10	2·4	16·3	SSW : S	SE : SW	6·8	0·0	0·65	308	p.-cl,slt.-r: v : 10, shs.-r	v, sc, shs.-r, t, w : v, slt.-r
11	7·7	16·2	SW : WSW	SW : SSW	0·8	0·0	0·04	219	1, li.-cl : 0 : v, s	8, li.-cl, cu.-s : 8
12	2·7	16·2	SW : ENE	E : SE	0·4	0·0	0·00	105	p.-cl : 10,hy.-shs: p.-cl, ci.-cu, cu.-s	v, cu, cu.-s, ci.-cu, slt.-r, t : v : 10, hy.-r
13	4·4	16·2	E : SW	WSW : SSW	0·5	0·0	0·01	162	10, hy.-r : p.-cl, cu, ci.-cu	9, ci.-cu, li.-cl, slt.-r : 10, slt.-r
14	1·3	16·1	SW : WSW : NE	N : NNW : WSW	0·9	0·0	0·01	161	10 : 10, m, shs.-r, t	v,cu.-s,th.-cl,shs.-r: 10
15	4·6	16·1	SW : WSW	WSW : SW	2·7	0·0	0·21	315	10 : 9	v, ci.-cu, cu.-s, cu, shs.-r: 1
16	7·9	16·1	WSW	WSW : SW	2·5	0·0	0·12	306	th.-cl : 10, cu.-s, th.-cl	p.-cl,cu,cu.-s,slt.-r: 10
17	5·8	16·0	WSW : NNW : N	SW : W : NW	4·6	0·0	0·11	207	10, r : v : 8,cu,ci.-cu,slt.-r,t	v,t.-sm,hy.-r: t.-sm :p.-cl,cu.-s,slt.-r,t
18	2·2	16·0	NNW : NW : SW	WSW : NW	0·0	0·0	0·00	131	10 : p.-cl, li.-cl, h	9,cu.-s,th.-cl: p.-cl : 1, th.-cl
19	5·5	16·0	Calm : NE	SW : SSW	0·2	0·0	0·00	111	0, hy.-d : p.-cl, cu.-s, ci.-s : v, li.-cl, m	v,cu,ci.-cu,m: p.-cl : 0
20	0·8	15·9	S : SSE	SSW : SW	3·2	0·0	0·29	287	0, d : p.-cl,s,ci.-s: 10, fq.-r	10, oc.-slt.-r : p.-cl : v
21	3·9	15·9	SW	SW : WSW	9·3	0·0	0·71	398	v, s, ci.-s :p.-cl,cu,cu.-s,li.-shs,w	v, fq.-hy.-r, l,w: v,t.-sm,hy.-r: 0
22	10·3	15·8	WSW : W	WSW : SSW	2·7	0·0	0·31	321	0 : v, cu, ci.-cu	9 : v : p.-cl
23	4·5	15·8	SSW	SW : WSW	3·5	0·0	0·06	209	v, s, li.-cl : v, slt.-r	v, t.-sm, hy.-r, hl : v, r, l, m
24	2·0	15·7	WSW	WSW : SSW	2·0	0·0	0·27	292	v : 9, th.-cl, so.-ha	10, slt.-r : 10, slt.-r
25	1·8	15·7	SW : WSW	WSW	4·5	0·0	1·00	440	10, r, w : p.-cl,cu,ci.-cu,hy.-sh,w	10,sc,slt.-r,w: 10, li.-shs : v, w
26	3·7	15·7	W : NNW	N : NNW	1·4	0·0	0·10	272	10 : p.-cl, ci.-cu	9,cu,cu.-s,slt.-r: 10, slt.-r : 10, fq.-r
27	0·3	15·6	NNW	NNW : NW : SW	1·0	0·0	0·04	230	10 : 10 : 10, slt,-r	10 : p.-cl, r, l, t : v, slt.-f
28	3·2	15·6	WSW	WSW : W	0·7	0·0	0·02	211	p.-cl : 7, li.-cl, m	8, li.-cl, m : v
29	0·4	15·5	WSW	SE : S	0·0	0·0	0·00	83	10, th.-r : 10, slt.-r, glm	10, cu.-s, m : 10 : v, th.-cl
30	3·1	15·5	SW	SW : E : S	0·1	0·0	0·00	86	p.-cl : v, th.-cl, h, m	v, th.-cl, cu.-s, h : v, li.-cl, cu.-s
31	12·7	15·4	SE	E	1·2	0·0	0·07	140	0 : 1, li.-cl	1, cu : v, th.-cl
Means	4·5	16·0	...	...	...	...	0·16	219		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 57°·0, being 0°·7 *lower* than the average for the 20 years, 1849–1868.
The mean *Temperature of the Dew Point* for the month was 53°·7, being *the same as* the average for the 20 years, 1849–1868.
The mean *Degree of Humidity* for the month was 77·4, being 4·4 *greater* than the average for the 20 years, 1849–1868.
The mean *Elastic Force of Vapour* for the month was 0in·413, being *the same as* the average for the 20 years, 1849–1868.
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 4grs·6, being *the same as* the average for the 20 years, 1849–1868.
The mean *Weight of a Cubic Foot of Air* for the month was 528 grains, being *the same as* the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 7·5.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·279. The maximum daily amount of *Sunshine* was 12·7 hours on July 31.

The highest reading of the *Solar Radiation Thermometer* was 148°·0 on July 9; and the lowest reading of the *Terrestrial Radiation Thermometer* was 38°·6 on July 19.

The mean daily distribution of *Ozone* for the 12 hours ending 9h. was 1·2; for the 6 hours ending 15h. was 0·8; and for the 6 hours ending 21h. was 0·6.

The *Proportions of Wind* referred to the cardinal points were N. 5, E. 5, S. 9, and W. 10. Two days were calm.

The *Greatest Pressure of the Wind* in the month was 9·3 lbs. on the square foot on July 21. The mean daily *Horizontal Movement of the Air* for the month was 219 miles; the greatest daily value was 440 miles on July 25; and the least daily value was 72 miles on July 8.

Rain fell on 16 days in the month, amounting to 2in·065, as measured by gauge No. 6 partly sunk below the ground; being 0in·371 *less* than the average fall for the 48 years, 1841–1888.

MONTH and DAY, 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Of Radiation. Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Of the Water of the Thames at Deptford. Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
Aug. 1	...	29·773	86·6	55·5	31·1	69·0	+ 6·4	64·0	60·1	8·9	19·4	0·8	73	141·3	50·0	...	...	0·000	2·0	...
2	In Equator	29·789	78·3	56·3	22·0	64·6	+ 1·9	58·8	54·0	10·6	20·6	3·8	69	142·1	48·4	...	...	0·000	4·5	...
3	...	29·714	68·6	59·1	9·5	62·8	+ 0·1	60·9	59·3	3·5	5·9	2·1	89	92·9	56·6	...	...	0·183	6·0	...
4	First Qr.	29·768	78·7	55·1	23·6	64·2	+ 1·5	59·6	55·8	8·4	17·2	1·5	74	143·5	49·7	...	...	0·040	3·0	...
5	...	29·564	75·6	54·2	21·4	61·9	− 0·8	58·9	56·4	5·5	14·9	0·8	82	142·5	49·0	...	...	0·121	4·0	...
6	...	29·581	71·1	51·3	19·8	59·6	− 3·1	54·7	50·4	9·2	16·4	3·0	72	137·0	45·6	...	...	0·045	4·8	...
7	...	29·797	72·0	52·0	20·0	60·4	− 2·3	54·8	49·9	10·5	21·1	1·8	68	131·2	46·2	...	...	0·000	0·7	...
8	Greatest Declination S.	29·910	73·0	49·1	23·9	59·7	− 3·0	55·1	51·0	8·7	16·2	1·2	73	136·0	41·9	...	...	0·000	0·0	...
9	Perigee	29·734	70·1	52·2	17·9	58·2	− 4·5	55·8	53·6	4·6	13·0	0·0	85	120·4	48·7	...	...	0·140	2·8	...
10	...	29·568	69·0	50·3	18·7	58·5	− 4·2	55·7	53·2	5·3	12·1	0·6	82	124·9	45·3	...	...	0·113	3·5	...
11	Full	29·382	66·9	49·7	17·2	57·0	− 5·7	54·3	51·8	5·2	13·3	0·6	83	120·5	43·2	...	...	0·010	0·8	...
12	...	29·574	62·1	48·8	13·3	55·3	− 7·3	53·1	51·0	4·3	8·2	0·6	86	107·1	43·0	...	...	0·048	0·0	...
13	...	29·823	63·7	52·3	11·4	57·6	− 4·9	53·3	49·4	8·2	15·2	3·4	74	114·0	47·0	...	...	0·001	0·0	...
14	In Equator	29·740	68·3	51·6	16·7	57·9	− 4·5	55·2	52·8	5·1	16·4	0·0	83	120·1	48·5	...	...	0·130	3·0	...
15	...	29·649	74·2	57·5	16·7	63·8	+ 1·5	60·3	57·4	6·4	17·5	0·2	80	127·4	51·4	...	...	0·000	0·0	...
16	...	29·796	77·7	55·3	22·4	64·4	+ 2·3	60·4	57·1	7·3	17·9	0·9	77	135·4	50·3	...	...	0·000	2·2	...
17	...	29·664	75·1	52·0	23·1	63·4	+ 1·5	58·4	54·2	9·2	20·7	3·6	72	133·4	44·0	...	...	0·001	1·0	...
18	Last Qr.	29·808	74·3	49·1	25·2	60·0	− 1·8	55·0	50·6	9·4	19·3	1·4	71	136·9	41·0	...	...	0·000	2·8	...
19	...	29·474	73·1	51·2	21·9	61·4	− 0·2	59·2	57·3	4·1	10·3	0·4	87	118·0	44·2	...	...	0·132	0·7	...
20	...	29·239	64·5	54·7	9·8	60·1	− 1·3	56·6	53·6	6·5	14·0	0·0	79	87·0	51·0	...	...	0·344	2·3	...
21	Apogee	29·278	65·2	53·1	12·1	58·3	− 3·0	55·7	53·4	4·9	12·9	1·0	83	99·2	49·7	...	...	0·247	7·0	...
22	Greatest Declination N.	29·350	68·6	51·7	16·9	57·8	− 3·5	54·5	51·5	6·3	14·8	1·2	80	127·6	47·0	...	...	0·059	5·0	...
23	...	29·760	65·4	48·9	16·5	55·6	− 5·6	51·2	47·0	8·6	16·3	2·2	73	119·6	43·0	...	...	0·000	0·5	...
24	...	29·681	65·6	49·0	16·6	54·0	− 7·1	52·1	50·2	3·8	13·1	0·8	87	123·0	42·0	...	...	0·197	1·5	...
25	...	29·706	64·3	44·1	20·2	54·5	− 6·5	50·6	46·8	7·7	17·3	0·2	75	112·0	37·1	...	...	0·000	0·0	...
26	New	29·887	63·1	48·7	14·4	55·0	− 5·9	51·6	48·3	6·7	11·2	0·6	79	105·2	41·3	...	...	0·000	0·0	...
27	...	30·062	68·0	45·1	22·9	57·0	− 3·8	53·1	49·5	7·5	13·0	1·3	76	114·5	38·0	...	...	0·000	0·0	...
28	...	30·033	72·1	49·9	22·2	59·4	− 1·3	55·2	51·5	7·9	16·6	0·6	75	134·2	44·3	...	...	0·000	0·0	...
29	In Equator	30·018	78·1	50·1	28·0	62·2	+ 1·6	57·5	53·5	8·7	20·4	0·2	74	137·1	43·4	...	...	0·000	4·0	...
30	...	29·968	84·2	48·6	35·6	65·7	+ 5·3	59·9	55·2	10·5	25·7	0·2	69	126·6	42·0	...	...	0·000	1·0	...
31	...	29·956	81·1	52·8	28·3	65·1	+ 4·8	61·6	58·7	6·4	17·7	0·8	80	120·5	45·0	...	...	0·000	3·5	...
Means	...	29·711	71·6	51·6	20·0	60·1	− 1·7	56·4	53·0	7·1	15·8	1·2	77·7	123·6	45·7	...	...	Sum 1·811	2·1	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, and 15 are derived from eye-readings of self-registering thermometers.

Throughout the month of August no observations of the temperature of the water of the Thames were made, and the electrometer was not in action.

The mean reading of the *Barometer* for the month was 29in·711, being 0in·088 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 86°·6 on August 1; the lowest in the month was 44°·1 on August 25; and the range was 42°·5.
The mean of all the highest daily readings in the month was 71°·6, being 1°·3 *lower* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was 51°·6, being 1°·5 *lower* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was 20°·0, being 0°·1 *greater* than the average for the 48 years, 1841–1888.
The mean for the month was 60°·1, being 1°·7 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
	hours.	hours.			lbs.	lbs.	lbs.	miles.		
Aug. 1	5·0	15·3	E : SE	SSW : WSW	1·0	0·0	0·06	160	1, s, m : 2, th.-cl, so.-ha	6, li.-cl, cu, so.-ha : p.-cl : 10
2	9·7	15·3	WSW	SW : SSW	2·8	0·0	0·43	359	10 : p.-cl, cu, cu.-s	5, cu, cu.-s, ci.-cu, ci.-s : v, so.-ha : 10
3	2·4	15·2	SSW	SW	4·9	0·0	0·95	452	10, r : 10, r, w	10, fq.-r, w : v : v
4	8·0	15·2	WSW	SW	0·7	0·0	0·03	178	v : p.-cl, cu, m	v, cu : 10 : 10, r
5	5·5	15·1	SW	SW	4·7	0·0	0·36	283	10, r : 10 : p.-cl, slt.-r	v, shs.-r, t, w : v, shs.-r
6	11·6	15·1	SW : WSW	WSW	4·3	0·0	0·85	442	0 : p.-cl, cu, ci.-cu, w	9, cu, cu.-s, shs.-r, w : v, w : 0
7	9·8	15·0	WSW : W	W : NW : WSW	2·2	0·0	0·35	360	0 : p.-cl : 6, ci.-cu, cu.-s	3 ci.-cu, cu, li.-cl : v, slt.-r : v, cu.-s, li.-cl
8	6·5	15·0	SW : WSW	WSW : SW	1·0	0·0	0·01	188	0 : 5, ci.-cu, cu.-s	p.-cl, ci.-cu, cu, cu.-s : p.-cl : v, th.-cl
9	0·5	14·9	SW : SSW	SW	2·4	0·0	0·22	274	10 : 10, oc.-slt.-r	10 : 10, fq.-r : v
10	4·1	14·9	WSW : SW	SSW	1·7	0·0	0·11	253	p.-cl : p.-cl, ci.-cu, cu.-s, fq.-r	9, cu, cu.-s, li.-cl : p.-cl : 9, slt.-r
11	3·9	14·8	SW	WSW : N	1·0	0·0	0·01	151	p.-cl : p.-cl, ci.-cu, cu.-s	v, shs.-r, t : v, cu.-s
12	0·1	14·7	WSW : NW	NNW	1·9	0·0	0·15	257	v : 10, shs.-r	10, oc.-slt.-r : p.-cl : v
13	0·3	14·7	NW : W	NW : WSW	1·2	0·0	0·02	204	v : 10 : 10, glm, slt.-r	10 : 10
14	1·6	14·6	SW	SSW : WSW	3·1	0·0	0·54	311	p.-cl : 8, ci.-cu, cu, cu.-s, so.-ha	10, slt.-r : 10, slt.-r : 10
15	6·5	14·6	W : WSW	WSW	2·0	0·0	0·19	293	p.-cl : v, cu	9, li.-cl, cu : v : 2, li-cl
16	7·7	14·5	WSW	SW	1·5	0·0	0·23	266	p.-cl : 8, cu, ci.-cu, m	6, cu, cu.-s : p.-cl : v, th.-cl
17	6·7	14·4	SW	SW : WSW	3·7	0·0	0·95	402	p.-cl : 10, w : p.-cl, slt.-r, w	7, cu, ci.-cu, slt.-r : li.-cl : 1, li.-cl
18	8·2	14·4	SW	SW : SSW	1·4	0·0	0·05	206	li.-cl : p.-cl, cu, ci.-cu	p.-cl, cu : v, th.-cl
19	0·4	14·3	ENE : ESE	SE : SSW	0·5	0·0	0·00	113	v, s : 10, slt.-r	9, cu.-s, ci.-cu, slt.-r : r : 10, hy.-r
20	2·4	14·3	S : W	W : WSW	10·5	0·0	1·58	481	10, hy-r : 10, hy.-r : 10, st.-w	9, st.-w : v, w : 9
21	2·7	14·2	SW	SSW : SW	9·1	0·0	0·89	367	10, slt.-r : 10	v, fq.-r, st.-w : v, fq.-r, w
22	4·3	14·1	SW : WSW	WSW : WNW	5·4	0·0	0·99	449	p.-cl, w : 10, w : p.-cl, w	8, ci.-cu, cu.-s, th.-cl, r, so.-ha : v, slt.-r
23	5·7	14·1	WSW : W	WSW : W	1·9	0·0	0·10	323	v : p.-cl, cu, li.-cl, m, h	6, cu, ci.-cu, th.-cl : p.-cl : v
24	2·5	14·0	SW : WSW	WSW : SW	6·5	0·0	0·06	270	p.-cl, sh.-r : 10 : 10, glm, shs.-r	v, cu, t.-sm, hy.-r, glm, w : v, f
25	5·6	13·9	WSW : W : WNW	W : WSW	1·0	0·0	0·02	248	v : 5, ci.-cu, cu.-s	8, ci.-cu : 10, oc.-slt.-r : v
26	2·3	13·9	WSW : NW	NW : NNW	0·7	0·0	0·01	227	0 : p.-cl, cu, m	9, cu, ci.-cu : v
27	3·9	13·8	SW : WSW	WSW : SW	0·2	0·0	0·00	200	v : v, th.-cl, m	10 : 10
28	11·7	13·8	SSW : SW	SW : SSW	2·2	0·0	0·28	315	v, d : p.-cl, cu.-s	4, ci.-cu, th.-cl : 0 : 0
29	11·4	13·7	SSW : SW	SSW : S	0·0	0·0	0·00	187	0, d : 0	0 : 0
30	11·5	13·7	Calm : SSW	SSW : SW	0·0	0·0	0·00	87	0, d : 0, slt.-f	0 : 0
31	7·5	13·6	WSW : Calm : NNE	NE : E	0·0	0·0	0·00	111	0, hy.-d : 0, m	v, li.-cl, ci.-cu : v
Means	5·5	14·5	...	...	...	...	0·30	272		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 56°·4, being 1°·5 *lower* than
The mean *Temperature of the Dew Point* for the month was 53°·0, being 1°·4 *lower* than
The mean *Degree of Humidity* for the month was 77·7, being 1·2 *greater* than
The mean *Elastic Force of Vapour* for the month was 0in·403, being 0in·021 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 4grs·5, being 0gr·2 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 528 grains, being *the same as*
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 6·7.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·379. The maximum daily amount of *Sunshine* was 11·7 hours on August 28.

The highest reading of the *Solar Radiation Thermometer* was 143°·5 on August 4; and the lowest reading of the *Terrestrial Radiation Thermometer* was 37°·1 on August 25.

The mean daily distribution of *Ozone* for the 12 hours ending 9h. was 1·0; for the 6 hours ending 15h. was 0·6; and for the 6 hours ending 21h. was 0·5.

The *Proportions of Wind* referred to the cardinal points were N. 2, E. 0, S. 12, and W. 16. One day was calm.

The *Greatest Pressure of the Wind* in the month was 10·5 lbs. on the square foot on August 20. The mean daily *Horizontal Movement of the Air* for the month was 272 miles; the greatest daily value was 481 miles on August 20; and the least daily value was 87 miles on August 30.

Rain fell on 14 days in the month, amounting to 1in·811, as measured by gauge No. 6 partly sunk below the ground; being 0in·546 *less* than the average fall for the 48 years, 1841–1888.

MONTH and DAY, 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Lowest.	Daily Range.	Mean of 24 Hourly Values.	Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
Sept. 1	...	30·002	72·7	54·1	18·6	61·7	+ 1·6	58·7	56·2	5·5	16·9	0·4	82	122·8	47·0	...	...	0·000	3·5	...
2	First Qr.	29·872	70·3	55·0	15·3	61·5	+ 1·5	59·9	58·5	3·0	9·2	0·0	90	110·9	48·0	...	...	0·290	2·0	...
3	...	29·827	69·4	58·5	10·9	62·9	+ 3·1	61·8	60·9	2·0	7·2	0·0	93	103·0	51·5	...	...	0·254	5·0	...
4	...	29·959	68·6	57·9	10·7	62·1	+ 2·4	59·9	58·0	4·1	9·5	0·0	87	107·4	50·9	...	...	0·000	0·0	...
5	Greatest Declination S.	30·062	63·2	56·4	6·8	60·3	+ 0·8	59·1	58·0	2·3	4·6	0·0	93	76·4	48·4	...	...	0·000	0·0	...
6	Perigee	30·095	70·3	52·9	17·4	59·8	+ 0·5	56·5	53·6	6·2	18·4	0·2	81	124·2	45·0	...	...	0·000	0·0	...
7	...	29·978	68·9	51·3	17·6	58·2	− 0·8	56·1	54·2	4·0	12·1	0·2	86	102·7	43·0	...	...	0·000	0·0	...
8	...	29·923	64·0	46·1	17·9	54·8	− 4·0	53·3	51·8	3·0	9·1	0·2	89	105·5	37·5	...	...	0·000	0·0	...
9	Full	29·972	75·1	51·0	24·1	61·2	+ 2·7	58·2	55·6	5·6	13·3	0·8	82	105·0	43·9	...	...	0·002	0·0	...
10	...	30·036	78·4	56·6	21·8	65·0	+ 6·7	61·3	58·2	6·8	17·5	0·8	80	118·7	48·0	...	...	0·000	0·0	...
11	In Equator	29·991	81·8	54·9	26·9	66·7	+ 8·6	60·6	55·7	11·0	21·9	1·7	68	120·9	46·2	63·5	62·7	0·000	0·0	...
12	...	30·014	77·2	59·8	17·4	66·6	+ 8·6	62·9	59·9	6·7	14·1	0·6	80	109·8	51·6	64·5	63·1	0·000	0·0	...
13	...	30·038	78·4	57·0	21·4	65·4	+ 7·6	61·3	57·9	7·5	20·1	0·0	78	129·8	50·1	64·6	64·6	0·000	0·0	...
14	...	30·146	67·3	51·4	15·9	58·8	+ 1·2	54·1	49·9	8·9	17·3	2·1	72	114·3	42·0	65·0	64·7	0·000	0·0	...
15	...	30·202	63·4	50·1	13·3	54·9	− 2·5	50·7	46·7	8·2	14·1	4·4	74	119·0	40·3	65·2	65·1	0·000	0·0	...
16	...	30·234	63·5	40·0	23·5	52·5	− 4·8	48·3	44·1	8·4	19·2	2·1	73	127·5	31·0	65·0	63·6	0·000	1·0	...
17	Last Qr.	30·072	62·8	35·7	27·1	49·1	− 8·0	44·4	39·3	9·8	20·9	0·7	69	119·5	26·1	63·8	63·1	0·000	0·0	...
18	Apogee: Great. Dec. N.	29·991	66·1	39·3	26·8	51·6	− 5·3	47·3	42·9	8·7	20·0	0·4	73	120·1	28·0	62·8	62·6	0·000	0·0	...
19	...	29·676	62·1	42·1	20·0	52·2	− 4·6	49·1	45·9	6·3	15·6	0·4	80	80·7	34·9	62·5	62·1	0·136	3·0	...
20	...	29·463	58·7	44·2	14·5	50·2	− 6·4	46·7	43·0	7·2	15·6	1·7	77	115·7	36·0	61·8	61·4	0·103	0·0	...
21	...	29·476	58·9	39·8	19·1	46·9	− 9·5	43·7	40·1	6·8	12·8	2·4	78	114·0	31·0	61·0	60·1	0·014	0·0	...
22	...	29·516	55·7	39·4	16·3	47·6	− 8·6	44·2	40·4	7·2	14·7	0·9	77	94·0	30·0	59·8	57·3	0·002	0·0	...
23	...	29·682	58·1	36·1	22·0	47·1	− 9·0	43·7	39·9	7·2	14·0	1·9	77	114·8	28·5	59·0	57·0	0·000	1·8	...
24	...	29·393	60·2	45·6	14·6	53·1	− 2·8	52·0	50·9	2·2	5·5	0·4	92	77·2	42·0	57·8	56·5	0·845	2·2	...
25	New: In Equator.	29·694	54·5	40·6	13·9	47·7	− 8·1	42·7	37·2	10·5	17·6	2·9	68	105·2	33·0	58·0	55·0	0·000	0·0	...
26	...	29·985	59·7	37·6	22·1	49·4	− 6·3	46·3	43·0	6·4	12·2	2·8	79	97·5	29·1	57·0	55·0	0·000	0·0	...
27	...	29·899	65·1	52·5	12·6	58·2	+ 2·7	55·5	53·1	5·1	9·4	3·0	83	90·8	47·0	56·1	55·0	0·000	4·0	...
28	...	29·656	59·1	48·3	10·8	54·9	− 0·5	50·4	46·1	8·8	14·8	2·3	72	94·7	40·5	...	...	0·000	1·0	...
29	...	29·628	53·6	45·1	8·5	49·1	− 6·1	44·9	40·4	8·7	11·8	5·5	72	89·5	38·6	...	...	0·000	0·0	...
30	...	29·536	55·5	44·8	10·7	48·5	− 6·4	46·6	44·5	4·0	8·8	1·1	87	79·0	38·7	...	...	0·042	0·0	...
Means	...	29·867	65·4	48·1	17·3	55·9	− 1·5	52·7	49·5	6·4	13·9	1·3	79·7	106·4	40·3	...	...	Sum 1·688	0·8	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, 15, 16, and 17 are derived from eye-readings of self-registering thermometers.

The Thames thermometers were out of order from September 1 to 10, and from September 28 to 30.

The electrometer was not in action throughout the month.

The mean reading of the *Barometer* for the month was 29in·867, being 0in·080 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 81°·8 on September 11; the lowest in the month was 35°·7 on September 17; and the range was 46°·1.
The mean of all the highest daily readings in the month was 65°·4, being 1°·9 *lower* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was 48°·1, being 1°·0 *lower* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was 17°·3, being 0°·9 *less* than the average for the 48 years, 1841–1888.
The mean for the month was 55°·9, being 1°·5 *lower* than the average for the 20 years, 1849–1868.

Month and Day, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
	hours.	hours.			lbs.	lbs.	lbs.	miles.		
Sept. 1	6·5	13·5	NE : ENE	E : ESE	1·3	0·0	0·01	170	p.-cl : 10 : v	0 : 0
2	3·0	13·4	E	E : NE	1·6	0·0	0·05	145	v, : v,cu.-s,th.-cl,so.-ha	10 : 10, t.-sm, hy.-r
3	0·0	13·4	Calm : WSW	NW : N : Calm	0·0	0·0	0·00	25	10, shs.-r, l, t : 10, hy.-r, l : 10, fq.-r, glm	9, slt.-r : 10, slt.-r, l, t : v, l, t, m, h
4	3·2	13·3	Calm : N	N : NNE	0·1	0·0	0·00	57	p.-cl : 10 : v	v, li.-cl, slt.-h : 10
5	0·0	13·2	NNE	N : NNE	0·2	0·0	0·00	74	10 : 10	10, slt.-r : 10 : v, f, d
6	8·5	13·2	NNE : ENE	NE : ENE	1·4	0·0	0·06	153	v, f : 5, cu.-s, ci.-cu	1, li.-cl : 0 : 0, d
7	1·4	13·1	NNE : NE	ENE : E	0·5	0·0	0·00	119	10 : 10	9, slt.-r : p.-cl, slt.-r : 1, th.-cl, d
8	1·0	13·0	Calm : NNE	SW : SSW	0·0	0·0	0·00	48	0, d : v, slt.-f	v, th.-cl, glm, f : v, th.-cl, d
9	6·7	13·0	SSW : SW	WSW : SSW	0·4	0·0	0·00	155	10 : p.-cl, cu	5, cu, ci.-cu : p.-cl : v, li.-cl
10	8·3	12·9	SW : SSW	SW : S	0·0	0·0	0·00	123	p.-cl : v, cu, so.-ha	1, cu.-s, ci : 0 : 0, d
11	8·9	12·9	S : SSW	SSW : SW	0·8	0·0	0·02	176	0, d : 0	2, th.-cl, ci.-cu : p.-cl : 4, li.-cl, d
12	5·2	12·8	SW : NW	N : NE	0·1	0·0	0·00	157	v, d : p.-cl, th.-cl, m	4, cu, ci.-cu, li.-cl : 0 : v, th.-cl, d
13	7·5	12·7	SE : WSW	W : NNW	2·0	0·0	0·20	242	f : p.-cl, cu, ci.-cu, slt.-r	3, ci.-cu, ci.-s, li.-cl : v : v, li.-cl
14	5·8	12·7	N : NE	NNE	1·5	0·0	0·02	224	p.-cl : 10	4, li.-cl, cu, ci.-cu : 0 : v
15	1·7	12·6	N	N : NE	1·5	0·0	0·03	241	10 : p.-cl	10 : v, th.-cl
16	7·2	12·6	NE : SE	SE : ESE	0·0	0·0	0·00	101	10 : p.-cl, cu	5, ci.-cu, cu.-s, li.-cl : 0 : 0
17	10·6	12·5	E : SE	SE : ESE	0·7	0·0	0·00	125	0, d : 0, ho.-fr, f : 0	1, li.-cl : 0 : 0, d
18	10·3	12·4	Calm : SE	SSE	0·0	0·0	0·00	123	0, ho.-fr : 0, tk.-f : 1, h	1, li.-cl : 0 : 0
19	0·0	12·3	S : SSW	SW : WSW	2·4	0·0	0·03	321	v : p.-cl : 10	10, fq.-r : v, oc.-slt.-r
20	6·3	12·3	WSW : W	WNW : W	4·5	0·0	0·30	361	v, d : v, cu, ci.-cu, li.-cl	7, cu, ci.-cu, cu.-s, hy.-sh : p.-cl : v
21	4·1	12·2	W : WNW	WNW : W : WSW	1·7	0·0	0·10	307	0, d : v, li.-cl, m, h	9, cu, cu.-s, slt.-r : v : 10
22	2·4	12·2	WSW : N	NNW : WNW	0·5	0·0	0·00	171	10 : p.-cl, cu, m	10, m : v, m : 0, d
23	1·7	12·1	WSW	SSW : SSE	0·1	0·0	0·00	186	0 : v, cu.-s, th.-cl	9 : 10, slt.-r : 10
24	0·0	12·0	SE : S : SSW	SW : NNW	2·9	0·0	0·11	284	10, fq.-r : 10, fq.-r : 10, oc.-slt.-r	10, hy.-r : v
25	8·8	11·9	WNW : NNW	NNW : NW	4·5	0·0	0·81	426	0 : v, li.-cl, w : 4, li.-cl, ci.-cu, ci.-s, w	1, li.-cl, cu : 0 : 0
26	2·3	11·9	WSW	WSW	2·7	0·0	0·30	356	0 : v, ci.-cu, cu.-s, so.-ha	7, th.-cl, h : p.-cl : 4, li.-cl
27	0·2	11·8	WSW	WSW	6·4	0·0	1·02	489	0 : v : 10	9, w : 10, w : 10, m.-r
28	2·0	11·7	W : WNW	NW : NNW	7·0	0·0	0·98	476	p.-cl : 8, cu, ci.-cu, w	9, cu, ci.-cu, slt.-r, w : v
29	1·9	11·7	NNW	NNW	4·2	0·0	0·94	422	p.-cl : 8, li.-cl, cu.-s, slt.-r, w	10, oc.-slt.-r, w : 10
30	0·3	11·6	NW : W : WSW	N	3·7	0·0	0·27	306	10 : 10, glm, slt.-r	10, shs.-r : 10, oc.-slt.-r : v, th.-cl, d
Means	4·2	12·6	...	...	...	...	0·17	219		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 52°·7, being 1°·6 *lower* than
The mean *Temperature of the Dew Point* for the month was 49°·5, being 1°·9 *lower* than
The mean *Degree of Humidity* for the month was 79·7, being 0·4 *less* than
The mean *Elastic Force of Vapour* for the month was 0^{in}·355, being 0^{in}·024 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 4^{grs}·0, being 0^{gr}·2 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 536 grains, being 4 grains *greater* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 6·0.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·334. The maximum daily amount of *Sunshine* was 10·6 hours on September 17.

The highest reading of the *Solar Radiation Thermometer* was 129°·8 on September 13; and the lowest reading of the *Terrestrial Radiation Thermometer* was 26°·1 on September 17.

The mean daily distribution of *Ozone* for the 12 hours ending 9^{h} was 0·2; for the 6 hours ending 15^{h} was 0·3; and for the 6 hours ending 21^{h} was 0·3.

The *Proportions of Wind* referred to the cardinal points were N. 8, E. 5, S. 6, and W. 9. Two days were calm.

The *Greatest Pressure of the Wind* in the month was 7·0 lbs. on the square foot on September 28. The mean daily *Horizontal Movement of the Air* for the month was 219 miles; the greatest daily value was 489 miles on September 27; and the least daily value was 25 miles on September 3.

Rain fell on 7 days in the month, amounting to 1^{in}·688, as measured by gauge No. 6 partly sunk below the ground; being 0^{in}·608 *less* than the average fall for the 48 years, 1841-1888.

MONTH and DAY, 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Of Radiation. Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Of the Water of the Thames at Deptford. Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
Oct. 1	Perigee	29·703	57·3	46·0	11·3	50·3	− 4·4	48·7	47·0	3·3	7·8	1·5	89	101·2	40·0	...	...	0·070	0·0	...
2	First Qr.: Great. Dec. S.	29·733	59·1	47·3	11·8	50·8	− 3·6	48·9	46·9	3·9	9·7	1·1	87	113·5	40·0	...	...	0·000	0·0	...
3	...	29·609	56·3	41·2	15·1	48·6	− 5·4	47·0	45·2	3·4	9·8	0·4	89	98·0	35·2	...	...	0·171	2·0	...
4	...	29·383	56·6	41·8	14·8	47·1	− 6·6	46·3	45·4	1·7	8·2	0·0	94	112·2	35·3	...	...	0·309	0·0	...
5	...	29·510	58·7	40·3	18·4	49·2	− 4·2	48·0	46·7	2·5	8·2	0·0	92	97·5	34·7	...	...	0·314	0·0	...
6	...	29·667	58·1	44·4	13·7	51·9	− 1·1	50·3	48·7	3·2	8·4	0·4	89	83·1	35·0	...	...	0·012	4·0	...
7	...	29·268	58·7	46·0	12·7	54·0	+ 1·3	50·0	46·1	7·9	14·4	1·0	74	98·0	39·0	...	...	0·119	7·0	...
8	In Equator	29·274	59·0	42·7	16·3	49·0	− 3·5	46·0	42·8	6·2	14·4	0·4	79	112·2	35·6	...	...	0·178	5·2	...
9	Full	29·064	58·2	42·7	15·5	48·8	− 3·5	45·9	42·8	6·0	12·2	2·0	80	112·0	36·0	...	...	0·000	8·8	...
10	...	29·181	61·4	40·8	20·6	48·1	− 4·0	45·8	43·3	4·8	14·3	0·2	84	119·2	33·1	...	...	0·000	0·0	...
11	...	29·309	53·7	41·5	12·2	47·2	− 4·7	46·5	45·7	1·5	4·4	0·0	95	73·7	33·0	...	...	0·260	0·0	...
12	...	29·460	59·4	40·0	19·4	48·0	− 3·7	45·6	43·0	5·0	12·5	0·4	83	108·9	32·3	...	...	0·003	0·0	...
13	...	29·632	56·5	35·0	21·5	44·8	− 6·8	43·4	41·8	3·0	11·4	0·0	89	102·8	28·0	...	...	0·000	0·0	...
14	...	29·767	55·1	35·1	20·0	44·1	− 7·3	42·7	41·0	3·1	14·0	0·0	89	84·7	29·0	...	...	0·002	0·0	...
15	Apogee: Great. Dec. N.	29·738	61·1	41·1	20·0	50·7	− 0·6	49·0	47·2	3·5	12·5	0·0	88	110·7	33·0	...	...	0·004	0·0	...
16	...	29·587	61·9	51·2	10·7	55·9	+ 4·7	54·9	54·0	1·9	5·3	0·0	93	97·2	50·0	...	...	0·454	2·0	... : wP, vN
17	Last Qr.	29·597	58·6	44·1	14·5	50·5	− 0·6	48·8	47·0	3·5	9·9	0·4	89	92·6	35·0	...	...	0·004	1·0	vP
18	...	29·430	57·6	39·6	18·0	48·7	− 2·3	47·3	45·8	2·9	8·7	0·0	90	83·0	30·0	...	...	0·000	5·8	vP
19	...	29·057	54·0	45·1	8·9	49·3	− 1·5	47·9	46·4	2·9	8·0	0·0	90	75·7	37·4	...	...	0·246	11·2	...
20	...	29·072	56·7	43·7	13·0	49·5	− 1·1	48·2	46·8	2·7	10·6	1·1	91	88·1	36·5	...	...	0·765	8·0	...
21	...	29·158	53·7	42·1	11·6	46·5	− 3·9	46·0	45·4	1·1	3·6	0·0	96	76·0	33·9	...	...	0·257	4·0	... : vP
22	...	29·236	55·1	42·1	13·0	47·6	− 2·5	47·0	46·3	1·3	6·0	0·0	96	83·0	31·5	...	...	0·000	0·0	vP : wP : vP
23	In Equator	29·486	51·7	43·5	8·2	47·9	− 1·8	47·1	46·2	1·7	4·4	0·0	94	65·1	36·6	48·4	47·6	0·027	0·0	wP : wP, wN : wP
24	New	29·842	51·6	41·3	10·3	47·1	− 2·3	46·2	45·2	1·9	4·6	0·4	94	71·0	32·5	47·4	46·6	0·022	0·0	wP : vP
25	...	30·011	53·7	34·9	18·8	44·9	− 4·2	43·7	42·3	2·6	8·8	0·0	91	101·9	30·0	49·9	49·4	0·000	0·0	vP
26	...	29·937	53·1	42·7	10·4	46·7	− 2·1	44·8	42·7	4·0	7·6	0·9	87	80·5	37·0	49·5	49·2	0·000	3·8	mP
27	Perigee	29·546	55·1	43·1	12·0	48·5	0·0	47·6	46·6	1·9	4·2	0·2	94	60·0	40·0	48·9	48·4	0·546	7·2	wP, vN : vN, wP
28	...	29·616	51·4	42·8	8·6	48·3	+ 0·1	48·2	48·1	0·2	1·1	0·0	99	64·9	33·5	49·6	48·9	0·012	0·0	wP : vP, wN
29	Greatest Declination S.	29·732	54·8	40·1	14·7	48·9	+ 1·0	48·4	47·8	1·1	4·0	0·0	96	67·1	31·3	49·2	48·4	0·002	0·0	vP
30	...	29·703	57·9	44·5	13·4	50·6	+ 3·0	48·7	46·7	3·9	10·3	0·0	87	105·5	34·3	49·9	48·9	0·000	3·0	vP
31	First Qr.	29·738	51·5	40·5	11·0	46·6	− 0·7	44·2	41·5	5·1	12·2	1·2	83	83·4	33·0	49·9	49·0	0·150	1·8	vP, vN : sP
Means	...	29·518	56·4	42·2	14·2	48·7	− 2·3	47·2	45·6	3·2	8·8	0·4	89·4	91·1	34·9	...	...	Sum 3·927	2·4	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, 15, 16, and 17 are derived from eye-readings of self-registering thermometers. The Thames thermometers were out of order from October 1 to 22.

The electrometer was brought into action on October 16.

The mean reading of the *Barometer* for the month was 29in·518, being 0in·202 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 61°·9 on October 16; the lowest in the month was 34°·9 on October 25; and the range was 27°·0.
The mean of all the highest daily readings in the month was 56°·4, being 1°·4 *lower* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was 42°·2, being 1°·1 *lower* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was 14°·2, being 0°·3 *less* than the average for the 48 years, 1841–1888.
The mean for the month was 48°·7, being 2°·3 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
	hours.	hours.			lbs.	lbs.	lbs.	miles.		
Oct. 1	1·6	11·6	N : NNW	N : NNW	2·5	0·0	0·33	327	v : p.-cl,cu.-s,li.-cl	10, shs.-r : 10
2	1·7	11·5	NNW : N	N : SSW	1·0	0·0	0·01	190	10 : 9, glm, slt.-r	8,cu.-s,ci.-cu,oc.-slt.-r : 10 : 10
3	2·3	11·4	SW : S	SW : SSW	2·0	0·0	0·05	211	10 : 10, fq.-r	v, ci.-cu : v
4	0·9	11·4	SE : ENE : SW	SW : S : SSE	3·7	0·0	0·16	210	10, fq.-r : 10, slt.-r, w	10, fq.-r : 10, slt.-r : v, li.-cl, h
5	1·3	11·3	S : SSW	SSW : SW	1·2	0·0	0·05	264	v, d : p.-cl	9, hy.-r : 1, li.-cl, d
6	0·0	11·2	SW	SW : SSW	1·8	0·0	0·06	277	0, d : 10	10, fq.-th.-r, so.-ha : 10, oc.-r
7	6·5	11·2	SSW : WSW	WSW : SW	15·0	0·4	3·68	736	10, shs.-r, w : p.-cl,shs.-r,st.-w	p.-cl, g : v, th.-cl, w
8	4·6	11·1	SW	SW : SSW	2·7	0·0	0·56	376	0 : v, li.-cl	9,cu.-s, ci.-cu, th.-cl, so.-ha : 10, fq.-r : v
9	7·0	11·0	SW	SSW	2·7	0·0	0·39	358	0 : 2, li.-cl	6,cu,cu.-s,ci.-cu,slt.-r : p.-cl : li.-cl
10	7·1	11·0	S : SW	SSW : S	1·0	0·0	0·00	202	v, d : v, th.-cl	4,cu,ci.-cu,cu.-s : v, li.-cl : p.-cl,m,slt.-r
11	0·0	10·9	NE : Calm	WSW	0·0	0·0	0·00	133	10, sh.-r : 10, fq.-r	10 : p.-cl : 10
12	5·9	10·9	SW	WSW : SW	0·4	0·0	0·00	190	v, d : 3, li.-cl	5,cu,ci.-cu,cu.-s : 2 : 0, d
13	3·7	10·8	SW : WSW	N : WSW	0·0	0·0	0·00	129	0 : 0 : 1, slt.-f	v, th.-cl, h, f : v, f
14	4·1	10·7	SW : WSW	SW : SSE : S	0·0	0·0	0·00	130	tk.-f : 0, f	0, h : 0, d
15	5·4	10·7	SSE : S	S : SSE	1·5	0·0	0·03	210	0,slt.-h,lu.-ha,d : 0, d : v	8,cu,ci.-cu,th.-cl,so.-ha : v : v, oc.-r
16	0·3	10·6	SSE	S : SW : NW	0·4	0·0	0·00	185	10, li.-shs : 9, shs.-r	9, th.-cl, so.-ha, slt.-r : 10, c.-r : 10, c.-r
17	2·7	10·5	NW : WSW	SW : SSW	0·9	0·0	0·01	232	10, oc.-r : 10 : 4, ci.-cu,li.-cl	7, li.-cl, ci.-cu : v, th.-cl, d
18	0·0	10·5	S : SE	SE : ESE	0·9	0·0	0·03	210	v, d : p.-cl, f, li.-shs	10, li.-sh : 10
19	1·1	10·4	ESE : SE : SSW	SW : S : SE	5·2	0·0	0·61	340	10, fq.-r : 10, m.-r	10, slt.-r, w : v, sh.-r : 10, hy.-r
20	1·9	10·3	SE : SSE	S : SE : ESE	2·5	0·0	0·19	222	10,c.-hy.-r : 10, c.-hy.-r : 10,fq.-hy.-r	v : p.-cl, fq.-r, l
21	0·0	10·3	E : NE	NNE	0·9	0·0	0·01	98	v : 10, fq.-r	p.-cl, r : p.-cl, f
22	0·2	10·2	NNE : NE	Calm : NE	0·0	0·0	0·00	66	v : p.-cl, slt.-f	10, glm, sh.-r : 10, f, l
23	0·0	10·2	NE : N	NNW	0·0	0·0	0·00	109	10 : 10	10, glm, fq.-r : 10 : 10
24	0·1	10·1	N	N : NNE	0·6	0·0	0·00	146	10, li.-sh : 10, glm	v, cu.-s, ci.-cu : v, m
25	5·4	10·0	N : NNE	NNE : NE	0·5	0·0	0·02	170	v : tk.-f : 2, m	5,cu,ci.-cu,cu.-s : v, slt.-r : v, d
26	0·5	10·0	NE	E : ENE	5·7	0·0	0·94	434	10 : 10	p.-cl,so.-ha,w : 10, w : 10, w
27	0·0	9·9	NE : ENE	SE : SSE	5·8	0·0	1·18	381	10, r, w : 10, c.-r, w	10, r : v, d
28	0·0	9·8	NE : N	N : Calm	0·0	0·0	0·00	79	v : 10, tk.-f	10, slt.-f, slt.-r : 10, f
29	0·0	9·8	SE : S	SSW	0·0	0·0	0·00	147	v, f : 10, tk.-f : 10, slt.-r	10, oc.-slt.-r : v
30	6·4	9·7	SSW	SSW	3·7	0·0	0·41	325	0, d : 0 : 2	5,ci.-cu,cu.-s,li.-cl : v, lu.-co : 10, w
31	6·8	9·7	WSW	W : SSW	2·4	0·0	0·30	329	10, r : v : 2	2,cu.-s,ci.-cu,li.-cl,slt.-h : 2, li.-cl
Means	2·5	10·6	...	...	...	...	0·29	239		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 47°·2, being 1°·7 *lower* than
The mean *Temperature of the Dew Point* for the month was 45°·6, being 1°·2 *lower* than
The mean *Degree of Humidity* for the month was 89·4, being 3·3 *greater* than
The mean *Elastic Force of Vapour* for the month was 0in·306, being 0in·015 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 3grs·4, being 0gr·2 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 537 grains, being 2 grains *less* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 7·3.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·236. The maximum daily amount of *Sunshine* was 7·1 hours on October 10.

The highest reading of the *Solar Radiation Thermometer* was 119°·2 on October 10; and the lowest reading of the *Terrestrial Radiation Thermometer* was 28°·0 on October 13.

The mean daily distribution of *Ozone* for the 12 hours ending 9h. was 1·3; for the 6 hours ending 15h. was 0·5; and for the 6 hours ending 21h. was 0·6.

The *Proportions of Wind* referred to the cardinal points were N. 7, E. 5, S. 11, and W. 7. One day was calm.

The *Greatest Pressure of the Wind* in the month was 15·0 lbs. on the square foot on October 7. The mean daily *Horizontal Movement of the Air* for the month was 239 miles; the greatest daily value was 736 miles on October 7; and the least daily value was 66 miles on October 22.

Rain fell on 17 days in the month, amounting to 3in·927, as measured by gauge No. 6 partly sunk below the ground; being 1in·105 *greater* than the average fall for the 48 years, 1841–1888.

MONTH and DAY, 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Of Radiation. Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Of the Water of the Thames at Deptford. Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
Nov. 1	...	29·569	55·1	40·1	15·0	47·4	+ 0·4	44·4	41·1	6·3	14·0	1·6	79	96·6	32·5	49·8	49·0	0·072	5·2	vP
2	...	29·730	52·1	38·4	13·7	43·9	− 2·8	41·2	38·0	5·9	13·0	2·1	79	84·4	29·5	49·2	48·4	0·000	0·2	mP : vP
3	...	29·579	52·2	41·0	11·2	48·6	+ 2·2	47·8	46·9	1·7	3·2	0·4	94	56·6	35·0	48·6	48·0	0·255	0·8	vP, wN : wP
4	...	29·636	54·4	43·3	11·1	49·6	+ 3·6	47·0	44·2	5·4	10·7	1·5	82	73·0	36·5	49·0	48·0	0·000	0·0	wP : vP
5	In Equator	29·781	50·1	32·6	17·5	40·0	− 5·6	38·5	36·5	3·5	10·3	0·0	88	80·8	25·0	48·1	47·7	0·000	0·0	sP
6	...	30·133	52·1	37·5	14·6	45·3	+ 0·1	43·5	41·4	3·9	7·8	1·1	87	67·0	34·0	47·2	46·6	0·000	0·0	sP
7	Full	30·297	53·1	40·1	13·0	47·0	+ 2·3	46·8	46·6	0·4	2·2	0·0	99	71·8	35·1	47·2	46·2	0·000	0·0	sP : mP
8	...	30·305	57·2	46·0	11·2	51·9	+ 7·6	50·7	49·5	2·4	8·0	0·0	92	67·1	37·0	47·6	47·2	0·000	1·0	wP, wN : vP
9	...	30·211	54·1	45·1	9·0	49·7	+ 5·9	48·3	46·8	2·9	7·8	0·0	90	58·1	37·3	47·8	46·8	0·000	0·0	mP : vP
10	...	30·190	54·2	47·4	6·8	50·1	+ 6·7	48·2	46·2	3·9	8·2	0·8	87	61·4	36·6	48·8	48·2	0·000	0·0	wP : mP : vP
11	...	30·235	52·2	46·6	5·6	50·1	+ 7·1	49·6	49·1	1·0	3·6	0·0	96	59·0	40·0	48·2	47·4	0·012	0·0	wwP : vP
12	Great. Dec. N : Apogee.	30·195	47·2	36·2	11·0	42·2	− 0·4	41·0	39·6	2·6	6·1	0·0	90	73·0	28·0	48·4	47·6	0·000	1·0	vP
13	...	30·145	50·8	28·4	22·4	39·2	− 3·1	38·7	38·0	1·2	7·4	0·0	96	71·7	24·5	48·6	47·8	0·000	0·0	sP : vP
14	...	30·138	49·1	38·0	11·1	45·0	+ 3·0	45·0	45·0	0·0	1·3	0·0	100	57·5	29·0	47·6	46·9	0·000	0·0	vP
15	Last Qr.	30·173	61·1	43·1	18·0	50·4	+ 8·6	49·2	47·9	2·5	9·3	0·0	92	86·6	37·0	48·1	47·2	0·002	0·0	vP : mP
16	...	30·339	54·0	47·1	6·9	50·3	+ 8·7	49·8	49·3	1·0	2·8	0·0	97	66·2	39·1	48·5	47·4	0·000	0·0	wP : vP, wN
17	...	30·450	51·7	48·7	3·0	50·0	+ 8·5	49·9	49·8	0·2	1·4	0·0	99	59·9	47·0	48·6	47·8	0·000	0·0	vP : mP
18	...	30·473	50·1	44·4	5·7	47·2	+ 5·7	46·7	46·2	1·0	2·7	0·0	96	64·4	43·0	48·9	47·9	0·005	0·0	vP
19	In Equator	30·464	45·8	40·5	5·3	42·8	+ 1·4	41·3	39·5	3·3	5·9	1·1	88	52·0	40·2	48·6	47·7	0·000	0·0	mP
20	...	30·459	42·7	38·5	4·2	41·0	− 0·3	39·0	36·5	4·5	5·7	2·3	84	46·8	38·5	48·3	47·4	0·000	0·0	mP
21	...	30·340	41·3	35·0	6·3	37·7	− 3·5	37·0	36·0	1·7	2·9	0·3	94	51·9	35·0	47·8	46·9	0·000	0·0	vP : sP
22	...	30·197	50·5	35·8	14·7	44·5	+ 3·4	44·4	44·3	0·2	1·3	0·0	99	55·3	29·3	47·6	46·4	0·000	0·0	vP
23	New	30·089	55·3	46·1	9·2	50·1	+ 9·1	49·5	48·9	1·2	3·2	0·0	96	68·1	37·9	47·3	46·5	0·120	0·0	mP : vP, vN
24	Perigee	29·720	52·7	44·5	8·2	49·0	+ 8·0	48·5	47·9	1·1	3·8	0·0	96	64·4	34·4	47·6	46·7	0·108	0·2	vP, vN
25	Greatest Declination S.	29·363	52·3	34·0	18·3	44·5	+ 3·6	42·2	39·5	5·0	11·1	0·6	83	59·0	29·0	47·6	46·9	0·188	0·8	vP, vN : sP
26	...	29·505	45·0	31·3	13·7	36·1	− 4·7	34·5	32·1	4·0	8·4	1·2	86	63·4	23·6	46·4	46·0	0·013	0·0	sP : vP, vN
27	...	29·566	35·3	27·7	7·6	32·3	− 8·5	30·8	27·5	4·8	10·4	0·5	82	40·0	19·9	45·6	44·8	0·006	0·0	sP : vP, wN
28	...	29·985	37·1	29·2	7·9	32·7	− 8·2	30·2	25·0	7·7	11·0	5·0	72	46·6	23·9	44·1	43·5	0·000	0·0	mP : sP
29	First Qr.	30·005	39·5	28·6	10·9	34·6	− 6·4	33·4	31·4	3·2	4·8	1·6	88	45·9	21·5	43·5	42·5	0·000	0·0	sP : vP
30	...	29·969	41·8	28·5	13·3	36·7	− 4·5	35·4	33·6	3·1	6·0	0·7	89	50·5	22·0	43·2	41·9	0·000	0·0	vP
Means	...	30·041	49·7	38·8	10·9	44·3	+ 1·6	43·1	41·5	2·9	6·5	0·7	90·0	63·3	32·7	47·6	46·8	Sum 0·781	0·3	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, 15, 16, and 17 are derived from eye-readings of self-registering thermometers.

The mean reading of the *Barometer* for the month was 30in·041, being 0in·270 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 61°·1 on November 15; the lowest in the month was 27°·7 on November 27; and the range was 33°·4.
The mean of all the highest daily readings in the month was 49°·7, being 0°·9 *higher* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was 38°·8, being 1°·3 *higher* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was 10°·9, being 0°·4 *less* than the average for the 48 years, 1841–1888.
The mean for the month was 44°·3, being 1°·6 *higher* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
	hours.	hours.			lbs.	lbs.	lbs.	miles.		
Nov. 1	4·1	9·6	S : WSW	WSW	5·6	0·0	1·23	465	0 : 9, r, w	v, cu, cu.-s : v
2	5·8	9·5	WSW	W : WSW	1·7	0·0	0·26	337	0, d : 0 : 1, li.-cl	4, cu, cu.-s: p.-cl, slt.-r : 1,s,lu.-co,ho.-fr
3	0·0	9·5	SSW : S	SSW : NW	2·5	0·0	0·27	306	p.-cl : 10, r	10, fq.-th.-r : 10, fq.-th.-r, m
4	0·0	9·4	WSW	W : WNW : NNW	0·6	0·0	0·02	244	10 : 10 : p.-cl	8, cu, li.-cl : 10 : th.-cl
5	2·8	9·4	NNW : SW	SW : SSW	0·0	0·0	0·00	119	0, ho.-fr : 3,li.-cl,so.-ha,m	7, th.-cl, so.-ha : v, f
6	0·0	9·3	SW	WSW	0·0	0·0	0·00	154	10, f : 10, slt.-f	10 : v : 0
7	0·6	9·2	WSW	WSW	0·7	0·0	0·02	279	th.-cl : f : 10	10 : p.-cl : 10
8	0·5	9·2	WSW : W : NNW	WNW : WSW	0·0	0·0	0·00	189	10 : 10, f : p.-cl, f	7,cu.-s,ci.-cu,li.-cl : p.-cl,th.-cl,slt.-f : 0,slt.-f,lu.-co,d
9	0·0	9·1	WSW : NW	NNW	0·6	0·0	0·01	228	p.-cl : 10 : 10, f	10 : 10
10	0·3	9·1	NW : WSW	NNW : N	0·9	0·0	0·01	154	10 : 10	v, ci.-cu, cu.-s : 10, slt.-f
11	0·0	9·0	N : NNE : NE	NE : E : ESE	0·3	0·0	0·00	135	10 : 10 : 10,slt.-f,slt.-r	10, fq.-th-r, glm : 10, slt.-r
12	5·2	9·0	ESE : SE	ESE : E	0·4	0·0	0·00	159	p.-cl : v : 1	0 : 0, ho.-fr
13	5·0	8·9	Calm : ESE	ESE : Calm	0·0	0·0	0·00	84	0 : 0, tk-f : tk.-f	1, th.-cl : 0, slt.-f : 0,tk.-f,ho.-fr
14	0·0	8·9	ESE : ENE	Calm : ESE	0·0	0·0	0·00	66	tk.-f : 10, tk.-f	10, slt.-f : 10, slt.-f
15	1·4	8·8	S : SSW	SSW : SW	0·2	0·0	0·00	156	10 : 10, slt.-f	6, ci.-cu, cu : v : 10
16	0·0	8·8	SW : WSW	Variable	0·0	0·0	0·00	112	10 : 10	10, glm, slt.-f : 10, slt.-f
17	0·0	8·7	Calm : ENE	ENE : SE	0·2	0·0	0·00	93	10 : 10, slt.-f	10, slt.-f : 10, slt.-r
18	0·0	8·7	SE : ESE	ESE	0·0	0·0	0·00	94	10 : 10, slt.-r	p.-cl : 10, oc.-slt.-r : 10
19	0·0	8·6	ENE : ESE	ESE	0·1	0·0	0·00	107	10 : 10	10 : 10
20	0·0	8·6	SE	ESE : SE	0·0	0·0	0·00	71	10 : 10	10 : 10
21	0·0	8·5	SSE : SE	SE : ESE	0·0	0·0	0·00	104	10 : 10	10 : 10
22	0·0	8·5	Calm : SSW	SSW : S	0·6	0·0	0·01	182	10 : v, m : 10,oc.-slt.-r	10 : 10 : v, d
23	0·0	8·4	S : SSW	SSW : SSE	0·6	0·0	0·02	160	0, d : p.-cl	10 : 10, fq.-r, f : v, li.-cl
24	0·0	8·4	SSE	SSW	6·3	0·0	0·33	263	v : 10, cu.-s, glm, r	10,fq.-th.-r : v, th.-r : 10, r, w
25	3·1	8·3	SW : NW : WNW	W : WSW	7·0	0·0	1·61	584	10,sh.-r,w : 10,c.-r,sqs : v,li.-cl,w	5,cu.-s,li.-cl,w : 0 : 0
26	2·1	8·3	WSW	WSW : W	5·6	0·0	0·35	341	0, ho.-fr : 0 : v, li.-cl	v, r, sl, w : 0, ho.-fr
27	0·0	8·2	WSW : NW	NNW	5·3	0·0	1·19	424	0, ho.-fr : p.-cl : 10, slt.-sn, w	10, slt.-sn, w : 0, w
28	0·7	8·2	N : NNW	NNW : NW	3·6	0·0	0·95	375	0, ho.-fr, w : 5, th.-cl, w	p.-cl, ci.-cu : 0 : 0
29	0·0	8·2	WSW	WSW : NW	0·5	0·0	0·02	254	0, ho.-fr : 10, slt.-f	9 : 10, m : 10, slt.-f
30	0·0	8·1	NW : Calm	ESE : SE	0·3	0·0	0·00	117	10 : 10, slt.-f	10 : 0 : 1, ho.-fr
Means	1·1	8·8	...	...	...	...	0·21	212		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 43°·1, being 1°·9 *higher* than
The mean *Temperature of the Dew Point* for the month was 41°·5, being 2°·2 *higher* than
The mean *Degree of Humidity* for the month was 90·0, being 2·7 *greater* than
The mean *Elastic Force of Vapour* for the month was 0in·262, being 0in·022 *greater* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 3grs·0, being 0gr·2 *greater* than
The mean *Weight of a Cubic Foot of Air* for the month was 552 grains, being 3 grains *greater* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 7·5.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·120. The maximum daily amount of *Sunshine* was 5·8 hours on November 2.

The highest reading of the *Solar Radiation Thermometer* was 96°·6 on November 1; and the lowest reading of the *Terrestrial Radiation Thermometer* was 19°·9 on November 27.

The mean daily distribution of *Ozone* for the 12 hours ending 9h. was 0·3; for the 6 hours ending 15h. was 0·0; and for the 6 hours ending 21h. was 0·0.

The *Proportions of Wind* referred to the cardinal points were N. 4, E. 6, S. 9, and W. 10. One day was calm.

The *Greatest Pressure of the Wind* in the month was 7·0 lbs. on the square foot on November 25. The mean daily *Horizontal Movement of the Air* for the month was 212 miles; the greatest daily value was 584 miles on November 25; and the least daily value was 66 miles on November 14.

Rain fell on 9 days in the month, amounting to 0in·781, as measured by gauge No. 6 partly sunk below the ground; being 1in·533 *less* than the average fall for the 48 years, 1841–1888.

MONTH and DAY, 1889.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	Of the Air. Lowest.	Of the Air. Daily Range.	Of the Air. Mean of 24 Hourly Values.	Of the Air. Excess above Average of 20 Years.	Of Evaporation. Mean of 24 Hourly Values.	Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean.	Greatest.	Least.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Of Radiation. Highest in Sun's Rays.	Of Radiation. Lowest on the Grass.	Of the Water of the Thames at Deptford. Highest.	Of the Water of the Thames at Deptford. Lowest.	Rain collected in Gauge No. 6, whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	in.		
Dec. 1	...	30.227	37.6	25.9	11.7	30.7	−10.8	29.8	27.4	3.3	10.8	0.0	86	63.2	19.3	42.6	41.4	0.000	0.0	sP
2	In Equator	30.311	35.4	22.7	12.7	28.7	−13.1	28.4	27.5	1.2	6.8	0.0	96	46.9	14.6	41.9	41.0	0.000	0.0	sP
3	...	30.287	33.3	25.8	7.5	28.1	−14.0	27.8	26.6	1.5	4.8	0.0	93	49.1	19.0	40.5	39.6	0.000	0.0	sP
4	...	30.300	34.7	24.1	10.6	30.3	−12.1	29.4	26.8	3.5	5.6	0.0	86	42.1	18.1	39.1	38.1	0.000	0.0	sP : vP
5	...	30.403	37.1	30.8	6.3	34.7	− 7.9	34.2	33.4	1.3	4.6	0.0	95	41.6	24.5	38.7	38.3	0.019	0.0	vP, wN : vP
6	...	30.361	37.8	33.8	4.0	35.4	− 7.3	34.3	32.6	2.8	5.5	1.0	90	45.5	31.0	37.4	36.4	0.000	0.0	vP
7	Full	29.981	34.9	31.3	3.6	32.8	−10.0	32.4	31.7	1.1	5.7	0.0	97	36.5	31.3	36.2	35.7	0.211	0.0	vP : vP, ssN
8	...	30.075	37.5	31.4	6.1	34.3	− 8.5	33.7	32.7	1.6	3.8	0.0	94	42.2	27.3	35.0	33.6	0.003	1.0	vP : ssP : vP
9	Greatest Declination N.	29.679	49.4	37.5	11.9	45.4	+ 2.6	44.8	44.1	1.3	3.4	0.0	96	53.8	35.0	37.6	37.3	0.121	3.0	vP
10	Apogee	29.236	48.7	35.6	13.1	44.8	+ 2.1	43.4	41.8	3.0	5.5	1.1	90	52.5	29.5	38.5	37.6	0.025	0.0	mP : vP, vN
11	...	29.342	38.2	30.2	8.0	34.7	− 7.8	33.5	31.5	3.2	7.7	0.4	88	38.2	24.0	37.6	36.5	0.000	0.0	sP : vP
12	...	29.844	39.0	24.3	14.7	32.8	− 9.4	31.5	28.9	3.9	7.6	0.0	85	44.6	17.2	39.0	38.5	0.000	0.0	sP : ssP : vP
13	...	29.699	46.2	31.6	14.6	40.8	− 1.0	40.2	39.5	1.3	4.4	0.0	95	53.7	28.0	40.0	39.4	0.083	0.0	vP
14	...	30.023	38.7	32.5	6.2	36.0	− 5.5	35.9	35.7	0.3	0.5	0.0	99	41.2	28.0	39.4	38.9	0.003	0.0	sP : vP
15	Last Qr.	30.253	42.1	33.4	8.7	38.6	− 2.5	38.3	37.9	0.7	3.7	0.0	98	50.0	29.6	39.6	38.9	0.003	0.0	vP : sP : vP
16	...	30.269	47.9	37.2	10.7	45.1	+ 4.3	45.0	44.9	0.2	1.9	0.0	99	50.2	30.1	39.8	39.2	0.022	0.0	vP
17	In Equator	30.280	53.1	47.7	5.4	50.2	+ 9.7	49.8	49.4	0.8	2.4	0.0	97	56.4	45.2	40.4	39.7	0.005	1.2	wP
18	...	30.112	50.6	44.4	6.2	48.3	+ 8.1	47.4	46.4	1.9	2.9	0.4	94	53.8	42.5	41.4	40.8	0.037	3.8	wP : vP
19	...	30.079	44.4	33.2	11.2	39.6	− 0.4	38.8	37.8	1.8	5.3	0.0	94	53.0	25.5	42.0	41.3	0.000	1.2	sP
20	...	29.616	45.8	35.7	10.1	41.7	+ 1.9	40.4	38.8	2.9	5.9	0.4	90	49.0	30.5	42.1	41.6	0.096	3.8	wP : vN, vP
21	...	29.602	47.3	35.0	12.3	41.8	+ 2.2	40.5	38.9	2.9	5.0	0.4	90	49.8	30.0	42.5	42.0	0.162	1.5	mP : vP, vN
22	New	29.404	52.5	45.7	6.8	49.6	+10.2	48.6	47.5	2.1	5.8	0.0	93	57.4	42.5	42.4	41.4	0.504	4.5	vP, vN
23	Perigee : Great. Dec. S.	29.772	49.2	41.6	7.6	46.1	+ 6.8	44.8	43.4	2.7	5.7	1.0	91	61.2	35.0	44.8	43.4	0.000	1.5	mP
24	...	29.729	52.1	37.3	14.8	46.1	+ 6.8	44.5	42.7	3.4	6.9	0.8	89	55.0	29.0	44.4	42.7	0.105	4.5	vP
25	...	30.271	38.9	32.7	6.2	36.2	− 3.0	35.6	34.7	1.5	3.8	0.0	95	39.8	24.0	44.2	42.7	0.000	2.0	mP : sP
26	...	30.388	41.1	32.0	9.1	36.6	− 2.5	36.0	35.2	1.4	5.5	0.0	95	44.1	24.0	43.4	42.2	0.000	0.0	sP : vP : sP
27	...	30.281	40.5	32.1	8.4	36.2	− 2.8	35.0	33.2	3.0	6.5	0.9	89	42.2	30.5	43.6	42.0	0.000	0.8	mP
28	...	30.090	33.6	25.2	8.4	30.7	− 8.1	29.4	25.8	4.9	7.9	0.0	81	39.3	20.4	42.6	40.9	0.000	2.2	wP : vP
29	First Quarter : In Equator	30.124	31.7	22.0	9.7	26.1	−12.6	26.1	26.1	0.0	1.6	0.0	100	33.1	18.8	41.4	39.7	0.000	0.0	vP : ...
30	...	30.204	34.1	30.4	3.7	32.3	− 6.2	32.2	32.1	0.2	1.6	0.0	100	36.0	27.2	41.1	39.6	0.038	0.0	... : wN, vP
31	...	30.163	38.5	23.8	14.7	31.1	− 7.2	30.7	29.7	1.4	6.5	0.0	93	50.8	23.6	40.6	38.5	0.000	0.0	sP : mP
Means	...	30.013	41.7	32.5	9.2	37.6	− 3.2	36.9	35.6	2.0	5.0	0.2	92.8	47.5	27.6	40.6	39.6	Sum 1.437	1.0	...
Number of Column for Reference.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The results apply to the civil day.

The mean reading of the Barometer (Column 2) and the mean temperatures of the Air and Evaporation (Columns 6 and 8) are deduced from the photographic records. The average temperature (Column 7) is that determined from the reduction of the photographic records from 1849 to 1868. The temperature of the Dew Point (Column 9) and the Degree of Humidity (Column 13) are deduced from the corresponding temperatures of the Air and Evaporation by means of Glaisher's Hygrometrical Tables. The mean difference between the Air and Dew Point Temperatures (Column 10) is the difference between the numbers in Columns 6 and 9, and the Greatest and Least Differences (Columns 11 and 12) are deduced from the 24 hourly photographic measures of the Dry-bulb and Wet-bulb Thermometers.

The values given in Columns 3, 4, 5, 14, 15, 16, and 17 are derived from eye-readings of self-registering thermometers.

The mean reading of the *Barometer* for the month was 30in·013, being 0in·222 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 53°·1 on December 17; the lowest in the month was 22°·0 on December 29; and the range was 31°·1.
The mean of all the highest daily readings in the month was 41°·7, being 2°·6 *lower* than the average for the 48 years, 1841–1888.
The mean of all the lowest daily readings in the month was 32°·5, being 2°·5 *lower* than the average for the 48 years, 1841–1888.
The mean of the daily ranges was 9°·2, being 0°·1 *less* than the average for the 48 years, 1841–1888.
The mean for the month was 37°·6, being 3°·2 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1889.	Daily Duration of Sunshine.	Sun above Horizon.	Wind as deduced from Self-registering Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure on the Square Foot. Greatest.	Least.	Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	Clouds and Weather. A.M.	P.M.
	hours	hours.			lbs.	lbs.	lbs.	miles.		
Dec. 1	3·8	8·1	ESE	ESE : SE	0·0	0·0	0·00	109	0, ho.-fr : 0	v : 0, ho.-fr
2	0·2	8·1	ESE	ESE	0·2	0·0	0·00	131	0, ho.-fr : 0 : v,li.-cl,slt.-f,so.-ha	9, th.-cl, so.-ha : v, th.-cl : v, th.-cl, lu.-ha
3	4·1	8·0	ESE	E	0·7	0·0	0·03	200	v, ho.-fr : v	2, th.-cl : v, th.-cl : v, th.-cl, slt.-f
4	0·3	8·0	E : ENE	ENE : E	0·3	0·0	0·00	148	0, ho.-fr : p.-cl	10 : v, li.-cl, ho.-fr
5	0·0	8·0	ENE	NE	0·3	0·0	0·01	185	10 : 10, oc.-slt.-r, sn	10, sl : 10
6	0·0	8·0	NE : NNE	NE : S	0·9	0·0	0·05	184	10 : 10	10 : 10
7	0·0	7·9	SSW : SSE	Calm : N	0·2	0·0	0·00	133	10 : 10, sn	10, m, sn : 10 slt.-r
8	0·0	7·9	N : SW	SW : SSW	0·7	0·0	0·02	177	p.-cl, f : 10, f : th.-cl, slt.-f	p.-cl, f : 10, lu.-ha, slt.-r
9	0·0	7·9	SSW : SW	WSW	3·4	0·0	0·97	465	10, fq.-r : 10, slt.-r	10, oc.-slt.-r : 10, oc.-slt.-r : v, li.-cl
10	0·0	7·9	WSW : SW	SW : WSW	3·0	0·0	0·58	394	v, slt.-r : 10	10, fq.-th.-r : v : 0, m
11	0·0	7·8	SW : WSW	WNW : NW	1·4	0·0	0·04	250	0, ho.-fr : v, ci.-cu, slt.-f	3, th.-cl, h : 0, h, ho.-fr
12	4·4	7·8	WSW : SW	SSW : S	1·4	0·0	0·03	231	0, ho.-fr : 0	0 : 0 : v, th.-cl
13	0·0	7·8	S : SSW	SSW : Calm	4·8	0·0	0·73	295	v, slt.-r, w : 10 : 10, fq.-r	8, li.-cl, cu.-s, th.-r : tk.-f, ho.-fr
14	0·0	7·8	NE : N	N : NNE	0·0	0·0	0·00	113	tk.-f : 10, f, glm	10, glm : 10, slt.-r : 10, f
15	0·0	7·8	SW : WSW	WSW : SW	0·0	0·0	0·00	161	10, f : 10	10, glm, f : 10, f
16	0·0	7·8	SW : WSW	WSW : SSW	0·9	0·0	0·01	183	v : 10, glm : 10	10, slt.-f : 10, slt.-r
17	0·0	7·7	SSW : SW	SW	1·4	0·0	0·17	334	10, li.-shs : 10	10 : 10
18	0·0	7·7	SW	SSW : N	3·7	0·0	0·75	401	10 : 10 : 10, th.-r	10, th.-r : 10, fq.-th.-r
19	2·1	7·7	N : SW	SW : SSW	0·7	0·0	0·01	176	v : 0 : 0, tk.-f	2, ci.-s, ci.-cu, th.-cl : 10
20	0·0	7·7	SSW	W : SW	5·8	0·0	1·35	495	10 : 10, slt.-r, w	10, fq.-r, w : 0 : 1
21	0·0	7·7	SW : SSW	SW : SSW	5·0	0·0	0·74	425	0, ho.-fr : p.-cl, ci.-cu, shs.-r	10, sc, oc.-slt.-r, w : 10, fq.-r
22	0·0	7·7	SW : WSW	WSW : W	3·3	0·0	0·66	372	10, fq.-r : 10, fq.-r : v, slt.-r	v, hy.-r : 10, c.-r : 10
23	3·2	7·7	W : WSW	WSW : SSW	1·2	0·0	0·06	282	v : 0 : 0	4, cu : 10 : v, th.-cl
24	0·0	7·7	SSW	WNW : W	5·8	0·0	1·00	439	10 : 10, fq.-r	9, ci.-cu, li.-cl, slt.-r, w : 0 : 0
25	0·0	7·7	W : WSW	SSW	0·3	0·0	0·00	197	0, ho.-fr : 0, ho.-fr : 5, th.-cl, slt.-f	p.-cl, f, glm : 0, slt.-f : 0, ho.-fr, slt.-f
26	0·0	7·8	SW	WSW : NE	0·0	0·0	0·00	97	tk.-f : 10, slt.-f	10, f, gt.-glm : 10
27	0·0	7·8	ENE	ENE : NE	2·0	0·0	0·35	329	10 : p.-cl : 10	10 : 10
28	0·0	7·8	ENE : E	ENE : NNE	2·3	0·0	0·08	161	10, fr : 10	10, glm : v : 0, f, ho.-fr
29	0·0	7·8	Calm	ENE : SW	0·0	0·0	0·00	78	tk.-f, ho.-fr : tk.-f	tk.-f, glm : 10, tk.-f
30	0·0	7·8	SW : Calm	SSW : SSE	0·0	0·0	0·00	81	10, f, sn : 10 : 10, glm, slt.-f	10, glm, f : 10, f, fr
31	2·2	7·8	Calm	SSW : SSE	0·5	0·0	0·00	138	10, f : 10 : v, li.-cl	0 : 0 : v, li.-cl
Means	0·7	7·8	...	...	...	...	0·25	238		
Number of Column for Reference.	21	22	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 36°·9, being 2°·4 *lower* than
The mean *Temperature of the Dew Point* for the month was 35°·6, being 1°·8 *lower* than
The mean *Degree of Humidity* for the month was 92·8, being 5·0 *greater* than
The mean *Elastic Force of Vapour* for the month was 0in·208, being 0in·016 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 2grs·5, being 0gr·1 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 559 grains, being 8 grains *greater* than
} the average for the 20 years, 1849–1868.

The mean amount of *Cloud* for the month (a clear sky being represented by 0 and an overcast sky by 10) was 7·5.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·084. The maximum daily amount of *Sunshine* was 4·4 hours on December 12.

The highest reading of the *Solar Radiation Thermometer* was 63°·2 on December 1; and the lowest reading of the *Terrestrial Radiation Thermometer* was 14°·6 on December 2.

The mean daily distribution of *Ozone* for the 12 hours ending 9h. was 0·9; for the 6 hours ending 15h. was 0·0; and for the 6 hours ending 21h. was 0·1.

The *Proportions of Wind* referred to the cardinal points were N. 4, E. 6, S. 11, and W. 9. One day was calm.

The *Greatest Pressure of the Wind* in the month was 5·8 lbs. on the square foot on December 20 and 24. The mean daily *Horizontal Movement of the Air* for the month was 238 miles; the greatest daily value was 495 miles on December 20; and the least daily value was 78 miles on December 29.

Rain fell on 13 days in the month, amounting to 1in·437, as measured by gauge No. 6 partly sunk below the ground; being 0in·361 *less* than the average fall for the 48 years, 1841–1888.

HIGHEST and LOWEST READINGS of the BAROMETER, reduced to 32° Fahrenheit, as extracted from the PHOTOGRAPHIC RECORDS.

MAXIMA.			MINIMA.			MAXIMA.			MINIMA.		
Greenwich Civil Time, 1889.		Reading.	Greenwich Civil Time, 1889.		Reading.	Greenwich Civil Time, 1889.		Reading.	Greenwich Civil Time, 1889.		Reading.
	d h m	in.		d h m	in.		d h m	in.		d h m	in.
January	3. 20. 0	30·555	January	7. 5. 20	29·816	April	26. 7. 30	29·868	April	28. 15. 0	29·537
	7. 20. 0	29·873		10. 1. 0	29·089		29. 9. 0	29·710		30. 15. 35	29·315
	11. 8. 30	29·526		12. 5. 50	29·224	May	3. 21. 30	29·825	May	6. 15. 50	29·605
	14. 18. 40	30·052		16. 7. 0	29·760		8. 9. 30	29·704		9. 16. 25	29·476
	18. 1. 30	30·285		18. 22. 35	30·124		10. 21. 0	29·650		12. 3. 25	29·575
	19. 7. 55	30·195		20. 12. 40	30·008		13. 21. 25	29·724		15. 2. 50	29·624
	23. 19. 15	30·333		26. 15. 15	30·180		16. 8. 30	29·820		17. 16. 0	29·714
	27. 11. 0	30·466		29. 14. 20	29·636		20. 20. 0	29·937		25. 2. 10	29·310
	29. 23. 15	29·896		30. 16. 20	29·635	June	1. 6. 10	29·817	June	2. 18. 20	29·516
	31. 4. 5	29·800	February	1. 21. 0	29·415		5. 8. 5	30·246		10. 3. 20	29·440
February	2. 11. 5	29·540		3. 20. 15	28·942		12. 23. 20	29·785		13. 16. 50	29·720
	5. 4. 35	30·123		7. 6. 15	29·265		18. 6. 25	30·064		20. 18. 0	29·830
	7. 20. 40	29·825		8. 14. 45	29·115		22. 9. 30	29·935		23. 17. 15	29·825
	10. 2. 0	29·640		10. 23. 55	28·968		26. 0. 0	29·943		27. 16. 0	29·826
	13. 0. 0	30·149		14. 15. 55	29·220	July	1. 23. 20	30·236	July	7. 16. 40	29·525
	16. 5. 40	30·058		16. 18. 5	29·804		9. 9. 10	29·704		10. 16. 10	29·395
	18. 12. 5	30·289		19. 4. 0	30·174		11. 22. 10	29·840		14. 4. 35	29·630
	19. 11. 0	30·257		20. 17. 50	29·745		14. 22. 45	29·754		17. 3. 55	29·566
	21. 20. 35	30·045		22. 21. 45	29·914		18. 22. 30	29·780		21. 12. 25	29·435
	24. 0. 25	30·090		27. 14. 35	29·396		22. 13. 45	29·727		23. 18. 0	29·576
March	6. 0. 0	30·025	March	8. 23. 25	28·835		24. 13. 25	29·664		25. 19. 20	29·370
	12. 10. 0	30·115		13. 13. 45	29·975		30. 7. 45	29·980	August	1. 17. 35	29·701
	15. 20. 35	30·431		20. 15. 45	28·810	August	2. 20. 35	29·825		3. 16. 50	29·676
	23. 9. 35	30·130		25. 15. 25	29·728		4. 9. 0	29·814		5. 15. 0	29·504
	28. 8. 30	30·317		31. 14. 40	29·668		8. 6. 15	29·950		11. 11. 0	29·343
April	1. 8. 10	29·819	April	2. 3. 20	29·685		13. 22. 25	29·884		14. 23. 50	29·540
	2. 12. 0	29·750		4. 15. 15	29·021		16. 8. 30	29·852		17. 9. 10	29·616
	6. 11. 0	29·364		8. 18. 25	29·096		18. 9. 30	29·844		20. 6. 0	29·039
	19. 9. 0	30·066		21. 17. 30	29·541		20. 21. 55	29·482		21. 22. 0	29·091
	22. 22. 50	29·705		24. 7. 0	29·269		23. 11. 55	29·799		24. 15. 10	29·627

HIGHEST and LOWEST READINGS of the BAROMETER reduced to 32° Fahrenheit, as extracted from the PHOTOGRAPHIC RECORDS—*continued.*

MAXIMA.		MINIMA.		MAXIMA.		MINIMA.	
Greenwich Civil Time, 1889.	Reading.	Greenwich Civil Time, 1889.	Reading.	Greenwich Civil Time, 1889.	Reading.	Greenwich Civil Time, 1889.	Reading.
d h m	in.	d h m	in.	d h m	in.	d h m	in.
August 27. 10. 55	30·090	August 30. 17. 40	29·930	October 31. 19. 10	29·844	November 1. 9. 0	29·441
September 1. 9. 0	30·036	September 3. 4. 0	29·765	November 2. 20. 0	29·810	3. 17. 40	29·416
6. 8. 55	30·124	8. 4. 0	29·904	8. 11. 0	30·335	10. 14. 55	30·156
10. 9. 35	30·064	11. 17. 50	29·957	11. 10. 20	30·267	13. 16. 10	30·116
12. 23. 20	30·092	13. 15. 0	29·979	18. 21. 0	30·493	25. 4. 10	29·126
16. 9. 45	30·265	21. 2. 40	29·430	25. 23. 25	29·585	26. 19. 40	29·435
21. 11. 40	29·512	22. 4. 10	29·429	28. 22. 55	30·088	30. 1. 0	29·900
23. 8. 50	29·751	24. 15. 15	29·320	December 5. 23. 15	30·464	December 7. 15. 0	29·887
26. 9. 30	30·010	30. 12. 45	29·462	8. 10. 25	30·143	10. 17. 15	29·105
October 2. 20. 45	29·768	October 4. 7. 0	29·203	12. 11. 20	29·902	13. 13. 0	29·636
6. 11. 5	29·715	7. 6. 54	29·137	15. 19. 50	30·295	16. 4. 0	30·210
8. 8. 45	29·419	9. 0. 0	29·011	16. 23. 20	30·319	18. 14. 40	30·039
14. 9. 30	29·786	16. 23. 15	29·527	19. 8. 45	30·178	20. 12. 10	29·444
17. 20. 0	29·630	19. 10. 20	28·964	21. 5. 45	29·664	22. 6. 0	29·370
19. 21. 0	29·135	20. 4. 50	29·005	23. 15. 25	29·866	24. 12. 0	29·486
25. 21. 55	30·045	27. 12. 15	29·465	26. 9. 55	30·410	28. 6. 0	30·055
30. 8. 0	29·773	31. 0. 55	29·493	30. 21. 30	30·235	31. 14. 0	30·125

The readings in the above table are accurate, but the times are occasionally liable to uncertainty, as the barometer will sometimes remain at its extreme reading without sensible change for a considerable interval of time. In such cases the time given is the middle of the stationary period.
The time is expressed in civil reckoning, commencing at midnight and counting from 0^h to 24^h.
The height of the barometer cistern above mean sea level is 159 feet: no correction has been applied to the readings to reduce to sea level.

HIGHEST AND LOWEST READINGS of the BAROMETER in each Month for the YEAR 1889.
[Extracted from the preceding Table.]

MONTH, 1889.	Readings of the Barometer. Highest.	Lowest.	Range.
	in.	in.	in.
January	30·555	29·089	1·466
February	30·289	28·942	1·347
March	30·431	28·810	1·621
April	30·066	29·021	1·045
May	29·937	29·310	0·627
June	30·246	29·440	0·806
July	30·236	29·370	0·866
August	30·090	29·039	1·051
September	30·265	29·320	0·945
October	30·045	28·964	1·081
November	30·493	29·126	1·367
December	30·464	29·105	1·359

The highest reading in the year was 30in·555 on January 3. The lowest reading in the year was 28in·810 on March 20.
The range of reading in the year was 1in·745.

MONTHLY RESULTS of METEOROLOGICAL ELEMENTS for the YEAR 1889.

MONTH, 1889.	Mean Reading of the Barometer.	TEMPERATURE OF THE AIR. Highest.	Lowest.	Range in the Month.	Mean of all the Highest.	Mean of all the Lowest.	Mean of the Daily Ranges.	Monthly Mean.	Excess of Mean above Average of 20 Years.	Mean Temperature of Evaporation.	Mean Temperature of the Dew Point.	Mean Degree of Humidity. (Saturation = 100.)
	in.	°	°	°	°	°	°	°	°	°	°	
January ...	29·994	53·6	19·8	33·8	41·5	32·2	9·3	37·2	− 1·6	36·1	34·6	90·7
February...	29·719	57·3	18·9	38·4	43·0	31·7	11·3	37·3	− 2·3	35·4	32·4	82·6
March	29·803	60·0	18·7	41·3	48·7	33·4	15·2	40·6	− 0·9	38·3	34·9	80·3
April	29·561	66·1	32·6	33·5	54·7	38·9	15·8	45·7	− 1·8	43·3	40·5	82·8
May.........	29·656	85·2	41·0	44·2	67·2	47·9	19·3	56·2	+ 3·1	53·1	50·2	80·7
June	29·852	83·9	45·7	38·2	72·9	51·7	21·2	61·3	+ 1·6	57·2	53·6	76·3
July.........	29·759	81·2	47·5	33·7	71·5	53·3	18·2	61·0	− 1·7	57·0	53·7	77·4
August	29·711	86·6	44·1	42·5	71·6	51·6	20·0	60·1	− 1·7	56·4	53·0	77·7
September.	29·867	81·8	35·7	46·1	65·4	48·1	17·3	55·9	− 1·5	52·7	49·5	79·7
October ...	29·518	61·9	34·9	27·0	56·4	42·2	14·2	48·7	− 2·3	47·2	45·6	89·4
November.	30·041	61·1	27·7	33·4	49·7	38·8	10·9	44·3	+ 1·6	43·1	41·5	90·0
December..	30·013	53·1	22·0	31·1	41·7	32·5	9·2	37·6	− 3·2	36·9	35·6	92·8
Means	29·791	Highest. 86·6	Lowest. 18·7	Annual Range. 67·9	57·0	41·9	15·2	48·8	− 0·9	46·4	43·8	83·4

MONTH, 1889.	Mean Elastic Force of Vapour.	Mean Weight of Vapour in a Cubic Foot of Air.	Mean Weight of a Cubic Foot of Air.	Mean Amount of Ozone.	Mean Amount of Cloud. (0–10.)	RAIN. Number of Rainy Days.	Amount collected in Gauge No. 6 whose receiving Surface is 5 inches above the Ground.	WIND. From Osler's Anemometer. Number of Hours of Prevalence of each Wind referred to different Points of Azimuth. N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W	Number of Calm or nearly Calm Hours.	Mean Daily Pressure on the Square Foot.	From Robinson's Anemometer. Mean Daily Horizontal Movement of the Air.
	in.	grs.	grs.				in.	h	h	h	h	h	h	h	h	h	lbs.	miles.
January ...	0·200	2·3	559	0·4	8·2	12	0·839	130	93	23	39	87	175	89	27	81	0·21	212
February...	0·184	2·1	554	0·3	8·0	19	2·195	207	82	10	6	18	117	162	67	3	0·63	386
March	0·203	2·4	552	2·6	7·8	14	1·317	131	81	57	51	86	170	110	43	15	0·34	292
April	0·252	2·9	542	3·6	7·7	17	1·852	141	85	98	39	97	179	29	41	11	0·26	267
May.........	0·364	4·1	532	3·6	6·6	15	3·299	84	111	91	72	133	155	48	14	36	0·13	204
June	0·412	4·6	530	0·8	6·0	6	2·067	149	217	92	38	26	82	40	8	68	0·10	183
July.........	0·413	4·6	528	2·6	7·5	16	2·065	62	78	46	41	63	249	105	55	45	0·16	219
August ...	0·403	4·5	528	2·1	6·7	14	1·811	12	6	10	10	78	396	168	42	22	0·30	272
September.	0·355	4·0	536	0·8	6·0	7	1·688	121	93	53	50	48	134	103	68	50	0·17	219
October ...	0·306	3·4	537	2·4	7·3	17	3·927	95	88	38	83	131	217	48	24	20	0·29	239
November.	0·262	3·0	552	0·3	7·5	9	0·781	42	37	83	103	76	171	113	65	30	0·21	212
December..	0·208	2·5	559	1·0	7·5	13	1·437	51	86	67	51	106	274	66	21	22	0·25	238
Sums	...	...	...	...	...	159	23·278	1225	1057	668	583	949	2319	1081	475	403	...	...
Means	0·297	3·4	542	1·7	7·2	...	...	...	...	...	...	...	...	...	...	...	0·25	245

The greatest recorded pressure of the wind on the square foot in the year was 15·0 lbs. on October 7.
The greatest recorded daily horizontal movement of the air „ „ 736 miles on October 7.
The least recorded daily horizontal movement of the air „ „ 25 miles on September 3.
The mean daily horizontal movements of the air for April and May are derived from the results for 21 and 23 days respectively.

MONTHLY MEAN READING of the BAROMETER at every HOUR of the DAY, as deduced from the PHOTOGRAPHIC RECORDS.

Hour, Greenwich Civil Time.	1889.												Yearly Means.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Midnight	30·005	29·726	29·804	29·578	29·656	29·854	29·770	29·720	29·882	29·519	30·048	30·022	29·799
1^h.	30·001	29·723	29·805	29·573	29·653	29·850	29·768	29·717	29·877	29·515	30·040	30·017	29·795
2	30·002	29·721	29·804	29·568	29·648	29·847	29·764	29·713	29·871	29·509	30·037	30·016	29·792
3	30·002	29·716	29·799	29·562	29·643	29·844	29·759	29·709	29·864	29·502	30·031	30·013	29·787
4	29·995	29·710	29·797	29·558	29·643	29·844	29·757	29·705	29·860	29·499	30·027	30·006	29·783
5	29·988	29·713	29·797	29·556	29·644	29·849	29·760	29·705	29·861	29·496	30·028	30·003	29·783
6	29·987	29·715	29·800	29·561	29·651	29·855	29·763	29·708	29·867	29·496	30·030	30·003	29·786
7	29·993	29·718	29·805	29·566	29·657	29·860	29·769	29·713	29·872	29·502	30·034	30·006	29·791
8	30·001	29·727	29·810	29·569	29·661	29·863	29·772	29·718	29·877	29·513	30·043	30·011	29·797
9	30·007	29·732	29·814	29·570	29·663	29·864	29·771	29·721	29·881	29·519	30·047	30·016	29·800
10	30·009	29·734	29·815	29·570	29·664	29·865	29·770	29·721	29·880	29·523	30·051	30·021	29·802
11	30·005	29·736	29·816	29·568	29·662	29·863	29·768	29·718	29·875	29·525	30·049	30·013	29·800
Noon	29·993	29·732	29·812	29·563	29·661	29·860	29·763	29·714	29·872	29·522	30·042	30·004	29·795
13^h.	29·983	29·723	29·805	29·558	29·658	29·853	29·760	29·710	29·864	29·518	30·035	29·998	29·789
14	29·978	29·712	29·796	29·552	29·655	29·847	29·756	29·705	29·859	29·515	30·029	29·997	29·783
15	29·978	29·707	29·789	29·544	29·648	29·840	29·752	29·699	29·852	29·517	30·028	30·002	29·780
16	29·981	29·705	29·787	29·541	29·647	29·837	29·745	29·698	29·848	29·518	30·031	30·008	29·779
17	29·983	29·706	29·788	29·542	29·646	29·834	29·741	29·695	29·849	29·524	30·037	30·012	29·780
18	29·988	29·710	29·794	29·547	29·648	29·836	29·739	29·696	29·853	29·529	30·044	30·017	29·783
19	29·994	29·713	29·800	29·553	29·652	29·843	29·741	29·703	29·860	29·532	30·048	30·021	29·788
20	29·994	29·715	29·805	29·563	29·662	29·852	29·749	29·712	29·869	29·534	30·052	30·025	29·794
21	29·995	29·715	29·807	29·568	29·669	29·862	29·759	29·719	29·872	29·534	30·056	30·026	29·798
22	29·997	29·718	29·809	29·569	29·671	29·866	29·761	29·723	29·873	29·533	30·059	30·028	29·801
23	29·997	29·723	29·809	29·570	29·670	29·867	29·763	29·723	29·873	29·529	30·061	30·028	29·801
24	29·997	29·724	29·809	29·567	29·667	29·867	29·761	29·723	29·870	29·524	30·059	30·024	29·799
Means 0^h.–23^h.	29·994	29·719	29·803	29·561	29·656	29·852	29·759	29·711	29·867	29·518	30·041	30·013	29·791
Means 1^h.–24^h.	29·994	29·719	29·803	29·561	29·656	29·853	29·759	29·711	29·867	29·518	30·042	30·013	29·791
Number of Days employed.	31	28	31	30	31	30	31	31	30	31	30	31	...

MONTHLY MEAN TEMPERATURE of the AIR at every HOUR of the DAY, as deduced from the PHOTOGRAPHIC RECORDS.

Hour, Greenwich Civil Time.	1889.												Yearly Means.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
	°	°	°	°	°	°	°	°	°	°	°	°	°
Midnight	36·3	36·7	38·2	42·1	51·2	55·3	56·9	55·6	52·4	46·7	42·7	36·8	45·9
1^h.	35·9	36·3	37·4	42·0	50·6	54·8	56·4	55·2	52·1	46·2	42·5	36·7	45·5
2	35·7	35·9	36·8	41·7	50·4	54·6	56·0	54·8	51·7	45·9	42·5	36·4	45·2
3	35·5	35·6	36·4	41·4	50·2	54·1	55·5	54·4	51·4	45·6	42·4	36·5	44·9
4	35·2	35·4	36·4	41·3	50·3	54·0	55·2	54·1	51·3	45·3	42·5	36·6	44·8
5	35·1	35·2	36·1	41·2	50·4	54·3	55·3	53·8	51·3	45·5	42·5	36·5	44·8
6	34·9	35·2	36·0	41·6	51·3	55·6	56·3	54·6	51·2	45·5	42·4	36·2	45·1
7	35·1	35·0	36·5	42·6	53·0	57·5	58·0	56·5	52·1	45·6	42·3	36·1	45·9
8	35·2	35·3	37·9	44·3	55·4	60·0	60·3	59·1	54·1	46·8	42·7	36·2	47·3
9	35·8	36·3	40·0	46·3	57·7	62·4	62·4	61·5	56·9	48·6	43·7	36·6	49·0
10	36·5	37·7	41·9	48·3	59·8	64·7	64·4	63·8	59·0	50·8	45·2	37·8	50·8
11	37·9	39·1	43·6	49·7	61·7	66·3	65·4	65·6	61·0	52·4	46·6	38·9	52·3
Noon	38·9	40·0	44·9	51·0	63·3	68·5	66·4	66·4	62·1	53·7	47·7	39·9	53·6
13^h.	39·5	40·4	45·7	51·3	63·7	69·8	67·0	67·3	62·6	53·7	48·2	40·3	54·1
14	39·4	40·5	46·1	51·4	63·7	70·3	66·7	67·4	62·8	53·9	48·2	40·1	54·2
15	39·4	40·0	46·3	51·5	63·3	69·9	67·1	67·0	62·5	53·2	47·4	39·5	53·9
16	39·3	39·6	45·7	50·5	62·7	69·3	66·7	66·2	61·2	52·2	46·5	38·8	53·2
17	38·8	38·8	44·6	49·5	60·9	67·3	65·8	64·9	59·5	50·5	45·7	38·3	52·0
18	38·5	38·2	43·1	48·0	59·3	65·4	64·4	63·1	57·6	49·2	45·0	38·0	50·8
19	38·3	37·7	41·9	46·3	57·5	63·5	62·5	61·1	56·0	48·3	44·3	37·7	49·6
20	38·0	37·1	41·2	44·8	55·4	61·1	60·6	59·3	54·5	47·9	43·7	37·3	48·4
21	37·9	36·8	40·5	43·8	53·7	59·0	58·8	58·0	53·6	47·5	43·5	37·3	47·5
22	37·6	36·3	39·5	43·1	52·6	57·5	57·6	57·2	53·0	47·4	43·1	37·1	46·8
23	37·4	36·1	38·9	42·6	51·9	56·7	57·2	56·4	52·3	46·9	42·8	37·0	46·3
24	37·0	35·9	38·5	42·2	51·4	55·8	56·7	55·6	51·9	46·5	42·3	37·0	45·9
Means 0^h.–23^h.	37·2	37·3	40·6	45·7	56·2	61·3	61·0	60·1	55·9	48·7	44·3	37·6	48·8
Means 1^h.–24^h.	37·2	37·3	40·7	45·7	56·3	61·3	60·9	60·1	55·9	48·7	44·3	37·6	48·8
Number of Days employed.	31	28	31	30	31	30	31	31	30	31	30	31	...

MONTHLY MEAN TEMPERATURE of EVAPORATION at every HOUR of the DAY, as deduced from the PHOTOGRAPHIC RECORDS.

Hour, Greenwich Civil Time.	1889. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Midnight	35·3	35·3	36·7	41·2	50·2	54·0	55·3	54·1	51·0	46·1	41·9	36·1	44·8
1h.	35·1	34·9	36·1	41·0	49·9	53·6	54·9	53·8	50·8	45·7	41·8	36·1	44·5
2	34·9	34·6	35·7	40·8	49·7	53·4	54·5	53·5	50·4	45·3	41·8	35·9	44·2
3	34·7	34·4	35·4	40·6	49·7	53·1	54·2	53·3	50·2	45·1	41·8	36·0	44·0
4	34·5	34·1	35·2	40·4	49·7	52·9	53·7	53·1	50·2	44·9	41·9	36·0	43·9
5	34·4	33·8	35·1	40·4	49·7	53·2	53·9	52·9	50·1	45·0	41·8	36·0	43·9
6	34·2	33·7	35·0	40·7	50·4	54·2	54·5	53·4	49·8	45·0	41·8	35·7	44·0
7	34·4	33·7	35·4	41·5	51·6	55·4	55·4	54·7	50·7	45·1	41·8	35·7	44·6
8	34·4	33·9	36·6	42·6	52·8	56·8	56·5	56·1	51·9	45·8	42·1	35·7	45·4
9	34·9	34·6	38·0	43·9	54·1	58·1	57·7	57·5	53·5	47·2	42·8	36·1	46·5
10	35·6	35·6	39·4	45·0	55·1	59·2	58·7	58·5	54·6	48·6	43·8	37·1	47·6
11	36·6	36·6	40·4	45·8	56·2	59·9	59·0	59·2	55·3	49·5	44·8	38·0	48·4
Noon	37·4	37·2	41·1	46·5	57·1	60·6	59·4	59·3	55·9	50·2	45·3	38·7	49·1
13h.	37·8	37·6	41·6	46·5	57·1	61·4	59·6	59·7	55·9	50·1	45·6	38·8	49·3
14	37·8	37·6	41·7	46·6	56·8	61·5	59·9	59·9	56·1	50·3	45·5	38·7	49·4
15	37·8	37·3	41·7	46·7	56·5	61·6	60·0	59·6	55·9	50·0	45·1	38·3	49·2
16	37·8	36·9	41·3	46·0	56·3	61·3	59·8	59·1	55·4	49·4	44·5	37·9	48·8
17	37·5	36·6	40·7	45·5	55·6	60·5	59·6	58·5	54·4	48·5	44·1	37·6	48·3
18	37·4	36·2	39·9	44·7	54·9	59·5	58·9	57·9	53·6	47·6	43·6	37·3	47·6
19	37·1	35·9	39·2	43·6	53·9	58·4	58·2	57·1	52·9	47·1	43·0	37·0	46·9
20	36·8	35·5	38·7	42·9	53·0	57·4	57·4	56·2	52·1	47·0	42·7	36·7	46·4
21	36·8	35·2	38·3	42·2	52·1	56·1	56·5	55·5	51·6	46·6	42·5	36·6	45·8
22	36·6	34·9	37·7	41·8	51·4	55·5	55·8	55·1	51·1	46·5	42·2	36·3	45·4
23	36·4	34·6	37·3	41·5	50·8	54·7	55·6	54·7	50·7	46·2	41·7	36·3	45·0
24	36·0	34·5	37·0	41·3	50·4	54·3	55·3	54·2	50·5	45·9	41·5	36·3	44·8
Means { 0h.–23h.	36·1	35·4	38·3	43·3	53·1	57·2	57·0	56·4	52·7	47·2	43·1	36·9	46·4
Means { 1h.–24h.	36·1	35·4	38·3	43·3	53·1	57·2	57·0	56·4	52·6	47·2	43·1	36·9	46·4
Number of Days employed	31	28	31	30	31	30	31	31	30	31	30	31	...

MONTHLY MEAN TEMPERATURE of the DEW POINT at every HOUR of the DAY, as deduced by GLAISHER'S TABLES from the corresponding AIR and EVAPORATION TEMPERATURES.

Hour, Greenwich Civil Time.	1889. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Midnight	33·9	33·3	34·7	40·1	49·2	52·7	53·9	52·7	49·6	45·4	40·9	35·1	43·5
1h.	33·9	32·9	34·3	39·8	49·2	52·4	53·5	52·4	49·5	45·1	41·0	35·3	43·3
2	33·7	32·6	34·2	39·7	49·0	52·2	53·1	52·2	49·1	44·7	41·0	35·2	43·1
3	33·5	32·5	34·0	39·6	49·2	52·1	52·9	52·2	49·0	44·6	41·1	35·3	43·0
4	33·4	32·1	33·5	39·3	49·1	51·8	52·2	52·1	49·1	44·5	41·2	35·2	42·8
5	33·2	31·6	33·6	39·4	49·0	52·1	52·5	52·0	48·9	44·5	41·0	35·3	42·8
6	33·1	31·4	33·5	39·6	49·5	52·9	52·8	52·2	48·4	44·5	41·1	35·0	42·8
7	33·2	31·6	33·8	40·2	50·2	53·5	53·1	53·0	49·3	44·6	41·2	35·1	43·2
8	33·1	31·7	34·9	40·6	50·3	54·0	53·2	53·4	49·7	44·7	41·4	35·0	43·5
9	33·5	32·1	35·4	41·2	50·8	54·5	53·7	54·1	50·3	45·7	41·7	35·4	44·0
10	34·3	32·7	36·3	41·4	50·9	54·6	53·9	54·1	50·6	46·3	42·2	36·1	44·4
11	34·9	33·3	36·6	41·7	51·5	54·7	53·8	54·0	50·4	46·6	42·8	36·8	44·8
Noon	35·4	33·6	36·7	41·8	51·9	54·4	53·7	53·6	50·5	46·8	42·7	37·1	44·8
13h.	35·6	34·0	36·9	41·5	51·6	54·9	53·7	53·6	50·1	46·6	42·8	36·9	44·8
14	35·7	33·9	36·7	41·6	51·1	54·7	54·4	53·9	50·3	46·8	42·5	36·9	44·9
15	35·7	33·8	36·5	41·8	50·8	55·2	54·3	53·7	50·2	46·8	42·6	36·7	44·8
16	35·8	33·4	36·3	41·3	50·8	55·1	54·3	53·3	50·4	46·6	42·2	36·7	44·7
17	35·7	33·6	36·2	41·3	51·0	55·1	54·5	53·2	49·9	46·4	42·2	36·6	44·6
18	35·9	33·5	36·1	41·1	51·0	54·7	54·3	53·5	50·0	45·9	42·0	36·3	44·5
19	35·4	33·4	35·9	40·5	50·6	54·1	54·6	53·6	50·0	45·8	41·5	36·0	44·3
20	35·1	33·3	35·6	40·7	50·7	54·2	54·6	53·4	49·8	46·0	41·5	35·9	44·2
21	35·3	33·0	35·5	40·3	50·5	53·5	54·4	53·2	49·6	45·6	41·3	35·6	44·0
22	35·3	32·9	35·4	40·2	50·2	53·7	54·2	53·2	49·2	45·5	41·1	35·2	43·8
23	35·0	32·4	35·1	40·2	49·7	52·9	54·2	53·1	49·1	45·4	40·4	35·3	43·6
24	34·6	32·4	34·9	40·2	49·4	52·9	54·0	52·9	49·1	45·3	40·5	35·3	43·5
Means { 0h.–23h.	34·6	32·9	35·3	40·6	50·3	53·7	53·7	53·2	49·7	45·6	41·6	35·8	43·9
Means { 1h.–24h.	34·6	32·8	35·3	40·6	50·3	53·8	53·7	53·2	49·7	45·6	41·6	35·8	43·9

MONTHLY MEAN DEGREE of HUMIDITY (Saturation = 100) at every HOUR of the DAY, as deduced by GLAISHER'S TABLES from the corresponding AIR and EVAPORATION TEMPERATURES.

Hour, Greenwich Civil Time.	1889. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
Midnight	91	88	87	93	93	91	90	90	91	96	94	94	92
1^{h}.	92	88	89	92	95	92	90	91	91	96	94	95	92
2	92	88	91	93	95	92	90	91	91	96	94	95	92
3	93	89	91	94	96	93	91	92	92	97	95	95	93
4	93	88	90	93	96	92	90	93	92	97	95	95	93
5	93	86	91	94	95	92	91	94	92	97	94	95	93
6	93	85	91	93	94	91	88	92	90	97	95	96	92
7	93	87	91	91	90	86	83	88	90	97	96	96	91
8	92	87	89	87	84	81	78	82	85	93	95	96	87
9	91	85	84	83	78	75	74	77	79	90	93	95	84
10	92	83	82	77	73	70	69	71	74	85	89	94	80
11	89	80	76	74	69	66	66	67	69	81	87	93	76
Noon	88	78	72	71	66	60	64	64	66	77	84	90	73
13^{h}.	86	78	72	70	65	58	62	62	64	76	82	88	72
14	87	78	71	70	63	58	65	62	64	76	81	89	72
15	87	78	69	70	64	59	64	62	65	79	84	90	73
16	88	79	70	71	66	60	64	64	68	81	86	93	74
17	90	83	72	73	69	65	67	66	71	86	88	94	77
18	91	83	77	77	74	69	70	71	76	89	89	94	80
19	90	85	80	81	78	72	75	77	80	92	90	94	83
20	89	86	81	86	85	78	81	82	84	94	92	95	86
21	91	86	83	87	89	83	85	84	86	94	92	94	88
22	91	88	86	90	92	87	88	86	87	94	93	93	90
23	91	87	87	91	92	87	89	89	89	95	91	94	90
24	91	87	87	93	93	90	91	91	90	96	94	94	91
Means { 0^{h}.–23^{h}.	91	84	82	83	82	77	78	79	81	90	91	94	84
Means { 1^{h}.–24^{h}.	91	84	82	83	82	77	78	79	81	90	91	94	84

TOTAL AMOUNT of SUNSHINE registered in each HOUR of the DAY in each MONTH, as derived from the RECORDS of the CAMPBELL-STOKES SELF-REGISTERING INSTRUMENT, for the YEAR 1889.

Month, 1889.	Registered Duration of Sunshine in the Hour ending 5^{h}.	6^{h}.	7^{h}.	8^{h}.	9^{h}.	10^{h}.	11^{h}.	Noon.	13^{h}.	14^{h}.	15^{h}.	16^{h}.	17^{h}.	18^{h}.	19^{h}.	20^{h}.	Total registered Duration of Sunshine in each Month.	Corresponding aggregate Period during which the Sun was above Horizon.	Proportion of Sunshine.	Mean Altitude of the Sun at Noon.
	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h		°
January ...	...	...	...	...	...	0·6	3·4	4·7	4·3	2·6	1·4	0·2	...	...	...	...	17·2	259·1	0·066	18
February ...	...	...	...	0·1	3·2	6·9	7·4	6·6	5·6	4·5	3·8	2·3	...	...	...	...	40·4	277·9	0·145	26
March	...	...	0·4	5·2	6·8	7·5	8·4	10·0	10·0	10·6	10·1	8·1	1·6	0·1	...	...	78·8	366·9	0·215	37
April	...	0·8	3·1	4·3	7·1	8·8	8·6	9·2	9·3	7·8	9·4	7·4	6·5	4·3	1·1	...	87·7	414·9	0·211	48
May	0·1	4·1	7·6	10·0	11·1	12·4	15·1	16·0	16·7	16·5	15·0	13·9	13·7	10·8	8·7	1·1	172·8	482·1	0·358	57
June	0·2	3·2	8·4	10·2	10·4	12·7	14·1	15·5	19·0	19·3	18·5	17·0	16·2	15·1	12·0	3·6	195·4	494·5	0·395	62
July	1·0	6·6	8·6	11·4	11·1	11·3	12·4	10·6	11·0	9·2	9·0	10·3	9·9	9·3	5·8	1·0	138·5	496·8	0·279	60
August	...	2·4	9·0	12·4	15·1	16·9	17·9	14·6	13·9	14·0	12·7	13·4	13·4	11·3	3·0	...	170·0	449·1	0·379	52
September ..	...	...	0·4	8·0	11·4	13·0	13·3	15·1	12·9	13·1	13·8	11·4	9·7	3·7	...	...	125·8	376·9	0·334	41
October......	...	...	...	1·9	6·5	10·7	11·0	12·2	9·1	8·0	8·9	7·9	1·3	...	...	...	77·5	328·7	0·236	30
November...	...	...	...	...	1·1	3·1	3·2	6·5	7·4	4·7	3·8	1·8	...	...	...	...	31·6	264·4	0·120	20
December...	...	...	...	...	0·3	1·2	3·9	5·1	4·9	3·5	1·4	...	...	...	...	...	20·3	242·7	0·084	16
For the Year	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1156·0	4454·0	0·260	...

The hours are reckoned from *apparent* midnight.

READINGS of DRY-BULB THERMOMETERS placed in a STEVENSON'S SCREEN near the Ordinary Stand, and of those mounted in a louvre-boarded shed on the ROOF of the MAGNET HOUSE at an elevation of 20 feet above the GROUND; and EXCESS of the READINGS above those of the corresponding THERMOMETERS on the ORDINARY STAND, in the YEAR 1889.

(The readings of the maximum and minimum thermometers apply to the twenty-four hours ending at 21h.)

[No observations have been made on Sundays, Good Friday, and Christmas Day.]

JANUARY.

Days of the Month.	Readings of Thermometers in Stevenson's Screen, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°	°	°	°	°
1	35.1	26.6	29.8	30.8	31.2	32.1	-0.1	-0.2	-0.1	-0.1	-0.2	0.0
2	37.1	25.5	28.2	35.9	37.0	35.3	-0.4	0.0	-0.8	0.0	-0.3	0.0
3	36.4	29.8	34.3	35.1	36.4	35.8	-0.7	-2.5	0.0	-0.3	-0.2	+0.4
4	36.1	26.3	31.2	33.9	33.8	31.7	0.0	+0.1	-0.3	-0.5	0.0	0.0
5	31.8	25.2	25.9	27.7	27.9	26.7	-0.3	-0.2	-0.2	-0.2	-0.1	-0.3
7	36.8	22.6	25.0	31.1	31.9	36.7	+0.7	+0.1	-0.7	-0.5	-0.4	+0.8
8	44.0	32.9	37.7	40.4	41.0	44.0	+0.2	+0.1	-0.2	0.0	0.0	+0.2
9	48.2	42.2	46.2	47.9	46.7	43.7	-0.8	+0.8	+0.1	-0.1	+0.4	-0.1
10	43.9	35.4	36.6	35.5	37.3	37.6	-0.3	-0.1	-0.2	-0.3	-0.1	+0.2
11	41.7	34.6	35.4	40.1	40.0	37.4	-0.8	+0.3	0.0	-0.6	+0.1	0.0
12	37.7	30.8	34.2	33.4	33.0	34.4	-0.1	+0.4	0.0	0.0	-0.1	0.0
14	38.3	36.6	37.1	38.3	38.3	36.9	-0.6	+0.2	0.0	-0.1	-0.3	0.0
15	37.1	33.0	35.4	36.3	36.1	33.3	0.0	-0.1	-0.3	-0.1	0.0	-0.1
16	33.7	32.1	32.5	32.9	33.2	33.2	0.0	0.0	-0.3	-0.2	-0.2	-0.1
17	40.1	33.0	35.5	38.5	39.7	36.9	-0.9	0.0	-0.3	-0.3	-0.1	-0.1
18	50.4	32.7	40.0	48.4	49.4	47.1	-0.9	+0.3	0.0	-0.3	0.0	+0.2
19	49.3	37.7	38.8	44.0	45.0	40.3	+2.0	+0.7	+0.7	-0.2	+0.3	+0.1
21	40.9	29.4	31.7	33.9	39.3	38.1	-0.1	+0.4	-0.2	0.0	-0.1	+0.1
22	40.6	35.4	36.5	40.1	39.9	37.5	-0.9	+0.2	-0.2	+0.1	-0.1	+0.1
23	40.7	30.4	32.3	37.0	33.6	34.8	-0.4	+0.5	-0.1	-0.5	-0.2	+0.1
24	42.4	32.7	36.2	39.7	41.2	41.4	-0.6	+0.3	-0.1	-0.1	-0.1	+0.3
25	43.0	39.5	41.2	40.3	40.5	43.0	-0.1	-0.2	+0.1	0.0	-0.1	-0.1
26	49.7	40.5	43.2	48.7	48.4	45.0	-1.1	+0.4	0.0	+0.1	0.0	+0.2
28	48.3	31.4	41.3	47.0	48.3	43.2	-0.8	+0.5	-0.1	+0.1	-0.1	+0.1
29	47.6	40.4	45.0	45.1	47.2	40.9	-0.4	+0.3	0.0	-0.3	0.0	+0.1
30	46.8	32.8	40.1	44.8	45.3	46.3	+0.1	+0.5	0.0	0.0	0.0	0.0
31	52.7	41.2	46.1	50.3	50.4	51.8	-0.9	+0.5	-0.1	-0.1	0.0	+0.1
Means	41.9	33.0	36.2	39.2	39.7	38.7	-0.3	+0.1	-0.1	-0.2	-0.1	+0.1

Days of the Month.	Readings of Thermometers on the Roof of the Magnet House, 20 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°	°	°	°	°
1	34.6	26.3	30.5	30.8	33.4	32.2	-0.6	-0.5	+0.6	-0.1	+2.0	+0.1
2	37.7	26.0	28.0	36.0	37.4	35.9	+0.2	+0.5	-1.0	+0.1	+0.1	+0.6
3	37.3	31.9	34.5	35.4	36.9	35.9	+0.2	-0.4	+0.2	0.0	+0.3	+0.5
4	37.8	25.6	31.7	34.6	33.9	31.8	+1.7	-0.6	+0.2	+0.2	+0.1	+0.1
5	33.8	25.2	27.1	28.2	28.5	26.9	+1.7	-0.2	+1.0	+0.3	+0.5	-0.1
7	37.0	21.7	26.0	31.7	32.2	36.9	+0.9	-0.8	+0.3	+0.1	-0.1	+1.0
8	44.5	33.3	38.4	40.5	41.5	44.5	+0.7	+0.5	+0.5	+0.1	+0.5	+0.7
9	48.7	42.1	46.5	48.3	47.1	44.3	-0.3	+0.7	+0.4	+0.3	+0.8	+0.5
10	44.7	34.9	36.8	35.9	37.4	37.5	+0.5	-0.6	0.0	+0.1	0.0	+0.1
11	42.2	33.7	35.8	40.7	40.1	37.1	-0.3	-0.6	+0.4	0.0	+0.2	-0.3
12	37.6	29.7	34.1	33.5	33.1	33.9	-0.2	-0.7	-0.1	+0.1	0.0	-0.5
14	38.6	36.1	37.5	38.5	38.6	36.9	-0.3	-0.3	+0.4	+0.1	0.0	0.0
15	37.0	32.5	35.9	36.5	36.1	33.4	-0.1	-0.6	+0.2	+0.1	0.0	0.0
16	34.7	31.9	33.0	33.2	33.5	34.0	+1.0	-0.2	+0.2	+0.1	+0.1	+0.7
17	41.1	32.8	36.7	38.9	39.9	36.9	+0.1	-0.2	+0.9	+0.1	+0.1	-0.1
18	51.3	32.6	41.0	48.9	49.6	47.6	0.0	+0.2	+1.0	+0.2	+0.2	+0.7
19	48.8	37.5	39.5	44.5	46.0	41.1	+1.5	+0.5	+1.4	+0.3	+1.3	+0.9
21	41.5	28.8	32.0	34.1	39.6	38.4	+0.5	-0.2	+0.1	+0.2	+0.2	+0.4
22	40.5	34.2	36.9	40.5	40.1	37.9	-1.0	-1.0	+0.2	+0.5	+0.1	+0.5
23	40.8	30.8	32.6	37.2	33.8	34.9	-0.3	+0.9	+0.2	-0.3	0.0	+0.2
24	44.0	32.1	36.6	40.4	41.9	42.5	+1.0	-0.3	+0.3	+0.6	+0.6	+1.4
25	44.1	39.3	41.6	40.6	40.9	43.9	+1.0	-0.4	+0.5	+0.3	+0.3	+0.8
26	50.3	40.4	43.9	49.1	49.0	45.5	-0.5	+0.3	+0.7	+0.5	+0.6	+0.7
28	49.0	32.4	41.7	47.5	48.8	44.8	-0.1	+1.5	+0.3	+0.6	+0.4	+1.7
29	47.8	40.1	45.6	45.8	47.4	40.9	-0.2	0.0	+0.6	+0.4	+0.2	+0.1
30	47.5	32.6	40.7	45.1	46.0	47.5	+0.8	+0.3	+0.6	+0.3	+0.7	+1.2
31	53.1	40.8	46.3	50.9	50.9	51.9	-0.5	+0.1	+0.1	+0.5	+0.5	+0.2
Means	42.4	32.8	36.7	39.5	40.1	39.1	+0.3	-0.1	+0.4	+0.2	+0.4	+0.4

FEBRUARY.

Days of the Month.	Readings of Thermometers in Stevenson's Screen, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°	°	°	°	°
1	55.3	49.6	51.4	52.3	55.2	52.2	-0.7	+0.5	-0.1	-0.2	+0.1	0.0
2	52.3	33.7	37.5	41.0	41.2	36.9	-0.1	-0.1	0.0	-0.4	-0.1	+0.1
4	38.6	29.4	34.2	33.8	34.8	30.2	-0.2	-0.1	-0.3	0.0	0.0	0.0
5	37.4	27.6	30.0	35.9	37.2	37.0	-0.8	+0.4	-0.1	-0.3	-0.1	+0.1
6	43.9	35.1	40.5	42.6	43.9	41.2	-0.2	-1.3	-0.3	-0.2	+0.1	+0.2
7	44.3	33.4	35.1	39.0	38.4	33.9	-0.4	+0.4	-0.2	-0.3	-0.2	+0.1
8	48.1	29.4	39.6	45.4	40.8	35.0	-0.5	+0.3	0.0	-0.1	+0.6	+0.1
9	36.1	29.5	32.0	34.9	34.0	29.9	+0.1	+0.2	0.0	0.0	0.0	0.0
11	32.8	28.4	30.2	31.4	32.4	30.0	-1.8	+0.6	-0.2	-0.9	-0.5	+0.1
12	35.7	19.9	25.5	34.3	35.1	29.0	-1.4	0.0	-0.6	-0.3	-0.3	+0.1
13	38.3	19.4	30.0	33.8	35.6	38.1	+0.2	+0.5	-0.4	-0.1	-0.2	+0.2
14	49.0	38.1	49.0	47.1	44.4	41.8	-0.2	+0.6	+0.3	+0.1	+0.1	+0.1
15	44.8	36.1	38.0	41.9	44.3	37.3	-0.4	+0.6	+0.1	+0.1	+0.1	+0.2
16	45.1	29.2	34.7	39.3	38.9	44.8	0.0	+0.9	0.0	0.0	-0.2	+0.1
18	54.1	40.4	44.4	52.2	50.4	46.9	+0.9	+0.5	+0.2	+0.2	0.0	+0.1
19	49.3	44.0	46.8	48.8	48.9	45.1	-0.8	+0.3	0.0	0.0	0.0	+0.1
20	47.6	38.7	41.0	46.5	47.1	43.1	-0.7	+0.5	0.0	+0.2	+0.3	+0.2
21	43.3	34.8	39.8	40.5	38.6	35.1	0.0	+0.4	0.0	-0.3	-0.2	+0.1
22	41.4	32.0	37.1	41.4	38.9	35.3	-1.0	+0.3	0.0	-0.7	-0.3	+0.2
23	37.7	29.3	32.8	34.6	35.0	34.4	-2.0	+0.2	+0.7	-0.2	-0.3	-0.1
25	38.0	31.7	33.4	35.7	35.9	33.0	-1.6	-0.1	-0.1	-0.2	-0.9	0.0
26	36.7	28.0	33.1	35.3	32.4	32.3	-1.2	+0.4	+0.8	-0.6	-0.4	0.0
27	37.1	31.1	32.7	35.3	35.2	32.0	-0.6	0.0	-0.1	-0.4	0.0	-0.1
28	34.6	29.4	30.0	31.9	33.4	30.5	-0.6	-0.2	-0.4	-0.4	-0.2	0.0
Means	42.6	32.4	36.6	39.8	39.7	36.9	-0.6	+0.2	0.0	-0.2	-0.1	+0.1

Days of the Month.	Readings of Thermometers on the Roof of the Magnet House, 20 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°	°	°	°	°
1	55.6	49.5	51.9	52.6	55.5	52.7	-0.4	+0.4	+0.4	+0.1	+0.4	+0.5
2	52.7	33.0	37.9	40.4	41.4	36.2	+0.3	-0.8	+0.4	-1.0	+0.1	-0.6
4	39.1	29.6	33.8	33.7	34.7	30.0	+0.3	+0.1	-0.7	-0.1	-0.1	-0.2
5	37.9	26.6	30.2	36.5	37.3	37.2	-0.3	-0.6	+0.1	+0.3	0.0	+0.3
6	44.3	36.3	41.4	43.0	44.3	41.4	+0.2	-0.1	+0.6	+0.2	+0.5	+0.4
7	44.6	33.0	34.8	39.0	38.7	33.8	-0.1	0.0	-0.5	-0.3	+0.1	0.0
8	48.5	28.5	40.0	46.0	39.7	35.2	-0.1	-0.6	+0.4	+0.5	-0.5	+0.3
9	37.0	29.4	32.2	34.9	34.2	30.2	+1.0	+0.1	+0.2	0.0	+0.2	+0.3
11	32.6	27.4	30.0	31.5	31.2	29.4	-2.0	-0.4	-0.4	-0.8	-1.7	-0.5
12	35.2	20.5	26.1	34.9	34.3	29.2	-1.9	+0.6	0.0	+0.3	-1.1	+0.3
13	39.6	20.6	32.2	34.3	35.9	39.2	+1.5	+1.7	+1.8	+0.4	+0.1	+1.3
14	50.0	38.2	49.5	47.2	44.9	42.4	+0.8	+0.7	+0.8	+0.2	+0.6	+0.7
15	45.0	36.1	38.5	42.1	44.2	37.2	-0.2	+0.6	+0.6	+0.3	0.0	+0.1
16	46.0	29.0	35.5	40.0	39.5	44.9	+0.9	+0.7	+0.8	+0.7	+0.4	+0.2
18	52.6	40.1	45.5	52.3	51.0	47.2	-0.6	+0.2	+1.3	+0.3	+0.6	+0.4
19	49.9	43.8	47.2	49.1	49.2	45.6	-0.2	+0.1	+0.4	+0.3	+0.3	+0.6
20	48.1	38.4	41.5	46.6	46.5	43.5	-0.2	+0.2	+0.5	+0.3	-0.3	+0.6
21	44.2	34.0	39.8	40.9	37.4	35.3	+0.9	-0.4	0.0	+0.1	-1.4	+0.3
22	41.5	31.4	37.1	40.9	39.4	36.1	-0.9	-0.3	0.0	-1.2	+0.2	+1.0
23	37.3	28.9	31.8	35.0	35.2	34.4	-2.4	-0.2	-0.3	+0.2	-0.1	-0.1
25	38.6	31.2	32.9	35.5	36.9	33.1	-1.0	-0.6	-0.6	-0.4	+0.1	+0.1
26	35.9	27.1	31.4	35.6	33.0	32.4	-2.0	-0.5	-0.9	-0.3	+0.2	+0.1
27	37.3	30.6	32.9	36.0	35.6	32.1	-0.4	-0.5	+0.1	+0.3	+0.4	0.0
28	34.9	29.2	30.4	31.3	33.8	30.6	-0.3	-0.4	0.0	-1.0	+0.2	+0.1
Means	42.8	32.2	36.9	40.0	39.7	37.1	-0.3	0.0	+0.2	0.0	0.0	+0.3

READINGS of DRY-BULB THERMOMETERS in a STEVENSON'S SCREEN and on the ROOF of the MAGNET HOUSE—*continued.*

Days of the Month.	Readings of Thermometers in Stevenson's Screen, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
MARCH.												
d	°	°	°	°	°	°	°	°	°	°	°	°
1	37.2	29.5	31.4	35.0	35.4	29.7	−1.0	+0.2	−0.6	+0.1	−0.4	−0.2
2	34.6	28.6	30.6	34.5	33.4	30.2	−1.5	+0.3	−0.4	−0.3	−0.3	−0.1
4	39.3	19.6	30.4	36.9	34.4	30.5	−0.2	+0.9	0.0	−1.0	−0.2	−0.3
5	39.4	25.7	31.4	35.9	38.0	28.9	−1.0	+0.2	+0.5	0.0	0.0	+0.1
6	46.6	25.7	37.0	45.0	45.9	35.8	−1.4	+0.6	+0.1	−0.4	+0.1	+0.3
7	48.7	34.9	39.0	45.9	48.4	48.7	−0.7	+0.2	−0.2	−0.5	−0.1	+0.1
8	54.0	46.8	48.8	49.9	51.8	49.9	−1.4	+0.3	0.0	−0.1	−0.1	+0.3
9	51.1	35.0	42.0	48.5	49.5	38.9	−2.0	+0.3	−0.1	−0.5	+0.1	+0.1
11	45.4	33.5	40.3	42.4	42.9	35.5	−0.2	+0.5	0.0	+0.1	−0.9	+0.1
12	46.1	28.7	34.7	38.1	44.0	44.9	0.0	+0.3	−0.2	−0.3	0.0	+0.1
13	51.6	38.3	43.0	51.0	51.0	46.3	−0.8	+0.4	0.0	−0.1	0.0	+0.2
14	48.3	37.4	41.2	44.3	47.1	39.3	0.0	+0.8	−0.2	+0.2	−0.3	0.0
15	41.3	28.4	36.1	36.2	38.2	29.0	+0.5	−0.7	−0.1	−0.4	+0.4	−0.3
16	48.7	26.2	35.2	40.5	47.3	46.6	−1.3	+1.1	−0.1	−0.5	−1.1	+0.3
18	48.0	40.8	43.2	47.3	47.8	41.5	−1.2	+0.5	0.0	−0.2	+0.1	−0.2
19	54.3	37.3	44.6	51.9	53.5	46.3	−1.7	+0.9	+0.3	−0.6	−0.4	0.0
20	51.1	39.5	44.2	49.1	48.1	43.0	−1.4	+0.6	+0.5	−1.3	−0.7	+0.5
21	44.3	35.0	39.1	37.0	36.8	35.7	+1.2	+0.1	−0.2	−0.2	0.0	0.0
22	45.8	32.1	36.0	42.9	45.8	38.9	−0.7	+0.6	−0.4	−0.6	+0.9	+0.3
23	52.0	32.7	42.1	50.6	52.0	44.4	−1.2	+0.6	0.0	−0.2	−0.6	+0.3
25	57.4	44.7	47.4	50.7	57.1	48.5	−1.6	+0.3	+0.2	−0.4	+0.3	+0.2
26	48.6	39.6	44.5	45.9	42.5	41.1	0.0	+0.5	+0.1	−0.2	0.0	+0.1
27	47.6	35.7	39.1	42.2	47.6	36.9	−1.4	+0.3	0.0	−0.2	−0.3	+0.1
28	52.6	27.3	38.2	49.9	51.5	43.7	−1.7	+0.7	−0.5	−0.2	−0.8	+0.3
29	57.0	42.6	48.5	53.5	56.2	53.5	−1.1	0.0	−0.1	0.0	+0.2	+0.4
30	53.8	43.3	48.8	51.9	52.4	47.9	−0.3	+0.7	0.0	+0.1	+0.1	+0.1
Means	47.9	34.2	39.9	44.5	46.1	40.6	−0.8	+0.4	0.0	−0.3	−0.2	+0.1
APRIL.												
d	°	°	°	°	°	°	°	°	°	°	°	°
1	51.7	33.3	39.4	48.5	49.9	44.4	−0.5	0.0	−0.5	−0.5	+0.2	+0.6
2	49.1	39.4	43.0	47.5	47.9	42.8	−1.5	0.0	+0.2	+0.1	+0.1	+0.1
3	43.5	35.9	39.4	41.5	43.5	38.5	−1.5	−0.1	−0.4	−0.3	−0.5	−0.1
4	52.6	38.0	47.5	51.0	49.7	41.3	−1.5	−0.3	−0.5	−0.7	−0.2	+0.5
5	54.7	37.9	44.9	51.5	50.0	41.1	−1.4	+0.1	−0.1	−0.2	−0.1	+0.3
6	53.5	38.2	45.5	50.1	53.5	41.9	−1.5	+0.3	+0.2	−0.3	−0.3	0.0
8	53.5	40.4	48.3	52.9	50.9	44.9	−1.6	+0.2	−0.4	−0.4	−0.1	+0.1
9	47.4	41.5	43.1	46.3	47.3	42.0	−1.3	−0.1	−0.1	−0.2	0.0	0.0
10	43.7	39.3	41.9	43.5	43.7	42.2	−1.0	−0.3	0.0	−0.1	−0.1	+0.1
11	48.5	35.3	42.2	47.6	46.1	40.8	−2.0	−0.2	−0.8	+0.1	−0.6	+0.1
12	51.1	37.5	42.9	50.0	49.3	43.7	−1.3	+0.5	−0.3	−0.2	+0.1	0.0
13	46.8	38.5	39.9	43.4	45.4	40.0	−1.4	−0.3	−0.1	−0.3	−0.3	+0.1
15	47.1	36.5	40.5	45.2	46.4	39.3	−1.2	0.0	+0.4	0.0	−0.3	0.0
16	48.6	33.2	42.4	47.3	47.3	42.9	−1.9	+0.6	−0.1	−0.2	−0.1	+0.1
17	54.0	39.2	44.2	51.7	53.8	49.1	−1.6	+0.1	+0.1	+0.3	0.0	+0.1
18	60.0	47.6	50.4	54.2	58.5	50.9	−1.1	+0.3	0.0	−0.5	+0.4	+0.7
20	59.5	45.2	52.0	55.0	58.4	48.9	−1.8	+0.7	−0.2	−0.4	0.0	+0.2
22	58.0	39.0	51.8	56.9	54.9	44.7	−2.8	+0.7	−1.1	−1.0	−0.1	+0.7
23	53.5	37.2	47.2	51.1	48.0	43.2	−1.8	+0.2	−1.4	−0.8	−0.1	+0.3
24	51.3	40.9	45.5	47.9	47.1	44.3	−2.4	+0.5	−0.5	+0.1	+0.1	−0.1
25	50.1	41.1	46.1	48.1	48.9	43.0	−2.0	0.0	−0.3	−0.1	−0.5	+0.3
26	59.7	35.4	51.1	58.8	59.1	47.4	−1.7	+0.3	−0.1	−1.0	+0.1	+0.3
27	62.5	45.7	52.8	60.4	62.1	47.2	−2.0	+0.3	−0.5	−0.3	−0.7	+0.4
29	60.3	38.7	52.0	55.4	56.5	45.9	−0.4	+0.6	+0.2	−1.3	−0.4	+0.5
30	60.4	43.5	50.5	53.9	60.0	48.3	−2.3	+0.4	−0.3	−0.2	−0.2	+0.3
Means	52.8	39.1	45.8	50.4	51.1	43.9	−1.6	+0.2	−0.3	−0.3	−0.1	+0.2

Days of the Month.	Readings of Thermometers on the Roof of the Magnet House, 20 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
MARCH.												
d	°	°	°	°	°	°	°	°	°	°	°	°
1	36.9	28.8	31.9	35.9	35.7	29.9	−1.3	−0.5	−0.1	+1.0	−0.1	0.0
2	36.2	27.6	31.2	35.8	34.0	30.2	+0.1	−0.7	+0.2	+1.0	+0.3	−0.1
4	38.6	18.3	28.8	36.9	35.2	30.7	−0.9	−0.4	−1.6	−1.0	+0.6	−0.1
5	39.9	24.6	31.0	36.1	38.1	30.0	−0.5	−0.9	+0.1	+0.2	+0.1	+1.2
6	47.5	25.8	38.3	44.9	46.0	36.1	−0.5	+0.7	+1.4	−0.5	+0.2	+0.6
7	49.5	35.2	39.5	46.6	49.0	49.2	+0.1	+0.5	+0.3	+0.2	+0.5	+0.6
8	54.7	47.2	49.5	50.8	52.2	50.8	−0.7	+0.7	+0.7	+0.8	+0.3	+1.2
9	51.1	34.2	41.5	47.7	49.5	39.2	−2.0	−0.5	−0.6	−1.3	+0.1	+0.4
11	43.9	33.1	39.1	42.1	43.0	36.1	−1.7	+0.1	−1.2	−0.2	−0.8	+0.7
12	47.8	27.8	35.1	38.6	43.9	45.3	+1.7	−0.6	+0.2	+0.2	−0.1	+0.5
13	51.4	38.0	43.8	50.9	51.4	46.6	−1.0	+0.1	+0.8	−0.2	+0.4	+0.5
14	47.1	37.2	41.2	43.9	46.4	39.5	−1.2	+0.6	−0.2	−0.2	−1.0	+0.2
15	40.5	28.0	36.7	36.4	38.0	29.1	−0.3	−1.1	+0.5	−0.2	+0.2	−0.2
16	49.6	25.9	35.5	41.1	48.1	47.3	−0.4	+0.8	+0.2	+0.1	−0.3	+1.0
18	49.2	41.0	43.5	47.5	48.1	41.9	0.0	+0.7	+0.3	0.0	+0.4	+0.2
19	54.2	36.9	45.2	52.3	53.9	46.9	−1.8	+0.5	+0.9	−0.2	0.0	+0.6
20	50.8	39.0	44.4	48.9	48.3	43.9	−1.7	+0.1	+0.7	−1.5	−0.5	+1.4
21	44.6	32.0	39.4	36.5	36.7	35.9	+1.5	−2.9	+0.1	−0.7	−0.1	+0.2
22	44.5	31.6	35.5	41.1	43.9	39.6	−2.0	+0.1	−0.9	−2.4	−1.0	+1.0
23	51.6	32.1	41.9	49.3	51.5	44.5	−1.6	0.0	−0.2	−1.5	−1.1	+0.4
25	58.1	44.6	47.8	51.2	56.2	49.0	−0.9	+0.2	+0.6	+0.1	−0.6	+0.7
26	49.2	39.2	44.3	46.1	42.6	41.9	+0.6	+0.1	−0.1	0.0	+0.1	+0.9
27	47.9	35.2	39.4	42.1	47.9	36.6	−1.1	−0.2	+0.3	−0.3	0.0	−0.2
28	51.9	26.7	38.2	49.9	51.9	43.6	−2.4	+0.1	−0.5	−0.2	−0.4	+0.2
29	58.1	42.4	49.4	53.5	56.6	53.5	0.0	−0.2	+0.8	0.0	+0.6	+0.4
30	55.2	43.9	49.1	52.0	52.3	47.8	+1.1	+1.3	+0.3	+0.2	0.0	0.0
Means	48.1	33.7	40.0	44.5	46.2	41.0	−0.6	−0.1	+0.1	−0.3	−0.1	+0.5
APRIL.												
d	°	°	°	°	°	°	°	°	°	°	°	°
1	52.2	33.6	39.8	48.7	49.9	44.2	0.0	+0.3	−0.1	−0.3	+0.2	+0.4
2	48.6	39.4	42.8	45.9	47.8	42.6	−2.0	0.0	0.0	−1.5	0.0	−0.1
3	44.1	35.8	39.4	41.7	43.3	38.8	−0.9	−0.2	−0.4	−0.1	−0.7	+0.2
4	52.1	38.2	48.4	51.3	49.8	42.7	−2.0	−0.1	+0.4	−0.4	−0.1	+1.9
5	54.6	37.9	45.4	51.0	49.8	40.9	−1.5	+0.1	+0.4	−0.7	−0.3	+0.1
6	54.6	37.4	45.1	50.8	52.5	41.8	−0.4	−0.5	−0.2	+0.4	−1.3	−0.1
8	54.9	39.7	48.9	53.8	50.8	44.8	−0.2	−0.5	+0.2	+0.5	−0.2	0.0
9	48.9	41.2	43.4	46.9	48.1	42.0	+0.2	−0.4	+0.2	+0.4	+0.8	0.0
10	44.3	39.1	42.0	43.8	44.0	42.4	−0.4	−0.5	+0.1	+0.2	+0.2	+0.3
11	49.8	35.1	41.3	48.5	46.2	40.6	−0.7	−0.4	−1.7	+1.0	−0.5	−0.1
12	51.9	36.7	43.7	51.5	49.2	43.7	−0.5	−0.3	+0.5	+1.3	0.0	0.0
13	46.8	37.9	39.3	43.6	45.5	39.9	−1.4	−0.9	−0.7	−0.1	−0.2	0.0
15	46.3	36.1	39.9	45.5	46.3	39.8	−2.0	−0.4	−0.2	+0.3	−0.4	+0.5
16	48.5	32.8	42.1	47.1	47.3	43.0	−2.0	+0.2	−0.4	−0.4	−0.1	+0.2
17	54.3	38.9	44.1	51.5	53.3	49.2	−1.3	−0.2	0.0	+0.1	−0.5	+0.2
18	61.2	47.4	50.5	54.6	58.8	51.4	+0.1	+0.1	+0.1	−0.1	+0.7	+1.2
20	60.2	44.8	52.7	55.3	58.4	48.6	−1.1	+0.3	+0.5	−0.1	0.0	−0.1
22	57.5	38.9	51.6	55.8	54.6	43.8	−3.3	+0.6	−1.3	−2.1	−0.4	−0.2
23	53.4	36.7	49.4	51.1	48.4	43.7	−1.9	−0.3	+0.8	−0.8	+0.3	+0.8
24	51.6	40.5	46.0	47.8	47.9	44.5	−2.1	+0.1	0.0	0.0	+0.9	+0.1
25	50.5	39.7	46.1	47.9	49.0	42.8	−1.6	−1.4	−0.3	−0.3	−0.4	+0.1
26	60.0	35.3	51.5	57.9	58.7	48.1	−1.4	+0.2	+0.3	−1.9	−0.3	+1.0
27	62.6	46.2	54.1	59.8	62.0	47.4	−1.9	+0.8	+0.8	−0.9	−0.8	+0.6
29	59.6	38.7	51.9	55.0	56.6	45.7	−1.1	+0.6	+0.1	−1.7	−0.3	+0.3
30	61.2	42.3	51.2	53.8	59.8	48.9	−1.5	−0.8	+0.4	−0.3	−0.4	+0.9
Means	53.2	38.8	46.0	50.4	51.1	44.1	−1.2	−0.1	0.0	−0.3	−0.2	+0.3

READINGS of DRY-BULB THERMOMETERS in a STEVENSON'S SCREEN and on the ROOF of the MAGNET HOUSE—*continued*.

MAY.

Days of the Month.	Readings of Thermometers in Stevenson's Screen, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
1	53·3	42·4	51·1	51·1	47·9	44·7	−1·2	+0·7	−0·1	−0·1	+0·1	0·0
2	57·5	41·5	50·1	50·6	57·4	48·1	−1·5	+0·5	0·0	+0·1	+0·1	+0·8
3	61·4	41·6	55·2	58·9	60·8	51·1	−2·1	+0·4	−1·3	−0·4	−0·1	+0·2
4	71·1	46·4	65·3	70·7	70·7	53·9	−2·3	+0·6	+0·3	−0·8	−0·1	+0·1
6	72·7	49·7	62·1	69·8	72·6	56·4	−1·5	+0·9	+0·6	−0·9	−0·3	+0·3
7	64·8	50·5	63·6	63·3	58·9	52·3	−2·3	+0·7	−0·2	−2·7	−1·2	−0·1
8	65·0	49·4	55·2	64·5	64·6	51·1	−2·8	0·0	−0·6	−1·8	−1·4	+0·3
9	71·1	49·6	66·9	67·2	67·1	57·9	−2·0	+0·5	−0·4	−0·7	−0·7	+0·1
10	62·7	49·1	51·5	62·7	59·9	54·5	−3·1	−0·2	−0·6	−1·4	−0·5	+0·4
11	54·7	48·3	52·2	52·8	50·5	48·8	0·0	0·0	+0·1	0·0	0·0	+0·3
13	57·1	49·4	50·6	53·9	56·8	52·2	−2·0	+0·1	−0·1	+0·1	0·0	+0·2
14	63·6	49·0	53·8	60·0	60·8	49·5	−1·7	+0·5	+0·1	+0·2	−0·2	+0·1
15	66·0	45·7	49·0	60·0	64·8	53·4	−0·1	0·0	−0·4	0·0	0·0	+0·5
16	70·0	45·4	55·5	68·6	69·9	57·9	−1·1	−0·3	−0·3	−0·1	+0·7	+0·4
17	67·7	47·3	52·0	61·5	67·5	55·8	−2·5	+0·2	−0·7	−0·9	−0·2	+0·4
18	64·4	50·2	54·4	60·4	60·9	50·4	−3·6	+0·7	−0·5	+0·1	−0·3	+0·6
20	65·1	51·9	54·6	59·9	64·5	53·9	−2·6	+0·1	−0·2	−0·2	−0·5	+0·5
21	69·5	52·2	61·8	68·8	66·6	57·0	−1·7	+1·1	+0·4	0·0	−0·4	+0·7
22	79·1	49·1	66·5	77·2	77·9	62·0	−1·4	+0·8	+0·3	+0·1	+0·9	0·0
23	81·2	53·3	72·3	77·9	75·3	63·3	−4·0	+0·8	+0·4	+0·2	−0·1	+0·2
24	79·1	54·1	71·8	77·1	79·1	64·0	−3·4	+1·0	−0·6	−0·7	−0·9	+0·2
25	73·9	56·8	66·5	71·4	69·8	56·9	−2·8	0·0	−0·5	−1·7	0·0	0·0
27	56·2	51·7	52·3	53·8	56·0	55·1	−2·0	+0·1	−0·1	−0·1	−0·3	+0·1
28	63·8	49·4	55·5	63·8	60·1	53·7	−1·2	+0·6	0·0	0·0	−0·8	−0·1
29	62·6	49·0	57·9	60·9	61·5	49·9	−2·4	+0·4	+0·3	−0·9	−0·6	+0·5
30	62·0	46·0	54·9	62·0	59·9	51·1	−2·6	+0·8	−0·1	−1·1	+0·1	+0·2
31	64·1	46·7	56·7	62·0	61·6	52·3	−3·0	+0·6	−0·5	−0·8	−0·2	+0·4
Means	65·9	48·7	57·8	63·4	63·8	54·0	−2·1	+0·4	−0·2	−0·5	−0·3	+0·3

Days of the Month.	Readings of Thermometers on the Roof of the Magnet House, 20 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
1	53·6	41·3	51·8	51·1	47·8	44·5	−0·9	−0·4	+0·6	−0·1	0·0	−0·2
2	57·7	40·5	50·8	49·8	57·7	49·1	−1·3	−0·5	+0·7	−0·7	+0·4	+1·8
3	62·5	41·6	55·2	59·1	60·9	51·7	−1·0	+0·4	−1·3	−0·2	0·0	+0·8
4	71·6	46·2	65·2	69·9	70·6	53·4	−1·8	+0·4	+0·2	−1·6	−0·2	−0·4
6	74·5	49·2	61·0	71·0	73·4	56·2	+0·3	+0·4	−0·5	+0·3	+0·5	+0·1
7	64·8	49·8	63·5	63·7	59·7	52·7	−2·3	0·0	−0·3	−2·3	−0·4	+0·3
8	65·1	49·5	56·1	65·6	63·2	51·3	−2·7	+0·1	+0·3	−0·7	−2·8	+0·5
9	72·0	48·8	67·1	68·3	67·5	57·7	−1·1	−0·3	−0·2	+0·4	−0·3	−0·1
10	62·7	49·0	52·1	61·8	60·0	54·8	−3·1	−0·3	0·0	−2·3	−0·4	+0·7
11	55·0	48·3	52·2	52·9	50·4	48·8	+0·3	0·0	+0·1	+0·1	−0·1	+0·3
13	57·8	49·2	50·4	54·8	56·8	51·9	−1·3	−0·1	−0·3	+1·0	0·0	−0·1
14	65·5	48·6	53·5	60·9	60·3	49·4	+0·2	+0·1	−0·2	+1·1	−0·7	0·0
15	65·2	45·0	48·9	59·8	63·2	53·4	−0·9	−0·7	−0·5	−0·2	−1·6	+0·5
16	70·4	44·8	54·0	67·1	69·4	57·9	−0·7	−0·9	−1·8	−1·6	+0·2	+0·4
17	69·4	46·6	53·4	62·2	68·2	56·1	−0·8	−0·5	+0·7	−0·2	+0·5	+0·7
18	65·7	50·0	55·3	60·2	61·9	50·9	−2·3	+0·5	+0·4	−0·1	+0·7	+1·1
20	66·3	51·4	54·8	59·8	63·8	53·5	−1·4	−0·4	0·0	−0·3	−1·2	+0·1
21	69·6	51·7	60·3	68·6	67·3	57·3	−1·6	+0·6	−1·1	−0·2	+0·3	+1·0
22	80·6	48·4	66·1	76·5	77·3	61·8	+0·1	+0·1	−0·1	−0·6	+0·3	−0·2
23	83·6	53·1	73·9	77·8	77·2	65·1	−1·6	+0·6	+2·0	+0·1	+1·8	+2·0
24	80·8	53·8	72·3	76·1	78·8	64·8	−1·7	+0·7	−0·1	−1·7	−1·2	+1·0
25	75·6	56·3	67·0	70·8	69·8	56·6	−1·1	−0·5	0·0	−2·3	0·0	−0·3
27	57·5	51·2	52·4	54·2	56·9	55·3	−0·7	−0·4	0·0	+0·3	+0·6	+0·3
28	62·8	49·6	56·2	62·7	61·6	53·6	−2·2	+0·8	+0·7	−1·1	+0·7	−0·2
29	63·0	48·9	57·8	60·1	61·5	49·8	−2·0	+0·3	+0·2	−1·7	−0·6	+0·4
30	63·0	45·5	54·4	60·5	59·9	51·2	−1·6	+0·3	−0·6	−2·6	+0·1	+0·3
31	64·6	46·0	57·5	60·5	61·8	52·4	−2·5	−0·1	+0·3	−2·3	0·0	+0·5
Means	66·7	48·3	57·9	63·2	64·0	54·1	−1·3	0·0	0·0	−0·7	−0·1	+0·4

JUNE.

Days of the Month.	Readings of Thermometers in Stevenson's Screen, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
1	71·9	47·3	65·2	69·4	71·3	58·1	−1·9	+0·9	+0·4	−1·5	−1·0	+0·2
3	73·8	56·7	67·1	72·1	70·4	56·9	−3·1	+0·6	−0·9	−0·5	+0·3	+0·1
4	74·7	50·2	63·0	71·0	71·5	61·4	−4·2	+0·4	+0·5	−2·1	−1·2	+0·5
5	73·6	53·5	66·9	71·5	73·0	61·0	−1·8	+0·8	0·0	−0·9	+0·1	+0·1
6	82·3	54·8	59·7	71·9	81·9	68·9	−1·6	+0·4	0·0	0·0	+0·1	−0·1
7	79·4	58·6	72·5	78·1	73·3	58·7	−2·2	0·0	−1·0	−0·1	+0·1	−0·1
8	59·5	54·2	56·4	57·6	59·5	56·9	−1·2	+0·3	0·0	−0·4	+0·1	+0·1
10	54·2	48·6	50·0	50·5	50·2	49·6	−0·8	−0·4	0·0	−0·1	−0·1	0·0
11	61·4	48·7	53·4	57·1	59·4	56·5	−2·2	−0·1	0·0	−0·2	−0·3	+0·1
12	64·8	54·3	55·1	62·4	64·1	59·0	−1·5	+0·3	+0·2	+0·3	+0·1	+0·5
13	71·1	54·0	64·0	68·8	70·5	60·9	−2·0	+0·5	0·0	−0·4	+0·5	+0·6
14	64·1	51·0	61·4	62·1	62·9	58·4	−2·5	+0·5	−0·8	−0·1	−0·4	+0·1
15	65·0	53·9	59·9	63·9	64·4	58·0	−1·3	+0·6	−0·1	+0·2	+0·4	0·0
17	67·1	49·0	63·9	60·4	66·9	55·1	−2·0	+0·9	+0·9	+0·1	−0·4	−0·1
18	64·0	48·4	56·9	60·7	62·8	52·1	−1·4	+0·3	0·0	−0·3	0·0	+0·1
19	67·5	46·1	58·4	64·7	66·4	53·8	−2·5	+0·4	+0·5	−0·1	+0·1	+0·3
20	73·5	51·2	59·9	70·4	70·6	61·9	−2·3	+0·5	−0·2	−0·6	−1·1	+0·1
21	72·3	54·1	60·9	68·7	72·2	58·5	−1·8	+0·3	0·0	−0·6	+0·3	0·0
22	76·8	52·7	56·1	69·8	76·8	58·4	−2·2	−0·1	0·0	−0·4	−0·7	+0·6
24	68·5	52·5	57·2	66·0	68·5	58·2	−1·6	+0·7	+0·3	+0·1	+0·5	+0·1
25	76·8	53·5	59·0	72·5	75·8	60·9	−2·1	+0·4	0·0	+0·4	−0·4	+0·2
26	78·7	51·0	70·1	77·3	77·7	62·8	−2·3	+0·7	+0·6	−0·2	−0·3	0·0
27	80·5	53·5	73·1	79·1	75·9	61·2	−1·3	+1·1	+0·1	+0·2	+0·3	−0·2
28	77·7	52·9	68·9	76·1	76·3	62·2	−2·3	+0·9	−0·1	−0·2	−0·2	+0·4
29	76·6	55·9	68·1	74·7	75·8	67·5	−0·1	+0·6	0·0	−0·1	−0·1	+0·4
Means	71·0	52·3	61·9	67·9	69·5	59·1	−1·9	+0·5	0·0	−0·3	−0·1	+0·2

Days of the Month.	Readings of Thermometers on the Roof of the Magnet House, 20 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
1	71·8	47·3	64·0	67·8	70·9	57·9	−2·0	+0·9	−0·8	−3·1	−1·4	0·0
3	73·6	55·8	66·6	70·6	70·8	56·9	−3·3	−0·3	−1·4	−2·0	+0·7	+0·1
4	76·9	49·4	63·0	69·4	72·6	61·7	−2·0	−0·4	+0·5	−3·7	−0·1	+0·8
5	72·0	52·8	65·3	69·2	71·8	61·0	−3·4	+0·1	−1·6	−3·2	−1·1	+0·1
6	83·5	54·0	59·1	69·5	80·8	69·2	−0·4	−0·4	−0·6	−2·4	−1·0	+0·2
7	79·1	58·4	70·8	76·7	73·2	58·4	−2·5	−0·2	−2·7	−1·5	0·0	−0·4
8	59·6	53·4	56·1	57·1	58·9	56·8	−1·1	−0·5	−0·3	−0·9	−0·5	0·0
10	53·8	48·2	49·4	49·3	49·8	49·3	−1·2	−0·8	−0·6	−1·3	−0·5	−0·3
11	62·6	48·0	53·1	56·4	59·4	56·7	−1·0	−0·8	−0·3	−0·9	−0·3	+0·3
12	66·3	53·8	55·1	62·9	65·2	59·2	0·0	−0·2	+0·2	+0·8	+1·2	+0·7
13	73·6	53·6	64·3	68·9	70·2	60·5	+0·5	+0·1	+0·3	−0·3	+0·2	+0·2
14	65·8	50·0	61·6	62·6	64·0	58·4	−0·8	−0·5	−0·6	+0·4	+0·7	+0·1
15	66·6	53·3	60·4	65·9	64·9	57·8	+0·3	0·0	+0·4	+2·2	+0·9	−0·2
17	69·4	47·8	62·1	60·1	67·0	55·1	+0·3	−0·3	−0·9	−0·2	−0·3	−0·1
18	64·1	48·2	56·9	60·8	62·5	51·8	−1·3	+0·1	0·0	−0·2	−0·3	−0·2
19	67·1	45·6	58·4	64·7	65·9	53·5	−2·9	−0·1	+0·5	−0·1	−0·4	0·0
20	73·7	50·6	59·1	68·5	69·8	62·0	−2·1	−0·1	−1·0	−2·5	−1·9	+0·2
21	72·8	53·4	60·7	68·8	70·7	58·3	−1·3	−0·4	−0·2	−0·5	−1·2	−0·2
22	76·3	52·3	56·0	70·1	74·8	57·8	−2·7	−0·5	−0·1	−0·1	−2·7	0·0
24	68·7	51·8	57·5	65·8	67·8	58·1	−1·4	0·0	+0·6	−0·1	−0·2	0·0
25	77·4	52·8	58·4	70·7	74·3	61·1	−1·5	−0·3	−0·6	−1·4	−1·9	+0·4
26	78·6	51·2	68·4	75·4	76·1	63·0	−2·4	+0·9	−1·1	−2·1	−1·9	+0·2
27	79·4	53·0	71·9	77·1	77·1	61·0	−2·4	+0·6	−1·1	−1·8	+1·5	0·0
28	78·3	52·0	69·2	76·0	75·8	62·4	−1·7	0·0	+0·2	−0·3	−0·7	+0·6
29	76·2	55·2	68·7	74·3	75·9	67·9	−0·5	−0·1	+0·6	−0·5	0·0	+0·8
Means	71·5	51·7	61·4	67·1	69·2	59·0	−1·5	−0·1	−0·4	−1·0	−0·4	+0·1

READINGS of DRY-BULB THERMOMETERS in a STEVENSON'S SCREEN and on the ROOF of the MAGNET HOUSE—*continued.*

JULY.

Days of the Month.	Readings of Thermometers in Stevenson's Screen, 4 feet above the ground. Maximum.	Minimum.	9ʰ	Noon	15ʰ	21ʰ	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9ʰ	Noon	15ʰ	21ʰ
d	°	°	°	°	°	°	°	°	°	°	°	°
1	71·4	54·5	65·5	68·5	71·4	58·4	−2·6	+0·4	−0·2	−0·9	−0·5	0·0
2	66·7	55·8	61·1	66·4	64·2	55·8	−2·4	+0·4	−0·2	−0·3	−0·1	+0·4
3	63·6	52·5	58·2	61·2	62·5	59·9	−1·4	+0·6	−0·1	0·0	−0·2	+0·2
4	71·6	55·8	61·1	65·0	71·3	57·5	−1·6	+0·3	+0·6	+0·2	−0·3	+0·2
5	78·5	54·9	66·9	76·2	78·5	59·1	−2·0	+0·3	+0·3	−0·6	0·0	+0·3
6	79·5	51·0	69·7	74·7	78·9	65·4	−1·7	+0·7	−0·6	−0·6	−0·4	+0·1
8	62·9	54·4	55·9	57·9	60·5	58·7	−2·2	+0·1	0·0	0·0	0·0	0·0
9	72·3	57·9	62·9	69·7	70·2	62·7	−2·8	0·0	+0·3	−0·9	−0·9	+0·3
10	70·2	57·8	62·6	60·9	67·7	62·1	−1·8	+0·4	−0·2	−0·4	−0·1	+0·3
11	71·9	52·5	66·6	71·9	70·2	62·5	−2·9	+0·4	−0·4	+0·8	−0·8	+0·2
12	74·4	58·5	66·1	72·1	68·2	63·1	−1·7	+0·4	+0·2	+0·1	+0·2	0·0
13	71·5	59·7	68·7	66·9	70·5	61·4	−2·5	+0·1	−0·7	+0·3	+0·3	+0·4
15	67·0	54·4	62·4	67·0	64·4	54·9	−2·5	+0·4	0·0	0·0	−1·1	+0·2
16	67·6	49·5	58·6	63·7	61·4	56·4	−2·3	+0·5	−0·1	0·0	+0·3	+0·1
17	65·2	51·8	58·9	61·9	59·2	52·6	−1·8	+0·2	+0·5	+0·3	−0·3	+0·3
18	67·1	52·5	60·7	60·3	66·0	58·1	−2·4	+0·3	−0·1	+0·1	−0·2	+0·4
19	72·1	48·3	63·2	64·9	67·5	57·9	−2·1	+0·8	+0·1	+0·5	0·0	+0·3
20	66·4	51·6	62·8	59·3	62·8	59·5	−1·8	+0·9	−0·5	−0·8	−0·6	+0·3
22	66·1	50·0	58·6	61·5	62·5	56·4	−2·5	+0·3	−0·9	−0·3	−0·3	+0·1
23	64·4	50·0	58·8	63·9	59·4	54·0	−2·6	+0·5	+0·3	−0·1	0·0	+0·2
24	65·3	48·2	59·8	64·1	61·5	57·9	−1·9	+0·7	0·0	+0·1	+0·3	+0·1
25	64·6	55·2	60·9	58·9	62·1	57·5	−2·4	+0·2	+0·1	+0·7	−0·7	+0·1
26	66·7	54·1	58·4	66·7	63·4	56·8	−2·2	+0·5	−0·5	−0·3	−0·9	+0·1
27	63·3	54·8	55·9	60·8	60·5	55·4	−0·8	+0·3	+0·5	−1·0	−0·4	+0·2
29	69·1	56·4	59·4	66·2	69·0	62·2	−1·4	+0·3	0·0	+0·1	+0·1	+0·3
30	76·8	57·4	70·0	76·1	75·7	63·5	−2·0	+0·4	+0·2	+0·3	+0·8	+0·3
31	77·2	53·4	72·4	76·0	76·5	61·3	−1·5	+0·9	+0·1	−0·8	+0·3	+0·1
Means	69·4	53·8	62·4	66·0	66·9	58·9	−2·1	+0·4	0·0	−0·1	−0·2	+0·2

Days of the Month.	Readings of Thermometers on the Roof of the Magnet House, 20 feet above the ground. Maximum.	Minimum.	9ʰ	Noon	15ʰ	21ʰ	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9ʰ	Noon	15ʰ	21ʰ
d	°	°	°	°	°	°	°	°	°	°	°	°
1	72·0	54·0	64·7	68·2	70·0	58·4	−2·0	−0·1	−1·0	−1·2	−1·9	0·0
2	66·0	55·1	60·9	64·4	63·8	55·6	−3·1	−0·3	−0·4	−2·3	−0·5	+0·2
3	64·1	52·2	58·0	60·8	62·5	59·7	−0·9	+0·3	−0·3	−0·4	−0·2	0·0
4	70·6	55·4	61·3	65·4	70·2	57·2	−2·6	−0·1	+0·8	+0·6	−1·4	−0·1
5	77·2	54·6	64·8	74·8	76·7	59·1	−3·3	0·0	−1·8	−2·0	−1·8	+0·3
6	80·6	50·4	69·1	74·8	78·8	65·3	−0·6	+0·1	−1·2	−0·5	−0·5	0·0
8	64·9	54·2	56·5	57·9	60·5	58·6	−0·2	−0·1	+0·6	0·0	0·0	−0·1
9	73·5	57·9	63·6	69·7	70·6	62·7	−1·6	0·0	+1·0	−0·9	−0·5	+0·3
10	71·6	57·5	63·3	61·3	67·6	61·9	−0·4	+0·1	+0·5	0·0	−0·2	+0·1
11	73·7	51·9	65·8	71·8	71·8	62·9	−1·1	−0·2	−1·2	+0·7	+0·8	+0·6
12	75·1	58·2	66·8	72·2	68·8	63·0	−1·0	+0·1	+0·9	+0·2	+0·8	−0·1
13	70·3	59·3	68·9	66·8	70·3	61·3	−3·7	−0·3	−0·5	+0·2	+0·1	+0·3
15	67·6	53·8	63·4	66·9	64·8	54·4	−1·9	−0·2	+1·0	−0·1	−0·7	−0·3
16	67·3	48·4	59·4	63·8	61·3	56·2	−2·6	−0·6	+0·7	+0·1	+0·2	−0·1
17	65·0	51·6	59·2	61·8	59·3	53·2	−2·0	0·0	+0·8	+0·2	−0·2	+0·9
18	69·2	52·2	60·4	60·8	66·9	59·2	−0·3	0·0	−0·4	+0·6	+0·7	+1·5
19	73·6	47·6	60·4	64·8	66·8	58·1	−0·6	+0·1	−2·7	+0·4	−0·7	+0·5
20	65·7	51·3	63·0	59·9	62·8	59·5	−2·5	+0·6	−0·3	−0·2	−0·6	+0·3
22	67·3	49·8	58·0	62·2	63·5	56·9	−1·3	+0·1	−1·5	+0·4	+0·7	+0·6
23	64·6	50·0	59·0	64·1	59·3	53·6	−2·4	+0·5	+0·5	+0·1	−0·1	−0·2
24	65·4	47·4	59·7	64·0	61·8	57·9	−1·8	−0·1	−0·1	0·0	+0·6	+0·1
25	65·6	53·5	61·3	59·2	62·4	57·2	−1·4	−1·5	+0·5	+1·0	−0·4	−0·2
26	66·8	53·5	59·1	65·9	64·2	56·4	−2·1	−0·1	+0·2	−1·1	−0·1	−0·3
27	64·2	54·3	55·7	60·3	60·9	55·5	+0·1	−0·2	+0·3	−1·5	0·0	+0·3
29	70·0	55·9	59·8	66·9	69·4	62·9	−0·5	−0·2	+0·4	+0·8	+0·5	+1·0
30	79·1	56·9	70·8	76·9	75·3	64·0	+0·3	−0·1	+1·0	+1·1	+0·4	+0·8
31	76·9	52·8	72·3	74·8	76·0	61·3	−1·8	+0·3	0·0	−2·0	−0·2	+0·1
Means	69·9	53·3	62·4	65·9	66·9	59·0	−1·5	−0·1	−0·1	−0·2	−0·2	+0·2

AUGUST.

Days of the Month.	Readings of Thermometers in Stevenson's Screen, 4 feet above the ground. Maximum.	Minimum.	9ʰ	Noon	15ʰ	21ʰ	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9ʰ	Noon	15ʰ	21ʰ
d	°	°	°	°	°	°	°	°	°	°	°	°
1	84·0	56·4	73·5	81·3	80·9	66·7	−2·6	+0·9	+0·3	−1·1	−0·2	+0·3
2	75·8	56·7	69·1	71·9	70·7	61·3	−2·5	+0·4	+0·2	−0·5	−0·4	+0·2
3	67·2	59·1	61·4	63·7	66·4	62·0	−1·4	0·0	0·0	−0·3	−0·4	+0·3
5	72·8	57·2	63·0	68·2	69·4	57·4	−2·8	+0·4	−0·1	−0·2	+0·1	+0·3
6	68·5	52·1	61·3	66·4	59·8	57·3	−2·6	+0·8	+0·1	−0·8	+0·4	+0·2
7	70·0	51·6	61·9	65·0	69·5	59·4	−2·0	−0·4	−0·1	−0·4	+0·1	+0·4
8	70·1	49·6	64·5	66·3	67·8	58·4	−2·9	+0·5	−0·6	−0·1	0·0	+0·2
9	67·7	52·7	60·8	61·3	64·1	56·3	−2·4	+0·5	−0·6	+0·1	+0·1	+0·1
10	66·8	50·6	59·9	60·1	65·8	57·0	−2·2	+0·3	0·0	−0·2	−0·3	+0·1
12	60·5	49·4	55·0	54·8	57·9	56·0	−1·6	+0·6	−0·1	+0·3	+0·1	+0·6
13	62·6	52·6	58·7	59·5	60·0	57·3	−1·1	+0·3	−0·1	+0·3	+0·2	+0·4
14	66·6	52·0	60·9	65·5	57·6	57·8	−1·7	+0·4	+0·1	+0·1	−0·2	+0·1
15	72·2	57·7	65·1	71·6	66·3	62·8	−2·0	+0·2	−0·1	+0·3	−0·1	+0·5
16	75·1	55·8	64·4	73·5	72·8	62·1	−2·6	+0·5	−0·2	−0·3	+1·0	+0·2
17	73·8	57·2	63·9	69·0	71·1	57·2	−1·3	+0·6	0·0	−1·1	−0·2	+0·6
19	71·6	51·6	62·9	69·0	68·9	59·9	−1·5	+0·4	+0·2	+0·4	−0·4	0·0
20	63·6	56·5	56·5	60·1	63·3	56·9	−0·9	+0·2	+0·1	+0·1	0·0	+0·2
21	64·1	53·3	59·2	63·5	61·8	56·3	−1·1	+0·2	0·0	+0·1	−0·5	+0·3
22	66·3	54·1	56·3	63·8	61·5	54·1	−2·3	+0·4	0·0	−0·5	−0·1	0·0
23	63·4	49·4	55·9	61·9	62·7	53·1	−2·0	+0·5	0·0	−0·5	−0·1	+0·3
24	64·0	50·8	53·4	55·3	64·0	51·9	−1·6	−0·3	+0·2	−0·9	+0·1	+0·1
26	61·3	49·3	56·1	55·6	60·2	54·2	−1·8	+0·6	+0·1	+0·1	0·0	0·0
27	65·8	45·5	59·3	64·4	63·8	58·5	−2·2	+0·4	0·0	+0·2	+0·4	+0·4
28	70·4	50·4	61·7	67·1	69·9	55·9	−1·7	+0·5	−0·5	+0·5	+0·1	+0·3
29	77·1	50·6	64·9	76·1	76·0	60·5	−1·0	+0·5	+0·9	+0·4	−0·5	+0·4
30	83·0	49·4	67·5	81·5	83·0	64·7	−1·2	+0·8	+0·7	+1·2	+1·1	+0·5
31	80·1	53·5	66·7	78·4	79·3	62·1	−1·0	+0·7	+0·9	+0·2	+0·9	+0·1
Means	69·8	52·8	61·6	66·5	67·2	58·4	−1·9	+0·4	+0·1	−0·1	0·0	+0·3

Days of the Month.	Readings of Thermometers on the Roof of the Magnet House, 20 feet above the ground. Maximum.	Minimum.	9ʰ	Noon	15ʰ	21ʰ	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9ʰ	Noon	15ʰ	21ʰ
d	°	°	°	°	°	°	°	°	°	°	°	°
1	85·1	56·3	74·5	81·5	81·4	67·0	−1·5	+0·8	+1·3	−0·9	+0·3	+0·6
2	75·9	55·9	68·2	71·9	69·9	61·2	−2·4	−0·4	−0·7	−0·5	−1·2	+0·1
3	68·2	59·0	61·7	64·3	67·1	62·0	−0·4	−0·1	+0·3	+0·3	+0·3	+0·3
5	72·9	56·7	63·0	68·6	69·0	57·3	−2·7	−0·1	−0·1	+0·2	−0·3	+0·2
6	67·7	51·2	61·5	67·3	58·1	57·4	−3·4	−0·1	+0·3	+0·1	−1·3	+0·3
7	71·0	51·0	61·6	64·8	69·6	59·3	−1·0	−1·0	−0·4	−0·6	+0·2	+0·3
8	71·1	48·6	63·4	66·5	68·3	58·3	−1·9	−0·5	−1·7	+0·1	+0·5	+0·1
9	68·1	52·4	61·0	61·5	64·4	56·3	−2·0	+0·2	−0·4	+0·3	+0·4	+0·1
10	67·9	49·9	60·5	61·0	66·8	57·2	−1·1	−0·4	+0·6	+0·7	+0·7	+0·3
12	61·5	48·4	55·1	54·3	57·9	56·1	−0·6	−0·4	0·0	−0·2	+0·1	+0·7
13	63·1	52·2	59·0	59·7	60·2	57·9	−0·6	−0·1	+0·2	+0·5	+0·4	+1·0
14	66·9	51·9	60·9	65·5	57·9	58·0	−1·4	+0·3	+0·1	+0·1	+0·1	+0·3
15	71·6	57·5	64·3	70·7	66·6	62·6	−2·6	0·0	−0·9	−0·6	+0·2	+0·3
16	76·7	55·2	65·1	72·8	72·7	62·1	−1·0	−0·1	+0·5	−1·0	+0·9	+0·2
17	72·5	56·8	63·8	68·3	70·8	57·3	−2·6	+0·2	−0·1	−1·8	−0·5	+0·7
19	72·6	51·2	63·5	69·8	69·2	60·0	−0·5	0·0	+0·8	+1·2	−0·1	+0·1
20	64·5	56·0	56·2	60·6	63·8	57·3	0·0	−0·3	−0·2	+0·6	+0·5	+0·6
21	65·2	53·2	59·8	64·0	61·6	56·6	0·0	+0·1	+0·6	+0·6	−0·7	+0·6
22	67·4	52·8	55·9	63·8	61·5	54·1	−1·2	−0·9	−0·4	−0·5	−0·1	0·0
23	64·3	48·4	56·2	61·5	62·9	53·2	−1·1	−0·5	+0·3	−0·9	+0·1	+0·4
24	65·0	51·1	53·4	56·2	64·8	51·8	−0·6	0·0	+0·2	0·0	+0·9	0·0
26	61·6	48·5	56·0	56·1	60·3	54·6	−1·5	−0·2	0·0	+0·6	+0·1	+0·4
27	67·1	44·6	58·6	64·4	64·1	58·8	−0·9	−0·5	−0·7	+0·2	+0·7	+0·7
28	70·2	50·2	60·8	66·8	68·9	55·5	−1·9	+0·3	−1·4	+0·2	−0·9	−0·1
29	76·6	50·1	63·5	75·3	75·3	61·6	−1·5	0·0	−0·5	−0·4	−1·2	+1·5
30	83·9	49·4	68·2	79·2	83·1	65·4	−0·3	+0·8	+1·4	−1·1	+1·2	+1·2
31	79·2	54·2	64·8	75·9	78·2	61·6	−1·9	+1·4	−1·0	−2·3	−0·2	−0·4
Means	70·3	52·3	61·5	66·4	67·2	58·5	−1·4	−0·1	−0·1	−0·2	0·0	+0·4

READINGS of DRY-BULB THERMOMETERS in a STEVENSON'S SCREEN and on the ROOF of the MAGNET HOUSE—*continued.*

Days of the Month.	Readings of Thermometers in Stevenson's Screen, 4 feet above the ground.						Excess above readings of Thermometers on ordinary stand, 4 feet above the ground.						Days of the Month.	Readings of Thermometers on the Roof of the Magnet House, 20 feet above the ground.						Excess above readings of Thermometers on ordinary stand, 4 feet above the ground.					
	Maximum.	Minimum.	9h	Noon	15h	21h	Maximum.	Minimum.	9h	Noon	15h	21h		Maximum.	Minimum.	9h	Noon	15h	21h	Maximum.	Minimum.	9h	Noon	15h	21h
SEPTEMBER.																									
d	°	°	°	°	°	°	°	°	°	°	°	°	d	°	°	°	°	°	°	°	°	°	°	°	°
2	69·2	54·6	64·3	67·9	63·7	60·9	−1·1	+0·5	+0·5	+0·7	−0·1	0·0	2	69·4	54·0	64·0	66·8	63·8	60·8	−0·9	−0·1	+0·2	−0·4	0·0	−0·1
3	68·1	60·7	61·1	61·9	66·9	62·3	−1·3	+0·3	+0·1	+0·1	+0·4	+0·4	3	69·8	60·3	61·1	61·7	66·4	62·0	+0·4	−0·1	+0·1	−0·1	−0·1	+0·1
4	67·5	58·4	58·5	66·9	67·2	62·1	−1·1	+0·5	+0·2	+0·7	+0·3	+0·3	4	67·9	58·3	58·4	66·7	66·8	62·1	−0·7	+0·4	+0·1	+0·5	−0·1	+0·3
5	62·6	58·5	58·6	60·2	62·0	59·9	−0·6	+0·3	0·0	−0·1	0·0	+0·8	5	63·0	58·3	58·6	59·9	62·1	59·9	−0·2	+0·1	0·0	−0·4	+0·1	+0·8
6	69·1	53·5	60·6	68·2	67·9	55·9	−1·2	+0·6	−0·2	+0·9	+0·2	+0·2	6	67·6	53·5	61·1	66·4	66·2	55·8	−2·7	+0·6	+0·3	−0·9	−1·5	+0·1
7	67·4	52·6	58·8	65·2	67·4	56·1	−1·5	+0·5	−0·1	+0·2	−0·6	+0·4	7	67·3	52·6	58·7	64·5	66·8	56·5	−1·6	+0·5	−0·2	−0·5	−1·2	+0·8
9	73·4	51·4	63·6	71·9	72·1	61·1	−1·7	+0·4	0·0	+0·3	+0·9	+0·4	9	74·3	51·2	63·4	71·1	72·5	61·3	−0·8	+0·2	−0·2	−0·5	+1·3	+0·6
10	78·0	57·1	63·8	73·0	77·4	62·8	−0·4	+0·5	+0·3	+0·4	+1·1	+0·6	10	79·0	57·2	64·6	72·7	77·8	63·0	+0·6	+0·6	+1·1	+0·1	+1·5	+0·8
11	80·3	55·8	72·9	79·0	78·1	64·7	−1·5	+0·9	+0·7	+0·9	+0·4	+0·2	11	80·3	56·1	72·2	77·4	78·3	65·1	−1·5	+1·2	0·0	−0·7	+0·6	+0·6
12	76·6	60·3	67·6	75·7	75·3	61·7	−0·6	+0·5	+0·3	+0·6	+0·1	+0·4	12	76·7	60·3	67·6	75·2	74·8	63·4	−0·5	+0·5	+0·3	+0·1	−0·4	+2·1
13	77·1	58·2	69·6	75·9	77·0	60·0	−1·3	+0·3	0·0	−0·3	+0·2	+0·2	13	78·2	58·3	69·2	75·3	77·1	60·1	−0·2	+0·4	−0·4	−0·9	+0·3	+0·3
14	66·7	52·7	58·9	65·2	66·4	52·9	−0·6	+0·6	+0·3	+0·6	+0·6	+0·1	14	64·8	52·6	59·4	64·8	63·8	52·9	−2·5	+0·5	+0·8	+0·2	−2·0	+0·1
16	63·4	44·2	57·5	59·2	59·9	44·2	−0·1	+1·0	0·0	+1·0	+0·6	+0·7	16	62·1	44·1	57·5	58·8	59·9	45·2	−1·4	+0·9	0·0	+0·6	+0·6	+1·7
17	62·9	36·1	56·3	60·9	60·9	46·7	+0·1	+0·4	+0·2	+0·3	−0·3	+0·7	17	61·6	36·2	54·9	60·7	59·6	47·2	−1·2	+0·5	−1·2	+0·1	−1·6	+1·2
18	65·6	40·2	55·8	64·6	64·4	48·1	−0·5	+0·9	+1·6	+1·2	+0·2	+0·2	18	65·0	40·1	54·3	61·5	63·4	48·9	−1·1	+0·8	+0·1	−1·9	−0·8	+1·0
19	61·0	42·4	57·7	60·1	56·9	52·7	−1·1	+0·3	+0·2	+0·3	+0·1	+0·2	19	61·5	42·1	58·2	60·5	56·8	52·4	−0·6	0·0	+0·7	+0·7	0·0	−0·1
20	57·9	46·4	52·3	55·9	55·7	47·3	−0·8	+0·7	+0·3	−0·1	0·0	+0·5	20	57·4	45·2	51·4	55·6	56·2	47·3	−1·3	−0·5	−0·6	−0·4	+0·5	+0·5
21	57·1	40·0	49·0	53·8	47·9	46·4	−1·8	+0·2	+0·2	−0·3	−0·2	+0·2	21	56·8	39·3	48·1	53·7	48·9	46·8	−2·1	−0·5	−0·7	−0·4	+0·8	+0·6
23	56·4	36·3	48·7	55·1	54·2	48·4	−1·7	+0·2	+0·9	+0·2	+0·1	+0·1	23	56·6	35·8	47·0	55·5	53·8	48·1	−1·5	−0·3	−0·8	+0·6	−0·3	−0·2
24	59·1	48·4	55·2	58·7	58·0	50·6	−1·1	+0·4	0·0	+0·2	0·0	0·0	24	59·8	48·1	56·0	59·3	57·8	50·9	−0·4	+0·1	+0·8	+0·8	−0·2	+0·3
25	53·9	40·6	45·4	52·8	53·8	47·0	−0·6	0·0	+0·1	+0·3	0·0	+0·4	25	54·2	40·3	44·6	51·4	53·9	47·1	−0·3	−0·3	−0·7	−1·1	+0·1	+0·5
26	58·6	37·7	50·4	54·7	58·6	53·9	−1·1	+0·1	−0·1	+0·1	−0·2	+0·4	26	59·4	37·2	50·1	55·0	59·4	54·1	−0·3	−0·4	−0·4	+0·4	+0·6	+0·6
27	64·0	52·8	57·5	60·2	63·9	58·9	−1·1	+0·3	0·0	+0·2	+0·1	+0·1	27	64·6	53·0	57·7	60·6	63·9	58·8	−0·5	+0·5	+0·2	+0·6	+0·1	0·0
28	59·0	49·0	54·7	57·9	57·0	50·0	−0·1	+0·7	+0·1	−0·6	+0·1	+0·5	28	59·4	48·6	55·2	57·7	57·0	49·9	+0·3	+0·3	+0·6	−0·8	+0·1	+0·4
30	54·1	45·4	47·0	53·2	51·1	47·9	−1·4	+0·1	+0·1	−0·1	−0·3	+0·3	30	54·7	45·1	47·0	54·0	51·2	47·5	−0·8	−0·2	+0·1	+0·7	−0·2	−0·1
Means	65·2	49·3	57·8	63·1	63·3	54·5	−1·0	+0·4	+0·2	+0·3	+0·1	+0·3	Means	65·3	49·1	57·6	62·7	63·1	54·7	−0·9	+0·2	0·0	−0·1	−0·1	+0·5
OCTOBER.																									
d	°	°	°	°	°	°	°	°	°	°	°	°	d	°	°	°	°	°	°	°	°	°	°	°	°
1	55·9	45·4	53·7	55·0	52·2	49·0	−1·4	+0·6	+0·2	+0·3	+0·2	+0·1	1	56·2	44·5	52·8	54·7	52·2	49·0	−1·1	−0·3	−0·7	0·0	+0·2	+0·1
2	57·6	47·8	50·9	54·9	55·0	49·0	−1·5	+0·4	+0·1	+1·3	+0·2	+0·2	2	57·6	47·2	50·8	54·2	54·8	49·2	−1·5	−0·2	0·0	+0·6	0·0	+0·4
3	54·6	44·0	49·3	51·4	53·0	44·0	−1·7	+0·9	−0·9	−0·1	−0·2	+0·2	3	56·4	43·6	49·5	51·8	53·0	43·8	+0·1	+0·5	−0·7	+0·3	−0·2	0·0
4	54·8	41·6	45·0	54·0	49·5	45·8	−1·8	+0·4	−0·1	+0·8	+0·1	+0·6	4	54·6	41·6	44·9	53·2	49·5	46·7	−2·0	+0·4	−0·2	0·0	+0·1	+1·5
5	57·3	40·6	50·2	56·0	56·1	48·4	−1·4	+0·3	0·0	−0·2	−0·2	+0·4	5	57·5	40·6	50·8	55·9	56·5	48·9	−1·2	+0·3	+0·6	−0·3	+0·2	+0·9
7	57·2	48·0	56·3	56·1	56·7	48·1	−1·5	+0·7	+0·2	0·0	−0·1	+0·3	7	57·9	48·1	56·3	56·5	57·6	48·5	−0·8	+0·8	+0·2	+0·4	+0·8	+0·7
8	57·8	43·1	52·0	57·8	53·7	47·7	−1·2	+0·4	+0·2	+0·2	+0·1	+0·2	8	57·4	42·3	51·8	57·4	53·9	48·3	−1·6	−0·4	0·0	−0·2	+0·3	+0·8
9	57·1	42·8	51·9	55·1	54·9	48·2	−1·1	+0·1	+0·8	+0·3	+0·6	+0·1	9	57·6	42·7	50·9	53·7	54·5	48·2	−0·6	0·0	−0·2	−1·1	+0·2	+0·1
10	60·3	41·9	52·4	59·1	56·1	43·6	−1·1	+1·1	+1·2	+0·7	+0·2	+0·3	10	59·6	41·7	52·1	57·6	56·6	44·8	−1·8	+0·9	+0·9	−0·8	+0·7	+1·5
11	52·5	42·5	48·1	51·7	50·6	46·3	−1·2	+1·0	0·0	−0·8	0·0	0·0	11	53·6	42·2	48·2	52·2	50·6	46·3	−0·1	+0·7	+0·1	−0·3	0·0	0·0
12	58·4	40·2	49·8	57·9	54·0	44·4	−1·0	+0·2	+0·3	+0·3	+0·4	+0·4	12	58·6	40·3	49·	57·0	54·8	44·1	−0·8	+0·3	+0·3	−0·6	+1·2	+0·1
14	54·6	35·4	40·7	51·5	54·4	43·4	−0·5	+0·3	0·0	−0·2	+0·1	+0·1	14	56·1	35·4	40·0	51·6	55·8	44·4	+1·0	+0·3	−0·7	−0·1	+1·5	+1·1
15	60·1	41·9	54·2	59·3	56·0	53·9	−1·0	+0·8	+1·0	+0·5	0·0	+0·2	15	60·2	43·1	53·9	58·8	55·8	54·4	−0·9	+2·0	+0·7	0·0	−0·2	+0·7
16	60·7	52·5	57·1	60·7	57·7	52·5	−1·2	+0·1	−0·2	0·0	−0·1	+0·1	16	60·9	52·2	57·5	60·5	58·1	52·9	−1·0	−0·2	+0·2	−0·2	+0·3	+0·5
17	57·5	44·4	48·6	57·0	54·9	47·8	−1·1	+0·3	−0·7	+0·2	0·0	+0·5	17	57·6	43·8	48·8	56·8	54·9	48·1	−1·0	−0·3	−0·5	0·0	0·0	+0·8
18	56·6	39·9	48·0	56·6	53·9	50·9	−1·0	+0·3	−0·2	+0·4	−0·3	+0·1	18	57·4	39·7	48·7	56·3	54·2	50·9	−0·2	+0·1	+0·5	+0·1	0·0	+0·1
19	53·1	46·2	50·9	50·3	52·9	46·9	−0·9	+1·1	−0·2	+0·1	0·0	+0·1	19	53·6	46·2	50·4	50·6	53·2	47·0	−0·4	+1·1	−0·7	+0·4	+0·3	+0·2
21	51·3	43·0	47·0	50·2	49·9	45·1	−2·4	+0·9	+0·2	−0·7	+0·1	+0·1	21	50·9	42·4	46·8	49·5	49·8	46·4	−2·8	+0·3	0·0	−1·4	0·0	+1·4
22	54·5	42·6	47·3	54·1	51·3	46·0	−0·6	+0·5	−0·3	+0·1	+0·2	+0·1	22	54·8	42·5	47·4	53·9	51·6	46·0	−0·3	+0·4	−0·2	−0·1	+0·5	+0·1
23	50·8	44·0	46·4	50·8	49·6	47·9	−0·9	+0·5	−0·5	−0·1	+0·2	+0·1	23	51·2	44·2	46·8	51·2	49·5	48·1	−0·5	+0·7	−0·1	+0·3	+0·1	+0·3
24	50·4	44·3	46·6	48·6	49·9	45·8	−1·2	+0·8	−0·2	−0·3	+0·1	+0·1	24	50·5	45·0	46·9	48·8	49·8	46·0	−1·1	+1·5	+0·1	−0·1	0·0	+0·3
25	50·8	35·1	42·7	49·4	50·3	47·2	−2·9	+0·2	+0·1	+0·1	+0·3	+0·2	25	52·6	37·7	41·6	49·3	50·4	47·2	−1·1	+2·8	−1·0	0·0	+0·4	+0·2
26	51·5	42·9	46·5	51·0	49·5	47·2	−1·6	+0·2	+0·2	−0·2	+0·1	+0·2	26	52·6	42·9	46·5	51·5	49·3	47·0	−0·5	+0·2	+0·2	+0·3	−0·1	0·0
28	51·1	44·3	46·6	50·1	50·5	49·1	−2·2	+1·5	+0·1	−0·3	0·0	+0·2	28	53·6	44·0	46·6	50·0	50·9	49·3	+0·3	+1·2	+0·1	−0·4	+0·4	+0·4
29	54·7	40·7	48·1	53·2	52·9	48·5	−0·1	+0·6	−0·3	+0·1	+0·2	+0·5	29	55·3	41·3	48·2	52·9	52·8	49·7	+0·5	+1·2	−0·2	−0·2	+0·1	+1·7
30	57·5	45·3	49·1	56·4	55·0	51·8	−0·4	+0·8	+0·9	+0·5	+0·2	0·0	30	57·4	46·0	50·2	56·1	54·9	51·9	−0·5	+1·5	+2·0	+0·2	+0·1	+0·1
31	53·3	41·3	44·0	50·1	51·2	43·1	−0·1	+0·2	+0·1	+0·3	+0·9	+0·8	31	53·6	40·7	43·9	49·4	51·3	44·4	+0·2	−0·4	0·0	−0·4	+1·0	+2·1
Means	55·3	43·0	49·0	54·0	53·0	47·5	−1·2	+0·6	+0·1	+0·1	+0·1	+0·2	Means	55·8	43·0	49·0	53·8	53·2	47·8	−0·7	+0·6	0·0	−c·1	+0·3	+0·6

READINGS of DRY-BULB THERMOMETERS in a STEVENSON'S SCREEN and on the ROOF of the MAGNET HOUSE—*concluded.*

NOVEMBER.

Days of the Month.	Readings of Thermometers in Stevenson's Screen, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Days of the Month.	Readings of Thermometers on the Roof of the Magnet House, 20 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°	°	°	°	°	d	°	°	°	°	°	°	°	°	°	°	°	°
1	53·7	40·6	49·4	53·5	52·5	45·0	−1·4	+0·5	+0·1	+0·1	+0·6	+0·4	1	54·2	41·1	49·8	53·3	52·8	45·4	−0·9	+1·0	+0·5	−0·1	+0·9	+0·8
2	51·0	38·6	43·3	50·5	49·7	40·1	−1·1	+0·2	+0·5	−0·3	+0·7	+0·3	2	50·7	38·5	43·5	49·8	49·0	39·9	−1·4	+0·1	+0·7	−1·0	0·0	+0·1
4	53·3	46·2	50·2	53·2	51·4	46·5	−1·1	+0·6	0·0	−0·2	+0·4	+0·1	4	53·5	46·2	50·5	53·3	51·8	47·0	−0·9	+0·6	+0·3	−0·1	+0·8	+0·6
5	49·9	33·1	38·0	49·9	46·4	35·9	−0·2	+0·5	−0·3	+0·5	+0·6	−0·3	5	49·1	33·2	39·0	49·1	45·8	37·4	−1·0	+0·6	+0·7	−0·3	0·0	+1·2
6	51·1	35·1	44·1	50·9	50·9	45·5	−1·0	+0·8	+0·1	0·0	+0·1	+0·6	6	51·6	36·1	44·7	50·8	51·2	46·4	−0·5	+1·8	+0·7	−0·1	+0·4	+1·5
7	52·9	40·0	44·7	48·3	51·3	51·2	−0·2	−0·1	−0·3	−0·2	0·0	+0·3	7	53·2	40·0	44·3	48·4	51·3	51·3	+0·1	−0·1	−0·7	−0·1	0·0	+0·4
8	57·0	47·5	52·6	55·3	55·9	47·9	−0·2	+0·6	+0·1	0·0	+0·6	+0·5	8	56·6	47·2	53·1	55·8	55·4	47·4	−0·6	+0·3	+0·6	+0·5	+0·1	0·0
9	53·6	45·5	47·5	52·7	53·6	51·1	−0·5	+0·4	0·0	+0·1	+0·3	+0·3	9	54·2	45·2	47·6	53·3	54·0	51·4	+0·1	+0·1	+0·1	+0·7	+0·7	+0·6
11	51·7	47·4	51·1	51·7	50·5	47·9	−0·5	+0·3	+0·1	−0·1	+0·1	+0·1	11	51·8	46·7	51·2	51·8	50·4	47·8	−0·4	−0·4	+0·2	0·0	0·0	0·0
12	47·9	38·3	41·0	44·6	46·1	39·1	−0·3	+1·1	+0·3	−0·2	+0·3	+0·2	12	47·8	37·7	41·5	44·1	46·2	39·4	−0·4	+0·5	+0·8	−0·7	+0·4	+0·5
13	51·0	28·2	32·6	48·4	50·4	40·2	+0·2	−0·2	+0·2	+0·2	+0·8	+0·4	13	51·0	28·4	33·1	47·8	50·5	41·0	+0·2	0·0	+0·7	−0·4	+0·9	+1·2
14	48·4	37·6	45·0	46·9	48·1	48·3	−0·7	+0·3	0·0	+0·1	−0·2	−0·1	14	49·6	37·2	44·9	47·2	48·8	48·7	+0·5	−0·1	−0·1	+0·4	+0·5	+0·3
15	60·9	43·3	49·4	58·1	58·5	50·1	−0·2	+0·2	−0·3	+0·2	+0·8	0·0	15	61·8	43·1	50·6	57·9	59·1	50·8	+0·7	0·0	+0·9	0·0	+1·4	+0·7
16	52·8	47·9	49·9	52·5	52·1	50·0	−1·2	+0·8	+0·1	−0·2	+0·1	+0·1	16	53·6	48·2	50·1	52·9	52·2	50·3	−0·4	+1·1	+0·3	+0·2	+0·2	+0·4
18	50·2	44·8	47·3	48·3	47·5	45·2	−0·6	+0·1	+0·2	−0·2	+0·1	+0·1	18	50·3	44·5	47·5	48·7	47·4	45·1	−0·5	−0·2	+0·4	+0·2	0·0	0·0
19	45·2	40·4	43·1	43·6	42·7	40·8	−0·6	−0·1	0·0	−0·1	+0·2	0·0	19	45·6	40·2	43·3	43·8	42·6	40·7	−0·2	−0·3	+0·2	+0·1	+0·1	−0·1
20	42·1	39·0	41·6	42·0	41·3	39·5	−0·6	−0·1	+0·2	0·0	−0·1	+0·1	20	42·8	38·7	41·7	41·9	41·4	39·6	+0·1	−0·4	+0·3	−0·1	0·0	+0·2
21	40·7	35·0	38·4	40·6	38·4	35·5	−0·6	0·0	−0·1	0·0	0·0	−0·3	21	40·6	34·8	38·5	40·5	38·3	35·8	−0·7	−0·2	0·0	−0·1	−0·1	0·0
22	49·9	34·6	44·9	48·8	49·9	48·2	−0·6	−0·4	−0·1	0·0	+0·1	+0·3	22	50·9	34·8	45·7	49·4	50·3	48·4	+0·4	−0·2	+0·7	+0·6	+0·5	+0·5
23	54·4	46·4	50·9	54·4	53·6	50·8	−0·9	+0·3	0·0	+0·3	+0·4	0·0	23	54·8	46·2	51·8	54·5	54·1	51·1	−0·5	+0·1	+0·9	+0·4	+0·9	+0·3
25	52·1	37·4	42·0	45·6	43·7	37·9	−0·2	+0·5	+0·1	+0·2	+0·3	+0·7	25	52·5	37·1	41·6	45·8	43·4	37·3	+0·2	+0·2	−0·3	+0·4	0·0	+0·1
26	44·1	31·7	34·0	42·9	38·4	34·9	−0·9	+0·1	−0·2	+0·2	0·0	+0·5	26	44·2	31·7	35·0	42·8	37·7	35·0	−0·8	+0·1	+0·8	+0·1	−0·7	+0·6
27	35·2	28·2	32·0	33·4	32·9	34·1	−0·1	+0·5	−0·1	−0·1	0·0	+0·2	27	35·4	28·3	32·4	33·8	33·0	34·1	+0·1	+0·6	+0·3	+0·3	+0·1	+0·2
28	36·7	29·0	31·2	35·0	36·5	33·6	−0·4	−0·2	0·0	+0·2	0·0	+0·6	28	36·9	29·1	31·5	34·8	36·9	34·2	−0·2	−0·1	+0·3	0·0	+0·4	+1·2
29	39·3	28·7	32·5	36·1	39·3	38·4	−0·2	+0·1	0·0	−0·2	0·0	+0·2	29	39·8	29·0	32·8	36·5	39·8	38·6	+0·3	+0·4	+0·3	+0·2	+0·5	+0·4
30	41·2	29·6	36·9	40·3	41·2	30·0	−0·6	−0·1	0·0	−0·2	0·0	+0·1	30	41·3	30·3	37·2	40·7	41·3	30·9	−0·5	+0·6	+0·3	+0·2	+0·1	+1·0
Means	48·7	38·2	42·8	47·2	47·0	42·6	−0·6	+0·3	0·0	0·0	+0·2	+0·2	Means	49·0	38·2	43·2	47·3	47·1	42·9	−0·3	+0·3	+0·4	+0·1	+0·3	+0·5

DECEMBER.

Days of the Month.	Readings of Thermometers in Stevenson's Screen, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Days of the Month.	Readings of Thermometers on the Roof of the Magnet House, 20 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h	Excess above readings of Thermometers on ordinary stand, 4 feet above the ground. Maximum.	Minimum.	9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°	°	°	°	°	d	°	°	°	°	°	°	°	°	°	°	°	°
2	35·1	23·3	25·3	34·4	32·7	28·9	−0·3	+0·6	−0·7	+0·2	0·0	+0·2	2	35·2	23·8	28·4	34·6	32·6	28·8	−0·2	+1·1	+2·4	+0·4	−0·1	+0·1
3	33·1	25·1	26·9	32·0	32·1	26·6	−0·2	−0·9	−0·2	+0·4	+0·2	+0·1	3	33·6	25·0	27·0	31·4	32·2	26·8	+0·3	−1·0	−0·1	−0·2	+0·3	+0·3
4	34·3	24·5	31·7	34·1	34·2	31·3	−0·4	+0·4	+0·1	0·0	−0·1	+0·3	4	35·1	24·8	31·8	34·5	34·5	31·2	+0·4	+0·7	+0·2	+0·4	+0·2	+0·2
5	36·6	30·8	35·1	35·0	36·5	36·2	−0·5	0·0	0·0	0·0	−0·2	0·0	5	37·2	30·4	35·3	35·3	37·0	36·4	+0·1	−0·4	+0·2	+0·3	+0·3	+0·2
6	37·2	33·5	35·9	37·2	35·7	33·9	−0·6	−0·3	0·0	0·0	+0·1	+0·1	6	37·6	33·6	36·1	36·9	35·9	34·0	−0·2	−0·2	+0·2	−0·3	+0·3	+0·2
7	34·0	30·8	31·8	33·4	33·1	33·5	−0·9	−0·5	−0·1	−0·4	+0·1	+0·1	7	35·0	31·7	32·5	33·7	33·4	33·6	+0·1	+0·4	+0·6	−0·1	+0·4	+0·2
9	48·8	34·9	46·1	47·9	48·4	48·8	−0·3	0·0	0·0	0·0	+0·2	+0·4	9	49·2	36·9	46·6	48·4	48·8	48·9	+0·1	+2·0	+0·5	+0·5	+0·6	+0·5
10	49·1	38·4	45·8	47·3	45·4	38·6	−0·3	+0·5	+0·2	+0·1	+0·1	+0·7	10	49·3	38·2	46·2	47·1	45·8	38·8	−0·1	+0·3	+0·6	−0·1	+0·5	+0·9
11	38·6	30·3	32·1	36·4	38·0	34·9	+0·3	+0·1	+0·1	+0·2	+0·7	+0·7	11	39·4	30·2	32·7	37·1	38·9	35·9	+1·1	0·0	+0·7	+0·9	+1·6	+1·7
12	40·1	25·1	27·3	38·4	38·4	38·0	+1·1	+0·8	−0·3	+0·6	+1·0	+0·3	12	40·7	25·2	28·1	39·0	39·8	38·9	+1·7	+0·9	+0·5	+1·2	+2·4	+1·2
13	46·0	31·3	43·9	44·2	45·4	32·5	−0·2	−0·3	+0·1	+0·2	+0·4	−0·3	13	47·7	33·0	44·8	45·2	45·2	34·6	+1·5	+1·4	+1·0	+1·2	+0·2	+1·8
14	38·2	32·0	34·2	36·9	38·1	38·2	−0·5	−0·5	−0·2	+0·1	0·0	−0·3	14	38·5	33·1	34·1	36·9	38·1	38·4	−0·2	+0·6	−0·3	+0·1	0·0	−0·1
16	47·6	37·6	44·9	46·6	47·1	47·2	−0·3	+0·4	−0·1	+0·1	+0·3	+0·1	16	49·0	37·3	45·5	46·9	47·3	48·4	+1·1	+0·1	+0·5	+0·4	+0·5	+1·3
17	52·4	46·9	49·4	51·9	52·4	51·5	−0·7	+0·1	+0·1	+0·1	+0·2	+0·5	17	52·9	48·0	49·8	52·5	52·7	51·6	−0·2	+1·2	+0·5	+0·7	+0·5	+0·6
18	51·7	47·2	50·1	48·9	48·3	48·0	−0·2	+0·4	+0·1	0·0	+0·1	+0·2	18	52·1	47·2	50·5	49·3	48·4	48·8	+0·2	+0·4	+0·5	+0·4	+0·2	+1·0
19	49·2	33·5	34·0	40·7	42·6	42·3	+0·9	+0·3	+0·1	−0·2	+1·0	+0·3	19	48·8	33·2	34·2	40·8	42·9	42·9	+0·5	0·0	+0·3	−0·1	+1·3	+0·9
20	45·5	36·6	44·0	44·3	40·0	36·8	−0·3	+0·3	+0·1	0·0	0·0	+0·3	20	46·3	36·6	44·6	44·9	40·3	37·1	+0·5	+0·3	+0·7	+0·6	+0·3	+0·6
21	46·5	35·1	39·1	45·1	46·4	46·3	−0·2	+0·1	+0·2	+0·3	+0·3	+0·2	21	46·8	35·0	39·8	45·5	46·3	46·8	+0·1	0·0	+0·9	+0·7	+0·2	+0·7
23	48·7	42·0	42·5	47·2	47·3	46·1	−0·5	+0·4	+0·4	0·0	0·0	+0·7	23	49·2	41·7	42·9	47·9	48·0	46·8	0·0	+0·1	+0·8	+0·7	+0·7	+1·4
24	51·8	39·7	49·9	51·7	46·1	39·9	−0·3	+0·6	+0·2	−0·1	+0·2	+0·6	24	52·3	39·6	50·5	52·0	46·5	40·5	+0·2	+0·5	+0·8	+0·2	+0·6	+1·2
26	40·7	32·0	33·6	38·2	38·1	40·7	−0·4	0·0	−0·1	−0·2	−0·2	+0·1	26	41·6	32·7	34·8	38·8	38·8	40·8	+0·5	+0·7	+1·1	+0·4	+0·5	+0·2
27	40·7	32·0	38·5	38·5	34·0	34·0	−0·3	−0·1	+0·1	−0·1	−0·1	0·0	27	41·3	32·0	38·7	38·7	34·1	34·0	+0·3	−0·1	+0·3	+0·1	0·0	0·0
28	34·1	26·6	30·8	32·2	31·7	27·0	−0·3	0·0	−0·1	0·0	−0·1	+0·4	28	34·5	26·3	30·8	32·4	32·0	27·4	+0·1	−0·3	−0·1	+0·2	+0·2	+0·8
30	34·0	28·8	32·4	33·5	33·9	31·7	−0·1	−0·5	−0·3	−0·3	0·0	+0·2	30	34·6	29·0	33·0	34·1	33·8	31·7	+0·5	−0·3	+0·3	+0·3	−0·1	+0·2
31	39·4	23·2	25·0	34·6	37·6	32·2	+0·9	−0·6	−0·4	−0·7	+0·6	+0·2	31	40·7	23·3	25·4	36·1	38·6	33·1	+2·2	−0·5	0·0	+0·8	+1·6	+1·1
Means	42·1	32·8	37·2	40·4	40·1	37·8	−0·2	+0·1	0·0	0·0	+0·2	+0·2	Means	42·7	33·1	37·8	40·8	40·5	38·2	+0·4	+0·3	+0·5	+0·4	+0·5	+0·7

READINGS of the WET-BULB THERMOMETER placed in a STEVENSON'S SCREEN near the Ordinary Stand ; and EXCESS of the READINGS above those of the corresponding THERMOMETER on the ORDINARY STAND, in the YEAR 1889.

[No observations have been made on Sundays, Good Friday, and Christmas Day.]

Days of the Month.	Readings of the Wet-bulb Thermometer in Stevenson's Screen, 4 feet above the ground. 9h	Noon	15h	21h	Excess above readings of the Thermometer on ordinary stand, 4 feet above the ground. 9h	Noon	15h	21h
JANUARY.								
d	°	°	°	°	°	°	°	°
1	29.8	30.8	31.2	31.5	− 0.1	− 0.1	− 0.2	0.0
2	27.4	34.2	35.1	34.2	− 0.6	0.0	0.0	+ 0.2
3	33.2	34.1	34.7	33.9	0.0	− 0.1	− 0.1	+ 0.3
4	31.1	33.1	32.5	31.1	− 0.3	− 0.2	0.0	+ 0.2
5	25.9	27.7	27.9	26.7	− 0.2	− 0.2	− 0.1	− 0.3
7	25.0	30.9	31.9	36.1	− 0.7	− 0.4	− 0.4	+ 0.6
8	37.1	39.6	40.1	42.0	− 0.2	− 0.1	+ 0.1	+ 0.1
9	44.1	45.2	42.4	42.5	+ 0.1	− 0.2	+ 0.2	− 0.1
10	36.0	35.1	36.5	37.1	0.0	− 0.1	0.0	+ 0.2
11	34.1	38.2	37.7	35.4	+ 0.2	− 0.5	+ 0.2	+ 0.1
12	33.9	33.1	32.9	33.5	+ 0.3	− 0.1	0.0	+ 0.1
14	36.4	37.1	36.4	35.9	0.0	− 0.1	0.0	0.0
15	34.2	34.8	34.7	32.2	0.0	− 0.1	0.0	+ 0.1
16	31.4	32.1	32.2	32.2	0.0	0.0	0.0	+ 0.2
17	34.7	37.6	38.6	36.8	− 0.2	− 0.2	− 0.1	− 0.1
18	39.1	45.8	45.6	44.9	+ 0.1	− 0.1	− 0.2	0.0
19	37.2	40.0	40.9	38.4	+ 0.4	+ 0.1	+ 0.4	+ 0.2
21	31.7	33.9	39.0	37.0	− 0.2	0.0	− 0.1	+ 0.1
22	35.1	37.2	36.9	36.3	+ 0.1	+ 0.1	0.0	0.0
23	32.3	36.6	33.6	34.8	− 0.1	− 0.3	− 0.2	+ 0.1
24	36.1	39.1	40.3	40.3	− 0.1	− 0.1	− 0.1	0.0
25	39.7	39.2	39.0	41.1	− 0.2	− 0.2	0.0	0.0
26	41.1	44.7	44.5	43.1	− 0.1	0.0	0.0	+ 0.2
28	41.0	44.4	45.5	42.3	0.0	+ 0.1	− 0.3	+ 0.2
29	42.5	43.7	46.3	37.7	− 0.1	− 0.4	− 0.1	0.0
30	37.9	42.1	44.2	45.3	− 0.1	0.0	− 0.1	+ 0.1
31	45.1	47.7	49.7	50.5	− 0.2	− 0.1	0.0	+ 0.1
Means	35.3	37.7	38.2	37.5	− 0.1	− 0.1	0.0	+ 0.1
FEBRUARY.								
d	°	°	°	°	°	°	°	°
1	50.4	51.3	53.1	50.2	− 0.1	− 0.2	0.0	0.0
2	34.5	36.7	35.7	35.4	− 0.4	+ 0.2	+ 0.5	+ 0.4
4	33.8	33.0	31.5	28.5	0.0	+ 0.1	0.0	0.0
5	29.2	33.7	34.2	36.3	0.0	− 0.3	0.0	+ 0.1
6	38.5	40.4	41.2	39.7	0.0	0.0	+ 0.2	0.0
7	34.8	36.5	34.6	31.7	− 0.1	0.0	− 0.1	+ 0.2
8	37.5	43.1	39.9	32.3	+ 0.1	− 0.1	0.0	+ 0.3
9	29.6	29.1	28.4	25.3	0.0	0.0	+ 0.1	+ 0.1
11	29.5	30.5	31.1	28.4	+ 0.1	− 0.4	− 0.3	+ 0.2
12	25.0	31.2	32.4	28.1	− 0.4	− 0.3	− 0.5	+ 0.2
13	28.4	33.1	34.9	37.9	− 0.2	0.0	0.0	+ 0.2
14	47.4	46.9	44.0	40.1	+ 0.2	+ 0.1	0.0	+ 0.2
15	35.0	37.4	38.7	34.0	+ 0.2	0.0	+ 0.2	+ 0.4
16	32.1	37.3	38.1	44.1	0.0	+ 0.1	− 0.1	+ 0.2
18	43.1	48.1	46.8	45.1	0.0	+ 0.1	+ 0.3	− 0.2
19	45.0	46.6	47.4	40.9	+ 0.1	− 0.1	+ 0.1	+ 0.2
20	39.8	43.1	43.3	40.7	− 0.1	+ 0.2	+ 0.1	+ 0.1
21	37.1	36.9	35.7	33.5	0.0	− 0.1	+ 0.1	+ 0.2
22	34.3	37.7	36.5	34.5	+ 0.1	− 0.5	− 0.1	+ 0.2
23	30.1	31.5	32.2	33.0	+ 0.4	− 0.1	+ 0.2	+ 0.1
25	33.1	34.1	34.9	32.1	+ 0.1	+ 0.1	− 0.3	+ 0.2
26	31.5	33.2	31.6	31.7	+ 0.3	− 0.3	− 0.1	0.0
27	31.1	32.9	32.4	30.6	+ 0.2	− 0.1	0.0	0.0
28	29.2	30.7	31.3	30.1	− 0.2	− 0.3	− 0.1	+ 0.2
Means	35.0	37.3	37.1	35.2	0.0	− 0.1	0.0	+ 0.1

Days of the Month.	Readings of the Wet-bulb Thermometer in Stevenson's Screen, 4 feet above the ground. 9h	Noon	15h	21h	Excess above readings of the Thermometer on ordinary stand, 4 feet above the ground. 9h	Noon	15h	21h
MARCH.								
d	°	°	°	°	°	°	°	°
1	29.8	31.9	31.8	28.9	− 0.4	− 0.0	− 0.1	− 0.2
2	29.4	31.1	30.7	29.0	− 0.3	− 0.2	− 0.1	− 0.1
4	28.7	32.1	30.1	28.5	+ 0.2	− 0.2	− 0.2	0.0
5	28.6	31.9	33.0	27.1	+ 0.1	0.0	0.0	+ 0.2
6	33.2	39.6	39.8	33.7	+ 0.1	− 0.3	0.0	+ 0.3
7	38.3	45.2	47.6	48.1	− 0.2	− 0.4	0.0	+ 0.2
8	48.1	48.2	49.2	47.1	0.0	− 0.1	− 0.1	+ 0.2
9	39.1	42.4	41.2	38.1	− 0.2	− 0.2	+ 0.3	+ 0.2
11	38.1	36.5	36.5	33.1	0.0	+ 0.3	− 0.5	+ 0.2
12	33.0	37.4	42.9	43.2	− 0.2	− 0.3	0.0	+ 0.1
13	41.6	47.1	45.8	43.6	− 0.1	+ 0.1	− 0.1	− 0.1
14	38.0	38.9	41.3	36.3	0.0	+ 0.2	− 0.2	− 0.1
15	32.3	32.2	33.7	27.7	− 0.1	− 0.3	+ 0.2	− 0.1
16	33.2	38.0	44.2	42.7	0.0	− 0.3	− 0.4	− 0.2
18	40.4	42.3	42.2	38.2	− 0.5	− 0.3	0.0	− 0.1
19	43.1	47.4	47.8	45.3	0.0	− 0.5	− 0.3	− 0.1
20	41.9	45.3	45.2	41.8	+ 0.1	− 0.9	− 0.4	+ 0.1
21	39.1	35.7	35.3	31.5	− 0.2	− 0.2	− 0.1	+ 0.2
22	33.1	37.1	39.0	36.1	− 0.9	− 0.4	+ 0.6	+ 0.5
23	39.0	44.0	45.9	41.4	− 0.3	− 0.2	− 0.1	+ 0.2
25	46.7	49.6	52.3	44.5	− 0.1	− 0.4	+ 0.1	+ 0.5
26	41.0	42.1	38.2	37.3	+ 0.2	− 0.2	− 0.3	+ 0.1
27	35.4	37.1	39.9	33.8	+ 0.2	− 0.1	− 0.3	+ 0.2
28	34.2	43.2	44.0	42.9	− 0.4	− 0.6	− 0.7	− 0.1
29	48.1	51.2	52.1	50.2	− 0.3	− 0.1	− 0.1	+ 0.2
30	45.2	47.6	47.9	46.3	− 0.1	− 0.2	+ 0.1	0.0
Means	37.6	40.6	41.4	38.3	− 0.1	− 0.2	− 0.1	+ 0.1
APRIL.								
d	°	°	°	°	°	°	°	°
1	38.8	44.2	44.1	42.5	− 0.4	− 0.3	+ 0.2	+ 0.5
2	38.4	39.3	39.6	38.2	+ 0.3	0.0	+ 0.2	+ 0.2
3	35.5	38.2	40.4	38.3	0.0	− 0.1	− 0.4	− 0.1
4	43.8	44.0	45.3	40.2	− 0.2	− 0.3	− 0.3	+ 0.3
5	42.6	45.3	45.9	39.7	− 0.1	− 0.5	0.0	+ 0.5
6	43.7	45.9	47.0	41.1	0.0	− 0.1	− 0.2	+ 0.1
8	45.7	47.7	47.0	44.1	− 0.5	− 0.5	+ 0.1	+ 0.2
9	42.8	45.5	45.6	41.4	− 0.1	− 0.4	− 0.3	− 0.2
10	41.3	42.7	43.4	42.2	− 0.2	− 0.2	− 0.4	+ 0.1
11	41.8	44.2	43.2	39.3	− 0.5	0.0	− 0.2	0.0
12	42.2	46.2	45.3	43.0	− 0.5	− 0.1	0.0	+ 0.1
13	38.6	40.3	41.5	38.3	− 0.2	− 0.2	− 0.2	+ 0.1
15	38.6	41.2	42.8	37.0	+ 0.1	− 0.1	− 0.2	+ 0.2
16	39.7	42.7	42.5	40.0	− 0.1	− 0.4	0.0	+ 0.3
17	42.8	47.3	48.4	48.2	+ 0.1	+ 0.2	0.0	− 0.1
18	48.9	51.5	53.8	49.2	− 0.2	− 0.4	0.0	+ 0.1
20	48.3	50.3	51.9	47.0	− 0.1	− 0.7	− 0.1	0.0
22	47.7	48.8	48.2	42.4	− 0.6	− 0.2	+ 0.3	+ 0.8
23	44.3	46.2	45.8	41.8	− 0.4	− 0.6	− 0.1	+ 0.2
24	42.9	44.8	45.2	42.5	− 0.1	0.0	+ 0.3	0.0
25	44.8	46.0	45.4	41.2	− 0.1	− 0.2	− 0.5	+ 0.3
26	46.5	50.7	49.5	45.1	− 0.1	− 0.8	− 0.1	0.0
27	49.7	52.0	53.4	44.1	− 0.3	− 0.1	− 0.5	+ 0.2
29	45.8	48.2	48.2	42.5	+ 0.4	− 0.7	+ 0.3	+ 0.2
30	49.4	51.6	54.2	46.8	− 0.4	− 0.2	0.0	0.0
Means	43.4	45.8	46.3	42.2	− 0.2	− 0.3	− 0.1	+ 0.2

' READINGS of the WET-BULB THERMOMETER in a STEVENSON'S SCREEN—*continued.*

MAY.

Days of the Month.	Readings of the Wet-bulb Thermometer in Stevenson's Screen, 4 feet above the ground. 9h	Noon	15h	21h	Excess above readings of the Thermometer on ordinary stand, 4 feet above the ground. 9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°
1	47·0	47·2	44·2	44·1	0·0	+ 0·4	+ 0·2	+ 0·1
2	48·2	49·0	52·2	46·9	0·0	+ 0·1	− 0·1	+ 0·5
3	50·6	52·2	52·4	48·2	− 0·3	+ 0·2	+ 0·3	+ 0·3
4	57·2	58·8	56·8	52·3	+ 0·1	− 0·1	− 0·1	+ 0·2
6	57·4	62·2	62·8	54·6	0·0	− 0·7	+ 0·1	+ 0·1
7	59·4	57·7	55·3	51·4	− 0·1	− 1·5	− 0·7	0·0
8	50·2	57·1	56·3	48·5	0·0	− 0·8	− 0·9	+ 0·4
9	60·2	61·1	60·4	57·1	− 0·2	− 0·2	+ 0·1	+ 0·2
10	51·2	56·2	54·2	51·9	0·0	− 0·7	− 0·3	+ 0·5
11	49·5	50·1	47·8	47·4	+ 0·1	+ 0·2	− 0·1	+ 0·2
13	50·6	52·6	53·8	51·2	− 0·1	− 0·1	− 0·1	+ 0·1
14	52·2	54·7	56·7	49·3	+ 0·3	+ 0·5	+ 0·2	+ 0·1
15	47·6	55·5	58·5	52·3	− 0·2	− 0·4	+ 0·3	+ 0·4
16	51·2	56·3	59·0	54·2	− 0·2	+ 0·2	+ 1·2	+ 0·5
17	51·2	57·0	59·5	54·2	− 0·4	− 0·9	+ 0·1	+ 0·3
18	51·2	54·6	54·2	48·8	− 0·4	+ 0·3	+ 0·1	+ 0·7
20	53·8	56·8	58·5	53·1	− 0·1	− 0·2	− 0·1	+ 0·3
21	56·6	61·2	59·8	55·1	− 0·2	− 0·1	+ 0·1	+ 0·6
22	60·2	66·5	65·2	58·3	+ 0·3	− 0·5	+ 0·6	0·0
23	64·7	66·2	66·0	62·2	− 0·3	+ 0·2	− 0·5	− 0·1
24	64·5	66·2	65·2	59·5	− 0·2	− 0·7	− 0·7	− 0·3
25	61·4	64·8	62·7	55·0	− 0·4	− 0·9	− 0·2	− 0·1
27	52·2	53·4	55·2	54·8	− 0·2	− 0·2	− 0·3	− 0·1
28	52·5	57·2	54·4	53·2	− 0·6	+ 0·1	− 0·1	+ 0·1
29	54·2	55·2	53·7	47·2	0·0	− 0·8	− 0·5	+ 0·2
30	52·2	53·4	52·3	48·2	− 0·2	− 1·0	− 0·2	+ 0·2
31	52·3	54·7	54·3	50·1	+ 0·4	− 0·3	+ 0·2	+ 0·3
Means	54·1	57·0	56·7	52·2	− 0·1	− 0·3	− 0·1	+ 0·2

JUNE.

Days of the Month.	Readings of the Wet-bulb Thermometer in Stevenson's Screen, 4 feet above the ground. 9h	Noon	15h	21h	Excess above readings of the Thermometer on ordinary stand, 4 feet above the ground. 9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°
1	58·2	58·5	60·1	55·3	0·0	− 1·0	0·0	− 0·3
3	61·2	62·3	59·6	51·5	− 0·8	− 0·5	− 0·2	0·0
4	58·8	62·3	61·8	59·2	0·0	− 0·6	+ 0·1	+ 0·3
5	56·8	58·8	60·6	54·1	+ 0·3	0·0	+ 0·2	+ 0·1
6	58·2	66·2	68·9	64·2	0·0	+ 0·2	− 0·1	+ 0·1
7	66·8	69·8	68·5	58·0	− 1·2	− 0·4	+ 0·1	− 0·1
8	55·1	55·7	57·0	55·3	− 0·1	− 0·4	− 0·2	− 0·2
10	49·0	49·3	49·8	49·3	− 0·1	− 0·1	− 0·1	− 0·1
11	53·3	54·8	55·9	55·4	− 0·1	− 0·4	− 0·4	− 0·4
12	54·2	58·2	58·3	57·2	0·0	+ 0·3	+ 0·1	+ 0·7
13	59·2	61·2	62·0	56·4	0·0	− 0·8	− 0·1	+ 0·5
14	56·7	57·6	58·8	56·3	− 0·4	− 0·1	− 0·1	− 0·3
15	57·2	59·3	60·5	57·2	− 0·4	0·0	0·0	− 0·1
17	57·3	56·2	59·4	53·3	+ 0·2	+ 0·2	− 0·3	0·0
18	52·8	54·3	55·2	49·4	− 0·2	− 0·3	+ 0·2	− 0·1
19	54·2	57·4	57·8	51·2	+ 0·2	− 0·4	0·0	+ 0·2
20	56·0	59·8	63·2	58·5	− 0·2	− 0·4	− 0·7	0·0
21	57·5	62·3	64·4	57·6	− 0·2	− 0·3	+ 0·3	− 0·3
22	53·7	61·2	64·4	56·2	− 0·2	− 0·7	− 0·8	+ 0·1
24	56·2	58·1	59·0	56·2	+ 0·1	− 0·1	+ 0·5	− 0·1
25	56·3	62·2	63·2	54·4	− 0·1	+ 0·3	− 0·5	0·0
26	63·2	66·2	67·4	59·1	+ 0·1	− 0·2	− 0·3	0·0
27	64·4	65·5	65·0	57·5	− 0·3	+ 0·1	+ 0·4	0·0
28	62·0	62·6	64·5	58·8	+ 0·4	− 0·3	− 0·5	+ 0·1
29	62·6	66·2	67·2	62·9	− 0·5	− 0·1	+ 0·1	+ 0·2
Means	57·6	60·2	61·3	56·2	− 0·1	− 0·2	− 0·1	0·0

JULY.

Days of the Month.	Readings of the Wet-bulb Thermometer in Stevenson's Screen, 4 feet above the ground. 9h	Noon	15h	21h	Excess above readings of the Thermometer on ordinary stand, 4 feet above the ground. 9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°
1	58·5	58·2	60·6	55·3	− 0·6	− 1·0	− 0·3	− 0·1
2	54·6	56·9	56·2	52·2	− 0·3	− 0·2	+ 0·2	+ 0·4
3	54·3	56·4	57·6	57·2	− 0·1	0·0	− 0·1	+ 0·3
4	57·8	59·3	63·2	56·4	+ 0·8	+ 0·4	+ 0·2	0·0
5	61·2	63·2	64·2	57·2	+ 0·2	+ 0·1	+ 0·2	+ 0·2
6	59·0	62·1	64·0	60·1	− 0·6	− 0·8	0·0	+ 0·2
8	51·8	54·8	57·2	58·5	− 0·1	− 0·1	+ 0·3	− 0·1
9	59·4	61·4	61·6	61·3	− 0·3	− 0·4	− 0·5	− 0·2
10	60·5	59·6	64·4	59·0	− 0·4	− 0·3	+ 0·2	+ 0·3
11	58·5	62·8	62·4	59·3	− 0·3	+ 0·6	− 0·5	+ 0·1
12	62·6	65·5	64·2	62·7	+ 0·5	+ 0·3	+ 0·1	+ 0·1
13	64·5	62·2	64·3	59·4	− 0·5	+ 0·3	+ 0·4	+ 0·1
15	57·9	57·8	58·7	53·1	+ 0·2	+ 0·4	− 0·5	+ 0·3
16	53·9	55·0	55·2	54·2	+ 0·2	+ 0·2	+ 0·4	+ 0·1
17	53·6	54·0	52·9	51·9	0·0	+ 0·5	− 0·1	+ 0·2
18	56·2	56·7	59·3	54·3	+ 0·1	+ 0·1	− 0·3	+ 0·4
19	55·8	57·4	58·9	55·5	+ 0·3	+ 0·2	+ 0·1	+ 0·3
20	55·9	57·0	60·5	57·2	− 0·1	− 0·3	+ 0·2	+ 0·5
22	52·5	54·1	55·0	53·1	− 0·9	0·0	+ 0·3	+ 0·1
23	55·2	56·9	55·4	53·2	+ 0·5	+ 0·4	− 0·1	+ 0·2
24	55·4	57·5	56·9	56·2	− 0·1	− 0·1	+ 0·6	+ 0·1
25	56·2	56·2	57·1	55·7	+ 0·2	+ 0·3	− 0·4	+ 0·2
26	54·5	57·5	57·5	55·9	− 0·5	− 0·4	− 0·7	− 0·1
27	54·1	57·1	56·2	54·8	+ 0·1	− 0·4	− 0·7	0·0
29	58·1	60·8	62·2	59·7	− 0·3	− 0·2	− 0·1	+ 0·1
30	64·2	66·4	66·3	60·2	− 0·1	− 0·5	+ 1·2	+ 0·3
31	64·6	65·7	65·1	59·4	− 0·4	− 0·5	+ 0·2	− 0·1
Means	57·4	59·0	59·9	56·8	− 0·1	− 0·1	0·0	+ 0·1

AUGUST.

Days of the Month.	Readings of the Wet-bulb Thermometer in Stevenson's Screen, 4 feet above the ground. 9h	Noon	15h	21h	Excess above readings of the Thermometer on ordinary stand, 4 feet above the ground. 9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°
1	66·5	70·2	68·7	62·3	− 0·4	0·0	− 0·6	− 0·1
2	62·0	60·7	61·2	57·2	+ 0·6	− 0·7	− 0·2	− 0·1
3	60·3	62·8	63·8	59·7	− 0·3	− 0·3	− 0·4	− 0·2
5	60·0	63·0	62·7	56·2	0·0	− 0·2	+ 0·4	0·0
6	55·0	58·0	56·6	53·2	+ 0·1	− 0·1	− 0·4	+ 0·3
7	56·4	56·6	57·9	54·5	− 0·5	− 0·4	− 0·2	0·0
8	58·7	58·5	59·4	55·2	− 0·6	− 0·6	+ 0·4	+ 0·3
9	57·3	58·2	57·9	55·9	− 0·7	+ 0·1	− 0·1	− 0·1
10	58·2	58·4	59·4	54·4	− 0·1	− 0·5	− 0·5	− 0·3
12	54·2	53·5	55·2	53·2	− 0·3	− 0·3	− 0·1	+ 0·2
13	54·7	54·3	55·0	53·2	− 0·4	− 0·1	+ 0·6	+ 0·2
14	55·5	57·2	55·9	57·3	− 0·4	+ 0·1	− 0·5	− 0·1
15	60·3	62·3	62·2	61·0	+ 0·2	+ 0·6	− 0·2	+ 0·2
16	60·5	64·2	62·0	60·4	− 0·5	− 0·4	+ 0·3	0·0
17	61·1	63·3	60·6	53·2	+ 0·1	− 0·6	− 0·3	+ 0·3
19	58·9	63·8	65·6	58·8	0·0	+ 0·3	− 0·3	− 0·1
20	55·0	54·3	55·6	52·1	+ 0·1	0·0	+ 0·2	+ 0·2
21	57·1	58·5	58·3	54·8	− 0·1	− 0·1	− 0·1	+ 0·1
22	54·2	55·6	55·6	52·3	− 0·1	− 0·4	− 0·2	+ 0·1
23	51·5	53·0	54·0	50·4	+ 0·6	− 0·5	+ 0·1	+ 0·1
24	52·2	53·2	56·2	51·2	+ 0·3	− 0·7	− 0·3	+ 0·3
26	51·7	51·3	54·4	49·8	− 0·3	0·0	− 0·3	+ 0·1
27	54·6	57·6	57·0	54·9	− 0·1	0·0	+ 0·1	+ 0·1
28	55·9	59·1	60·4	52·7	− 0·4	+ 0·6	0·0	+ 0·3
29	59·4	65·2	63·9	56·1	+ 0·5	+ 0·3	− 0·5	+ 0·3
30	61·2	67·2	67·3	62·0	+ 0·3	+ 0·3	+ 0·3	0·0
31	61·5	67·6	68·5	60·8	0·0	− 0·3	+ 0·6	− 0·1
Means	57·6	59·5	59·8	55·7	− 0·1	− 0·1	− 0·1	+ 0·1

READINGS of the WET-BULB THERMOMETER in a STEVENSON'S SCREEN—*concluded.*

SEPTEMBER.

Days of the Month.	Readings of the Wet-bulb Thermometer in Stevenson's Screen, 4 feet above the ground. 9h	Noon	15h	21h	Excess above readings of the Thermometer on ordinary stand, 4 feet above the ground. 9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°
2	60·6	63·2	61·0	60·5	0·0	+ 0·3	− 0·2	− 0·3
3	60·8	61·8	64·1	61·2	− 0·1	0·0	+ 0·4	+ 0·3
4	56·7	61·2	61·2	60·3	− 0·2	0·0	− 0·2	0·0
5	56·8	58·4	60·3	59·2	− 0·1	− 0·3	− 0·2	+ 0·2
6	58·5	59·8	58·2	54·2	− 0·1	+ 0·2	0·0	+ 0·2
7	57·2	60·3	60·1	55·1	− 0·1	− 0·1	− 0·6	+ 0·2
9	59·4	64·2	63·9	59·7	0·0	+ 0·6	+ 0·1	0·0
10	60·2	64·4	66·2	60·2	+ 0·5	+ 0·4	+ 0·6	+ 0·1
11	63·7	65·8	65·6	60·1	− 0·5	− 0·1	+ 0·1	+ 0·1
12	62·6	67·0	66·5	60·6	− 0·2	0·0	− 0·1	+ 0·2
13	65·0	67·2	65·2	56·2	− 0·2	− 0·2	+ 0·1	+ 0·2
14	54·3	56·9	56·4	49·0	− 0·3	+ 0·4	0·0	− 0·1
16	51·1	50·7	49·8	41·5	+ 0·1	+ 0·4	+ 0·3	+ 0·3
17	48·5	50·2	50·9	43·1	+ 0·1	+ 0·1	− 0·2	+ 0·3
18	51·1	53·2	53·7	45·5	+ 0·7	+ 0·8	− 0·1	+ 0·3
19	51·8	53·0	53·0	52·3	0·0	+ 0·2	+ 0·2	+ 0·2
20	47·9	49·1	48·9	45·3	+ 0·2	0·0	+ 0·2	+ 0·3
21	45·1	48·4	46·0	44·0	+ 0·1	− 0·2	− 0·2	+ 0·1
23	45·0	48·4	48·1	45·8	+ 0·4	0·0	+ 0·3	− 0·1
24	54·4	57·2	57·8	49·9	− 0·3	0·0	− 0·1	0·0
25	41·8	45·5	45·8	42·4	− 0·2	+ 0·1	0·0	+ 0·3
26	46·4	48·9	52·6	52·2	− 0·1	− 0·2	− 0·1	+ 0·2
27	55·3	57·2	58·7	56·6	− 0·2	+ 0·1	− 0·1	+ 0·1
28	50·1	50·9	49·5	46·3	0·0	− 0·5	+ 0·1	+ 0·3
30	46·3	50·0	49·3	46·5	+ 0·2	+ 0·1	− 0·1	+ 0·2
Means	54·0	56·5	56·5	52·3	0·0	+ 0·1	0·0	+ 0·1

NOVEMBER.

Days of the Month.	Readings of the Wet-bulb Thermometer in Stevenson's Screen, 4 feet above the ground. 9h	Noon	15h	21h	Excess above readings of the Thermometer on ordinary stand, 4 feet above the ground. 9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°
1	48·7	48·2	46·7	42·1	− 0·1	+ 0·1	+ 0·7	+ 0·4
2	41·4	45·6	44·1	39·1	+ 0·3	− 0·3	+ 0·6	+ 0·2
4	49·2	50·2	47·4	43·2	− 0·1	− 0·2	+ 0·1	+ 0·5
5	37·7	44·4	42·7	35·5	+ 0·1	+ 0·2	+ 0·5	+ 0·1
6	42·1	47·7	47·6	44·8	0·0	+ 0·1	+ 0·2	+ 0·3
7	44·2	47·7	50·6	50·5	− 0·1	− 0·1	− 0·1	+ 0·2
8	52·2	51·7	52·2	47·2	0·0	+ 0·2	+ 0·5	+ 0·3
9	47·5	49·7	50·0	49·2	0·0	− 0·2	+ 0·1	+ 0·2
11	50·2	51·2	50·3	47·6	0·0	− 0·2	0·0	0·0
12	40·2	41·9	43·2	38·3	+ 0·3	− 0·3	+ 0·3	+ 0·1
13	32·6	45·4	47·2	40·2	+ 0·2	+ 0·2	+ 0·6	+ 0·4
14	45·0	46·9	47·8	48·2	0·0	+ 0·1	− 0·1	− 0·1
15	49·1	54·7	53·3	49·4	− 0·3	− 0·2	+ 0·4	− 0·2
16	49·4	51·2	50·8	49·5	− 0·2	− 0·2	0·0	− 0·1
18	46·9	47·5	46·6	44·4	0·0	− 0·4	+ 0·1	0·0
19	41·2	41·0	41·1	39·4	0·0	− 0·1	+ 0·2	− 0·2
20	39·5	39·5	39·2	38·0	− 0·1	+ 0·1	+ 0·2	0·0
21	37·4	39·5	37·7	35·4	− 0·3	− 0·2	− 0·1	− 0·2
22	44·6	48·3	49·2	48·0	− 0·2	− 0·3	0·0	+ 0·2
23	49·9	52·7	52·3	50·5	− 0·1	+ 0·2	+ 0·1	− 0·3
25	40·5	40·6	40·0	36·3	0·0	+ 0·2	+ 0·2	+ 0·4
26	33·4	39·4	37·2	33·6	− 0·1	0·0	+ 0·1	+ 0·4
27	29·9	30·1	32·1	32·3	+ 0·1	+ 0·1	+ 0·2	+ 0·4
28	28·7	31·3	32·5	31·1	0·0	0·0	+ 0·2	+ 0·6
29	31·7	34·5	37·3	37·0	0·0	− 0·2	0·0	+ 0·2
30	36·4	39·0	38·5	29·3	− 0·2	− 0·3	0·0	+ 0·3
Means	41·9	44·6	44·5	41·5	0·0	− 0·1	+ 0·2	+ 0·2

OCTOBER.

Days of the Month.	Readings of the Wet-bulb Thermometer in Stevenson's Screen, 4 feet above the ground. 9h	Noon	15h	21h	Excess above readings of the Thermometer on ordinary stand, 4 feet above the ground. 9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°
1	50·5	50·8	50·2	48·1	+ 0·1	+ 0·1	0·0	+ 0·2
2	49·3	50·9	50·2	48·0	0·0	+ 0·4	+ 0·2	+ 0·1
3	48·2	50·2	51·3	42·7	− 0·1	− 0·3	0·0	+ 0·2
4	44·8	50·0	48·9	45·4	− 0·1	+ 0·5	0·0	+ 0·2
5	49·0	51·4	52·8	48·1	+ 0·1	− 0·4	− 0·4	+ 0·3
7	51·4	50·5	49·6	45·2	0·0	+ 0·2	+ 0·3	+ 0·3
8	47·3	50·7	48·6	47·3	+ 0·3	+ 0·3	+ 0·1	+ 0·1
9	47·2	50·2	50·9	46·4	+ 0·1	+ 0·3	+ 0·7	+ 0·2
10	48·8	52·2	50·3	43·3	+ 0·6	+ 0·6	+ 0·3	+ 0·3
11	48·1	50·6	49·2	46·1	0·0	− 0·8	0·0	+ 0·1
12	47·6	51·5	48·8	43·2	− 0·1	+ 0·5	+ 0·4	+ 0·3
14	40·7	48·2	47·7	42·7	0·0	0·0	+ 0·1	+ 0·3
15	50·3	52·6	52·5	53·3	+ 0·4	+ 0·2	+ 0·1	+ 0·2
16	55·8	57·4	56·2	52·4	− 0·1	− 0·3	+ 0·2	+ 0·1
17	47·5	52·2	51·4	47·4	− 0·5	+ 0·3	0·0	+ 0·5
18	47·5	51·6	51·0	48·7	− 0·1	+ 0·3	+ 0·1	+ 0·3
19	49·7	48·2	49·2	46·1	− 0·2	+ 0·1	+ 0·2	+ 0·2
21	47·0	49·1	48·9	45·0	+ 0·2	− 0·4	0·0	+ 0·1
22	47·2	51·2	49·9	46·0	− 0·3	0·0	0·0	+ 0·1
23	46·2	48·5	48·5	47·2	+ 0·1	− 0·3	+ 0·1	0·0
24	46·1	47·0	47·7	45·0	+ 0·1	− 0·2	− 0·1	+ 0·1
25	42·6	45·5	47·2	46·3	+ 0·2	0·0	+ 0·2	+ 0·1
26	44·3	47·7	46·5	44·9	− 0·1	− 0·2	+ 0·1	+ 0·1
28	46·6	49·9	50·2	49·1	+ 0·1	− 0·1	0·0	+ 0·2
29	48·1	51·8	51·2	47·9	− 0·3	− 0·1	− 0·1	+ 0·2
30	47·5	51·6	50·7	49·2	+ 0·1	+ 0·2	+ 0·2	+ 0·1
31	42·3	45·8	45·6	41·3	− 0·1	+ 0·3	+ 0·6	+ 0·4
Means	47·5	50·3	49·8	46·5	0·0	0·0	+ 0·1	+ 0·2

DECEMBER.

Days of the Month.	Readings of the Wet-bulb Thermometer in Stevenson's Screen, 4 feet above the ground. 9h	Noon	15h	21h	Excess above readings of the Thermometer on ordinary stand, 4 feet above the ground. 9h	Noon	15h	21h
d	°	°	°	°	°	°	°	°
2	25·3	31·9	31·8	28·5	− 0·7	+ 0·1	+ 0·1	+ 0·5
3	26·4	30·4	31·1	26·2	− 0·1	+ 0·2	+ 0·4	+ 0·2
4	30·3	32·2	32·1	30·7	+ 0·1	0·0	0·0	+ 0·3
5	33·7	34·8	35·9	35·7	0·0	− 0·1	0·0	− 0·1
6	35·2	34·8	34·0	32·4	+ 0·2	− 0·1	+ 0·1	+ 0·1
7	31·7	32·9	33·1	33·5	0·0	− 0·7	+ 0·1	+ 0·1
9	46·0	47·0	47·2	48·2	+ 0·1	0·0	− 0·1	+ 0·1
10	43·7	44·8	44·1	37·4	− 0·1	− 0·1	0·0	+ 0·2
11	31·6	35·2	35·3	33·2	+ 0·1	+ 0·2	+ 0·4	+ 0·7
12	27·1	35·4	35·2	36·2	− 0·1	+ 0·5	+ 0·6	+ 0·3
13	43·2	43·8	44·5	32·5	0·0	− 0·1	+ 0·1	− 0·3
14	34·2	36·9	38·0	38·1	− 0·2	+ 0·1	0·0	− 0·1
16	44·3	45·5	46·6	47·2	− 0·3	− 0·1	+ 0·2	+ 0·1
17	49·2	51·2	51·4	50·1	0·0	− 0·1	− 0·3	0·0
18	49·0	48·2	47·2	47·4	0·0	0·0	0·0	0·0
19	34·0	40·2	40·2	40·3	+ 0·1	+ 0·1	+ 0·3	0·0
20	43·2	43·2	38·9	35·4	0·0	− 0·1	− 0·2	+ 0·1
21	37·5	43·2	44·2	45·8	− 0·2	+ 0·1	0·0	0·0
23	42·0	45·1	45·3	45·2	+ 0·1	− 0·1	− 0·1	+ 0·3
24	49·2	51·0	43·1	37·5	− 0·2	− 0·1	0·0	+ 0·2
26	33·6	37·9	37·9	38·0	− 0·1	− 0·1	0·0	0·0
27	37·2	36·8	31·8	32·4	− 0·1	− 0·1	− 0·1	− 0·1
28	29·8	30·3	30·4	27·0	0·0	− 0·1	0·0	+ 0·4
30	32·4	33·5	33·8	31·7	− 0·3	− 0·3	0·0	+ 0·2
31	25·0	33·4	35·4	31·4	− 0·3	− 0·4	+ 0·3	0·0
Means	36·6	39·2	38·7	36·9	− 0·1	− 0·1	+ 0·1	+ 0·1

(I.)—Reading of a Thermometer whose bulb is sunk to the depth of 25·6 feet (24 French feet) below the surface of the soil, at Noon on every Day of the Year.

1889.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	51·30	50·81	50·05	49·26	48·65	48·42	48·85	49·82	50·90	51·76	52·38	52·45
2	51·29	50·76	50·02	49·23	48·63	48·43	48·88	49·85	50·95	51·79	52·39	52·44
3	51·28	50·74	49·99	49·20	48·62	48·43	48·90	49·88	50·96	51·80	52·40	52·41
4	51·26	50·71	49·96	49·18	48·61	48·43	48·94	49·92	51·00	51·83	52·42	52·42
5	51·25	50·68	49·94	49·16	48·60	48·44	48·96	49·95	51·03	51·87	52·41	52·42
6	51·21	50·67	49·94	49·14	48·58	48·44	48·98	49·99	51·07	51·89	52·43	52·42
7	51·21	50·69	49·90	49·12	48·56	48·45	49·01	50·03	51·10	51·93	52·44	52·40
8	51·21	50·63	49·88	49·10	48·55	48·45	49·03	50·06	51·12	51·95	52·46	52·39
9	51·22	50·58	49·85	49·06	48·55	48·45	49·06	50·09	51·16	51·96	52·46	52·42
10	51·18	50·55	49·81	49·04	48·53	48·46	49·09	50·12	51·21	51·98	52·46	52·41
11	51·17	50·53	49·80	49·02	48·52	48·47	49·12	50·15	51·25	52·00	52·48	52·37
12	51·14	50·51	49·76	49·01	48·50	48·48	49·15	50·19	51·27	52·04	52·46	52·36
13	51·15	50·49	49·76	48·97	48·49	48·51	49·19	50·24	51·30	52·05	52·47	52·39
14	51·13	50·48	49·72	48·95	48·49	48·51	49·21	50·28	51·31	52·06	52·48	52·36
15	51·11	50·45	49·69	48·93	48·47	48·52	49·23	50·31	51·33	52·11	52·51	52·36
16	51·08	50·42	49·66	48·91	48·47	48·54	49·26	50·35	51·36	52·13	52·50	52·37
17	51·07	50·40	49·65	48·88	48·46	48·55	49·30	50·37	51·38	52·14	52·51	52·36
18	51·09	50·37	49·62	48·87	48·45	48·56	49·32	50·40	51·43	52·16	52·50	52·35
19	51·05	50·35	49·60	48·85	48·44	48·58	49·36	50·46	51·46	52·17	52·49	52·31
20	51·03	50·31	49·56	48·84	48·44	48·60	49·39	50·48	51·48	52·19	52·49	52·32
21	51·00	50·27	49·53	48·82	48·44	48·61	49·43	50·52	51·49	52·20	52·48	52·30
22	50·99	50·25	49·52	48·79	48·44	48·63	49·46	50·56	51·52	52·23	52·50	52·30
23	50·96	50·21	49·51	48·77	48·43	48·65	49·49	50·58	51·55	52·25	52·51	52·28
24	50·95	50·19	49·48	48·75	48·43	48·67	49·53	50·61	51·58	52·26	52·52	52·28
25	50·94	50·15	49·45	48·74	48·42	48·70	49·56	50·64	51·59	52·28	52·48	52·23
26	50·93	50·13	49·41	48·73	48·42	48·74	49·59	50·68	51·63	52·30	52·47	52·23
27	50·89	50·10	49·38	48·70	48·42	48·75	49·62	50·72	51·67	52·30	52·45	52·21
28	50·88	50·07	49·36	48·68	48·41	48·77	49·66	50·76	51·70	52·32	52·45	52·17
29	50·86		49·35	48·67	48·41	48·80	49·70	50·80	51·70	52·34	52·45	52·15
30	50·84		49·33	48·65	48·41	48·83	49·75	50·85	51·73	52·36	52·46	52·15
31	50·83		49·29		48·41		49·78	50·87		52·36		52·11
Means	51·08	50·45	49·67	48·93	48·49	48·56	49·28	50·34	51·34	52·10	52·46	52·33

The mean of the twelve monthly values is 50°·42.

(II.)—Reading of a Thermometer whose bulb is sunk to the depth of 12·8 feet (12 French feet) below the surface of the soil, at Noon on every Day of the Year.

1889.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	50·05	47·85	46·47	45·62	46·31	48·83	52·18	54·97	56·10	56·47	54·90	53·02
2	50·00	47·77	46·41	45·60	46·34	48·99	52·25	54·94	56·12	56·46	54·82	52·96
3	49·96	47·70	46·37	45·61	46·40	49·07	52·34	54·94	56·09	56·39	54·76	52·88
4	49·88	47·63	46·33	45·61	46·44	49·18	52·47	55·03	56·11	56·34	54·70	52·82
5	49·82	47·62	46·30	45·63	46·50	49·30	52·61	55·04	56·11	56·34	54·61	52·79
6	49·72	47·56	46·30	45·65	46·56	49·40	52·71	55·08	56·17	56·30	54·57	52·70
7	49·67	47·51	46·22	45·68	46·58	49·53	52·80	55·11	56·17	56·28	54·50	52·60
8	49·62	47·50	46·20	45·70	46·62	49·59	52·88	55·16	56·15	56·23	54·47	52·52

(II.)—Reading of a Thermometer whose bulb is sunk to the depth of 12·8 feet (12 French feet) below the surface of the soil, at Noon on every Day of the Year—*concluded*.

1889.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
9	49·59	47·41	46·16	45·70	46·70	49·69	53·02	55·20	56·23	56·20	54·39	52·51
10	49·48	47·38	46·10	45·70	46·73	49·80	53·10	55·23	56·27	56·14	54·33	52·39
11	49·40	47·33	46·06	45·72	46·80	49·95	53·24	55·29	56·31	56·06	54·28	52·22
12	49·30	47·30	45·99	45·75	46·89	50·09	53·35	55·32	56·32	56·05	54·17	52·13
13	49·23	47·26	45·98	45·76	46·96	50·26	53·46	55·40	56·31	55·97	54·10	52·10
14	49·15	47·25	45·92	45·79	47·03	50·38	53·52	55·48	56·31	55·90	54·04	51·92
15	49·06	47·16	45·87	45·81	47·11	50·50	53·62	55·55	56·30	55·91	54·04	51·84
16	48·97	47·10	45·85	45·84	47·21	50·63	53·72	55·61	56·33	55·87	53·94	51·77
17	48·90	47·05	45·82	45·87	47·30	50·74	53·81	55·63	56·36	55·79	53·88	51·66
18	48·84	47·01	45·79	45·90	47·40	50·84	53·91	55·69	56·40	55·73	53·81	51·55
19	48·72	46·95	45·78	45·93	47·49	50·95	54·00	55·71	56·40	55·63	53·72	51·41
20	48·65	46·89	45·72	45·98	47·58	51·08	54·09	55·70	56·41	55·58	53·66	51·34
21	48·57	46·81	45·69	46·00	47·69	51·19	54·19	55·76	56·41	55·50	53·60	51·23
22	48·50	46·77	45·70	46·01	47·80	51·26	54·25	55·79	56·42	55·47	53·57	51·15
23	48·41	46·69	45·70	46·04	47·89	51·37	54·33	55·80	56·47	55·40	53·53	51·02
24	48·35	46·66	45·67	46·05	47·98	51·45	54·42	55·81	56·50	55·33	53·48	50·90
25	48·29	46·61	45·64	46·08	48·07	51·58	54·47	55·85	56·48	55·29	53·40	50·81
26	48·22	46·56	45·61	46·11	48·13	51·69	54·52	55·89	56·51	55·24	53·31	50·75
27	48·13	46·52	45·62	46·16	48·24	51·79	54·57	55·94	56·56	55·16	53·22	50·69
28	48·10	46·48	45·60	46·20	48·36	51·88	54·67	56·00	56·53	55·11	53·17	50·60
29	48·02		45·60	46·22	48·47	51·95	54·72	56·05	56·48	55·06	53·12	50·50
30	47·96		45·60	46·26	48·60	52·07	54·82	56·11	56·47	55·01	53·10	50·46
31	47·92		45·60		48·69		54·88	56·11		54·93		50·39
Means	48·98	47·15	45·92	45·87	47·32	50·50	53·64	55·52	56·33	55·78	53·97	51·73

The mean of the twelve monthly values is 51°·06.

(III.)—Reading of a Thermometer whose bulb is sunk to the depth of 6·4 feet (6 French feet) below the surface of the soil, at Noon on every Day of the Year.

1889.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	47·94	45·23	44·16	44·96	47·60	53·96	58·47	59·78	59·80	58·24	54·34	51·50
2	47·84	45·26	44·07	45·05	47·71	54·07	58·60	59·72	59·80	58·11	54·23	51·23
3	47·71	45·32	43·98	45·14	47·92	54·11	58·74	59·75	59·81	57·93	54·15	50·97
4	47·53	45·40	43·90	45·21	48·08	54·23	58·94	59·94	59·92	57·77	54·03	50·72
5	47·32	45·47	43·81	45·28	48·20	54·43	59·13	60·04	60·00	57·69	53·88	50·46
6	47·12	45·45	43·73	45·33	48·34	54·68	59·20	60·15	60·11	57·51	53·79	50·16
7	46·94	45·38	43·63	45·40	48·53	55·02	59·25	60·25	60·13	57·39	53·66	49·87
8	46·77	45·28	43·58	45·49	48·79	55·16	59·30	60·35	60·13	57·24	53·58	49·60
9	46·59	45·16	43·56	45·59	49·11	55·45	59·50	60·38	60·25	57·11	53·43	49·43
10	46·38	45·09	43·57	45·71	49·39	55·96	59·53	60·40	60·26	56·99	53·35	49·21
11	46·21	45·02	43·60	45·82	49·70	56·44	59·70	60·40	60·27	56·80	53·30	48·99
12	46·09	44·91	43·67	45·97	49·99	56·45	59·77	60·37	60·24	56·71	53·20	48·88
13	46·03	44·80	43·71	46·05	50·27	56·41	59·81	60·37	60·28	56·54	53·16	48·81
14	45·94	44·59	43·75	46·10	50·48	56·30	59·81	60·38	60·24	56·40	53·12	48·64
15	45·87	44·10	43·80	46·17	50·58	56·29	59·88	60·33	60·26	56·31	53·10	48·52

(III.)—Reading of a Thermometer whose bulb is sunk to the depth of 6·4 feet (6 French feet) below the surface of the soil, at Noon on every Day of the Year—*concluded.*

1889.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
16	45·78	44·06	43·86	46·22	50·69	56·36	59·93	60·26	60·33	56·16	52·97	48·42
17	45·73	44·02	43·91	46·22	50·80	56·39	59·97	60·15	60·39	55·96	52·87	48·31
18	45·69	43·99	43·92	46·29	50·92	56·41	60·01	60·13	60·41	55·86	52·80	48·20
19	45·58	43·99	43·98	46·30	51·09	56·50	60·02	60·14	60·36	55·72	52·72	48·15
20	45·51	44·02	44·01	46·35	51·29	56·60	60·00	60·12	60·22	55·61	52·70	48·20
21	45·48	44·11	44·10	46·44	51·50	56·70	60·00	60·20	60·09	55·48	52·66	48·22
22	45·46	44·21	44·20	46·59	51·71	56·80	59·94	60·22	59·94	55·39	52·63	48·25
23	45·43	44·30	44·28	46·75	51·90	56·96	59·92	60·21	59·79	55·31	52·60	48·16
24	45·40	44·36	44·31	46·89	52·10	57·12	59·90	60·18	59·61	55·20	52·50	48·16
25	45·35	44·37	44·37	47·02	52·33	57·37	59·82	60·15	59·34	55·10	52·37	48·11
26	45·29	44·33	44·41	47·10	52·56	57·60	59·76	60·10	59·15	55·03	52·29	48·18
27	45·24	44·28	44·52	47·19	52·92	57·78	59·70	60·08	58·97	54·89	52·20	48·19
28	45·21	44·21	44·63	47·22	53·46	57·92	59·72	60·00	58·74	54·73	52·10	48·14
29	45·22		44·71	47·32	53·61	58·10	59·68	59·95	58·50	54·62	51·95	48·06
30	45·22		44·80	47·45	53·85	58·30	59·72	59·91	58·34	54·44	51·77	47·98
31	45·23		44·84		53·92		59·71	59·84		54·40		47·84
Means	46·10	44·67	44·04	46·15	50·62	56·20	59·59	60·14	59·86	56·21	53·05	48·95

The mean of the twelve monthly values is 52°·13.

(IV.)—Reading of a Thermometer whose bulb is sunk to the depth of 3·2 feet (3 French feet) below the surface of the soil, at Noon on every Day of the Year.

1889.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	43·70	42·19	40·04	43·94	48·21	56·83	63·43	62·35	61·55	56·60	51·85	46·41
2	43·15	42·72	39·86	43·83	48·30	57·14	63·60	62·77	61·87	56·40	51·57	45·93
3	42·62	43·00	39·74	43·79	48·46	57·82	63·56	63·19	62·02	56·20	51·33	45·24
4	42·26	42·61	39·58	43·76	48·71	58·65	63·41	63·52	62·14	56·00	51·03	44·70
5	42·01	42·20	39·35	43·83	49·32	59·21	63·42	63·50	62·14	55·72	51·06	44·17
6	41·67	41·70	39·26	44·09	50·19	59·70	63·60	63·60	62·23	55·40	50·82	43·86
7	41·31	41·47	39·22	44·35	51·01	60·42	63·73	63·44	62·09	55·29	50·51	43·74
8	41·00	41·54	39·50	44·70	51·80	60·75	63·80	63·26	61·97	55·32	50·46	43·60
9	40·81	41·30	40·28	45·01	52·40	60·79	63·80	63·08	61·84	55·13	50·60	43·53
10	41·03	41·01	40·80	45·19	52·83	60·46	63·53	62·93	61·68	54·88	50·66	43·63
11	41·34	40·49	41·00	45·21	53·11	59·65	63·60	62·65	61·96	54·62	50·78	44·00
12	41·40	40·10	41·00	45·13	53·03	58·99	63·43	62·33	62·20	54·48	50·80	43·98
13	41·37	39·80	40·90	45·14	52·63	58·87	63·48	61·94	62·52	54·22	50·62	43·60
14	41·21	39·40	40·95	45·20	52·41	58·89	63·56	61·64	62·61	53·92	50·25	43·34
15	41·23	39·48	41·17	45·02	52·36	59·10	63·60	61·48	62·60	53·70	50·05	43·34
16	41·21	39·79	41·32	44·92	52·66	59·26	63·44	61·55	62·41	53·49	50·04	43·42
17	41·11	39·80	41·23	44·81	53·14	59·42	63·20	61·80	62·06	53·65	50·22	43·77
18	41·10	40·10	41·40	44·93	53·63	59·63	62·94	62·21	61·51	53·84	50·46	44·12
19	41·19	40·65	41·72	45·41	54·01	59·80	62·67	62·40	60·93	53·72	50·47	44·64
20	41·49	41·19	41·97	46·01	54·18	59·98	62·44	62·36	60·48	53·46	50·38	44·84

(IV.)—Reading of a Thermometer whose bulb is sunk to the depth of 3·2 feet (3 French feet) below the surface of the soil, at Noon on every Day of the Year—*concluded.*

1889.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
21	41·52	41·45	42·20	46·61	54·36	60·35	62·36	62·34	59·92	53·28	50·10	44·83
22	41·40	41·50	42·31	46·89	54·83	60·90	62·23	62·09	59·29	53·06	49·82	44·63
23	41·29	41·30	42·11	46·93	55·50	61·44	62·00	61·80	58·66	52·87	49·61	44·74
24	41·13	41·08	42·10	46·87	56·21	61·73	61·86	61·50	58·08	52·72	49·62	45·12
25	41·06	40·82	42·51	46·73	56·83	61·96	61·67	61·27	57·61	52·62	49·71	45·22
26	41·20	40·62	43·00	46·68	57·36	62·23	61·56	60·87	57·88	52·41	49·66	44·95
27	41·46	40·37	43·22	46·70	57·67	62·62	61·46	60·70	57·03	52·20	49·06	44·52
28	41·60	40·18	43·10	47·15	57·33	62·98	61·47	60·49	57·03	52·02	48·23	44·22
29	41·60		42·98	47·61	56·91	63·18	61·35	60·61	57·07	51·95	47·40	43·80
30	41·83		43·30	47·85	56·80	63·36	61·63	60·90	56·88	51·94	46·77	43·26
31	41·93		43·64		56·71		61·90	61·21		51·88		42·79
Means	41·56	41·00	41·31	45·48	53·32	60·20	62·83	62·12	60·61	53·97	50·13	44·26

The mean of the twelve monthly values is 51°·40.

(V.)—Reading of a Thermometer whose bulb is sunk to the depth of 1 inch below the surface of the soil, at Noon on every Day of the Year.

1889.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	34·0	49·0	35·2	43·0	50·0	58·7	66·4	67·0	63·1	53·0	48·6	37·4
2	33·0	41·2	35·2	43·1	50·0	63·6	66·4	66·2	64·1	53·2	46·5	35·7
3	35·0	37·6	35·1	42·5	51·0	64·4	63·9	65·4	62·2	52·6	47·7	33·8
4	35·2	36·0	33·3	46·0	55·3	63·4	64·4	64·6	62·7	51·1	49·5	35·1
5	34·0	35·3	33·8	44·7	58·0	63·6	66·3	65·1	62·4	51·6	45·8	36·6
6	33·8	39·1	35·2	45·6	58·4	64·4	66·0	63·0	62·0	51·8	46·1	37·9
7	30·0	39·1	39·3	46·1	59·0	68·0	66·8	62·0	61·8	53·8	46·0	37·3
8	37·2	39·6	44·2	47·2	57·2	62·9	63·0	62·3	59·8	51·6	50·0	35·7
9	41·0	35·0	41·3	46·3	60·3	61·0	65·2	62·9	60·6	50·9	49·0	41·0
10	38·6	32·7	39·2	45·0	57·0	56·8	64·3	61·6	63·0	50·9	49·3	43·4
11	38·0	34·5	42·2	44·6	55·1	56·7	63·6	61·0	64·0	50·5	50·0	38·9
12	34·6	33·3	36·7	45·6	52·2	58·7	66·0	58·8	65·0	50·2	47·1	36·0
13	37·4	33·7	44·0	44·0	53·0	60·9	66·5	59·2	65·2	48·3	49·0	39·8
14	38·0	44·0	41·0	43·0	54·2	61·0	64·5	60·3	63·0	48·1	46·0	37·2
15	37·6	38·0	38·9	43·4	55·0	61·2	64·0	61·8	60·9	49·8	47·2	39·1
16	36·3	36·4	38·1	43·4	56·2	60·9	62·0	63·0	59·1	53·9	49·5	41·8
17	36·7	40·3	42·3	44·8	57·0	61·1	61·8	64·2	56·1	52·0	50·0	45·0
18	40·3	43·1	43·0	48·1	58·0	60·5	61·2	62·5	56·0	51·0	49·0	46·2
19	40·0	43·5	43·0	49·5	57·2	61·0	61·5	63·6	56·9	51·5	47·5	45·0
20	40·0	42·0	43·3	50·3	56·9	62·4	62·3	62·1	55·0	50·5	46·1	43·3
21	36·3	40·3	42·0	50·0	59·8	64·3	63·3	61·4	53·0	49·6	45·0	41·2
22	38·0	38·6	38·2	49·1	61·4	64·4	59·8	60·3	52·0	49·5	46·2	45·6
23	36·7	35·0	42·2	47·2	64·0	64·5	61·1	58·8	51·0	49·4	48·0	42·0
24	38·0	36·7	45·4	46·6	64·0	64·1	60·6	58·9	55·0	49·6	48·6	46·2
25	40·5	36·8	45·7	46·8	64·9	64·5	61·0	57·0	51·0	48·0	47·1	39·1

(V.)—Reading of a Thermometer whose bulb is sunk to the depth of 1 inch below the surface of the soil, at Noon on every Day of the Year—*concluded.*

1889.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
26	42·4	35·0	43·6	46·6	60·7	66·1	61·0	57·6	51·0	49·0	42·6	37·0
27	38·5	36·0	42·2	50·6	57·3	67·6	60·0	58·2	55·3	47·0	39·2	39·5
28	45·2	35·0	42·0	50·9	57·7	66·3	60·4	59·6	55·8	49·0	37·0	37·5
29	42·6		46·3	49·0	57·5	66·6	62·0	60·6	53·1	48·0	38·0	33·9
30	40·3		46·1	54·2	57·5	66·7	64·0	61·6	51·5	49·8	40·2	36·0
31	43·2		45·3		58·0		64·3	63·0		48·7		34·2
Means	37·8	38·1	40·8	46·6	57·2	62·9	63·3	61·7	58·4	50·4	46·4	39·3
The mean of the twelve monthly values is 50°·24.												

(VI.)—Reading of a Thermometer within the case covering the deep-sunk Thermometers, whose bulb is placed on a level with their scales, at Noon on every Day of the Year.

1889.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	32·2	51·4	35·6	45·6	52·3	67·9	70·1	79·0	67·7	55·4	52·3	35·2
2	35·2	41·0	35·0	45·4	53·1	77·3	66·5	71·1	69·5	55·2	49·5	32·7
3	36·2	37·9	36·0	42·5	60·0	72·1	63·2	65·2	62·3	52·9	50·8	31·0
4	33·5	35·0	35·1	50·4	69·0	69·1	66·2	70·5	65·8	50·9	51·5	33·4
5	28·6	38·7	36·9	49·4	71·3	71·3	74·5	67·3	61·6	54·7	46·2	35·2
6	24·9	42·0	43·4	50·5	70·3	70·0	73·0	66·2	67·0	54·9	49·8	36·7
7	30·2	39·0	45·9	51·3	63·5	78·6	68·6	65·1	64·4	56·2	48·4	34·2
8	40·0	44·7	50·0	53·3	63·0	59·1	60·3	66·3	61·3	56·8	53·2	34·9
9	47·6	34·2	46·0	47·2	70·3	58·2	69·8	63·5	69·7	55·2	51·0	47·2
10	36·7	32·0	40·0	44·6	60·5	53·0	62·6	62·3	71·2	56·8	50·0	46·4
11	38·8	35·5	42·8	47·4	53·6	57·5	70·7	60·8	75·3	51·9	52·0	34·9
12	34·1	33·5	37·8	50·3	51·3	60·6	71·6	56·0	73·2	55·9	45·2	34·0
13	36·6	34·3	48·0	43·5	54·4	66·4	70·2	59·4	73·5	51·2	48·3	43·9
14	38·2	47·3	44·4	43·0	59·2	63·8	64·7	65·4	65·3	49·8	46·8	38·0
15	36·0	40·9	37·9	45·6	60·3	64·0	66·3	69·6	61·0	58·5	55·2	39·1
16	33·4	38·2	39·5	47·2	62·8	67·6	64·3	70·6	59·7	60·3	51·9	45·6
17	38·0	48·3	47·2	49·7	61·2	63·4	62·0	68·2	60·8	55·1	50·8	50·0
18	45·1	50·0	47·1	53·0	61·1	63·5	61·5	67·2	62·0	54·7	48·8	49·7
19	41·2	48·2	50·4	58·5	58·7	66·0	66·2	69·5	59·4	51·2	44·3	38·5
20	42·0	45·2	48·2	53·8	59·6	68·9	63·2	59·8	55·8	49·5	42·2	44·8
21	33·9	40·5	37·6	53·3	68·1	68·3	68·1	64·0	53·8	49·6	41·5	43·7
22	38·8	40·3	41·2	56·0	73·3	68·1	61·2	63·7	51·7	52·1	48·1	50·8
23	35·2	35·0	50·0	51·3	74·9	67·2	63·6	61·6	54·3	49·8	52·8	45·5
24	38·4	36·4	51·8	48·9	74·8	64·3	64·8	56·6	59·5	48·2	50·7	51·6
25	40·4	36·3	50·1	48·9	72·2	69·6	61·5	58·8	51·0	49·9	44·2	38·3
26	47·0	35·5	44·8	55·0	59·6	74·7	65·0	56·9	55·2	50·7	41·2	38·7
27	38·0	36·0	42·9	57·2	55·4	77·5	58·8	63·6	60·0	47·0	33·9	38·8
28	47·0	35·8	46·9	54·0	62·3	74·4	66·0	66·8	57·0	50·5	34·0	32·8
29	45·3		51·2	54·2	60·2	71·5	64·3	72·3	51·3	51·8	35·5	27·0
30	44·1		51·2	51·9	61·6	73·0	72·8	74·0	52·5	54·5	39·9	33·8
31	48·9		46·5		61·6		73·4	73·6		49·8		31·0
Means	38·2	39·8	43·9	50·1	62·6	67·6	66·3	65·6	61·8	52·9	47·0	39·3
The mean of the twelve monthly values is 52°·92.												

ABSTRACT of the CHANGES of the DIRECTION of the WIND, as derived from the Records of OSLER'S ANEMOMETER in the Year 1889.

(It is to be understood that the direction of the wind was nearly constant in the intervals between the times given in the second column and those next following in the first column.)

Note.—The time is expressed in civil reckoning, commencing at midnight and counting from 0^h to 24^h.

Greenwich Civil Time.		Change of Direction.		Amount of Motion.	
From	To	From	To	Direct.	Retrograde.
				°	°
January.					
d h	d h				
1. 2	1. 3¾	W.S.W.	N.N.E.		225
1. 4¼	1. 7¼	N.N.E.	N.N.E.	360	
1. 8¼	1. 8½	N.N.E.	S.W.		157½
1. 13½	1. 15½	S.W.	N.E.	180	
2. 3	2. 4	N.E.	N.N.E.		22½
3. 2½	3. 4	N.N.E.	N.E.	22½	
4. 4¾	4. 5	N.E.	S.	135	
4. 11½	4. 12	S.	W.S.W.	67½	
4. 13¾	4. 14	W.S.W.	S.S.W.		45
4. 22	4. 23½	S.S.W.	S.W.	22½	
6. 21	7. 1	S.W.	W.	45	
7. 3	7. 4½	W.	S.S.W.		67½
7. 12	7. 15¼	S.S.W.	S.S.W.	360	
7. 17½	7. 18	S.S.W.	S.		22½
8. 2	8. 5	S.	S.E.		45
8. 19	8. 20	S.E.	S.S.E.	22½	
9. 3½	9. 4½	S.S.E.	S.	22½	
9. 7½	9. 8	S.	S.S.W.	22½	
9. 15	9. 18	S.S.W.	S.		22½
9. 23	10. 1	S.	S.W.	45	
10. 2½	10. 6	S.W.	N.N.W.	112½	
10. 20	11. 1	N.N.W.	E.	112½	
11. 4	11. 7	E.	N.E.		45
11. 12	11. 13	N.E.	E.	45	
11. 15	11. 16	E.	E.S.E.	22½	
12. 0	12. 1	E.S.E.	E.		22½
12. 4½	12. 7	E.	N.N.E.		67½
13. 12	13. 13	N.N.E.	N.		22½
14. 9	14. 11	N.	N.N.E.	22½	
15. 2¾	15. 3	N.N.E.	N.E.	22½	
15. 6½	15. 7½	N.E.	S.E.	90	
15. 14¾	15. 15½	S.E.	S.	45	
15. 17	15. 18	S.	S.E.		45
16. 4	16. 5	S.E.	S.S.E.	22½	
16. 11	16. 12	S.S.E.	S.E.		22½
16. 17	16. 19	S.E.	S.	45	
17. 0	17. 1	S.	S.S.W.	22½	
17. 8	17. 13	S.S.W.	W.S.W.	45	
17. 19	17. 20	W.S.W.	S.W.		22½
18. 5	18. 6	S.W.	S.S.W.		22½
18. 9	18. 11	S.S.W.	S.W.	22½	
19. 2½	19. 4	S.W.	N.N.W.	112½	
19. 5	19. 6½	N.N.W.	N.W.		22½
19. 8	19. 9	N.W.	W.S.W.		67½
19. 10	19. 11	W.S.W.	W.N.W.	45	
19. 16½	19. 18	W.N.W.	W.S.W.		45
20. 2	20. 4	W.S.W.	S.W.		22½
20. 12¾	20. 13¼	S.W.	N.N.E.	157½	
20. 16	20. 17	N.N.E.	N.		22½
21. 0¾	21. 1	N.	S.W.		135
21. 5	21. 6	S.W.	W.S.W.	22½	
Jan.—*cont.*					
21. 7½	21. 8	W.S.W.	S.W.		22½
21. 11	21. 15	S.W.	N.	135	
21. 18	21. 19	N.	N.N.E.	22½	
22. 20½	22. 21	N.N.E.	N.		22½
23. 14¼	23. 14½	N.	S.	180	
23. 17½	23. 18	S.	W.S.W.	67½	
23. 22	23. 23½	W.S.W.	S.W.		22½
24. 0½	24. 3	S.W.	N.W.	90	
24. 4	24. 4½	N.W.	S.S.W.		112½
24. 5½	24. 6¼	S.S.W.	N.W.	112½	
24. 7	24. 7½	N.W.	S.S.W.		112½
24. 8¼	24. 9	S.S.W.	N.N.W.	135	
24. 17	24. 17¼	N.N.W.	S.S.W.		135
24. 18	24. 20	S.S.W.	N.N.W.	135	
24. 20¾	24. 22½	N.N.W.	W.S.W.		90
25. 2½	25. 2¾	W.S.W.	W.N.W.	45	
25. 6½	25. 7	W.N.W.	N.W.	22½	
25. 8¼	25. 12	N.W.	W.S.W.		67½
25. 18½	25. 18¾	W.S.W.	W.N.W.	45	
25. 23	26. 0	W.N.W.	W.S.W.		45
26. 23	27. 1½	W.S.W.	N.N.E.	135	
27. 10½	27. 15	N.N.E.	S.	157½	
27. 23½	28. 0	S.	S.S.W.	22½	
28. 8	28. 8½	S.S.W.	S.W.	22½	
28. 16	28. 18	S.W.	S.S.W.		22½
29. 12	29. 14	S.S.W.	S.W.	22½	
29. 16	29. 16¼	S.W.	N.N.W.	112½	
29. 23	30. 3	N.N.W.	S.W.		112½
30. 15	30. 21	S.W.	W.	45	
30. 23	31. 5	W.	W.S.W.		22½
			Sums	3780	1980
February.					
1. 21	1. 22	W.S.W.	W.	22½	
2. 22	2. 23	W.	W.S.W.		22½
3. 9	3. 11	W.S.W.	W.	22½	
3. 19¼	3. 20	W.	S.W.		45
3. 20½	3. 20¾	S.W.	N.E.	180	
3. 22	3. 23	N.E.	N.N.E.		22½
4. 3	4. 5	N.N.E.	N.		22½
4. 11	4. 11½	N.	N.N.E.	22½	
4. 17	4. 19	N.N.E.	N.		22½
5. 2¾	5. 3¼	N.	N.N.W.		22½
5. 5½	5. 6½	N.N.W.	S.W.		112½
5. 8½	5. 9	S.W.	W.S.W.	22½	
6. 0	6. 1	W.S.W.	W.	22½	
Feb.—*cont.*					
6. 10½	6. 11	W.	W.N.W.	22½	
6. 16	7. 1	W.N.W.	S.S.W.		90
7. 2	7. 8	S.S.W.	N.N.E.	180	
7. 12	7. 12½	N.N.E.	N.		22½
7. 16	7. 17	N.	N.N.W.		22½
7. 19	8. 1	N.N.W.	S.W.		112½
8. 14¾	8. 15	S.W.	N.W.	90	
8. 17	8. 20	N.W.	W.		45
8. 22	9. 4	W.	N.W.	45	
9. 13½	9. 14	N.W.	N.N.W.	22½	
9. 22	10. 7	N.N.W.	W.S.W.		90
10. 12	10. 16	W.S.W.	E.S.E.		135
11. 2¾	11. 10	E.S.E.	N.		112½
12. 4½	12. 6	N.	W.		90
12. 7½	12. 10	W.	N.	90	
12. 23	13. 1	N.	S.W.	225	
13. 3	13. 6	S.W.	S.S.W.		22½
13. 22	14. 0	S.S.W.	S.W.	22½	
14. 9	14. 12	S.W.	N.	135	
14. 13	14. 18	N.	W.N.W.		67½
14. 21¾	14. 23	W.N.W.	W.S.W.		45
15. 3	15. 5	W.S.W.	W.N.W.	45	
15. 9	15. 12	W.N.W.	N.N.W.	45	
15. 23	16. 4	N.N.W.	S.S.W.		135
16. 14	16. 19½	S.S.W.	W.S.W.	45	
19. 9	19. 12	W.S.W.	W.	22½	
19. 17	19. 18	W.	N.	90	
19. 19	19. 22	N.	N.W.		45
20. 0	20. 3	N.W.	W.S.W.		67½
20. 6	20. 11½	W.S.W.	N.W.	67½	
20. 17	20. 19	N.W.	N.N.W.	22½	
21. 1	21. 4	N.N.W.	N.	22½	
22. 20	23. 3	N.	N.N.E.	22½	
24. 5	24. 7	N.N.E.	N.		22½
25. 19	26. 2	N.	N.E.	45	
26. 16	26. 20	N.E.	N.N.E.		22½
26. 22	27. 0	N.N.E.	N.		22½
27. 4½	27. 5	N.	N.N.E.	22½	
27. 9	27. 12	N.N.E.	E.N.E.	45	
27. 22½	28. 0	E.N.E.	N.N.E.		45
28. 11	28. 13	N.N.E.	N.E.	22½	
			Sums	1642½	1485
March.					
1. 6	1. 7	N.E.	E.N.E.	22½	
2. 0	2. 0½	E.N.E.	N.N.E.		45
2. 7	2. 12	N.N.E.	E.N.E.	45	

ABSTRACT of the CHANGES of the DIRECTION of the WIND—*continued.*

Greenwich Civil Time. From	Greenwich Civil Time. To	Change of Direction. From	Change of Direction. To	Amount of Motion. Direct.	Amount of Motion. Retrograde.
				°	°
March—*cont.*					
d h	d h				
2. 16	2. 16½	E.N.E.	S.S.W.	135	
2. 18	2. 20	S.S.W.	E.S.E.		90
3. 13	3. 13½	E.S.E.	N.E.		67½
3. 15	3. 18	N.E.	E.S.E.	67½	
5. 6	5. 9	E.S.E.	S.E.	22½	
5. 19	5. 21	S.E.	S.S.E.	22½	
6. 8½	6. 9	S.S.E.	S.S.W.	45	
6. 16	7. 4	S.S.W.	S.E.		67½
7. 7	7. 12¼	S.E.	S.S.W.	67½	
8. 13	8. 17	S.S.W.	S.S.E.		45
8. 19½	9. 1	S.S.E.	W.S.W.	90	
9. 10	9. 12	W.S.W.	W.	22½	
9. 18¾	9. 19	W.	S.S.W.		67½
10. 2	10. 6	S.S.W.	N.E.		157½
10. 18	10. 20½	N.E.	E.	45	
10. 22¾	11. 1½	E.	N.		90
11. 5	11. 6	N.	N.N.E.	22½	
11. 22	11. 23	N.N.E.	N.		22½
12. 1	12. 2¼	N.	W.S.W.		112½
12. 16	12. 18	W.S.W.	W.	22½	
12. 22	12. 22¼	W.	W.S.W.		22½
13. 9	13. 12	W.S.W.	N.N.W.	90	
13. 20	13. 21½	N.N.W.	N.N.E.	45	
14. 2	14. 2½	N.N.E.	N.		22½
14. 14	14. 18	N.	N.N.E.	22½	
15. 5	15. 8¼	N.N.E.	E.N.E.	45	
15. 18	16. 1½	E.N.E.	W.S.W.	180	
16. 15½	16. 16½	W.S.W.	W.N.W.	45	
16. 21	16. 21½	W.N.W.	W.		22½
17. 3	17. 5	W.	W.S.W.		22½
18. 11	18. 23	W.S.W.	E.S.E.		135
19. 5	19. 9	E.S.E.	S.S.W.	90	
19. 16	19. 17	S.S.W.	S.		22½
19. 21	20. 1	S.	S.W.	45	
20. 13	20. 14	S.W.	S.S.W.		22½
20. 21	20. 23	S.S.W.	N.	157½	
21. 7	21. 8	N.	N.N.E.	22½	
21. 22	22. 2	N.N.E.	N.		22½
22. 18	22. 18¼	N.	S.W.		135
23. 7	23. 11	S.W.	W.S.W.	22½	
23. 16	23. 19	W.S.W.	S.W.		22½
24. 10	24. 12	S.W.	W.S.W.	22½	
24. 23	25. 3	W.S.W.	S.W.		22½
25. 12	25. 16	S.W.	N.N.W.	112½	
25. 18	25. 23	N.N.W.	W.		67½
26. 6	26. 14	W.	N.	90	
27. 13	27. 17	N.	N.N.E.	22½	
28. 0	28. 4½	N.N.E.	S.W.		157½
28. 9	28. 12	S.W.	W.	45	
28. 20	28. 22	W.	W.S.W.		22½
29. 6	29. 12	W.S.W.	N.	112½	
29. 18½	29. 20	N.	W.S.W.		112½
29. 20¾	29. 21	W.S.W.	N.N.W.	90	
29. 23½	30. 2	N.N.W.	W.S.W.		90
30. 7	30. 9	W.S.W.	W.	22½	
30. 15	30. 16	W.	W.S.W.		22½
30. 22	31. 0	W.S.W.	N.W.	67½	
31. 5	31. 7	N.W.	W.		45
31. 8	31. 12	W.	N.	90	
31. 13¼	31. 14½	N.	S.W.	225	

Greenwich Civil Time. From	Greenwich Civil Time. To	Change of Direction. From	Change of Direction. To	Amount of Motion. Direct.	Amount of Motion. Retrograde.
				°	°
March—*cont.*					
d h	d h				
31. 15½	31. 16	S.W.	S.E.	270	
31. 21	31. 21¾	S.E.	N.N.E.		112½
31. 23	31. 23¼	N.N.E.	E.S.E.	90	
			Sums	2655	1867½
April.					
1. 0¾	1. 1	E.S.E.	N.		112½
1. 3½	1. 4½	N.	S.W.		135
1. 7½	1. 10½	S.W.	W.N.W.	67½	
2. 1	2. 6	W.N.W.	N.N.W.	45	
3. 11	3. 11½	N.N.W.	W.S.W.		90
3. 13	3. 19	W.S.W.	S.S.E.		90
3. 22	4. 1	S.S.E.	S.S.W.	45	
5. 1	5. 2	S.S.W.	S.S.E.		45
5. 9	5. 9½	S.S.E.	E.		67½
5. 11	5. 15	E.	S.W.	135	
5. 15½	5. 16	S.W.	S.S.E.		67½
5. 19	6. 0	S.S.E.	E.		67½
6. 3½	6. 4	E.	E.N.E.		22½
6. 15	6. 17	E.N.E.	E.S.E.	45	
7. 0	7. 1½	E.S.E.	N.E.		67½
7. 5	7. 6½	N.E.	E.	45	
8. 0½	8. 1	E.	E.N.E.		22½
8. 6	8. 8	E.N.E.	E.	22½	
9. 1	9. 3	E.	E.N.E.		22½
9. 10	9. 13	E.N.E.	E.	22½	
10. 0	10. 4¼	E.	N.E.		45
10. 11	10. 12½	N.F.	E.S.E.	67½	
10. 14	10. 15¼	E.S.E.	N.	247½	
10. 16½	10. 17¼	N.	S.S.E.	157½	
10. 21	10. 21½	S.S.E.	E.S.E.		45
10. 23	11. 0	E.S.E.	S.	67½	
11. 2¾	11. 4	S.	N.E.	225	
11. 10	11. 10¼	N.E.	S.S.E.	112½	
11. 14½	11. 15	S.S.E.	S.S.W.	45	
11. 18	11. 23	S.S.W.	E.		112½
12. 2½	12. 4	E.	E.N.E.		22½
12. 13	12. 14	E.N.E.	N.N.E.		45
12. 17	12. 19¾	N.N.E.	E.N.E.	45	
12. 20½	13. 2	E.N.E.	N.N.E.		45
13. 14	13. 15	N.N.E.	N.		22½
13. 18	13. 21	N.	N.N.W.		22½
14. 7	14. 16	N.N.W.	N.N.E.	45	
16. 0	16. 1	N.N.E.	N.		22½
16. 14	16. 15	N.	N.N.E.	22½	
16. 23	17. 0	N.N.E.	N.		22½
17. 4	17. 5	N.	N.W.		45
17. 8	17. 12	N.W.	N.	45	
17. 20	17. 21	N.	N.N.E.	22½	
18. 11½	18. 12	N.N.E.	N.E.	22½	
18. 14½	18. 18	N.E.	S.	135	
18. 21	19. 4	S.	W.S.W.	67½	
19. 21	19. 22	W.S.W.	S.W.		22½
20. 12	20. 17	S.W.	W.S.W.	22½	

Greenwich Civil Time. From	Greenwich Civil Time. To	Change of Direction. From	Change of Direction. To	Amount of Motion. Direct.	Amount of Motion. Retrograde.
				°	°
April—*cont.*					
d h	d h				
20. 19	20. 19½	W.S.W.	S.W.		22½
22. 1	22. 3	S.W.	S.S.W.		22½
22. 7	22. 11	S.S.W.	W.S.W.	45	
22. 20	22. 23	W.S.W.	S.W.		22½
23. 8	23. 12	S.W.	S.S.W.		22½
24. 5	24. 9	S.S.W.	W.S.W.	45	
24. 9¼	24. 12	W.S.W.	S.S.W.		45
24. 15½	24. 17	S.S.W.	N.	157½	
25. 22¾	25. 23	N.	S.W.	225	
26. 3	26. 6	S.W.	S.S.W.		22½
27. 5	27. 7	S.S.W.	S.W.	22½	
27. 15	27. 16	S.W.	S.S.W.		22½
28. 0¾	28. 3½	S.S.W.	E.N.E.		135
28. 5½	28. 6½	E.N.E.	S.S.E.	90	
28. 11	28. 14	S.S.E.	S.S.W.	45	
29. 15	29. 23	S.S.W.	E.		112½
30. 10	30. 12	E.	S.E.	45	
30. 15½	30. 17	S.E.	S.S.W.	67½	
30. 19	30. 19¾	S.S.W.	S.		22½
			Sums	2520	1732½
May.					
1. 10	1. 15	S.	E.S.E.		67½
2. 6	2. 8	E.S.E.	S.E.	22½	
2. 10½	2. 12½	S.E.	N.E.		90
2. 13½	2. 17	N.E.	S.S.W.		202½
3. 4	3. 4½	S.S.W.	S.S.E.		45
3. 11	3. 13	S.S.E.	S.S.W.	45	
3. 19	3. 23½	S.S.W.	E.N.E.		135
4. 8½	4. 10½	E.N.E.	S.S.E.	90	
4. 15	4. 16	S.S.E.	E.S.E.		45
4. 23	4. 23¼	E.S.E.	E.N.E.		45
5. 9	5. 14	E.N.E.	E.S.E.	45	
5. 23¾	6. 0½	E.S.E.	N.E.	292½	
6. 9	6. 10	N.E.	E.N.E.	22½	
6. 16½	6. 18	E.N.E.	E.S.E.	45	
6. 19	6. 20	E.S.E.	E.N.E.		45
6. 21¾	6. 23	E.N.E.	E.S.E.	45	
7. 8	7. 8½	E.S.E.	S.	67½	
7. 16	7. 17	S.	S.S.W.	22½	
8. 19	8. 23½	S.S.W.	E.		112½
9. 16	10. 0	E.	W.S.W.	157½	
11. 0	11. 1	W.S.W.	N.N.E.	135	
11. 2	11. 5	N.N.E.	N.N.W.		45
11. 11	11. 23	N.N.W.	W.S.W.		90
13. 16½	13. 17	W.S.W.	N.E.	157½	
14. 10	14. 16	N.E.	E.	405	
15. 0¾	15. 4	E.	N.E.		45
15. 16	15. 18	N.E.	N.		45
15. 18½	15. 20	N.	N.N.E.	22½	
16. 1	16. 2	N.N.E.	N.		22½
16. 6	16. 9	N.	N.N.E.	22½	
16. 17¾	16. 20½	N.N.E.	E.	67½	
16. 22	17. 4	E.	N.N.E.		67½

ABSTRACT of the CHANGES of the DIRECTION of the WIND—*continued*.

Greenwich Civil Time.		Change of Direction.		Amount of Motion.	
From	To	From	To	Direct.	Retrograde.
d h	d h			°	°
May—*cont*.					
17. 8	17. 9	N.N.E.	E.N.E.	45	
17. 11	17. 12	E.N.E.	E.S.E.	45	
17. 17	17. 17½	E.S.E.	S.S.W.	90	
17. 23	18. 3	S.S.W.	S.W.	22½	
18. 13	18. 13½	S.W.	S.S.W.		22½
19. 0	19. 1½	S.S.W.	W.S.W.	45	
19. 6¼	19. 10	W.S.W.	W.S.W.		360
19. 16¾	19. 17	W.S.W.	N.	112½	
19. 20½	19. 21	N.	N.N.E.	22½	
19. 23	20. 0	N.N.E.	N.		22½
20. 19	20. 20	N.	N.N.E.	22½	
21. 10	21. 13	N.N.E.	E.S.E.	90	
22. 1½	22. 5	E.S.E.	S.W.	112½	
22. 7	22. 8	S.W.	N.	135	
22. 10	22. 15	N.	E.S.E.	112½	
22. 22	22. 22¼	E.S.E.	E.N.E.		45
23. 1	23. 2	E.N.E.	W.	202½	
23. 5¼	23. 5¾	W.	S.W.		45
23. 8	23. 9½	S.W.	S.E.		90
23. 11½	23. 12½	S.E.	S.W.	90	
23. 13¾	23. 14	S.W.	S.E.		90
23. 15¾	23. 17¾	S.E.	E.S.E.	337½	
23. 21	23. 21¼	E.S.E.	S.	67½	
24. 13	24. 15	S.	S.S.E.		22½
25. 3	25. 6	S.S.E.	S.S.W.	45	
25. 9½	25. 11	S.S.W.	W.S.W.	45	
25. 14½	25. 15½	W.S.W.	N.	112½	
25. 18	25. 19	N.	N.N.E.	22½	
26. 18	26. 21	N.N.E.	N.E.	22½	
27. 8	27. 9	N.E.	N.		45
27. 13	27. 13½	N.	N.N.E.	22½	
27. 15½	27. 16¼	N.N.E.	S.S.E.		225
27. 17¾	27. 18	S.S.E.	E.N.E.		90
27. 21	27. 22	E.N.E.	S.S.W.	135	
30. 18	30. 22	S.S.W.	S.S.E.		45
31. 2	31. 8	S.S.E.	S.S.W.	45	
31. 19	31. 21	S.S.W.	S.		22½
			Sums	3667½	2227½
June.					
1. 4½	1. 7	S.	S.S.E.		22½
1. 14½	2. 1	S.S.E.	E.N.E.		90
2. 8¼	2. 9	E.N.E.	S.S.E.		270
2. 14	2. 18	S.S.E.	W.S.W.	90	
3. 19	3. 23	W.S.W.	S.W.		22½
4. 4	4. 6	S.W.	W.S.W.	22½	
4. 11	4. 12	W.S.W.	S.W.		22½
4. 17¾	4. 18	S.W.	E.	225	
4. 19	4. 22	E.	S.W.	135	
4. 23¼	5. 3	S.W.	N.E.		180
5. 10	5. 12	N.E.	N.N.E.		22½
6. 3	6. 5	N.N.E.	N.		22½
6. 12½	6. 14	N.	N.E.	45	
June—*cont*.					
7. 20	8. 0	N.E.	N.		45
9. 4	9. 5	N.	N.N.E.	22½	
11. 8	11. 11	N.N.E.	S.S.E.	135	
11. 15½	11. 19½	S.S.E.	S.W.	67½	
11. 21¼	11. 21½	S.W.	N.	135	
12. 9¼	12. 11	N.	W.	270	
12. 12	12. 12¼	W.	N.E.		225
12. 13¾	12. 14	N.E.	W.		135
12. 20	12. 20½	W.	S.S.W.		67½
13. 5½	13. 8	S.S.W.	S.E.		67½
13. 10	13. 11	S.E.	N.W.	180	
13. 12	13. 12½	N.W.	S.S.W.	247½	
13. 16	13. 16½	S.S.W.	E.N.E.		135
13. 18	13. 21¼	E.N.E.	S.W.		202½
15. 14	15. 14½	S.W.	E.		135
15. 15¾	15. 16	E.	W.S.W.	157½	
15. 17¼	15. 22	W.S.W.	N.E.		202½
16. 14½	16. 17	N.E.	E.S.E.	67½	
16. 22	16. 23	E.S.E.	N.E.		67½
17. 9	17. 15½	N.E.	E.	45	
17. 21	18. 2	E.	N.E.		45
18. 8	18. 10	N.E.	E.N.E.	22½	
18. 16	18. 18	E.N.E.	E.	22½	
18. 21	19. 0	E.	N.E.		45
19. 14	19. 16	N.E.	E.	45	
19. 21	20. 0	E.	N.E.		45
21. 13½	21. 15	N.E.	E.	45	
21. 21½	22. 4	E.	N.		90
22. 17½	22. 20	N.	N.E.	45	
22. 22	23. 4	N.E.	N.		45
24. 8	24. 11½	N.	E.	90	
24. 22½	25. 2	E.	N.N.E.		67½
25. 3	25. 4¼	N.N.E.	E.S.E.	90	
25. 5	25. 6	E.S.E.	N.E.		67½
25. 12	25. 12½	N.E.	E.S.E.	67½	
25. 23	26. 1½	E.S.E.	N.		112½
26. 4½	26. 10	N.	E.N.E.	67½	
26. 17¾	26. 18½	E.N.E.	E.	22½	
26. 22	26. 23¼	E.	N.E.		45
27. 14½	27. 17	N.E.	E.S.E.	67½	
28. 21	28. 22½	E.S.E.	W.S.W.	495	
29. 11¼	29. 11½	W.S.W.	N.	112½	
29. 16	29. 19	N.	N.N.W.	337½	
30. 2	30. 5	N.N.W.	S.W.		112½
30. 13	30. 20	S.W.	N.N.W.	112½	
			Sums	3487½	2610
July.					
1. 5	1. 7	N.N.W.	N.	22½	
1. 16½	1. 19	N.	E.S.E.	112½	
2. 0¾	2. 2	E.S.E.	N.N.E.		90
4. 8	4. 11	N.N.E.	E.N.E.	45	
4. 17	4. 19	E.N.E.	E.S.E.	45	
July—*cont*.					
4. 20	4. 21	E.S.E.	E.		22½
5. 1	5. 3	E.	N.E.		45
5. 6	5. 7	N.E.	E.N.E.	22½	
6. 0	6. 2	E.N.E.	N.N.W.		90
6. 12	6. 12½	N.N.W.	W.S.W.		90
7. 9	7. 10	W.S.W.	W.	22½	
8. 1	8. 8½	W.	S.E.	225	
8. 10	8. 12	S.E.	N.E.		90
8. 15¾	8. 16	N.E.	S.E.		270
8. 20	8. 20¼	S.E.	E.		45
8. 22¼	8. 22½	E.	S.S.W.	112½	
9. 9	9. 10	S.S.W.	S.		22½
9. 16	9. 18	S.	S.S.E.		22½
9. 23	10. 2	S.S.E.	S.S.W.	45	
10. 9	10. 11	S.S.W.	S.S.E.		45
10. 14	10. 15	S.S.E.	S.S.W.	45	
10. 20	10. 20½	S.S.W.	S.W.	22½	
11. 14	11. 15	S.W.	S.S.W.		22½
11. 23	12. 1½	S.S.W.	W.	67½	
12. 3	12. 6	W.	N.E.		225
12. 11½	12. 15	N.E.	S.E.	90	
13. 0	13. 1	S.E.	E.		45
13. 7½	13. 9	E.	S.W.	135	
13. 14½	13. 15	S.W.	W.S.W.	22½	
13. 20	13. 21	W.S.W.	S.S.W.		45
14. 0	14. 7	S.S.W.	W.S.W.	45	
14. 9	14. 11	W.S.W.	N.E.	157½	
14. 12½	14. 14	N.E.	N.		45
14. 17¾	14. 22¼	N.	W.S.W.		112½
15. 16	15. 16¼	W.S.W.	S.W.		22½
16. 0	16. 4	S.W.	W.S.W.	22½	
16. 12	16. 14	W.S.W.	S.W.		22½
17. 3	17. 5	S.W.	N.N.W.	112½	
17. 14	17. 17½	N.N.W.	S.W.		112½
17. 19½	17. 19¾	S.W.	N.E.		180
17. 20¼	17. 20½	N.E.	S.W.		180
17. 21	17. 22	S.W.	N.N.W.	112½	
18. 7	18. 9	N.N.W.	W.S.W.		90
18. 13¾	18. 14	W.S.W.	N.W.		292½
18. 21	18. 22¼	N.W.	W.S.W.		67½
19. 2	19. 3½	W.S.W.	N.N.E.	135	
19. 8	19. 11	N.N.E.	S.S.W.	180	
19. 21	20. 5	S.S.W.	S.S.E.		45
20. 8	20. 12	S.S.E.	S.S.W.	45	
20. 15	20. 20	S.S.W.	S.W.	22½	
21. 19	22. 1	S.W.	W.	45	
22. 13	22. 22	W.	S.S.W.		67½
23. 11	23. 12	S.S.W.	S.W.	22½	
23. 23	24. 0	S.W.	W.S.W.	22½	
24. 13	24. 22	W.S.W.	S.S.W.		45
25. 0	25. 9	S.S.W.	W.S.W.	45	
26. 0	26. 6	W.S.W.	N.N.W.	90	
27. 17	27. 20	N.N.W.	W.S.W.		90
28. 19	28. 20¼	W.S.W.	W.N.W.	45	
28. 22	28. 23½	W.N.W.	W.S.W.		45
29. 9½	29. 10½	W.S.W.	S.		67½
29. 12	29. 12½	S.	N.		180
29. 12½	29. 14	N.	S.E.	495	
29. 20	30. 1	S.E.	S.W.	90	

ABSTRACT of the CHANGES of the DIRECTION of the WIND—*continued.*

Greenwich Civil Time. From	Greenwich Civil Time. To	Change of Direction. From	Change of Direction. To	Amount of Motion. Direct.	Amount of Motion. Retro-grade.
				°	°
July—*cont.*					
d h	d h				
30. 15	30. 21	S.W.	E.S.E.		112½
31. 7	31. 7½	E.S.E.	S.E.	22½	
31. 12½	31. 13	S.E.	E.		45
			Sums	2745	2992½
August.					
1. 6¾	1. 14	E.	S.S.W.	112½	
1. 17	1. 18½	S.S.W.	W.S.W.	45	
2. 11	2. 21	W.S.W.	S.S.W.		45
3. 11	3. 14	S.S.W.	S.W.	22½	
4. 0	4. 6	S.W.	W.S.W.	22½	
4. 15	4. 16	W.S.W.	S.W.		22½
6. 5	6. 9	S.W.	W.S.W.	22½	
7. 5	7. 10	W.S.W.	W.	22½	
7. 16¾	7. 17	W.	N.W.	45	
7. 18	7. 22	N.W.	W.S.W.		67½
8. 15	8. 17	W.S.W.	S.W.		22½
9. 3	9. 3¼	S.W.	S.S.W.		22½
9. 19	10. 0	S.S.W.	W.S.W.	45	
10. 4	10. 12	W.S.W.	S.S.W.		45
11. 1½	11. 2½	S.S.W.	S.W.	22½	
11. 16	11. 18	S.W.	N.	135	
11. 19	11. 19¾	N.	W.S.W.		112½
12. 5	12. 11	W.S.W.	N.N.W.	90	
12. 23	13. 3	N.N.W.	W.S.W.		90
13. 6½	13. 12	W.S.W.	N.W.	67½	
13. 19	14. 0	N.W.	S.W.		90
14. 13	14. 17	S.W.	S.S.W.		22½
14. 21	15. 2	S.S.W.	W.	67½	
15. 9	15. 10	W.	W.S.W.		22½
16. 9½	16. 10	W.S.W.	S.W.		22½
17. 14	17. 15	S.W.	W.S.W.	22½	
17. 18	17. 22	W.S.W.	S.W.		22½
18. 18¼	18. 18½	S.W.	S.S.W.		22½
18. 23½	19. 5	S.S.W.	N.E.		157½
19. 7	19. 16	N.E.	S.S.W.	157½	
19. 22	19. 23	S.S.W.	S.		22½
20. 5	20. 8	S.	W.S.W.	67½	
20. 18	21. 0	W.S.W.	S.W.		22½
22. 3	22. 7	S.W.	W.S.W.	22½	
22. 15½	22. 15¾	W.S.W.	W.N.W.	45	
22. 20	22. 21	W.N.W.	W.S.W.		45
23. 6½	23. 7	W.S.W.	W.	22½	
23. 18¼	23. 22	W.	S.W.		45
24. 10	24. 12½	S.W.	W.	45	
24. 14	24. 17	W.	S.W.		45
24. 19½	24. 21	S.W.	W.S.W.	22½	
25. 7	25. 7¼	W.S.W.	W.	22½	
25. 22¾	25. 23	W.	W.S.W.		22½
26. 7¾	26. 11	W.S.W.	N.W.	67½	
26. 23	27. 0	N.W.	S.W.		90
27. 7	27. 9	S.W.	W.S.W.	22½	
27. 20½	28. 3	W.S.W.	S.S.W.		45
28. 5	28. 8	S.S.W.	S.W.	22½	

Greenwich Civil Time. From	Greenwich Civil Time. To	Change of Direction. From	Change of Direction. To	Amount of Motion. Direct.	Amount of Motion. Retro-grade.
				°	°
Aug.—*cont.*					
d h	d h				
29. 10	29. 11	S.W.	S.S.W.		22½
29. 23¼	30. 4	S.S.W.	N.N.E.		180
30. 9½	30. 11	N.N.E.	S.W.	202½	
31. 0	31. 2	S.W.	W.S.W.	22½	
31. 5	31. 9	W.S.W.	N.N.E.	135	
31. 11	31. 12	N.N.E.	N.E.	22½	
31. 15	31. 17	N.E.	E.	45	
31. 22	31. 23½	E.	N.E.		45
			Sums	1687½	1372½
September.					
1. 7½	1. 12	N.E.	E.	45	
2. 21	3. 0	E.	N.W.		135
3. 5	3. 7	N.W.	W.S.W.		67½
3. 12	3. 13½	W.S.W.	N.	112½	
3. 14½	3. 15¾	N.	W.S.W.		112½
3. 16¼	3. 18¼	W.S.W.	N.	112½	
3. 23¼	4. 0¾	N.	S.W.		135
4. 2	4. 2½	S.W.	N.N.E.	157½	
4. 6	4. 6½	N.N.E.	N.		22½
5. 18	5. 20	N.	N.N.E.	22½	
6. 7	6. 11	N.N.E.	E.N.E.	45	
6. 20	7. 1	E.N.E.	N.N.E.		45
7. 8	7. 14½	N.N.E.	E.S.E.	90	
7. 15¼	7. 20½	E.S.E.	N.E.		67½
8. 2½	8. 3½	N.E.	N.N.E.		22½
8. 4¾	8. 5	N.N.E.	W.N.W.		90
8. 6½	8. 11	W.N.W.	N.E.	112½	
8. 11¾	8. 13	N.E.	S.W.		180
8. 20	8. 22	S.W.	S.S.W.		22½
9. 6	9. 9	S.S.W.	S.W.	22½	
10. 15	10. 16½	S.W.	S.		45
11. 7¾	11. 8	S.	S.S.W.	22½	
11. 20½	11. 21	S.S.W.	S.W.	22½	
12. 4	12. 12	S.W.	N.	135	
12. 16	12. 18	N.	N.E.	45	
12. 22¾	13. 4	N.E.	S.S.E.	112½	
13. 6	13. 15	S.S.E.	N.N.W.	180	
13. 23½	14. 5	N.N.W.	N.E.	67½	
14. 11	14. 12	N.E.	N.N.E.		22½
14. 22	15. 1	N.N.E.	N.		22½
15. 16	15. 19	N.	N.E.	45	
16. 9	16. 9¼	N.E.	S.E.	90	
16. 23	17. 0¼	S.E.	E.N.E.		67½
17. 4	17. 6	E.N.E.	S.E.	67½	
17. 20	17. 20½	S.E.	E.		45
17. 22½	17. 23	E.	E.S.E.	22½	
18. 1¼	18. 3	E.S.E.	E.N.E.		45
18. 9	18. 12	E.N.E.	S.S.E.	90	
19. 1½	19. 11	S.S.E.	S.W.	67½	
19. 19	19. 20	S.W.	W.S.W.	22½	
20. 7	20. 8	W.S.W.	W.	22½	
21. 22	21. 23	W.	W.S.W.		22½

Greenwich Civil Time. From	Greenwich Civil Time. To	Change of Direction. From	Change of Direction. To	Amount of Motion. Direct.	Amount of Motion. Retro-grade.
				°	°
Sept.—*cont.*					
d h	d h				
22. 9	22. 9½	W.S.W.	N.	112½	
22. 13	22. 15	N.	N.N.W.		22½
22. 19½	23. 1	N.N.W.	W.S.W.		90
23. 12	24. 0	W.S.W.	S.E.		112½
24. 3½	24. 12	S.E.	S.W.	90	
24. 15	24. 16	S.W.	N.N.W.	112½	
24. 23	25. 1	N.N.W.	W.N.W.		45
25. 3	25. 5	W.N.W.	N.N.W.	45	
25. 21	25. 23	N.N.W.	W.S.W.		90
27. 23	28. 5	W.S.W.	W.N.W.	45	
28. 11	28. 12	W.N.W.	N.W.	22½	
28. 21	29. 0	N.W.	N.N.W.	22½	
29. 23	30. 5	N.N.W.	W.S.W.		90
30. 6	30. 7	W.S.W.	W.	22½	
30. 9½	30. 12	W.	N.	90	
			Sums	2295	1620
October.					
2. 16	3. 1	N.	S.W.	225	
3. 2¾	3. 6	S.W.	S.		45
3. 11¾	3. 12	S.	S.W.	45	
3. 19½	4. 4	S.W.	E.N.E.		157½
4. 7	4. 8	E.N.E.	S.W.		202½
4. 13	4. 14	S.W.	E.N.E.		157½
4. 14¾	4. 16	E.N.E.	S.	112½	
5. 7	5. 8	S.	S.S.W	22½	
5. 18	5. 21	S.S.W.	S.W.	22½	
6. 17	6. 18	S.W.	S.S.W.		22½
7. 6	7. 8	S.S.W.	W.S.W.	45	
7. 17	7. 22	W.S.W.	S.W.		22½
8. 14	8. 15¼	S.W.	S.S.W.		22½
8. 20	8. 21	S.S.W.	S.W.	22½	
9. 11	9. 12	S.W.	S.S.W.		22½
9. 22	9. 23	S.S.W.	S.		22½
10. 8½	10. 9	S.	S.W.	45	
10. 13½	10. 18	S.W.	S.		45
11. 0	11. 2	S.	N.E.		135
11. 11½	11. 13	N.E.	W.S.W.	202½	
11. 23½	12. 0	W.S.W.	S.W.		22½
13. 11	13. 12	S.W.	W.S.W.	22½	
13. 14	13. 14½	W.S.W.	N.	112½	
13. 17	13. 21½	N.	S.W.		135
14. 11¼	14. 11½	S.W.	N.N.E.	157½	
14. 13	14. 13¼	N.N.E.	W.S.W.		135
14. 16¾	14. 17	W.S.W.	E.S.E.		135
14. 17½	14. 20	E.S.E.	S.	67½	
14. 22	14. 23	S.	S.S.E.		22½
15. 8½	15. 10	S.S.E.	S.	22½	
15. 17	15. 19	S.	S.S.E.		22½
16. 9	16. 11	S.S.E.	S.	22½	
16. 19	16. 23	S.	N.W.	135	
17. 1½	17. 6	N.W.	W.S.W.		67½
17. 13	17. 17	W.S.W.	S.S.W.		45

ABSTRACT of the CHANGES of the DIRECTION of the WIND—*continued.*

Greenwich Civil Time. From	Greenwich Civil Time. To	Change of Direction. From	Change of Direction. To	Amount of Motion. Direct.	Amount of Motion. Retrograde.
				°	°
Oct.—*cont.*					
d h	d h				
17. 23¼	18. 4	S.S.W.	S.E.		67½
18. 17	18. 18	S.E.	E.S.E.		22½
19. 4	19. 12	E.S.E.	S.W.	112½	
19. 16	19. 22	S.W.	S.E.		90
20. 4¼	20. 7	S.E.	S.	45	
20. 8	20. 10	S.	S.E.		45
20. 19¾	20. 22½	S.E.	E.		45
21. 1½	21. 1¾	E.	N.E.	315	
21. 10	21. 15¾	N.E.	N.N.E.	337½	
22. 7	22. 8½	N.N.E.	N.E.	22½	
22. 22½	22. 23	N.E.	N.	315	
24. 21	24. 22	N.	N.N.E.	22½	
25. 15	25. 18	N.N.E.	N.E.	22½	
26. 9	26. 12	N.E.	E.	45	
26. 14	26. 15½	E.	E.N.E.		22½
27. 11½	27. 14	E.N.E.	S.E.	67½	
28. 1	28. 1½	S.E.	N.E.		90
28. 5	28. 7	N.E.	N.		45
28. 16	28. 17	N.	N.N.E.	22½	
28. 18¾	28. 19	N.N.E.	S.S.W.	180	
28. 20½	28. 21	S.S.W.	S.E.		67½
29. 8	29. 11½	S.E.	S.S.W.	67½	
31. 0¾	31. 1¼	S.S.W.	W.S.W.	45	
31. 11	31. 12½	W.S.W.	W.N.W.	45	
31. 13¾	31. 16½	W.N.W.	S.S.W.		90
31. 20	31. 22	S.S.W.	S.		22½
			Sums	2947½	2047½
November.					
1. 1	1. 2	S.	S.S.W.	22½	
1. 9	1. 10½	S.S.W.	W.S.W.	45	
2. 22	3. 1½	W.S.W.	S.S.W.		45
3. 17	3. 20	S.S.W.	W.N.W.	90	
4. 0	4. 3	W.N.W.	W.S.W.		45
4. 12	4. 19	W.S.W.	N.N.W.	90	
5. 1½	5. 2½	N.N.W.	S.W.		112½
6. 11	6. 12	S.W.	W.S.W.	22½	
8. 9½	8. 10	W.S.W.	N.W.	67½	
8. 13	8. 16½	N.W.	W.S.W.		67½
9. 10	9. 12	W.S.W.	N.N.W.	90	
10. 2	10. 3½	N.N.W.	W.S.W.		90
10. 7½	10. 8	W.S.W.	N.W.	67½	
10. 12	10. 18	N.W.	N.	45	
11. 2	11. 10	N.	N.E.	45	

Greenwich Civil Time. From	Greenwich Civil Time. To	Change of Direction. From	Change of Direction. To	Amount of Motion. Direct.	Amount of Motion. Retrograde.
				°	°
Nov.—*cont.*					
d h	d h				
11. 14	11. 14½	N.E.	E.	45	
11. 22	11. 23	E.	E.S.E.	22½	
12. 13	12. 13½	E.S.E.	E.		22½
13. 6	13. 6¼	E.	E.N.E.	337½	
13. 9½	13. 10½	E.N.E.	E.S.E.		315
13. 22¼	13. 23	E.S.E.	N.E.		67½
14. 0½	14. 1½	N.E.	E.S.E.	67½	
14. 17½	14. 18	E.S.E.	S.S.E.	45	
15. 3	15. 6	S.S.E.	S.S.W.	45	
15. 19	15. 20	S.S.W.	S.W.	22½	
16. 12	16. 14	S.W.	N.	135	
16. 15	17. 3	N.	N.E.		315
17. 13½	17. 14	N.E.	E.N.E.	22½	
17. 21	18. 0	E.N.E.	S.E.	67½	
18. 15	18. 18	S.E.	E.		45
18. 23½	19. 0½	E.	N.E.		45
19. 2	19. 7	N.E.	E.S.E.	67½	
19. 20	19. 21	E.S.E.	S.E.	22½	
21. 13	21. 16	S.E.	E.S.E.		22½
21. 21	21. 22	E.S.E.	S.S.E.	45	
22. 0	22. 1¼	S.S.E.	N.E.		112½
22. 3¾	22. 4	N.E.	S.S.E.	112½	
22. 7½	22. 8	S.S.E.	S.S.W.	45	
22. 16½	22. 17	S.S.W.	S.		22½
23. 2½	23. 3	S.	S.S.W.	22½	
23. 15	23. 20	S.S.W.	S.S.E.	315	
24. 12½	24. 14	S.S.E.	S.S.W.	45	
25. 0	25. 2	S.S.W.	S.W.	22½	
25. 4½	25. 5	S.W.	N.W.	90	
25. 8	25. 9½	N.W.	W.		45
25. 16	25. 21	W.	W.S.W.		22½
27. 4	27. 6	W.S.W.	N.W.	67½	
27. 11	27. 12	N.W.	N.N.W.	22½	
28. 15	28. 16	N.N.W.	N.W.		22½
28. 23	28. 23½	N.W.	W.S.W.		67½
29. 20	30. 6	W.S.W.	N.E.	157½	
30. 11	30. 20	N.E.	S.E.	90	
			Sums	2520	1485
December.					
2. 17	2. 19	S.E.	E.S.E.		22½
3. 9	3. 11	E.S.E.	E.		22½
4. 2¼	4. 2½	E.	N.E.		45
4. 6	4. 8½	N.E.	E.	45	

Greenwich Civil Time. From	Greenwich Civil Time. To	Change of Direction. From	Change of Direction. To	Amount of Motion. Direct.	Amount of Motion. Retrograde.
				°	°
Dec.—*cont.*					
d h	d h				
4. 16	4. 17	E.	E.N.E.		22½
5. 4½	5. 5	E.N.E.	N.E.		22½
6. 21	6. 23	N.E.	S.S.W.	157½	
7. 7	7. 10	S.S.W.	S.S.E.		45
7. 15	7. 19½	S.S.E.	N.		157½
8. 5	8. 8	N.	S.W.		135
8. 17	8. 18	S.W.	S.S.W.		22½
9. 7	9. 9	S.S.W.	S.W.	22½	
11. 9	11. 12	S.W.	N.W.	90	
11. 22	12. 7	N.W.	S.W.		90
12. 13½	12. 16	S.W.	S.		45
13. 7	13. 11	S.	S.S.W.	22½	
13. 15½	13. 16	S.S.W.	S.W.	22½	
13. 21	13. 22½	S.W.	N.	135	
14. 23½	15. 1	N.	S.W.		135
16. 19	16. 19¼	S.W.	S.S.W.		22½
17. 3½	17. 4	S.S.W.	S.W.	22½	
18. 11½	18. 12	S.W.	S.S.W.		22½
18. 21	18. 21½	S.S.W.	N.	157½	
19. 4	19. 8	N.	S.S.W.		157½
20. 11	20. 13½	S.S.W.	W.	67½	
20. 15	20. 17	W.	S.W.		45
22. 15¾	22. 16	S.W.	S.		45
22. 17½	22. 18½	S.	W.	90	
23. 2	23. 4	W.	W.S.W.		22½
23. 15½	23. 16½	W.S.W.	S.S.W.		45
24. 11	24. 12¾	S.S.W.	W.N.W.	90	
24. 14½	24. 15	W.N.W.	W.		22½
25. 1	25. 2	W.	S.W.		45
25. 3	25. 5	S.W.	W.	45	
25. 11	25. 17	W.	S.S.W.		67½
25. 22¼	25. 23	S.S.W.	S.W.	22½	
26. 15½	26. 16½	S.W.	N.N.E.	157½	
26. 23¼	26. 23½	N.N.E.	E.N.E.	45	
28. 16½	28. 18	E.N.E.	N.N.E.		45
28. 23¾	29. 0	N.N.E.	S.S.W.		180
29. 3½	29. 10½	S.S.W.	E.N.E.		135
29. 16	29. 19	E.N.E.	S.W.	157½	
29. 20½	29. 23	S.W.	S.W.	360	
30. 9½	30. 11¼	S.W.	S.	315	
30. 13¼	30. 14	S.	S.W.	45	
30. 15	30. 15¾	S.W.	S.S.E.		67½
30. 20¼	30. 20½	S.S.E.	S.S.W.	45	
31. 8½	31. 9	S.S.W.	S.E.		67½
31. 11	31. 12	S.E.	S.S.W.	67½	
31. 16	31. 17	S.S.W.	S.S.E.		45
31. 21	31. 22½	S.S.E.	S.S.W.	45	
			Sums	2227½	1800

ABSTRACT of the CHANGES of the DIRECTION of the WIND—*concluded.*

EXCESS of MOTION in each MONTH.

1889.	Direct. °	Retrograde. °	1889.	Direct. °	Retrograde. °
January	1800		July		247½
February	157½		August	315	
March	787½		September	675	
April	787½		October	900	
May	1440		November	1035	
June	877½		December	427½	

The whole excess of direct motion for the year was 8955°.

MEAN HOURLY MEASURES of the HORIZONTAL MOVEMENT of the AIR in each MONTH, and GREATEST and LEAST HOURLY MEASURES, as derived from the Records of ROBINSON'S ANEMOMETER.

Hour ending	1889. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Mean for the Year.
h	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
1	7·4	15·1	11·9	10·1	7·1	6·6	8·0	9·2	7·9	9·7	8·0	9·4	9·2
2	7·6	15·7	11·2	9·8	7·6	5·8	7·7	9·2	7·6	10·1	8·4	9·4	9·2
3	7·6	15·1	10·7	9·1	7·3	5·7	7·4	8·4	7·3	10·1	8·2	9·5	8·9
4	7·4	15·1	10·5	8·3	6·4	5·5	7·6	8·2	7·0	9·9	7·8	9·5	8·6
5	7·6	14·5	10·2	8·3	6·7	5·7	6·9	8·3	7·5	9·8	7·7	10·5	8·6
6	7·6	14·3	10·5	9·9	7·0	5·5	7·4	8·0	7·6	9·8	7·9	10·2	8·8
7	7·9	14·3	10·7	10·0	7·3	6·7	7·6	8·8	7·3	9·0	8·0	10·2	9·0
8	7·9	14·6	11·0	9·4	7·3	6·6	7·8	10·0	7·9	9·1	8·0	10·3	9·2
9	8·2	15·9	12·1	9·8	7·8	7·5	8·4	11·2	8·8	9·4	8·5	10·5	9·8
10	8·5	17·0	13·5	10·3	8·4	8·3	9·7	12·0	10·1	10·3	8·8	10·3	10·6
11	9·0	17·6	14·5	10·7	10·0	8·3	10·2	12·9	10·5	10·6	9·3	10·4	11·2
Noon.	8·5	18·3	14·0	10·8	8·7	8·2	11·1	12·6	10·6	9·5	9·1	9·2	10·9
h 13	10·2	19·2	14·8	12·7	11·0	9·4	10·7	14·0	10·8	12·0	10·4	10·7	12·2
14	10·5	19·1	14·1	13·5	10·7	9·9	11·4	15·0	11·8	11·6	10·8	11·5	12·5
15	10·2	18·9	14·5	14·5	11·2	9·7	11·3	15·0	11·8	11·5	11·0	11·3	12·6
16	9·4	17·8	13·7	14·2	10·5	10·2	11·1	14·8	11·1	10·9	9·7	9·7	11·9
17	9·3	17·2	13·7	14·2	10·4	10·1	11·5	15·3	10·9	9·9	9·2	9·1	11·7
18	9·7	15·8	12·7	13·3	9·3	9·7	10·7	13·8	10·1	9·1	8·8	9·6	11·0
19	9·5	15·6	11·7	13·0	9·9	8·4	10·2	12·5	9·7	9·5	9·4	9·2	10·7
20	10·4	15·6	11·6	11·7	8·8	8·0	9·4	11·6	9·2	9·5	9·0	10·0	10·4
21	9·4	15·1	11·7	11·6	7·9	7·0	9·0	10·6	9·1	9·3	9·0	9·5	9·9
22	10·0	14·9	11·4	10·8	8·1	6·9	8·3	10·3	8·5	9·4	8·8	9·3	9·7
23	9·3	14·8	10·5	10·5	7·2	7·1	7·9	10·5	8·4	9·6	8·0	9·2	9·4
Midnight.	8·7	14·7	10·7	10·4	7·2	6·5	7·8	9·3	7·5	9·5	8·0	9·2	9·1
Means	8·8	16·1	12·2	11·1	8·5	7·6	9·1	11·3	9·1	10·0	8·8	9·9	10·2
Greatest Hourly Measures	32	41	46	32	25	27	30	36	27	44	34	31	...
Least Hourly Measures	0	0	0	0	0	0	0	0	0	0	0	0	...

The measures for April and May are derived from the results for 21 and 23 days respectively.

MEAN ELECTRICAL POTENTIAL of the ATMOSPHERE, from THOMSON'S ELECTROMETER, for each CIVIL DAY.

(Each result is the mean of Twenty-four Hourly Ordinates from the Photographic Register. The scale employed is arbitrary: the sign + indicates positive potential.)

1889.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d												
1	...	...	...	...	...	...	...	...	...	...	+ 895	+1448
2	...	...	...	...	...	...	...	...	...	...	+1161	+1428
3	...	...	...	...	...	...	...	...	...	...	+ 315	+1476
4	...	...	...	...	...	...	...	...	...	...	+ 575	+1388
5	...	...	...	...	...	...	...	...	...	...	+1671	+1332
6	...	...	...	...	...	...	...	...	...	...	+1461	+1325
7	...	...	...	...	...	...	...	...	...	...	+1025	+ 851
8	...	...	...	...	...	...	...	...	...	...	+ 483	...
9	...	...	...	...	...	...	...	...	...	...	+ 628	+ 612
10	...	...	...	...	...	...	...	...	...	...	+ 533	+ 962
11	...	...	...	...	...	...	...	...	...	...	+ 295	+1477
12	...	...	...	...	...	...	...	...	...	...	+ 938	+1810
13	...	...	...	...	...	...	...	...	...	...	+1183	+ 862
14	...	...	...	...	...	...	...	...	...	...	+ 873	+1297
15	...	...	...	...	...	...	...	...	...	...	+ 655	+1384
16	...	...	...	...	...	...	...	...	...	...	+ 413	+ 682
17	...	...	...	...	...	...	...	...	...	+ 838	+ 642	+ 205
18	...	...	...	...	...	...	...	...	...	+ 719	+ 566	+ 420
19	...	...	...	...	...	...	...	...	...	...	+ 939	+1555
20	...	...	...	...	...	...	...	...	...	...	+ 821	+ 790
21	...	...	...	...	...	...	...	...	...	...	+ 919	+ 689
22	...	...	...	...	...	...	...	...	...	+ 573	+ 872	+ 243
23	...	...	...	...	...	...	...	...	...	+ 340	+ 431	+ 927
24	...	...	...	...	...	...	...	...	...	+ 597	+ 364	+ 512
25	...	...	...	...	...	...	...	...	...	+ 933	+ 480	+1219
26	...	...	...	...	...	...	...	...	...	+ 582	+1214	+1280
27	...	...	...	...	...	...	...	...	...	− 78	+1087	+ 700
28	...	...	...	...	...	...	...	...	...	+ 327	+1204	+ 679
29	...		...	...	...	...	...	...	...	+ 730	+1481	...
30	...		...	...	...	...	...	...	...	+ 535	+1433	...
31	...		...		...		...	...		+ 737		+1248
Means ...	...	...	...	...	...	...	...	...	...	+ 569	+ 852	+1029

The electrometer was not in effective action until October 17.

MONTHLY MEAN ELECTRICAL POTENTIAL of the ATMOSPHERE, from THOMSON'S ELECTROMETER, at every HOUR of the DAY.

(The results depend on the Photographic Register, using all days of complete record. The scale employed is arbitrary: the sign + indicates positive potential.)

Hour, Greenwich Civil Time.	1889.												Yearly Means.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Midnight.	...	...	...	...	...	...	...	...	...	+ 614	+ 904	+1095	...
1h.	...	...	...	...	...	...	...	...	...	+ 612	+ 825	+1001	...
2	...	...	...	...	...	...	...	...	...	+ 550	+ 778	+ 953	...
3	...	...	...	...	...	...	...	...	...	+ 496	+ 786	+ 927	...
4	...	...	...	...	...	...	...	...	...	+ 529	+ 758	+ 894	...
5	...	...	...	...	...	...	...	...	...	+ 531	+ 718	+ 917	...
6	...	...	...	...	...	...	...	...	...	+ 506	+ 727	+ 907	...
7	...	...	...	...	...	...	...	...	...	+ 517	+ 743	+ 931	...
8	...	...	...	...	...	...	...	...	...	+ 525	+ 789	+ 992	...
9	...	...	...	...	...	...	...	...	...	+ 498	+ 825	+ 971	...
10	...	...	...	...	...	...	...	...	...	+ 504	+ 778	+1038	...
11	...	...	...	...	...	...	...	...	...	+ 547	+ 805	+ 998	...
Noon.	...	...	...	...	...	...	...	...	...	+ 330	+ 844	+1006	...
13h.	...	...	...	...	...	...	...	...	...	+ 420	+ 882	+1044	...
14	...	...	...	...	...	...	...	...	...	+ 458	+ 775	+1017	...
15	...	...	...	...	...	...	...	...	...	+ 547	+ 762	+ 944	...
16	...	...	...	...	...	...	...	...	...	+ 664	+ 826	+ 945	...
17	...	...	...	...	...	...	...	...	...	+ 662	+ 999	+1001	...
18	...	...	...	...	...	...	...	...	...	+ 710	+1050	+1086	...
19	...	...	...	...	...	...	...	...	...	+ 762	+1080	+1179	...
20	...	...	...	...	...	...	...	...	...	+ 685	+1018	+1224	...
21	...	...	...	...	...	...	...	...	...	+ 605	+ 938	+1247	...
22	...	...	...	...	...	...	...	...	...	+ 682	+ 897	+1232	...
23	...	...	...	...	...	...	...	...	...	+ 712	+ 940	+1138	...
24	...	...	...	...	...	...	...	...	...	+ 712	+ 924	+1010	...
Means 0h.–23h.	...	...	...	...	...	...	...	...	...	+ 569	+ 852	+1029	...
Means 1h.–24h.	...	...	...	...	...	...	...	...	...	+ 574	+ 853	+1025	...
Number of Days employed.	...	...	...	...	...	...	...	...	...	12	30	28	...

MONTHLY MEAN ELECTRICAL POTENTIAL of the ATMOSPHERE, from THOMSON'S ELECTROMETER, on RAINY DAYS, at every HOUR of the DAY.

(The results depend on the Photographic Register, using all days on which the rainfall amounted to or exceeded $0^{in}\cdot020$. The scale employed is arbitrary: the sign + indicates positive potential.)

Hour, Greenwich Civil Time.	1889.												Yearly Means.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Midnight.	...	...	...	...	...	...	...	...	...	+ 297	+ 848	+ 806	...
1^h.	...	...	...	...	...	...	...	...	...	+ 195	+ 702	+ 677	...
2	...	...	...	...	...	...	...	...	...	− 80	+ 560	+ 539	...
3	...	...	...	...	...	...	...	...	...	− 262	+ 552	+ 443	...
4	...	...	...	...	...	...	...	...	...	− 107	+ 488	+ 349	...
5	...	...	...	...	...	...	...	...	...	+ 12	+ 378	+ 404	...
6	...	...	...	...	...	...	...	...	...	− 20	+ 314	+ 403	...
7	...	...	...	...	...	...	...	...	...	+ 85	− 50	+ 461	...
8	...	...	...	...	...	...	...	...	...	+ 350	− 224	+ 574	...
9	...	...	...	...	...	...	...	...	...	+ 438	+ 118	+ 630	...
10	...	...	...	...	...	...	...	...	...	+ 505	+ 220	+ 666	...
11	...	...	...	...	...	...	...	...	...	+ 530	+ 376	+ 571	...
Noon.	...	...	...	...	...	...	...	...	...	− 28	+ 394	+ 489	...
13^h.	...	...	...	...	...	...	...	...	...	+ 340	+ 498	+ 586	...
14	...	...	...	...	...	...	...	...	...	+ 478	+ 572	+ 627	...
15	...	...	...	...	...	...	...	...	...	+ 512	+ 524	+ 563	...
16	...	...	...	...	...	...	...	...	...	+ 673	+ 380	+ 528	...
17	...	...	...	...	...	...	...	...	...	+ 620	+ 856	+ 668	...
18	...	...	...	...	...	...	...	...	...	+ 770	+ 728	+ 689	...
19	...	...	...	...	...	...	...	...	...	+ 872	+ 904	+ 818	...
20	...	...	...	...	...	...	...	...	...	+ 900	+ 782	+1015	...
21	...	...	...	...	...	...	...	...	...	+ 823	+ 672	+1196	...
22	...	...	...	...	...	...	...	...	...	+ 825	+ 594	+1184	...
23	...	...	...	...	...	...	...	...	...	+ 847	+ 742	+1007	...
24	...	...	...	...	...	...	...	...	...	+ 775	+ 726	+1158	...
Means $0^h.-23^h$.	...	...	...	...	...	...	...	...	...	+ 399	+ 497	+ 662	...
Means $1^h.-24^h$.	...	...	...	...	...	...	...	...	...	+ 419	+ 492	+ 677	...
Number of Days employed.	...	...	...	...	...	...	...	...	...	4	5	10	...

MONTHLY MEAN ELECTRICAL POTENTIAL of the ATMOSPHERE, from THOMSON'S ELECTROMETER, on NON-RAINY DAYS, at every HOUR of the DAY.

(The results depend on the Photographic Register, using only those days on which no rainfall was recorded. The scale employed is arbitrary: the sign + indicates positive potential.)

Hour, Greenwich Civil Time.	1889.												Yearly Means.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Midnight.	...	...	...	...	...	...	...	...	...	+ 934	+ 955	+ 1329	...
1h.	...	...	...	...	...	...	...	...	...	+ 972	+ 874	+ 1259	...
2	...	...	...	...	...	...	...	...	...	+ 976	+ 847	+ 1251	...
3	...	...	...	...	...	...	...	...	...	+ 948	+ 864	+ 1246	...
4	...	...	...	...	...	...	...	...	...	+ 928	+ 857	+ 1239	...
5	...	...	...	...	...	...	...	...	...	+ 820	+ 826	+ 1239	...
6	...	...	...	...	...	...	...	...	...	+ 744	+ 835	+ 1219	...
7	...	...	...	...	...	...	...	...	...	+ 688	+ 928	+ 1236	...
8	...	...	...	...	...	...	...	...	...	+ 538	+ 1019	+ 1255	...
9	...	...	...	...	...	...	...	...	...	+ 468	+ 984	+ 1229	...
10	...	...	...	...	...	...	...	...	...	+ 502	+ 916	+ 1357	...
11	...	...	...	...	...	...	...	...	...	+ 584	+ 926	+ 1296	...
Noon.	...	...	...	...	...	...	...	...	...	+ 564	+ 992	+ 1336	...
13h.	...	...	...	...	...	...	...	...	...	+ 570	+ 1017	+ 1295	...
14	...	...	...	...	...	...	...	...	...	+ 518	+ 961	+ 1222	...
15	...	...	...	...	...	...	...	...	...	+ 620	+ 935	+ 1142	...
16	...	...	...	...	...	...	...	...	...	+ 714	+ 978	+ 1193	...
17	...	...	...	...	...	...	...	...	...	+ 748	+ 1052	+ 1249	...
18	...	...	...	...	...	...	...	...	...	+ 694	+ 1130	+ 1365	...
19	...	...	...	...	...	...	...	...	...	+ 654	+ 1144	+ 1461	...
20	...	...	...	...	...	...	...	...	...	+ 512	+ 1084	+ 1426	...
21	...	...	...	...	...	...	...	...	...	+ 412	+ 993	+ 1362	...
22	...	...	...	...	...	...	...	...	...	+ 460	+ 977	+ 1344	...
23	...	...	...	...	...	...	...	...	...	+ 476	+ 1012	+ 1241	...
24	...	...	...	...	...	...	...	...	...	+ 550	+ 992	+ 1023	...
Means 0h.–23h.	...	...	...	...	...	...	...	...	...	+ 668	+ 963	+ 1283	...
Means 1h.–24h.	...	...	...	...	...	...	...	...	...	+ 652	+ 964	+ 1270	...
Number of Days employed.	...	...	...	...	...	...	...	...	...	5	20	14	...

AMOUNT of RAIN COLLECTED in EACH MONTH of the YEAR 1889.

MONTH, 1889.	Number of Rainy Days.	Monthly Amount of Rain collected in each Gauge.							
		Self-registering Gauge of Osler's Anemometer.	Second Gauge at Osler's Anemometer.	On the roof of the Octagon Room.	On the roof of the Magnetic Observatory.	On the roof of the Photographic Thermometer Shed.	Gauges partly sunk in the ground.		
		No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.
		in.	in.	in.	in.	in.	in.	in.	in.
January	12	0·392	0·422	0·634	0·763	0·891	0·839	0·912	0·916
February	19	1·204	1·203	1·612	1·968	2·161	2·195	2·220	2·258
March	14	0·543	0·612	0·843	1·090	1·285	1·317	1·316	1·345
April	17	1·145	1·234	1·530	1·712	1·881	1·852	1·861	1·907
May	15	2·450	2·533	2·992	3·134	3·253	3·299	3·294	3·295
June	6	1·134	1·221	1·542	2·039	2·090	2·067	2·067	2·049
July	16	1·416	1·432	1·724	2·004	2·086	2·065	2·023	2·062
August	14	1·203	1·145	1·542	1·748	1·843	1·811	1·796	1·840
September	7	1·276	1·297	1·496	1·636	1·714	1·688	1·676	1·709
October	17	3·085	3·216	3·431	3·789	4·024	3·927	3·946	3·979
November	9	0·404	0·402	0·527	0·661	0·785	0·781	0·806	0·809
December	13	0·826	0·795	1·145	1·182	1·372	1·437	1·466	1·471
Sums	159	15·078	15·512	19·018	21·726	23·385	23·278	23·383	23·640
		ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
Height of receiving Surface above the ground	...	50. 8	50. 8	38. 4	21. 6	10. 0	0. 5	0. 5	0. 5
Height of receiving Surface above mean sea level	...	205. 6	205. 6	193. 2	176. 4	164. 10	155. 3	155. 3	155. 3

ROYAL OBSERVATORY, GREENWICH.

OBSERVATIONS

OF

LUMINOUS METEORS.

1889.

Month and Day, 1889.		Greenwich Civil Time.	Observer.	Apparent Size of Meteor in Star-Magnitudes.	Colour of Meteor.	Duration of Meteor in Seconds of Time.	Appearance and Duration of Train.	Length of Meteor's Path in Degrees.	No. for Reference.
		h m s				s		°	
April	29	21. 37. 2	F.	3	Bluish-white	0·2	None	5	1
August	11	22. 36. 41	F.	1	Bluish-white	0·5	None	7	2
	„	22. 39. 49	F.	2	Bluish-white	0·3	None	5	3
November	12	22. 53. 29	H.	3	Bluish-white	0·6	None	10	4
	„	23. 8. 12	H.	1	White	0·8	None	...	5
	„	23. 23. 28	H.	1	Bluish-white	1·5	None	8	6
	„	23. 57. 18	H.	1	Bluish-white	1·0	None	8	7
November	13	0. 0. 51	H.	>1	Yellowish	...	Train	...	8
	„	0. 6. 8	H.	>1	Bluish-white	1	Bright	15	9
	„	0. 53. 21	H.	2	Bluish-white	0·8	None	25	10
November	28	22. 47. 46	H.	1	White	0·2	None	3	11

The time is expressed in civil reckoning commencing at midnight and counting from 0^h to 24^h.

No. for Reference.	Path of Meteor through the Stars.
1	From direction of κ Draconis passed across and disappeared a little beyond α Draconis
2	From a few degrees below δ Cassiopeiæ to 72 Cassiopeiæ.
3	From δ Persei to α Persei.
4	From direction of γ Andromedæ towards η Cassiopeiæ.
5	From direction of φ Piscium towards a point between α Andromedæ and γ Pegasi.
6	From direction of ο Persei travelled upwards in a line parallel to line joining ζ and ε Persei.
7	From direction of ι Aurigæ towards a point between Aldebaran and the Pleiades.
8	From direction of ψ Ursæ Majoris towards β Ursæ Majoris.
9	From direction of ε Draconis fell almost vertically downwards. Very brilliant.
10	From direction of ε Cassiopeiæ towards Polaris. Path slightly curved.
11	Appeared between θ Aurigæ and θ Geminorum and moved in direction of 58 Aurigæ.